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New directions and trends in parenting research

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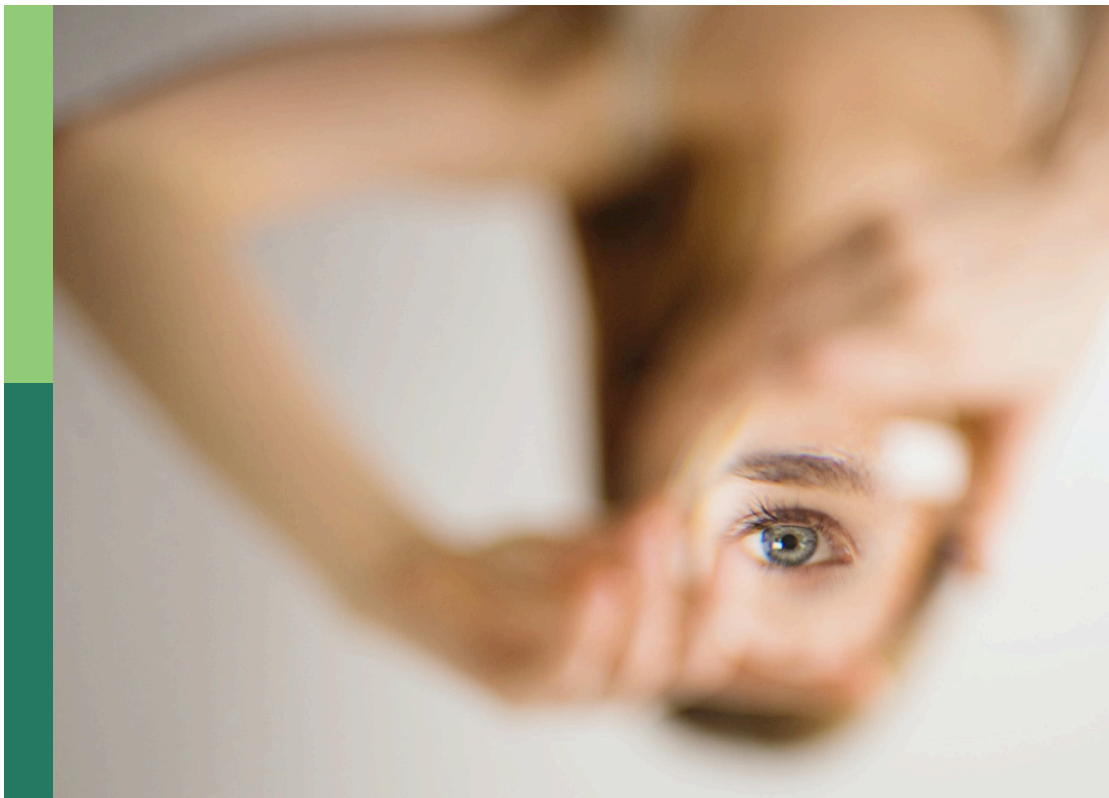

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New directions and trends in parenting research

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Table of contents

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Editorial: New directions and trends in parenting research

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Editorial on the Research Topic
New directions and trends in parenting research

For centuries, the study of child socialization has focused primarily on understanding the effects of traditional parenting styles, dimensions, and behaviors on the developmental trajectories and outcomes of children and adolescents. While these core issues remain highly significant, recent research in parenting aims to broaden our understanding by exploring contemporary aspects and fields within this domain. Parenting science has expanded significantly over the past five decades to understand parenting, the parent-child relationship, child development and the adjusted adult. The shift has been from behaviorism to attachment and child development, positive parenting, and the role of technology. More recently there has been an increased focus on father involvement, adverse childhood experiences (ACEs), genetics and epigenetics, the role of culture on parenting and evidence-based interventions providing more scientifically backed parenting programs and interventions. The findings and insights stem from the studies included in the current Research Topic resume those recent trends in parenting research and further enhance our knowledge of the numerous factors that influence parenting and its impact on children's and adolescents' development. Key areas of interest include cultural and gender significances in parent-child relationships, the importance of other socialization agents, parental mental health, unconventional or novel parenting patterns alongside traditional parental behaviors, parenting children with disabilities, and family dynamics that influences children's creative and academic outcomes. By exploring these exciting directions in parenting research, we can deepen our understanding of how various elements affect parenting practices and outcomes, ultimately contributing to the wellbeing of children and adolescents.

In this Research Topic, we intended to show new directions for parenting science. In particular, the study of human "capital" which is used in different ways by Hazan-Liran and Wang et al.. Hazan-Liran focuses on psychological capital which can influence how parents cope with challenges, their overall wellbeing, and their ability to provide effective parenting. Wang et al. symbolic capital can affect children's social standing among peers, access to resources, and overall wellbeing. A holistic overview of the studies in this Research Topic, show both overtly and covertly, the importance of focusing on mental health in and through the parent-child/adolescent relationship. We know that mental health plays a key role in the way parents and children interact and engage with each other, in the family and with the wider environment (see Egami). The new directions encourage a holistic understanding of the psychological, social, and organizational factors, within and outside of the family environment, that affect parenting, particularly for those facing unique challenges, such parents with children with a disability, thereby paving the way

for innovative approaches and solutions in the field of parenting research. These new directions integrate social, cultural, and economic factors, for culturally relevant, and technology-driven approaches to provide parenting support, ultimately contributing to improved child health and family wellbeing in diverse contexts. Nguyen and Nguyen reported that conflicts often arise between Vietnamese parents and their teenagers over using the internet and schoolwork. Consistent with evidence from western families, in these families, adolescents indicated experiencing a higher frequency of conflicts with their mothers compared to their fathers. Interestingly, despite the identification of instances involving parental aggression, the majority of adolescents perceived their parents' approaches to conflict resolution as supportive. The findings highlight the importance of investigating parenting styles and parent-child communication within the cultural contexts such as modern Vietnamese families. Additionally, Chen et al. analyzed the relationship between parental psychological control and young children's peer interactions in Chinese families, while considering the moderating effect of teachers' emotional support in this context. They found that parental psychological control was negatively associated with young children's peer interactions, while teachers' emotional support moderated this relationship, mitigating the adverse effects of the parental control factor. The study findings offer valuable insights for integrating elements of the proximal system and developing interventions aimed at creating a harmonious home-school environment that promotes children's social development. Jin and Ahn tested the mediating role of maternal anxiety and the moderating role of mindfulness in the relationship between work–family conflict and preschool children's problem behaviors during the COVID-19 epidemic. Their findings indicated that maternal anxiety mediates the positive association between work–family conflict and children's problem behaviors, suggesting that children of mothers with work–family conflict exhibit more behavioral problems at least partially due to their mothers' increased anxiety. The study findings shed more light on the significance of parental mental health in explaining child's behavior, while signifying the potential role of mindfulness practices in restraining the former's negative effects.

Parenting behavior plays a crucial role in shaping children's development and academic success. The paper titled "*Associations between challenging parenting behavior and creative tendencies of children: the chain mediating roles of positive emotion and creative self-efficacy*" (Shi et al.) explores how parenting that encourages children to face and overcome challenges can foster their creativity. It delves into the mechanisms through which positive emotions and creative self-efficacy mediate this relationship, offering insights into how parental actions can influence a child's creative potential. This research is particularly relevant as it highlights the importance of fostering a positive emotional environment and nurturing a belief in one's creative abilities, which can significantly impact a child's creative output. Complementing this, the paper, "*Parent-adolescent discrepancies in educational expectations, relationship quality, and study engagement: a multi-informant study using response surface analysis*," (Song et al.) examines the dynamics between parents and adolescents regarding educational expectations. It investigates how differences in these expectations can affect the quality of their relationship and the adolescent's engagement in their studies. This study provides a nuanced understanding of the complexities involved in parent-adolescent interactions and how mismatched expectations can influence academic engagement and relational quality. Hence, both papers provide valuable perspectives on how parenting and relational dynamics influence children's creative and academic outcomes. These insights can inform the development of educational programs that not only enhance knowledge but also foster positive emotional and relational environments, ultimately contributing to more effective learning and engagement. Additionally, they offer guidance on how parents and educators can balance challenges and expectations to cultivate creativity and maintain strong, supportive relationships, thereby improving educational experiences for children and adolescents. Furthermore, these studies highlight the need for targeted interventions that address specific parent-child dynamics, enhancing overall family wellbeing and academic success. Furthermore, these studies can inform policy-making by emphasizing the importance of parent education programs that teach effective communication and expectation management strategies. This could lead to improved family dynamics, and better educational outcomes for children.

Author contributions

YY: Conceptualization, Validation, Writing – original draft, Writing – review & editing. NR: Conceptualization, Writing – original draft, Writing – review & editing. DA: Conceptualization, Writing – original draft, Writing – review & editing.

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Development and evaluation of a tailored mHealth parenting program for multicultural families: a three-arm cluster randomized controlled trial

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Objective: Health management of children during early childhood requires substantial information. Multicultural families find it difficult to obtain and use parenting-relevant information for their young children. This study aimed to develop, implement, and evaluate a tailored Health parenting program and lay-health workers' support to improve children's health in multicultural families in Korea.

Methods: In this study, we employed the Analysis, Design, Development, Implementation, and Evaluation (ADDIE) model as the conceptual framework, guiding the creation of a tailored mHealth application supplemented by a lay-health worker support module. The efficacy of the program was assessed through an experimental three-arm cluster randomized controlled trial. A total of 101 participants were stratified into three distinct groups as follows: (1) Experimental Group A, which received the mHealth program alongside the lay-health worker support component; (2) Experimental Group B, exposed solely to the mHealth program; and (3) Control Group, devoid of any intervention. Within these groups, 101 marriage migrant women hailing from Vietnam, the Philippines, and China were incorporated, with each group comprising 33, 30, and 38 participants, respectively. The study's primary endpoint encompassed a comprehensive assessment of health-promoting behaviors, proficiency in eHealth literacy, and the family strength.

Results: The analysis revealed noteworthy interactions among the three distinct groups over the course of time, with implications for health-promotion behaviors ($p = 0.041$), eHealth literacy ($p = 0.037$), and family strength ($p = 0.044$). Specifically, the experimental groups exhibited substantially elevated levels of the specified outcome variables when contrasted with the control group. Notably, the positive effects persisted even up to 12 weeks subsequent to the conclusion of the intervention, underscoring the program's capacity to foster enduring improvements in the observed metrics.

Conclusion: This study highlights the benefits of offering contextually appropriate information to target groups constrained by challenges in information access, evaluation, and utilization. Notably, drawing from their positive experiences in this process, we underscore the importance of employing lay health workers. These workers play a crucial role in fostering and ensuring sustained behavioral changes.

KEYWORDS

mHealth, emigrants and immigrants, health behavior, health education, parenting

1. Introduction

In East and Southeast Asia, international marriages are on the rise and have substantial influence on the national populations (1). In South Korea, recent data show 173,882 such households in 2021, up from 87,964 in 2007, and the majority (about 80%) of immigrant spouses are women (2). Around 84% of these women become pregnant less than one year after marriage, and they also experience various physiological changes related to pregnancy, childbirth, and childrearing along with the stress of adapting to a new culture (3). Giving birth to and raising-children is a very important and difficult task for parents, but in the case of cultural differences and little support, such as marriage migrant women, the burden of child rearing increases considerably, impeding performance of the role of caregivers (4). Early childhood is the most active period of growth in life and thus is a decisive developmental period that forms the foundation for lifelong health; thus, parental education should be provided so that migrant women can fulfill their parental roles well.

Health management for children during early childhood requires substantial information. The parents are often placed in diverse situations, and having access to the necessary childcare information can enable them to respond more flexibly and appropriately (5). Most of the postpartum education about infant care is provided to new parents at or before hospital discharge. However, research shows that providing postpartum education only around the time of hospitalization reduces receptivity and recall (6). Research shows that new parents do not retain information that is only taught once (7), and they return to websites to recall information when in need (7, 8). Yet, the quality and reliability of information from digital sources vary substantially (9), and the information can be overwhelming and often causes anxiety among parents (10). Therefore, it is necessary for parents to develop eHealth literacy, which is the ability to find, understand, and apply appropriate online health information necessary for the management of their children's healthcare.

Immigrants, specifically, often experience an even greater burden because they have to perform childcare in a new culture. It is reported that immigrant parents feel overwhelmed with a variety of challenges including the lack of family and community support, lack of access to linguistically appropriate services and resources, cultural conflict regarding parenting practices, fear related to social services, and language barriers (11). A large proportion of women that have immigrated to get married to Korean men (i.e., marriage immigrants) have low socioeconomic status and low formal education levels, tend to have low levels of health literacy to begin with, and find it more challenging to correctly evaluate and accept health information (12). Research also found that these women often experience family conflicts because their culture is different from that of their husbands (13). Thus, to facilitate immigrant mothers and their children's effective navigation of the challenges, it is necessary to provide customized information about parenting that considers their special circumstances and contexts.

Mobile health (mHealth) interventions have been shown to be efficient in delivering tailored health-related information, which tends to be more effective than generic information at inducing behavioral change (14, 15). A tailored mHealth intervention can be designed to deliver essential health-related information tailored to the user's characteristics. With the popularity of mobile technology, mHealth interventions are widely utilized because they are readily accessible without space and time constraints. They are also generally cost-efficient and effective for pediatric healthcare (14). Furthermore, in family-based interventions, if circumstances make it difficult for the whole family to meet directly, an mHealth intervention can be used to deliver accurate information to all family members (16). For marriage immigrant women, who often speak different languages than their husbands and their husbands' families, mHealth intervention would be particularly advantageous.

While mHealth interventions offer numerous advantages, specific populations may require additional strategies to effectively replicate their effects. As many marriage immigrants may not be familiar with using mobile applications, implementing mHealth intervention alone may not be sufficient (16). Furthermore, the program contents may not be effectively delivered if the user does not perceive the intervention to be necessary or lacks the motivation to continue using it (17). To change the behaviors of individuals with a low socioeconomic status, providing relevant education through home visits is effective (18). For marriage immigrants—who lack access to medical services and health information due to linguistic and cultural differences and tend to have low level of health literacy in general—human support could increase the effectiveness of mHealth intervention in helping them to provide effective care and manage the health of their young children. Especially for individuals like marriage immigrants, the guidance of educated lay health workers who understand their unique circumstances is likely more effective than specialized medical professionals. Research shows that lay-health workers (LHWs) who meet with the study population on a regular basis to provide education and support can be effective for health interventions (19). Thus, our intervention combines an mHealth program and LHWs, who met with marriage immigrants on a regular basis to provide education and counseling. To investigate if the addition of LHWs indeed enhances the effectiveness of the mHealth intervention, this study includes an experimental group B that had the mHealth intervention alone without LHWs.

This study aimed to develop, implement, and evaluate a tailored mHealth program with and without LHWs on health-promoting behaviors, eHealth literacy, and family strength in multicultural families with young children. The main study hypotheses are as follows:

> H1. There will be a significant increase in health-promoting behaviors among those who received the tailored mHealth intervention with and without LHW (mH and mH-L) compared to those who did not receive any intervention (control group).
>
> H2. There will be a significant increase in eHealth literacy among those who received the mHealth intervention with and without LHW (mH and mH-L) compared to those who did not receive any intervention (control group).
>
> H3. There will be a significant increase in family strength among those who received the mHealth intervention with and without LHW (mH and mH-L) compared to those who did not receive any intervention (control group).

2. Materials and methods

2.1. Study design

A mobile app-based parenting program for multicultural families with young children was developed and evaluated using the five stages of the ADDIE model: analysis, design, development, implementation,

and evaluation (20). To test the effectiveness of the program, we used experimental design. Specifically, we used a cluster randomized controlled trial with three groups with a pretest (T0), post-test (T1) immediately after the intervention during Week 8, and follow-up during Week 20 (T2).

The duration of the intervention was eight weeks for all participants. The experimental group (mH-L) received eight weeks of mobile application use and LHW support. The LHWs' activity consisted of approximately twenty-five minutes of support and counseling during each visit, and they provided positive reinforcement for participants who were comfortable using the application. The experimental group B (mH) received only the mobile application without LHW support. The control group was observed without either a mobile application or LHW support.

Given that marriage immigrant women who move to Korea often use a multicultural family support center near their home, there is a concern that potential interactions at the support centers may affect the study outcome. To address this concern, we used a cluster randomization method to randomly assign centers to the three study groups.

2.2. Participants

Study participants were women who immigrated to Korea from China, the Philippines, and Vietnam to marry Korean men and who currently have children aged 0–6. We recruited participants who had visited Multicultural Family Support Center (MFSC). To be eligible to participate in the study, women had to own an Android smartphone and have the ability to download and use the mobile application. The study participants then had to agree to not participate in another early-childhood healthcare program during the intervention period.

Since social welfare services for marriage migrant women who move to Korea are mainly delivered through MFSC, most marriage migrant women use the MFSC. Therefore, this study recruited subjects through the MFSC. There are thirty-eight MFSC in three adjacent metropolitan cities, and we used the RANDBETWEEN function in Microsoft Excel 2010 to randomly assign three centers for each of the three study groups. According to the power calculation using G-power 3.1.9.2, the minimum number of participants needed was 54 women, 18 individuals in each group. However, we considered that a similar study conducted in the past had the dropout rate of 40% (21), and, given that the current study utilized repeated measures, we recruited a total of 120 women, 40 for each group. The actual number of participants in the final analysis were 101 women, 33 in the mH-L group, 30 in the mH group, and 38 in the control group (Figure 1).

2.3. Intervention

2.3.1. mHealth application

A mobile app-based parenting program for multicultural families with young children was developed using the five stages of the ADDIE model: analysis, design, development, implementation, and evaluation (20). Table 1 provides a succinct summary of each stage of the ADDIE.

First, for the analysis stage, we conducted a systematic review of the research literature on early childhood health care programs and analyzed known intervention strategies applicable to immigrants, educational characteristics, and effects. In addition, to maximize the impact of the intervention, the participants and the surrounding environment were also carefully analyzed. These analyses revealed that marriage immigrant women experience communication difficulties and family conflicts due to cultural and language differences, and such family health issues affected children's health-related behaviors. We also found that, while these women wanted to find health-related information online, they often had difficulty finding, selecting, and utilizing reliable information. In the expert analysis, we learned that these women often lack motivation to improve parenting quality and did not know how to effectively resolve family conflicts. The intervention program needed to address these areas.

Second, for design and development stages, we designed the contents of the program to include information on growth and development, disease management, healthy living, vaccination, and nutrition, all based on the results of the above analysis and input from the participants and experts. First, we created user interface (UI) scenarios to develop the mobile application for marriage immigrant women to help them with parenting and improving the health of infants and young children in their families. An algorithm providing tailored health information for each registered child's age was developed, and the health information provision flow was written as a UI scenario. The UI scenario according to personalized information regarding their child's age and language was used to tailor the content of the mobile application.

The application was developed by discussing the content to be implemented through the UI with two developers who have experience in developing multiple apps. A pilot test to assess the efficacy and safety of the developed mobile application was conducted on eight marriage immigrant women who had experience raising young children. After the participants had operated the mobile application for one week, we assessed factors such as stability of use, content readability, satisfaction with the application, and the ease and utility of information delivery. Based on the results, the mobile application was modified and improved to produce the final version.

The final mobile application was named "DajeongDagam" (hereafter, DaDa), which is a Korean abbreviation for "coming closer to multicultural families" (see Figure 2). The content of DaDa consists of essential health information related to young children, including the following issues: growth and development, disease management, healthy lifestyle (e.g., dental hygiene, safety, potty training, sleep management, personal hygiene, and nursery), vaccination, and nutritional management. To reinforce family strength, animations were provided that illustrated problems that may occur due to cultural differences as well as potential solutions. To account for linguistic differences between the participants, DaDa underwent translation and editing for Korean, English, Chinese, and Vietnamese by a translation team consisting of migrant women who were fluent in Korean as well as their native language. The translation of the content was commissioned to a professional translation agency, and the organization, an interpreter and translation cooperative established by an organization supporting migrant women, tried to improve the validity of the translation by reviewing the translated content by migrant women fluent in Korean and their mother tongue.

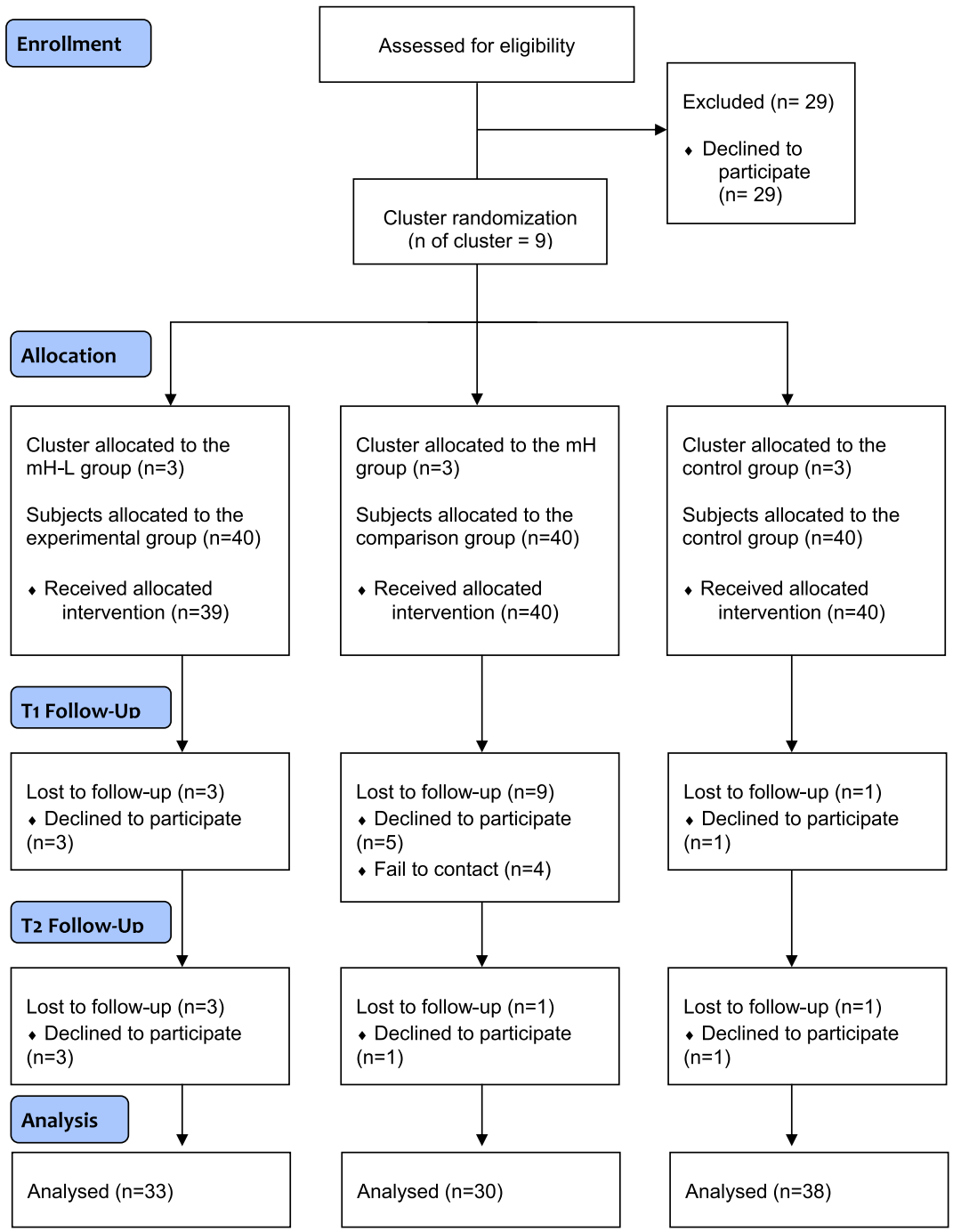

FIGURE 1
Recruitment of the program.

Importantly, the information was constructed to provide a tailored experience, depending on the age of the child (in months). To provide personalized information, the participants provided their IDs, passwords, and countries of origin and their child's date of birth. Based on these details, the participants were provided with information tailored to their child's age in the language of their country of origin. To change participants' behavior, the content of DaDa was not limited to information on childcare but also included the ability to log the child's biological changes as well as providing instructional images and videos. Simple terminology was used to aid participants' understanding, and a message board was established that allowed participants to share their personal experiences and information related to the care of young children. If the participants had a question, they could ask it through the Q&A message board in the mobile application, and an expert would respond within three days. We used the push function to motivate the target user to engage with the app. Content designed to capture the user's attention was displayed, and upon clicking, it led them directly into the app.

TABLE 1 Process of program development base on ADDIE model.

Stage	Contents	Details
Analysis	Literature review & Contents analysis	Literature analysis of health promoting behaviors, eHealth literacy, and family strength
		Health communication strategies
	Target population analysis	Analysis of experiences of parenting (marriage immigrant women, Korean husbands, mother-in-law)
		Analysis of multicultural family dynamics
		Analysis of factors affecting parenting behaviors
		Analysis of factors affecting eHealth literacy
		Needs analysis in online health information
	Environment analysis	Immigrant support specialist focus group interviews and Delphi study
		Analysis of websites & apps related to child health
Design	Establish the goals and purposes of the program	mHealth program topic/content selection and education design
	Develop contents and format of the preliminary program	Development of mobile application UI scenarios to provide customized health information
	Plan research study evaluating the effects of the program	A three-arm cluster randomized controlled trial
Development	Develop detailed contents and strategies	Tailoring for subjects' mother tongue and child's age
		Lay health workers' support
	Evaluate the preliminary program	Expert review and validity evaluation
		Pilot test and modification of the program
Implementation	Implement the program for 8 weeks	mH-L group: tailored mHealth program and support of lay health workers mH group: tailored mHealth program Control gorup: user care
Evaluation	Evaluate the effects of the program	Outcome variables: health promoting behavior, eHealth literacy, family strength Measure time: before intervention (T0), Week 8 (T1). Week 20 (T2)

2.3.2. Lay-health workers

The LHWs provided counseling and support through home visits during an eight-week intervention period. A total of twelve LHWs were involved in the study, and they consisted of staff members who directly provided support services to multicultural families at the MFSC, meaning that they had frequent contact with multicultural families. Any staff member selected to be a LHW had to have at least one year of experience providing support services to multicultural families.

Before the program began, the LHWs participated in two four-hour sessions. The training introduced and educated them about the application's educational content, the method of use, and the content required for counseling. In addition, a manual containing tips for support and counseling as well as instructions on how to use the mobile application and contents were provided to LHWs for continued use.

The LHWs visited participants' homes during the intervention period and provided counseling in case the participant had any difficulties using the application or had questions about healthcare information concerning their young children. They also introduced the participants to the expert Q&A through which they could ask questions and provided support for them to continue using the mobile application.

A total of 12 LHW participated in this study, and the researcher confirmed their activities and kept a journal so that support could be provided as intended. In addition, we kept in close contact with them to continuously manage problems that occurred during support. The content of their activities consisted of program usage guide, explanation and recommendation to use the program, problem identification, and connection to additional services. The LHWs' activity consisted of approximately thirty minutes of support and counseling during each visit.

2.4. Data collection

Data were collected between September 18, 2017, and June 30, 2018. The mH-L, mH, and control groups each completed a pretest survey (T0), two post-test surveys at T1 (Week 8), and a follow-up test at T2 (Week 20). The method for data collection was a paper-based self-administered questionnaire survey.

The research instruments consisted of structured questionnaires, used with permission from the original developers and translators. The questionnaires included sociodemographic characteristics, healthcare behaviors for young children, eHealth literacy, and family strength. The instruments utilized Korean, English, Chinese, and Vietnamese translations, meaning that participants could either select the Korean version or that in their native language. The instruments were translated by a professional organization, which was a translation and interpretation cooperative founded by a group supporting immigrant women. The instruments were translated by immigrant women who were

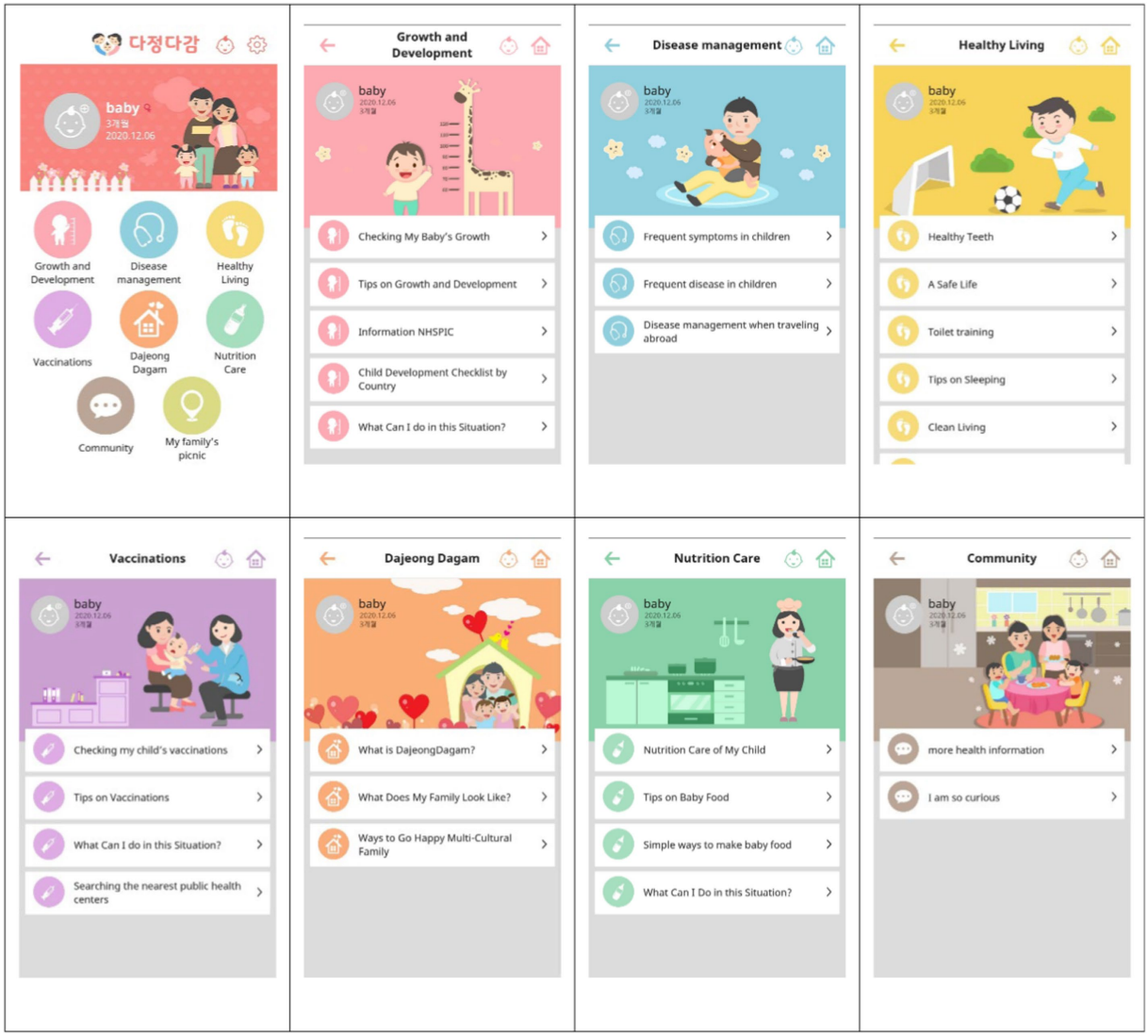

FIGURE 2
Screenshots of DaDa.

fluent in Korean and their native language, and the translated content was further edited to improve its validity.

2.5. Variables

As a result of the program, to verify whether marriage migrant women effectively manage their children's health, the primary outcome was measured as marriage migrant women's children's health-promoting behavior. We adapted the early childhood health-promoting behavior instrument developed by Kim et al. (22). The instrument measures healthcare behaviors based on seven factors: safety, emotional support/endeavor, activity/rest, disease prevention, appropriate clothing, nutrition, and cleanliness/hygiene. Each item was scored on a 4-point Likert scale with higher scores indicating better performance of early childhood healthcare behaviors. We modified some of the questions to fit the objectives of the present study, and two nursing professors evaluated the modified items to ensure the content validity. The Cronbach's alpha values of health-promoting behavior were 0.950 for T0, 0.967 for T1, and 0.957 for T2.

To measure eHealth literacy, we utilized the e-HEALS scale by Norman and Skinner (23), and the instrument was modified to fit the subject of healthcare regarding young children. Two nursing professors checked the content. There were eight questions in total, and each of them was scored on a 5-point Likert scale. The Cronbach's alpha values of eHealth literacy were 0.941 for T0, 0.928 for T1, and 0.965 for T2.

To measure family strength, we used the family strengths and capabilities instrument developed by Deal et al. (24) and validated by Danışman et al. (25). This instrument consists of 26 questions scored on a 5-point Likert scale. The Cronbach's alpha values of family strength were 0.962 for T0, 0.975 for T1, and 0.968 for T2.

The content validity of the instruments used in the user experience of the mobile application was checked in advance by two nursing professors. The reliability of the instruments used in the pilot was found to be always 0.8 or higher, indicating an acceptable level of reliability.

2.6. Ethical considerations

The study was approved beforehand by the Institutional Review Board at our institution (OOO IRB/OOOO_OO_OO). To ensure the autonomy of participants, the study's aims and methods were thoroughly explained prior to their participation. Participants with a low Korean-language aptitude were given the explanations in their native language through a translation/interpretation expert; the consent form was also written in their native language. Lastly, as an additional ethical consideration, after the mH-L and mH groups had completed the intervention program, the control group was also given access to the mHealth application along with an approximately fifteen-minute orientation on how to use it.

2.7. Data analysis

The collected data were analyzed using SPSS WIN 25.0, and a two-tailed test was performed at the significance level of 0.05. The normality test of the dependent variable was verified using the Kolmogorov–Smirnov test, and it was found that it was not normally distributed. This study is designed to compare the effects of interventions with repeated measurements, so repeated measures analysis of variance is generally considered, but the normality of the dependent variable is not satisfied and the repeated measures analysis of variance is not appropriate. In consideration of this, the generalized estimating equation (GEE), which is an extension of the generalized linear model, was analyzed. The generalized estimation equation is a method of applying multiple regression analyzes in consideration of the intra-subject correlation of measured values. It can be applied even if the assumption of normality is not satisfied, and it can be analyzed in data containing missing values by considering time as a variable.

Descriptive statistics were employed to summarize the general characteristics of the subjects, and the comparability of the three groups was assessed using χ2-test, Fisher's exact test, or ANOVA, as appropriate. Prior to the intervention, an ANOVA homogeneity test was performed to examine the equality of variance in the dependent variables across the three groups. Disparities among the three groups concerning the time elapsed before and after the implementation of the intervention program were examined utilizing GEE. To assess the distinctions among the mH-L, mH, and control groups at time points T1 and T2, we conducted the Kruskal-Wallis test. Subsequently, a Mann–Whitney test was employed as a *post hoc* analysis for the three groups. A significance level of 0.05 was initially set, which was adjusted to 0.017 using the Bonferroni correction.

3. Results

3.1. General characteristics and homogeneity test of subjects

Table 2 presents both the demographic characteristics and the outcomes of the homogeneity tests conducted across the three groups. The mean age of participants was 30.12 years for the mH-L group, 29.10 years for the mH group, and 28.87 years for the control group. In terms of nationality, 63.6% of the mH-L group, 66.7% of the mH group, and 81.6% of the control group hailed from Vietnam. Regarding educational level, middle school graduates accounted for 30.3, 40.0, and 28.9% of the mH-L, mH, and control groups, respectively. Regarding employment status, percentages of unemployment were noted as 78.8% for the mH-L group, 70.0% for the mH group, and 81.6% for the control group. The duration of residence in Korea was found to be 4.16 years for the mH-L group, 4.06 years for the mH group, and 5.20 years for the control group. Additionally, the duration of marriage was observed to be slightly longer than the period of residence in Korea, with respective values of 4.25 years for the mH-L group, 4.16 years for the mH group, and 5.13 years for the control group. Furthermore, when asked about their child's primary caregiver, 45.5, 50.5, and 42.1% of participants in the mH-L, mH, and control groups, respectively, indicated that the caregiver was solely responsible. Family affluence, assessed as an indicator of household wealth, yielded scores of 7.39, 6.93, and 6.95 for the mH-L, mH, and control groups, respectively. Upon examining the homogeneity of these general characteristics among the three groups, no statistically significant differences were observed across all parameters ($p > 0.05$), affirming the comparability of the groups prior to intervention.

3.2. Pretest homogeneity for dependent variables

First, Table 3 shows the results of the pre-intervention homogeneity testing for the dependent variables. Results show that participants in the mH-L, mH, and control groups did not differ significantly in terms of the three dependent variables of health-promotion behaviors, eHealth literacy, and family strength.

3.3. Program's effect

The effects of the tailored mHealth program and the LHWs on three study dependent variables concerning early childhood healthcare behaviors are presented in Table 3 and Figure 3.

3.3.1. Health-promotion behaviors

The first hypothesis that there would be a significant increase in health-promoting behaviors among those who received the mHealth intervention with LHW (mH-L group) compared to those who did not (control group) was supported by the data. The mH-L group demonstrated a steady increase in health-promoting behaviors at three points (M = 3.37, 3.55, and 3.69) with significantly higher levels at T2 compared to the control group (M = 3.51). Data also show that, while mH group had some increase in health-promoting behavior at T1 (M = 3.60), the increase was not sustained at T2 (M = 3.57). The interactions between the three groups and over time indicated statistically significant differences in health-promoting behaviors ($\chi^2 = 9.951$, $p = 0.041$).

The examination of group distinctions at the T1 time point revealed no statistically significant differences among the three groups (H = 1.375, $p = 0.503$). However, a statistically significant distinction was observed among the three groups at the T2 time point (H = 7.832, $p = 0.020$). *Post hoc* analysis results indicated that the mH-L and mH groups (U = 392.000, $p = 0.150$), as well as the mH and control group (U = 463.500, $p = 0.188$), did not exhibit statistically significant

TABLE 2 Characteristics of the mHealth program participants ($N = 101$).

Characteristics	Categories	n(%) or M ± SD			χ^2/F	p
		mH-L ($n = 33$)	mH ($n = 30$)	Cont. ($n = 38$)		
Age (yr)		30.12 ± 14.05	29.10 ± 5.85	28.87 ± 4.70	0.205	0.815
Country of origin	Vietnam	21 (63.6)	20 (66.7)	31 (81.6)	3.865	0.421
	China	9 (27.3)	7 (23.3)	6 (15.8)		
	Philippines	3 (9.1)	3 (10.0)	1 (2.6)		
Education level	Elementary school or less	2 (6.1)	3 (10.0)	1 (2.6)	3.922	0.708
	Middle school	10 (30.3)	12 (40.0)	11 (28.9)		
	High school	15 (45.5)	9 (30.0)	16 (42.1)		
	College and above	6 (18.2)	6 (20.0)	10 (26.3)		
Job status	Unemployed	26 (78.8)	21 (70.0)	31 (81.6)	1.346	0.576
	Employed	7 (21.2)	9 (30.0)	7 (18.4)		
Duration of stay in Korea (yr)		4.16 ± 2.51	4.06 ± 2.57	5.20 ± 2.48	2.227	0.113
Duration of marriage (yr)		4.25 ± 2.55	4.16 ± 2.00	5.13 ± 2.17	1.918	0.152
Korean language ability		2.79 ± 0.76	2.89 ± 0.73	3.09 ± 0.57	1.814	0.169
Primary caregiver	Self	15 (45.5)	15 (50.0)	16 (42.1)	2.874	0.593
	Father	2 (6.1)	1 (3.3)	0 (0.0)		
	Both	16 (48.5)	14 (46.7)	22 (57.9)		
Parenting assistant	None	7 (21.2)	15 (50.0)	12 (31.6)	14.870	0.051
	family in law	15 (45.5)	10 (33.3)	21 (55.3)		
	Family on the maternal side	9 (27.3)	2 (6.7)	3 (7.9)		
	Neighbor	1 (3.0)	2 (6.7)	0 (0.0)		
	Etc.	1 (3.0)	1 (3.3)	2 (5.3)		
Number of children	1	20 (60.6)	24 (80.0)	22 (57.9)	4.104	0.143
	≧ 2	13 (39.4)	6 (20.0)	16 (42.1)		
Perceived child' health status		4.12 ± 0.78	4.00 ± 0.79	4.03 ± 0.68	0.237	0.789
Family Affluence		7.39 ± 1.77	6.93 ± 1.72	6.95 ± 1.63	0.787	0.458

differences. In contrast, a statistically significant difference was identified between the mH-L and control groups (U = 388.500, $p = 0.006$).

3.3.2. eHealth literacy

The second hypothesis that there would be a significant increase in eHealth literacy among those who received the mHealth intervention with LHW (mH-L group) compared to those who did not (control group) was also supported by the data. As in the case of health-promoting behaviors, the mH-L group demonstrated a steady increase in eHealth literacy over time (M = 3.51 to 3.88 and then to 4.12). At T2, the mean eHealth literacy for the mH-L group was significantly higher than for the control group (M = 3.50). Analysis revealed a statistically significant interaction in eHealth literacy over time among the three groups ($\chi 2 = 10.206$, $p = 0.037$). As with the health-promoting behaviors, the mH group showed an increase in eHealth literacy immediately after the intervention (M = 4.13), which decreased slightly (M = 4.05) at T2.

The examination of eHealth literacy differences among the three groups at T1 and T2 yielded statistically significant results (T1; H = 7.960, $p = 0.019$, T2; H = 14.536, $p < 0.001$). Subsequent *post hoc* analyses at T1 indicated no statistically significant differences between the mH-L and mH groups (U = 395.000, $p = 0.167$), as well as between the mH-L group and the control group (U = 493.000, $p = 0.119$). However, a statistically significant difference was observed between the mH group and the control group (U = 350.500, $p = 0.006$). At T2, *post hoc* analyses showed no statistically significant difference between the mH-L and mH groups (U = 475.500, $p = 0.786$). Conversely, statistically significant differences were observed between the mH-L group and the control group (U = 333.000, $p < 0.001$), as well as between the mH group and the control group (U = 326.000, $p = 0.002$).

3.3.3. Family strength

The final hypothesis that there would be a significant increase in family strength among those who received the mHealth intervention with LHW (mH-L) compared to those who did not (control group) was supported by the data as well. As with the two other dependent variables, family strength increased over time among the mH-L group (M = 4.11, 4.20, and 4.40). At T2, the mean family strength score for the mH-L group was significantly higher than that for the control

TABLE 3 The program's effect.

Variables	Time	mH-L[a]	mH[b]	Control[c]	Source	χ^2	*p*	*Post hoc*
		M ± SE	M ± SE	M ± SE				
Health-promoting Behavior	Pre	3.37 ± 0.08	3.49 ± 0.08	3.44 ± 0.06	Group	0.732	0.694	–
	T1	3.55 ± 0.08	3.60 ± 0.07	3.52 ± 0.06	Time	16.905	<0.001	–
	T2	3.69 ± 0.06	3.57 ± 0.08	3.51 ± 0.05	Group *Time	9.951	0.041	a > c
eHealth Literacy	Pre	3.51 ± 0.16	3.70 ± 0.12	3.51 ± 0.13	Group	10.314	0.006	–
	T1	3.88 ± 0.11	4.13 ± 0.13	3.64 ± 0.09	Time	13.125	0.001	b > c
	T2	4.12 ± 0.13	4.05 ± 0.14	3.50 ± 0.11	Group *Time	10.206	0.037	a,b > c
Family Strength	Pre	4.11 ± 0.12	4.18 ± 0.12	4.05 ± 0.10	Group	4.989	0.083	–
	T1	4.20 ± 0.10	4.51 ± 0.09	4.17 ± 0.09	Time	8.567	0.014	b > c
	T2	4.40 ± 0.09	4.37 ± 0.09	4.13 ± 0.09	Group *Time	9.806	0.044	–

group (M = 4.13). The interactions among the groups and over time indicated statistical significance in family strength ($\chi 2 = 9.806$, $p = 0.044$). It is worth noting that the mean family strength score for the mH group was 4.51, even higher than that of the mH-L group (M = 4.20), but it declined substantially at T2 to levels (M = 4.37) lower than that of the mH-L group (M = 4.40).

Upon analyzing the disparities in family strength among the three groups at both T1 and T2, significant differences emerged (T1; H = 7.051, $p = 0.029$, T2; H = 6.224, $p = 0.045$). *Post hoc* analysis at T1 indicated the absence of statistically significant distinctions between the mH-L and mH groups (U = 352.500, $p = 0.049$), as well as between the mH-L group and the control group (U = 592.500, $p = 0.690$). Nonetheless, a notable statistically significant difference was identified between the mH group and the control group (U = 361.000, $p = 0.010$). In contrast, no significant differences were observed at the T2 time point for comparisons between mH-L and mH (U = 470.000, $p = 0.730$), mH-L and the control group (U = 430.000, $p = 0.023$), and mH and the control group (U = 414.500, $p = 0.055$).

4. Discussion

This study aimed to develop a comprehensive and tailored mHealth intervention program that promotes healthy behaviors for children from multicultural families. The program involved Lay Health Worker (LHW) elements that were incorporated to optimize the effectiveness of the mHealth intervention based on participants' characteristics. There is a substantial need to provide support for marriage immigrant women to help improve their parenting and manage health issues of their young children better. Learning to promote and manage necessary health care for young children is a critical public health matter in Korea. This is a rare study that developed and tested an mHealth application specifically designed to help marriage immigrant women. It demonstrated that a tailored mHealth program, combined with an LHW component, can effectively contribute to enhanced health-promoting behaviors, eHealth literacy, and family strength in multicultural families. This program is meaningful because it directly improved families' health behavior. These findings are in line with Conway et al.'s (15) general effectiveness of tailored mHealth interventions. The result is the outcome of increased health-related behaviors as tailored information that considers the characteristics of individuals motivates behavior changes. These results suggest that using mHealth would work effectively in providing tailored information. Delivering tailored information using a mobile phone or computer is more effective because it can utilize materials such as videos and pictures (26). Therefore, tailoring intervention using mHealth is an effective strategy to change the subject's health behavior.

This study also addressed the relative importance of the LHW component. Specifically, within the mH-L group, supported by LHW, children's healthcare behaviors and eHealth literacy at T2 surpassed those of the control group. These findings imply an impact on sustained behavioral changes compared to the group solely receiving mHealth interventions. This aligns partially with prior research indicating the efficacy of LHW in improving behavior among participants with lower socioeconomic status (18). Challenges of mHealth programs targeting vulnerable populations encompass limited accessibility and technical obstacles (17). In this study, LHW was engaged to assist women in installing and navigating mHealth applications, resolving issues, and promoting application utilization. Through these avenues, LHW may have contributed to enhancing the program's long-term effectiveness by aiding women in overcoming technical challenges and cultivating self-efficacy through successful parenting behaviors (27). Thus, for individuals with low eHealth literacy who struggle to access, comprehend, evaluate, and effectively apply information to foster the healthy upbringing of their children, strategies involving human resources to enhance actual behaviors become imperative, rather than relying solely on standalone mHealth interventions.

The mH group, which received the mHealth program, showed an improvement in eHealth literacy after the intervention. The mH-L group showed a sustained increase. eHealth literacy refers to everything from finding, evaluating, and applying electronic information to solving health problems (23). It includes not just obtaining information but also having the capability to use it. In this study, the information provided on child rearing was verified by experts, thereby ensuring that the individuals could trust the information given to them. The

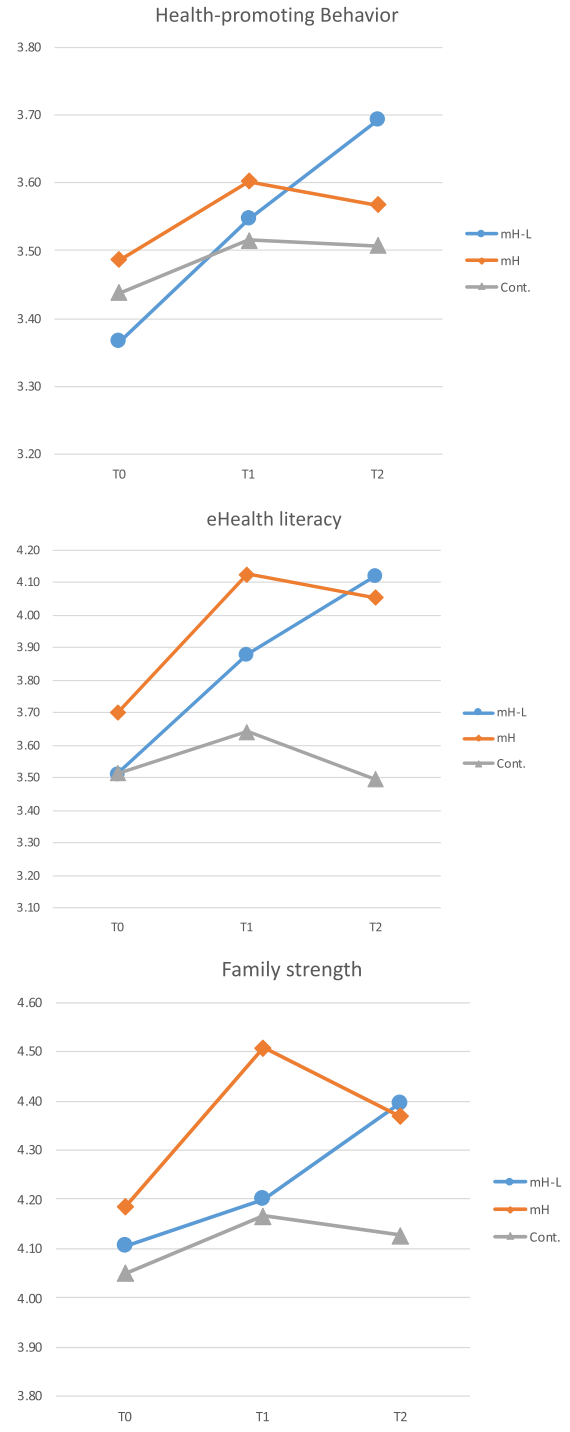

FIGURE 3
Changes of dependent variables by time.

information was classified according to the age of the child so that necessary details could be identified and applied immediately. The success of this intervention in terms of information utilization resulted in an improvement in eHealth literacy. In particular, the participants with LHWs had additional support to ensure accurate utilization of the health information. Since finding, understanding, and utilizing health information is an important factor in behavior change, as opposed to merely being informed (28), improvement in eHealth literacy is particularly crucial. Additionally, these results have significant implications, because they mean that marriage immigrant women can critically select, evaluate, and apply online information in the current era where a lot of information is being distributed online.

The mH-L and mH groups, both of which used the mobile application, showed improved family strength. Marriage immigrant women, having moved to a new society, are dependent on their husbands (13). Specifically, when the mother applies different childcare methods than her husband or mother-in-law, who exert greater authority in these matters, family conflict regarding childcare issues is inevitable (3, 13). In such situations, education though animation is an effective way to aid the participant's understanding (29). This study provided information in the participants' native language, which could easily be converted into Korean so that information about children could be shared with other families. The mHealth program in this study provided case studies in the form of animations to resolve family conflicts resulting from cultural differences. These are considered to improve family health by enhancing mutual cultural understanding (30). Thus, multicultural families who are raising a child in an environment where different childcare methods may cause conflicts, support is needed for adapting to the dual cultures.

The ability to observe these effects in this study stemmed from a rigorous analysis of participants and their surrounding environment based on the ADDIE model. In the analysis stage of the ADDIE model, the participant and the environment surrounding the participant were thoroughly analyzed to deliver tailored health information to the target population. Looking at the existing parent support program for immigrants, it was found that most studies considered tailoring programs for cultural adaptation (31). However, by analyzing the participants and their surrounding environment, we found that there were difficulties in language, family conflicts, and application of information when parenting children. Thus, essential information for each age was provided to generate information about the growth and development of children, and the app was configured to check the previous age group, if desired. In addition, animation was composed to resolve family conflicts caused by different cultures. The provision of tailored information from such thorough analysis was quite effective in delivering a large amount of information and increasing knowledge and skills for better parenting among these women. Therefore, it is desirable to apply user-customized mHealth information for parenting. Additionally, considering the global situation where there are only a few opportunities such as the COVID-19 crisis to face the target population directly, tailoring mHealth intervention is meaningful as it can be used as an effective strategy.

Our results support the conclusion that, while mHealth interventions offer advantages such as the lack of spatiotemporal restrictions and the ease of access to relevant information and services, addition of interpersonal support component such as LHWs may be necessary to ensure lasting program effectiveness. This is especially important for programs directed at vulnerable populations like marriage immigrant women.

4.1. Limitations

First, our study only included participants who already owned an Android smartphone and had the ability to download and use the mobile application. Those who did not own their own phone or lacked the ability to work with mobile applications were excluded from the study.

Additionally, we were unable to verify the actual usage time of the mobile application. As such, our findings may not be generalizable to women who have a lower level of technology competency or who lack access to smartphones. This may be particularly problematic when our findings are generalized to people in regions where the level of smartphone penetration or technological environment may differ substantially. Second, since the participants in this study were marriage immigrant women from China, Vietnam, or the Philippines, our program only addressed the childcare cultures of these countries. We did not account for the cultural characteristics of other countries—for instance, those outside of Southeast Asia—and generalizing the study results beyond these countries should be done with caution. Third, due to the nature of the intervention, the LHWs and participants were not blinded to the treatment condition they were assigned to. Fourth, family strength was only measured from the mother's perspective, and we were not able to get data from other family members. Thus, the variable family strength is a subjective assessment of the women about the family and may differ from those of other family members.

5. Conclusion

The "DajeongDagam," a tailored mHealth parenting program to improve early childhood healthcare, effectively improved health-promoting behaviors, eHealth literacy, and family strength among marriage immigrant women. Moreover, we also confirmed that using LHWs for additional interpersonal support for utilizing the mHealth application produced sustained behavioral changes well beyond the conclusion of the intervention. Future studies are needed to further enhance our understanding about mHealth interventions directed at vulnerable populations. In concluding this study, several pivotal insights emerged. Firstly, the significance of a comprehensive and meticulous examination of the target population cannot be overstated. For interventions aimed at vulnerable groups, such as married immigrants, understanding the distinct characteristics and challenges of this demographic is crucial. Our rigorous analysis enabled the creation of finely tailored messages, thereby enhancing their effectiveness. Secondly, technological interventions, notably eHealth and mHealth platforms, while promising, demand caution in deployment among vulnerable populations. Absent immediate supporting mechanisms — exemplified by Lay Health Workers (LHWs) in our scenario — the effectiveness of such programs can be jeopardized. In light of these findings, it becomes evident that to ensure sustained behavioral changes post-intervention, continued interpersonal resources are indispensable. This ensures the longevity of positive outcomes, cementing the initial benefits introduced by the program.

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 humans were approved by Pusan National University Institutional Review Board (PNU IRB/2017_90_HR). The studies were conducted in accordance with the local legislation and institutional requirements. The participants provided their written informed consent to participate in this study.

Author contributions

HS and GH: conceptualization, data curation, investigation, supervision, methodology, project administration, resources, software, validation, visualization, and writing—review and editing. HS: funding acquisition and writing—original draft. 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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Parent-adolescent conflict: an exploration from the perspective of Vietnamese adolescents

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This research investigates parent-adolescent conflicts from the viewpoint of Vietnamese adolescents. Employing a mixed-method approach, the study conducted in-depth interviews and a questionnaire survey with 706 high-school students. The findings highlight that conflicts between Vietnamese parents and adolescents commonly arise regarding internet usage for entertainment and academic purposes. Furthermore, adolescents reported having more conflicts with their mothers than with their fathers. Although instances of parental aggression were identified, most adolescents perceived their parents' conflict resolution as supportive. However, Vietnamese adolescents tended to display passive behavioral responses during conflicts. The research also identified certain emotional responses as warning signs of mental health issues, including suicidal thoughts, among some adolescents. Moreover, a higher frequency of conflicts with parents was significantly associated with increased peer connections. The study emphasizes the importance of professionals, such as school social workers or counselors, prioritizing the understanding of parent–child conflicts' impact on adolescents' emotions and mental health. Additionally, it underscores the significance of examining parenting patterns and parent–child communication within contemporary Vietnamese families.

KEYWORDS

parent-adolecent conflict, Vietnamese families, conflict resolution, emotional response to conflict, behavioral response to conflict, friend network

1. Introduction

Conflict is an inevitable part of social relationships, and disagreements often arise between parents and children within families. During the adolescent period, parent–child conflict tends to occur more frequently and intensively, and adolescents experience more conflict with their parents compared to their peers (Van Doorn et al., 2008; Moed et al., 2015). This heightened conflict between adolescents and their parents can be attributed, in part, to the developmental drives of adolescence, which push adolescents to seek greater independence from their parents while simultaneously desiring closer connections with their peers (Branje, 2018). In addition, cognitive development during this period allows adolescents to differentiate between closed-field relationships (such as those with parents) and open-field relationships (such as those with peers) and become more aware of the vulnerability of open-field relationships to rupture when conflicts arise (Hartup, 1992). Consequently, adolescents tend to carefully manage and minimize conflict with their peers while displaying a less protective attitude when it comes to handling disagreements within family relationships.

Parent–child conflict is not only an inevitable aspect of family life but also serves as a functional component of healthy family dynamics across cultures. Conflict within the parent–child relationship

has both potential risks and benefits. Conflict provides opportunities for growth and learning in the parent–child relationship. It facilitates the child's transition from an instinctive being to a social being by helping them understand and navigate differences, social norms, conflict resolution patterns, and skills necessary for social engagement (Wrench et al., 2020). However, an excessive or inadequate amount of conflict may indicate unhealthy family dynamics, such as neglectful or highly authoritarian parenting styles. Adolescents also learn from their parents' conflict management styles and apply these lessons in their interactions outside the family context (Van Doorn et al., 2008). Branje (2018) emphasizes that parent-adolescent conflicts can serve as mechanisms for change and development within the parent–child relationship. If parents and adolescents can effectively manage emotional variability during conflicts, these conflicts can provide opportunities for relationship development and meeting the needs of adolescents. However, if parents exhibit negative behaviors and responses during conflicts, adolescents may internalize these patterns and adopt negative strategies for conflict resolution. Research has shown that children of coercive parents are more likely to resort to coercive resolutions and are at higher risk of developing non-compliance and antisocial behaviors (DeGarmo, 2010). Excessive conflict during adolescence has been associated with maladaptive outcomes, including behavioral and emotional difficulties (Moed et al., 2015).

Indeed, the way parents and adolescents handle their conflicts has a profound influence on the psychological development of adolescents. Research has shown that the resolution of parent-adolescent conflicts has an impact on the development of adolescents' empathy (Van Lissa et al., 2015). Specifically, the way parents handle conflicts can either enhance or hinder the development of empathy in adolescents. Studies conducted on Singaporean youths by Keng and Wong (2017) have shed light on the relationship between parental invalidation and borderline personality disorder. Parental invalidation, which is a common parenting trait observed in Asian cultures, was found to be positively associated with borderline personality disorder symptoms. Furthermore, Keng and Soh (2018) found that the mother–child relationship had a more significant impact on the child than the father-child relationship in this regard. They also highlighted that the child's conformity mediated the association between maternal invalidation and borderline personality disorder symptoms. Considering the differential impact of mothers' and fathers' interactions with adolescents during conflicts, Renk et al. (2005) suggested that the examination of parent-adolescent conflicts should take into account the gender of the parent(s) involved. This aligns with the findings of Keng and Soh (2018) regarding the stronger influence of the mother–child relationship. The dynamics of parent-adolescent conflicts may vary depending on the gender of the parent, and it is essential to consider these nuances in understanding the impact of conflicts on adolescents.

Whereas this topic has been examined in many cultural contexts, there is a limited understanding of the specific dynamics and issues surrounding parent-adolescent conflicts in Vietnamese families, whereas the parent-adolescent conflict in Vietnam might be an interesting case to study. For thousand of years, the parent–child relationship in Vietnamese families has been regulated by Confucian ideology which emphasized the submission of children to their parents. The effect of Confucian ideology on family relationships, especially between parents and children, remained robust during French colonization and even when Vietnam gained independence and established socialist government. Radical changes in political regime tended to exert its impact on socio-economic aspects of Vietnam society rather than the interactions between parents and children, partly because this period Vietnam was quite a closed society due to the trade ban imposed to Vietnam by the US However, economic renovation (often known as Doi Moi) in 1986 has brought about vital changes to family functioning (Teramoto et al., 2017). Market-oriented economy encouraged women to participate in labor force as an equivalent family's breadwinner to men, raised both men's and women's time and energy spent in economic sphere, and hence some of the traditional functions of family as educating children or taking care of the children and older persons must be transferred to social services. Especially since 1994 when the US lifted its 30-year trade embargo on Vietnam, Vietnam rapidly developed international affairs, which in turn let Vietnamese families and individuals exposed to international values and norms. These changes in family functioning and the adoption of international perspectives about the self and the family create growing inter-generational gap between adults and adolescents. Whereas adults tend to attach to traditional norms and values, young persons are more inclined to Western values and norms, and consider themselves as "different kind of citizens" from previous generations (Nilan, 1999: 354).

In this context, understanding parent-adolescent conflict in general and in Vietnamese families in particular is of great importance, since it helps identify the contemporary issues in families such as current concerns of and differences in major concerns between parents and adolescents, how parents and adolescents respond to each other during their conflicts, how they perceive of their roles as members of family and in relation to each other. In the long run, such understanding can help identify the changes in family as an important social institution and socialization agent for children in the context of broader social changes. Particularly, when mental health of adolescents in Vietnam is a growing concern (UNICEF, 2022), tracing back original foundation of mental health as family interactions as well as parent–child conflict may contribute significant implications for professionals as counselors and social workers when working with adolescents and their families.

2. Research methods

2.1. Research design

Because this topic has been underexplored in Vietnam, this study applied an exploratory approach to seek some insights into the conflicts between adolescents and their parents in contemporary Vietnamese families. The study used two methods: semi-structured interview and questionnaire survey. Semi-structured interviews were used to explore themes of conflicts between adolescents and their parents, the motivations, feelings and reasonings underlying the way they response to the conflict, and identify the factors associated with conflicts and conflict resolutions. In total, researchers conducted 16 semi-structured interviews with high-school students, 06 with parents, and 04 with high-school homeroom teachers. The qualitative interview sample was purposively selected. Researchers asked homeroom teachers at each school to introduce and connect some students and parents of students who often met troubles at schools, and some students and parents of students who did good academic and behavioral performance at school. All interviews were conducted in person (between a researcher and an interviewee) at the psychological counselling room at the school to ensure the safety, privacy, and comfort of interviewees. Interviews were recorded upon interviewees' consent. Each interview usually lasted 60 min. The collected qualitative data was then analyzed using NVivo. Based on content analysis of these in-depth interviews, a self-administrated questionnaire for

high-school students was designed. A pilot study was conducted with 30 students before the questionnaire was finalized.

In the second stage, the study invited students at the two high schools to participate in the questionnaire survey. There are three grades in high schools in Vietnam: 10, 11, and 12. In the urban school there are 8 classes in each grade, each class has about 50 students. In the rural school there are 7 classes in each grade, each class has about 40 students. At each school, we randomly selected two classes from each grade, using lottery method. Then we invited all students in the selected class to participate in the survey. To ensure the representativeness of the sample, we planned that the questionnaire survey would be conducted at the selected class only if (1) less than 10% of the students refuse to participate in the survey and (2) there is no typical characteristics of the students who refuse (for example, most of them have poor academic performance; or have record of maladaptive behaviors). All of the students agreed to join in the survey. In total, 706 students participated in and completed the questionnaire survey.

Before interviewing the students, we first contacted the schools, explaining the study and asking their permission to conduct the interview with their students. With the permission of the schools, we sent each student an invitation letter and a Question-and-Answer leaflet explaining the study and some other information such as possible benefits and risk of taking part in the study. Two days after sending the letter and leaflet, investigators contacted the students asking if they understood the study and agreed to participate. At the day of interviewing, consent forms were provided to the participants. Students' right to withdraw from the study anytime they want without any harm was also reminded again before the interview started. The research design was reviewed and approved by the IRB of the Institute for Family and Gender Studies, under Decision 03/HĐKH-GĐ&G signed on 06 January 2020. The questionnaire survey sample can be summarized as in Table 1.

2.2. Measuring parent-adolescent conflict

2.2.1. Parent-adolescent specific conflict checklist

According to qualitative data analysis, 09 popular conflict themes were identified: 1-conflict over adolescents' dressing and hair style; 2-time spent with friends, 3-academic performance, 4-taking extra-classes; 5-higher education orientation (choosing the university and the major to apply for); 6-self-study at home; 7-money management; 8-time spent on internet (either on their computer or smartphone) for entertainment purpose (including playing online games); and 9-choosing friends. In the questionnaire, each of the conflicts was measured on a 4-point Likert scale, with 0 = hardly having conflict; 1 = sometimes per month; 2 = sometimes per week; and 3 = nearly daily.

2.2.2. Frequency of parent-adolescent conflict

This variable was created by computing all the 09 specific conflicts, its value was recoded into 4-point scale, with 0 = low frequency; and 3 = very high frequency.

3. Results

3.1. Adolescents' frequency of having conflict with their parents

When being asked about the frequency of having conflict with their parents in the last three months, with 0 = hardly; 1 = sometimes a month; 2 = sometimes a week; 3 = nearly daily, results show that Vietnamese adolescents have more conflict with their mother than with father in all reasons for conflict. However, the trends of having conflict with father and mother are quite similar, as shown in Table 2.

TABLE 1 Sample characteristics.

	N	Percentage
Gender		
Boy	285	40.4
Girl	421	59.6
Living area		
Rural	329	46.6
Urban	377	53.4
Grade		
Grade 10	242	34.3
Grade 11	249	35.3
Grade 12	215	30.5

TABLE 2 Frequency of parent-adolescent conflicts by conflict themes.

Adolescents' conflict with their father and mother over...	*N*	Range	Father		Mother	
			Mean	SD	Mean	SD
1. Dressing and hair style	709	0–3	0.39	0.666	0.48	0.717
1. Time spent with friends	709	0–3	0.58	0.773	0.65	0.787
2. Academic performance	709	0–3	0.67	0.766	0.85	0.823
3. Extra classes	709	0–3	0.45	0.707	0.56	0.765
4. Higher education orientation	709	0–3	0.38	0.633	0.47	0.695
5. Self-study at home	709	0–3	0.82	0.926	0.99	0.959
6. Money management	709	0–3	0.40	0.647	0.48	0.715
7. Time spent on internet for entertainment	709	0–3	1.27	0.998	1.46	0.715
8. Choosing friend	709	0–3	0.35	0.616	0.41	0.637

As reported by adolescents, their conflicts with both father and mother occur most frequently on the amount of time they spent on internet for entertainment purpose (highest mean values at 1.27 and 1.46 respectively), following by self-study at home (0.82 and 0.99, respectively) and academic performance (0.67 and 0.85, respectively). Adolescents have least conflict with their father and mother on choosing friend (0.35 and 0.41, respectively); however, more conflicts occur on their spending time with friends (0.58 and 0.65, respectively).

To further examine if there is an intra-role conflict between mother and daughter, father and son, one-way ANOVA analysis is used to see if there is any difference in mean scores of boy group and girl group in having conflict with their father and mother. The result is presented in Table 3.

According to the results, there is no difference between girls and boys in their frequency of having conflict with their mother in almost every reason for conflict, except for academic performance and self-study at

TABLE 3 Difference between boys and girls in frequency of having conflict with their father and mother, by conflict themes.

	Adolescent's sex	*N*	Mean	SD	*F* (1, 698)	*p*-value
Conflict with father over…						
Dressing and hair style	Boy	279	0.43	0.695	0.988	0.320
	Girl	421	0.38	0.649		
Time spent with friends	Boy	279	0.69	0.848	8.191	0.004
	Girl	421	0.52	0.716		
Academic performance	Boy	279	0.82	0.846	17.294	0.000
	Girl	421	0.58	0.686		
Extra classes	Boy	279	0.57	0.835	13.235	0.000
	Girl	421	0.37	0.600		
Higher education orientation	Boy	279	0.47	0.731	8.613	0.003
	Girl	421	0.33	0.555		
Self-study at home	Boy	279	0.97	0.987	12.171	0.001
	Girl	421	0.72	0.874		
Money management	Boy	279	0.46	0.697	3.763	0.053
	Girl	421	0.36	0.607		
Time spent on internet for entertainment	Boy	279	1.39	0.994	6.448	0.011
	Girl	421	1.19	0.990		
Choosing friends	Boy	279	0.41	0.688	3.897	0.049
	Girl	421	0.32	0.563		
Conflict with mother over…						
Dressing and hair style	Boy	279	0.47	0.688	0.215	0.643
	Girl	421	0.49	0.739		
Time spent with friends	Boy	279	0.67	0.834	0.374	0.541
	Girl	421	0.64	0.758		
Academic performance	Boy	279	0.97	0.893	10.240	0.001
	Girl	421	0.77	0.769		
Extra classes	Boy	279	0.62	0.848	3.295	0.070
	Girl	421	0.52	0.699		
Higher education orientation	Boy	279	0.51	0.763	1.957	0.162
	Girl	421	0.44	0.643		
Self-study at home	Boy	279	1.08	0.971	4.33	0.038
	Girl	421	0.93	0.949		
Money management	Boy	279	0.49	0.753	0.378	0.539
	Girl	421	0.46	0.684		
Time spent on internet for entertainment	Boy	279	1.49	1.003	0.312	0.577
	Girl	421	1.44	1.005		
Choosing friends	Boy	279	0.42	0.679	0.234	0.628
	Girl	421	0.40	0.611		

home. For the two reasons for conflict, academic performance and self-study at home, mean scores show that the frequency of having conflict between mother and boy are higher than between mother and girl, and these differences are statistically significant.

About the conflicts between fathers and their boys/girls, mean scores show that fathers have more conflicts with their boys than with their girls in all reasons for conflicts; and the differences between these two groups (fathers and boys; fathers and girls) are statistically significant in most of the reasons for conflict except for adolescents' dressing and hair style and money management.

3.2. How Vietnamese adolescents and their parents handle their conflict and adolescents' responses to conflict resolution

When being asked how their mother and father respond at the most recent conflict between them, most adolescents report that their parents' response is quite supportive, as presented in Figure 1.

Among eight parental responses against parent-adolescent conflict as documented in the study, the most supportive response – explaining the situation and providing advice – is the most popular reaction among both fathers and mothers. 54.8% of adolescent participants report that their father and 67.2% report that their mother does so in the most recent conflict between them and their parents. Lower percentage reports aggressive response from their parents, and fathers tend to have more physically aggressive responses (corporal punishment such as beating or hitting) than mothers (9.4 and 6.5% reported, respectively), whereas mothers tend to have more verbally and emotionally aggressive reaction than fathers (17.8% and 15.7%, respectively). Some parents also tell their adolescents' homeroom teachers for their intervention into the conflict between parents and adolescents, as reported by adolescents (0.6% of fathers, 1.4% of mother). Notably, whereas 7.6% of adolescents report that their fathers ignore the conflict as if nothing happened, none of the participants report that type of reactions from their mothers.

The following figure presents adolescents' response to their parents during conflict (See Figure 2).

As reported by adolescents, 36.5% of them try to explain their situation to parents and persuade parents to accept or even support them in the situation. The remaining 63.5% report either passive response (46.4% kept silent, just letting their parent(s) talk; 13.9% obeyed parents' solution even though they was unhappy about that; and 12.9% avoided communicating with their parents about the conflict) or aggressive response (14.4% aggressively agued with their parents).

Whereas adolescents' behavioral responses seem not so alarming, report from adolescents shows that a part of them have negative feelings, as presented in Figure 3.

Beside 55.5% claim that the conflict is not so serious, so they have no notable feeling, 10.6% report that they feel satisfied because they and their parents develop better understanding of each other after the conflict. The remaining reports a quite alarming emotional response. Nearly 7% want to run away from home and 4.5% even think of committing suicide.

Whereas most of the parents behave quite supportively (67.2% of the mothers and 54.8% of the fathers of survey participants explained the situation/conflict to adolescents, and giving them advice), why do many of adolescents still have quite negative behavioral and emotional responses? Semi-structured interviews with adolescents show that adolescents tend to feel that their parents do not understand them and respect their needs.

> 'My mom often says, "I gave birth to you, I understand you more than you do." Anytime she says so, I do not want to talk with her anymore' (12th grade student, girls, GPA at 'Good' level).

Even when parents give their adolescents reasonable advice, if this advice is not suitable to adolescents' needs, the support of parents might create somehow negative feelings in adolescents. Following is one of the cases where parents provide support whereas teens feel disappointed. The communication between the adolescent and her parents, as narrated by the adolescent herself, somehow implies a parental

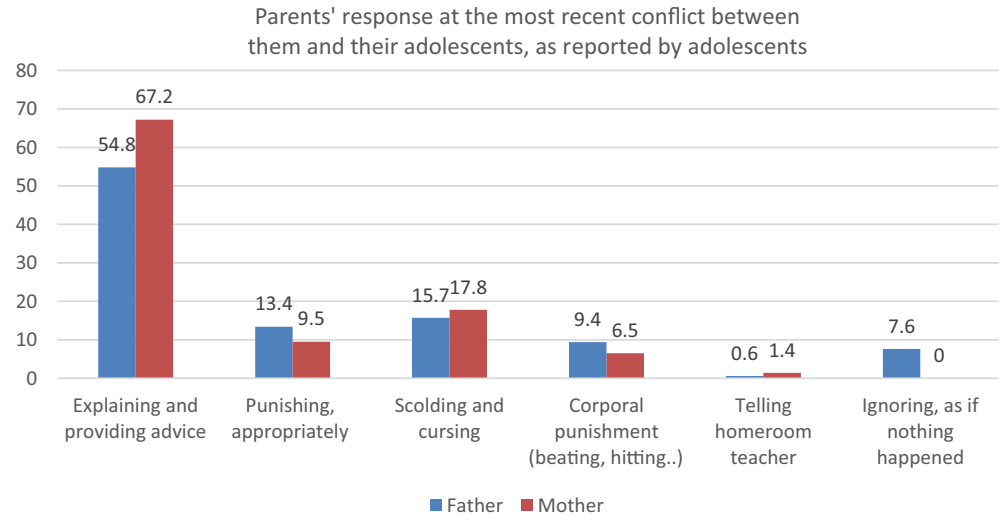

FIGURE 1
Parents' response at the most recent conflict, as reported by adolescents.

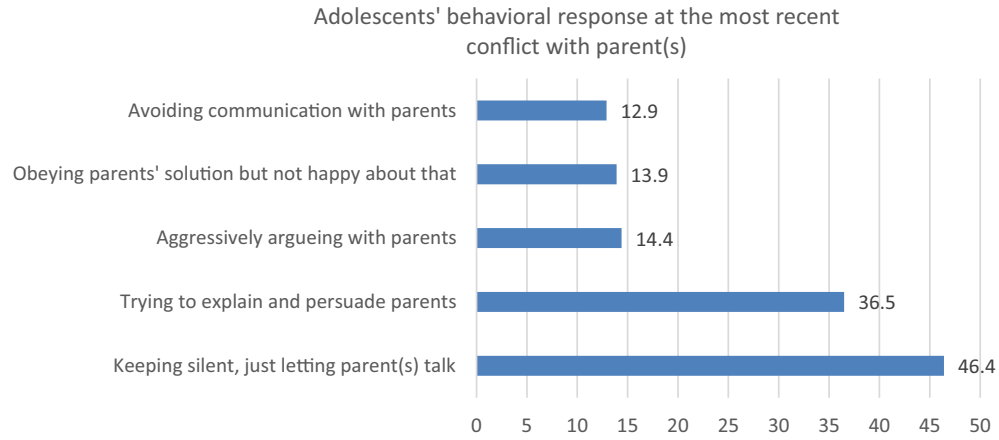

FIGURE 2
Adolescents' response in the most recent conflict.

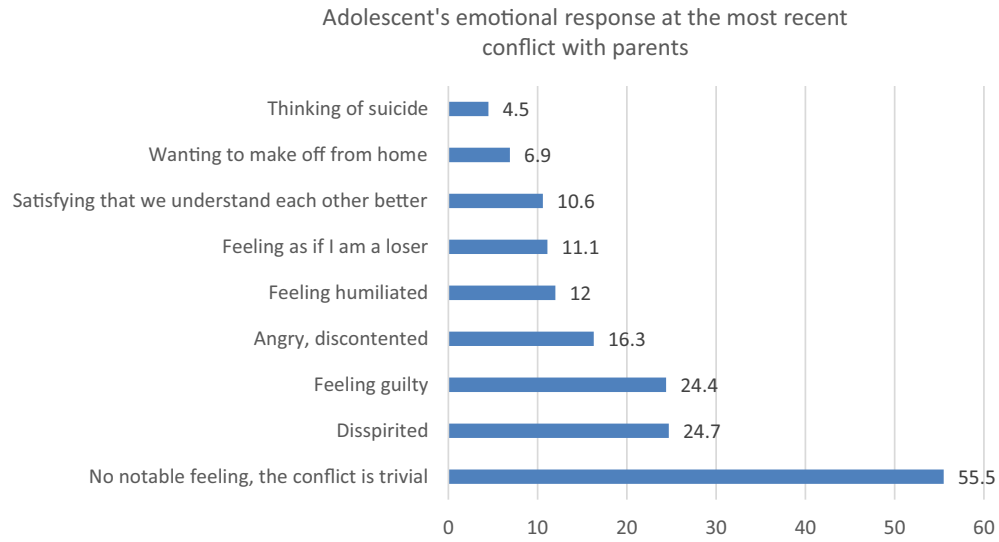

FIGURE 3
Adolescents' emotional response at the most recent conflict with their parents.

invalidation. In this case, the parents love their daughter and care about every step in her progress. However, the way they take care of their daughter seems overprotective that the girl feels as if she is disabled to make decision for and take control of her own life. We hereafter quote a conversation between her and us to provide a better understanding of the girl's perception and feeling towards her parents' reaction.

Results from the questionnaire survey is in the same line with qualitative data. One-way ANOVA test result showed that how adolescents feel after the conflict varied among different way in which their parents and them resolve the conflict. When being asked how they felt about the conflict (0 = completely unsatisfied; 3 = completely satisfied), results show that most of adolescents in the situation that parents impose their way of resolving the conflict on adolescent feel unsatisfied (mean score = 0.94 on a 4-point scale from 0–3, with a low standard deviation at 0.276). They also somewhat dissatisfy in the case that their parents ignore the conflict (mean score = 1.50, SD = 0.746). Adolescents are most satisfied with the situation where parents support their way (mean score = 2.56; SD = 0.577), followed by the situation where parents talk it over with them (mean score = 2.09; SD = 0.578). One-way ANOVA test result show that the differences between mean scores are statistically significant ($F(3,706) = 178.670$; $p = 0.000$).

3.3. Factors related and unrelated to adolescents' frequency of having conflict with their parents

The following table summarizes associations between adolescents' frequency of having conflict with parents and some personal and family factors. Where the independent variables are Likert scale or quantitative, we use Pearsons'r; and where they are categories, we use Chi-square analysis (See Table 4).

Different from our expectations, adolescents' sex (whether they are boys or girls), grade (whether they have just been enrolled to high-school – grade 10; or they are about to finish their high-school education and preparing for university entrance exam – grade 12); and academic performance (whether they obtained high or low GPA) have no statistically significant association with adolescents' frequency of having conflict with their parents. Whether the family is nuclear (only parents and children) or extended (parents, children, grand-parents…) also has no relationship with adolescents' frequency of having conflicts with their parents. In addition, how often adolescents have conflict with their parents was found unrelated to their feeling that their home is cozy and warm.

However, our study finds that Vietnamese adolescents' frequency of having conflict with parents is statistically related to some parent- and friend-related factors, as following:

Parents' education level: the higher education level the parent is at, the more frequently they have conflict with their adolescent child. This is true for both father and mother.

Relationship between mother and father: whereas the harmonious relationship between father and mother has no association with their frequency of having conflict with their teenage child, parents who often quarrel with each other tend to have more conflict with their teens.

Friend network: although Chi-square test shows no statistically significant relation between friend network and adolescents' frequency of having conflict with parents, the distribution of having conflicts with parents over types of friend network worths considering, as presented in the following table:

As shown in Table 5, adolescents who have a healthy friend network (type 2 – having many friends, some of them are close friends; and type 3 – having not many friends, some of them are close friends) tend to have less conflict with their parents. Notably, there is a remarkably higher proportion of adolescents who are somewhat socially isolated (type 4 – having a few friends, not close with anyone) frequently have with parents (14.7%, three times that proportion among type 2; and about two times that proportion among type 1 and 3). On the contrary, the proportion of rarely having conflict with parents among type 2 was also higher than that proportion among type 1, 2, and 3 (50%, in comparison with 44.1%; 39.4%; 43.1%, respectively). The similar trend is also observed among adolescents who have many friends but are hardly close with anyone (type 1).

Frequency of hanging out with friends: the more frequently adolescents hang out with their friends, the more frequent conflict they have with their parents.

This study finds that adolescents who have very little time for hanging out with friends (almost no) tend to have less conflict with their parents, whereas those who spend too much time on hanging out with friends (nearly daily) have more conflicts with their parents.

4. Discussion

This exploratory study finds that Vietnamese parents and adolescents commonly have conflict over 09 issues: adolescents' dressing and hair style; time spent with friends, academic performance, taking extra-classes; higher education orientation; self-study at home; money management; time spent on internet for entertainment purpose; and choosing friends. Among these issues, conflicts over adolescents' spending time on the internet for

TABLE 4 The associations between parent-adolescent conflicts and some personal and family factors.

No association	Statistically significant associations
Adolescents' sex; grade, and academic performance	Frequency of hanging out with friends ($r = -0.130$; $p = 0.001$)
The number of generations at home	Mothers' education ($r = 0.142$; $p = 0.000$)
The number of children in the household	Father's education ($r = 0.143$, $p = 0.000$)
Cozy and warm atmosphere at home; parents love each other	Parents' conflicts with each other (0.152; $p = 0.000$)

TABLE 5 Relationship between adolescents' social relationship and their frequency of having conflict with parents.

	Adolescents' frequency of having conflict with parents (%)				
	Rarely	Sometimes	Many times	Frequently	*N*
Friend network (n/a)					
Type 1	44.1	26.5	22.1	7.4	68
Type 2	39.4	31.6	24.2	4.8	393
Type 3	43.1	28.0	22.7	6.2	211
Type 4	50.0	26.5	8.8	14.7	34
Adolescents' frequency of hanging out with friends (*)					
Nearly daily	33.3	22.7	30.7	13.3	75
Sometimes a week	42.1	26.3	25.8	5.7	209
Sometimes a month	39.5	34.7	21	4.8	248
Hardly	48.2	31.0	17.9	3.0	168

n/a: no association; (*) $p < 0.001$.

Interviewer: Please tell me an example of your communication with parents which made you feel disappointed.

Interviewee: I want to study Psychology for my higher education program. First, my parents told me to let them think. A few days later, they asked me to have a talk with them and then they gave me a hundred reasons for why I should not study Psychology and why I should study Business instead. I cannot contradict, because all what they said was reasonable and full of evidence. It's just… I want to study Psychology, not Business.

Interviewer: So, you disappointed with the fact that you must give up Psychology, or what?

Interviewee: With the communication. With my parents. About Psychology, I was not self-confident about my understanding of this discipline, so…, yes I did feel somewhat regretful for giving up but not too much disappointed.

Interviewer: I am trying to understand your situation. It took your parents some time to study both Psychology and Business before talking with you, it seems that they really care about you [the interviewee nodded]. At first you preferred Psychology, however the fact that you find their reasons reasonable, then you follow their advice, it seems that you are somewhat persuaded. What made you disappointed with that communication and your parents?

Interviewee: It was like my parents' performance, and I am just an audience. I kept silent all the time. No room for me to talk. They gave me the reasons, and they made the decision for me. Like all the other times. Even though I know what they say is good for me, their decision will be better than mine because they have a lot of experience and knowledge. I cannot contradict anything they say. But I am still unsatisfied.

Interviewer: From what you said, I understand that your parents tend to impose their solution for your issues. Even though their solution may be the best one for you to select, the fact that you have no voice in the important milestones of your life makes you dissatisfied, because you are unable to manage your own life. Did I get you right?

Interviewee: Yes, exactly. It makes me feel I am unable to take control of my own life.

entertainment purposes, self-study and academic performance occur most frequently among adolescents and their parents. It also adds that, beside the traditional concern for study, Vietnamese parents strongly worry that their adolescent spend too much time on the internet for entertainment.

Further, this study found that there was no difference between mothers and fathers in the trend of having conflict with their adolescent child over specific issues. Both mother and father have more conflicts over study, internet usage, and friend issues than other issues. This suggests that the Vietnamese mothers and fathers share similar concerns about their child.

This study found that Vietnamese parents, especially mothers, tend to act supportively when a conflict arose between them and their adolescents, as reported by adolescents themselves. Most of the parents would talk over the situation with their adolescents and provide them with advice. Even though some adolescents reported that their parents behave violently, the proportion is not too high, considering the fact that Vietnam is a culture which considers corporal punishment as a method of educating children (UNICEF, 2015). In addition, about 8% of Vietnamese adolescents reported that their fathers ignore the conflict. However, we believe this number does not mean these fathers neglect their adolescents. This finding may be better explained by the fact that in Vietnam it is the mother who plays the key role in taking care of and educating the children, hence in some trivial cases the father may completely entrust the mother with dealing with the parent–child conflict. This situation is quite popular in Asian cultures affected by Confucism (Keng and Soh, 2018).

However, the frequency of conflict between mother and adolescent is higher than between father and adolescent in all nine themes. In addition, no difference was found in the way mothers had conflict with their girls in comparison with boys. However, fathers have more conflicts with their boys than with their girls in most of the conflict themes, and these differences were statistically significant. We suppose that these differences may imply an intra-role conflict between fathers and sons, in which fathers tend to impose their expectations of being a man into their boys, and hence fathers have more conflicts with their boys than with their girls. However, we found no signals of the intra-role conflict between mother and girl. We suppose that this intra-role conflict between mother-and-girl may be neutralized by the fact that, in Vietnamese culture, mothers are often in charge for educating and taking care of their children (Teerawichitchainan et al., 2010). The more they undertake these education and care missions, the more chances they may have conflict with their adolescents, despite their adolescent's sex.

Notably, the study finds that both behavioral and emotional response of Vietnamese adolescents when having conflict with their parents tend to be quite negative. They tend to act passively (e.g., either keeping silent and letting their parents talk; or obeying their parents' arrangement even though they are unhappy with that). The rate of adolescents who have positive actions (e.g., trying to persuading their parents so that their parents understand their perspective and/or accept their solution), and the rate of those who have aggressive response (i.e., arguing aggressively with parents) are much lower than those who behave in a passive manner. Adolescents' reports of their emotional responses even showed some alarming signals. Actually, half of them had no special feeling after their most recent conflict with their parents because the conflict was not serious; and even about one in ten reported a positive feeling that they were happy that the conflict resolution had helped them and their parents understand each other better. However, some reported quite alarming negative feelings such as feeling humiliated or feeling as if they were a loser. Remarkably, 4.5% of participants reported thought of committing suicide and 6.9% said they had wanted to run away from home. This result is in the same line with a recent report by UNICEF on the mental health of Vietnamese adolescent, which alarmed the risk of mental health issues and thought of committing suicide. Our in-depth interviews with Vietnamese adolescents suggested that the conflict between parents and adolescents itself was just stimulus. The key causes of these negative responses spring from the long-term relationship between parents and adolescents. In cases where the parent-adolescent conflicts were severe, our interviews with adolescents documented that the way their parents disrespect their autonomy, feeling and thought made them feel oppressed, impotent, and lonely. Remarkably, this situation also happened in families

where parents love and over-protect their children. This study, hence, alarms some problems in Vietnamese parent-adolescent relationships which might results in adolescents' poor mental health.

These findings are culturally understandable. Vietnam has been affected by Confucian ideology for a thousand of years; and Confucian concept of filial piety ("đạo Hiếu") which requires children to unconditionally obey their parents (Bedford and Yeh, 2019). As the character "xiao is comprised of an upper component representing age and a lower component representing child" (Bedford and Yeh, 2019: 1), the concept of filial piety implies orderly social structure in which the parents are assigned the power to rules over the child. As a Vietnamese idiom goes, "Children must stay where their parents arrange" (cha me dat dau con ngoi day). This cultural belief lets Vietnamese parents tend to believe that they have the rights to decide things for their children. On the other hand, whereas adolescents have also been socialized this concept of filial piety, their profound exposure to new values and ideas such as children's rights, autonomy, or individualism imported to Vietnam through mass media and cultural products (movies, novels, manga) creates generational differences between them and their adults. Though generation gap between parent and children occurs in many cultures (Kaufman, 1998; Williams and Nussbaum, 2001), it might occur more remarkably in Vietnam due to the socio-economic renovation in Vietnam since 1986 (Doi Moi). This turning point marked a radical change from a quite closed, bureaucratic, and subsidized economy to a market-oriented economy with a great effort to attract foreign investment in Vietnam. While Vietnamese parents in this study were children of the old economy, adolescent participants of this study were born when Vietnamese economy had been robustly developed and resulted in many social changes with a strong internationalization effort. Hence, though this study is discussing generational gap between adolescents and their parents in domestic Vietnamese families, the situation is quite identical to what the adolescents of migrated Vietnamese families in Poland are experiencing as found by Szymanska-Matusiewicz (2016): being "torn between two worlds" (p. 84). One world is the traditional values and norms, and the other one strongly affected by inter-national cultures especially Western cultures to which Vietnamese adolescents are daily exposed through various sources such as movies, novels, and especially social media platforms such as Facebook, Instagram, or Tik Tok. The warning point here, as this study discovered to some extent, is that this great difference gap between Vietnamese parents and adolescents, when combining with such an authoritarian parenting style, may result in the risk of mental health issue among adolescents such as low self-esteem, depression and anxiety (Fadlillah et al., 2020; Chen, 2022), and further childhood invalidation may in its turn may result in more severe issues like personality borderline disorder symptom (Keng and Soh, 2018).

Further, this study explores an interesting relation between teen friendship and adolescent-parent conflict. The more adolescents spend their time hanging out with friends, the more frequently they will have conflict with their parents. More frequent association with peers may broaden the generational differences between adolescents and their parents. This finding is in the same line with a study by Moon and Hofferth (2015), which found that the more time spent with peers and less time spent with parents increased adolescents' externalizing behavior problems. Our study further found that adolescents having a healthy friend network tended to have less conflict with their parents. Adolescents having loose friend network tend to fall into two opposite categories: they might have either much more or, on the contrary, much less conflict with their parents. However, it should be noted that having less conflict with parents does not mean positive parent-teen conflict. This situation may reflect a harmonious relationship between parents and adolescents, but it may also imply a highly unharmonious relationship where adolescents hide their issues from their parents, or parents neglect their adolescents' doings.

This study hence suggests that psychologists and social workers should pay more attention to the way parents and adolescents communicate with each other in daily life and how they perceive their relationships, the other's expectations, and their own expectations of their parents/child. Developing more education programs for parents to better understand their adolescent child's developmental needs and how parent–child relationship affects their child may be of great importance to Vietnamese families at this period.

5. Limitations and suggestions

This is an exploratory study aiming at discovering the relationship between parents and adolescents in a fast-developing country as Vietnam. It focuses on studying how Vietnamese parents and adolescent deal with their daily conflicts through the lens of adolescents. As an exploratory study, the study has captured key trends in parent-adolescent conflicts and the way they responded to their conflict, and further explored the associations between factors, both personal and family-related, and adolescent-parent conflict frequency. However, this study, with its exploratory nature, is unable to affirm some possibly significant associations between the loose friend network and the risk of parent–child conflict. Adolescent is the developmental period when peer relationship becomes critically important, therefore more study needs to be conducted to clarify how friend network and parent–child relationship is inter-related. This study also suggests that further qualitative and quantitative study should be conducted in order to clarify how parenting styles and parent-adolescent relationships may affect adolescents' mental health and behavior problems in Vietnamese context. Whereas quantitative research helps clarify the correlations between parent-adolescent relationship and adolescents' internalizing and externalizing problems, qualitative help provide more insightful understanding of how cultural beliefs and norms, family organization and division of labor, technology and the increasing participation of technology in personal living may contribute to parent-adolescent relationships.

6. Conclusion

This study focuses on investigating parent-adolescent conflicts in Vietnamese families, primarily from the perspectives of adolescents. A mixed-method approach involving in-depth interviews and questionnaire surveys was used to collect data for the study. The findings indicate that conflicts between Vietnamese parents and adolescents often arise regarding internet usage for entertainment purposes and academic matters. Furthermore, adolescents tend to experience more conflicts with their mothers than with their fathers. Although instances of parental aggression in response to conflicts were identified in the study, the majority of adolescents reported that

their parents handled the conflicts in a supportive manner. However, Vietnamese adolescents likely to display passive behavioral responses. The study also identifies some warning signs of mental health issues in the emotional response of some adolescents such as suicidal thoughts. It is also found that more connection with peers significantly relates to the higher frequency of having conflict with parents. The study suggests that practitioners such as school social workers or counsellor should pay more attention to the impacts of parent–child conflict on adolescents' emotion in particular and mental health in general, as well as trace back to the patterns of parenting and parent–child communication in contemporary Vietnamese families.

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 humans were approved by Vietnam Institute for Family and Gender Studies. The studies were conducted in accordance with the local legislation and institutional requirements. Written informed consent for participation in this study was provided by the participants' legal guardians/next of kin.

Author contributions

THN designed the research, collected the data, run data analysis, and wrote the result session. TNN wrote introduction, research methods, discussion, limitations, and conclusion. 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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Supplementary material

The Supplementary material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/fpsyg.2023.1243494/full#supplementary-material

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The impact of maternal work–family conflict on problem behaviors among preschoolers during the COVID-19 epidemic: a moderated mediation model of maternal anxiety and trait mindfulness

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Purpose: The mediating effects of maternal anxiety and moderating effects of trait mindfulness on the relationship between Work–family conflict (WFC) and preschool children's problem behaviors remain unclear during the COVID-19 epidemic. So, this study examined the association between mothers' WFC and preschoolers' problem behaviors and identified the roles of maternal anxiety as a mediator and trait mindfulness as a moderator during the COVID-19 epidemic.

Methods: In this cross-sectional study, a sample of 1,068 Chinese preschoolers and their mothers from coastal cities in southern China were investigated. Data were collected using demographic questionnaires, Carlson's WFC scale, Ma's Parenting Anxiety Scale, Goodman's SDQ Scale, and Brown and Ryan's Trait Mindfulness Scale, and were analyzed using SPSS 26.0 and Process 3.3.

Results: WFC had a positive and direct association with problem behaviors in preschoolers ($\beta = 0.118$, $t = 3.880$, $p < 0.001$). WFC also had a positive and direct association with maternal anxiety ($\beta = 0.480$, $t = 18.034$, $p < 0.001$). Maternal anxiety had a positive and direct association with preschoolers' problem behaviors ($\beta = 0.415$, $t = 13.584$, $p < 0.001$). The mediating effect value of maternal anxiety between WFC and preschoolers' problem behaviors was 0.199, and the moderating effect value of trait mindfulness between maternal anxiety and preschoolers' problem behaviors was −0.078.

Conclusion: WFC was positively associated with preschoolers' problem behaviors, and maternal anxiety was a mediator of this association. So, WFC could cause maternal anxiety and lead to more problematic behaviors in children. Besides, maternal anxiety was positively associated with preschoolers' problem behaviors, and trait mindfulness was a moderator of this association.

KEYWORDS

work–family conflict, maternal anxiety, preschoolers' problem behaviors, trait mindfulness, intermediation effect, moderating effect

Introduction

Problem behavior, known as behavior distress, bad behavior, and so on, is an important indicator of individual social adaptation. Onyskiw believes that problem behavior is a series of behaviors that are contrary to common sense standards in the process of children's socialization (Onyskiw, 2003), including the problem behaviors of emotion, attention deficit, conduct, and peer relationship (Durant et al., 1997). While Achenbach used a dichotomy to divide problem behaviors into internalized problem behaviors and externalized problem behaviors (Achenbach, 1991). Internalized problem behaviors refer to the negative emotions that individuals experience physiologically, including anxiety, depression, withdrawal, and other emotional problems (Zahn-Waxler et al., 2000; Onyskiw, 2003). Externalized problem behaviors refer to non-adaptive behaviors that violate social norms (Liu, 2004), including disciplinary and aggressive behaviors. Numerous studies have shown that both internalized and externalized problem behaviors are distributed in the preschool period. In recent years, children's problem behaviors have been increasingly younger (Chen et al., 2021). Due to the rapid physical and mental development of individuals in the preschool period, and at the same time individuals experience changes in the environment from home to school, it is easier for preschoolers to produce problem behaviors (Peng et al., 2018). The emergence of problem behaviors will directly affect preschoolers learning knowledge and skills. Besides, problem behaviors in early childhood will continue into adolescence if not intervened, eventually leading to an increase in the probability of adverse behaviors such as substance abuse in adolescence and even adulthood (Ashford et al., 2008; Fanti and Henrich, 2010; Basten et al., 2016). Rutter's early research found that more than 70% of the subjects with antisocial problem behaviors in adulthood had a strong tendency toward antisocial behaviors in childhood (Robins and Price, 1991). Therefore, problem behaviors in early childhood have a great impact on individual growth.

Work–family conflict and preschoolers' problem behaviors

Work–family conflict refers to the role conflict that occurs when an individual's family needs and work needs are difficult to coordinate (Li et al., 2017). This kind of role conflict, involving both home and work, is relevant to every professional worker, especially mothers who take full-time jobs. The dual identity of a professional worker and the mother of one or more minor children often faces greater role conflict (Zhou et al., 2018), which may have been amplified by COVID-19. Since the outbreak of COVID-19, many countries have implemented social distancing measures to curb its spread, which has also fundamentally changed mothers' routines in the home and work spheres (Prime et al., 2020; Settersten et al., 2020). Many mothers are required to take full responsibility for the supervision, care, and education of their children during working hours as a result of the measures that have resulted in a significant increase in the time children spend with their mothers. So, a significant proportion of mothers will bring work into the family (Arntz et al., 2020), which also creates new risks for parent–child relationships and child development (Adisa et al., 2021; Schmeer et al., 2023). Previous studies have focused on the impact of work–family conflict on individual work or psychological aspects (such as job burnout, life satisfaction, etc.), but little is known about the impact of work–family conflict on child development (Dinh et al., 2017). Therefore, this study attempts to change the perspective and explore the impact of work–family conflict on child development.

Research has found that mothers working from home blur the boundaries between work and parenting roles (Desrochers and Sargent, 2004) and that mothers managing these boundaries deplete their psychological resources and negatively impact their parenting behaviors (Voydanoff, 2005). Meanwhile, as these boundaries become more permeable (Desrochers and Sargent, 2004), this also leads to more tasks, longer working hours, more work–family conflict, and increased stress, especially when they spend overtime working (Arntz et al., 2019; Kim et al., 2020; Song and Gao, 2020). According to the spillover hypothesis theory, individual emotions (including positive and negative) or behaviors will be transferred from one situation (relationship) to another situation (relationship). Work–family conflict, as a negative emotional perception, may be transferred to the parenting situation and have a negative impact on children. Studies have shown that when mothers have conflicts between work and family, children are more likely to have externalized problem behaviors, such as emotional problems (e.g., depression and anxiety), and behavioral problems (e.g., hyperactivity) (Zeng, 2011; Hess and Pollmann-Schult, 2020; Wang et al., 2021). For example, Strazdins found that when the mother experienced a high level of work–family conflict, the emotional and behavioral problems of 4 or 5-year-old children would be more prominent, and this association has a certain stability (Strazdins et al., 2013). As a result, mothers working from home are likely to amplify the negative spillovers of work-related stress to parent–child relationships, which in turn leads to more problem behaviors in children (Edhborg et al., 2003). Before the epidemic, some scholars have already confirmed that mothers' work–family conflict can significantly predict children's anxiety and other internalized problem behaviors (Zeng, 2011). However, the mechanistic research on the relationship between mothers' work–family conflict and preschoolers' problem behaviors caused by the COVID-19 epidemic was still very limited. Therefore, this study explored the association between work–family conflict and preschoolers' problem behaviors during the COVID-19 epidemic, and the underlying mechanisms of maternal anxiety and trait mindfulness in the Chinese context.

Maternal anxiety as a mediator

Research has found that the COVID-19 epidemic has increased work–family conflict for many mothers (Verweij et al., 2021). And both pre-pandemic and during-pandemic studies have shown that work–family conflict is associated with higher levels of anxiety (Freisthler et al., 2021) and health problems (Borgmann et al., 2019), and high levels of work–family conflict often lead to lower maternal sensitivity (Chung and Van der Lippe, 2020; Haines III et al., 2020), which creates a greater risk of increased problem behaviors in children (Conrad and Hammen, 1989). Moreover, the work–family conflict theory emphasizes that in the case of lack of boundary elasticity, role stress, and role conflict will cause individuals to have more negative emotional experiences such as anxiety (Greenhaus and Beutell, 1985; Eby et al., 2005). In the Chinese social environment, the work–family

conflict also has a significant impact on mothers' parenting anxiety (Zhang and Lin, 2020), individual work anxiety (Qiu et al., 2017), and mental health (Zeng et al., 2019). Staines proposed the spillover theory of the relationship between work and family in 1980. This theory holds that work–family conflict will have adverse effects on both work and family, while work–family conflict, as a stressor, can extend the negative impact of mothers' negative emotional level on parent–child relationships, resulting in maladaptive problems in children (Cox and Paley, 1997; Buehler and Gerard, 2002). It can even cause distress and anxiety in children, leading to a series of problem behaviors (Su et al., 2011). According to social learning theory, mothers' negative emotions (such as anxiety) can affect the child's problem behaviors level through the role of genetics and parenting style (Puka et al., 2017).

A survey study using a family research design, after controlling for the influence of parental raters, also showed that maternal anxiety symptoms significantly predicted children's problem behaviors (Gagne et al., 2019). Meanwhile, a large cohort study conducted in Norway using multilevel analysis modeling found that maternal anxiety was significantly associated with internalized problems in preschoolers (Gjerde et al., 2020). The findings of Teyhan suggested that maternal anxiety symptoms were significantly associated with children's internalized problems and abnormal SDQ difficulty total scores (Teyhan et al., 2014). In addition, a large-scale cross-sectional study conducted by Chinese scholars found that during the COVID-19 epidemic, maternal anxiety had a greater impact on children, that is, the higher the anxiety level of parents, the higher the incidence of children's problem behaviors (Zhong et al., 2021). And a long-term, multi-measurement follow-up study conducted by Frigerio before and after the COVID-19 epidemic showed that in a sample of preschoolers, the more severe the mother's emotional symptoms, the higher incidence of children's internalized (i.e., emotional responses, anxiety/depression, withdrawal) and externalized (i.e., aggressive behaviors) problems. This also suggests that in stressful settings (such as those created by the COVID-19 epidemic and subsequent illness), mothers' emotional symptoms may have some effects on the child's healthy development negative effects (Frigerio et al., 2022). And the results of a follow-up study conducted during the COVID-19 epidemic in Israel also supported a significant association between maternal anxiety and children's internalized problems (Hanetz-Gamliel et al., 2021). Therefore, this study hypothesizes that maternal anxiety acts as the mediator between maternal work–family conflict and preschoolers' problem behaviors during the COVID-19 epidemic.

Maternal trait mindfulness as a moderator

Ellen Langer believes that mindfulness is a psychological trait and it refers to the degree to which individuals perceive and pay attention to stimuli that occur at the moment, with stability across time and situations (Brown and Ryan, 2003). The mindful coping model holds that individuals with high mindfulness can expand attention and enhance cognitive flexibility when they decentralize their responses to conflicts and other potential threats in the environment, and carry out positive cognitive reappraisal, thus reducing the threat brought by conflicts or stressful events (Garland et al., 2009). Therefore, mothers facing high levels of work–family conflict do not necessarily experience negative effects due to the role of individual mindfulness. The results of empirical research also showed that maternal mindfulness had a positive effect on reducing the negative impact of conflict and problem behaviors of children (Siu et al., 2016). Besides, an empirical study in the Chinese context suggested that maternal mindfulness effectively alleviated the impact of stress caused by individual work–family conflict on children's problem behaviors (Wang et al., 2023). And the family interaction theory holds that the interaction between family members and the interaction model between parents and children can effectively explain the formation mechanism of children's problem behaviors (Lv et al., 2003). For preschoolers, mothers are the primary caregivers and significant persons, so young children's problem behaviors are inevitably influenced by some of the mother's traits, such as mindfulness (Goodman et al., 2011; Corthorn, 2018). Studies have found that higher levels of mindfulness in mothers tend to predict fewer problem behaviors and positive social adaptation in children (Geurtzen et al., 2015; Coatsworth et al., 2018). And Siu found that maternal mindfulness levels were negatively correlated with children's problem behaviors, and high levels of maternal mindfulness helped to improve young children's problem behaviors (Siu et al., 2016). Therefore, this study hypothesizes that maternal trait mindfulness moderates the direct link between work–family conflict and problem behaviors in preschoolers during the COVID-19 pandemic.

Research has shown that individuals with trait mindfulness are good at mastering their attention and making non-judgment about what is happening at the moment, which helps to regulate the individual's emotional state (Gross, 1998; Shallcross and Spruill, 2018). Individuals with high trait mindfulness can look at things dialectically, quickly get rid of the negative emotions brought about by negative events (Haun et al., 2018), and are less likely to be influenced by the outside world (Xu et al., 2017). On the contrary, individuals with low trait mindfulness have difficulty focusing on the present moment, and stressful events in daily work and life can trigger more severe mood swings (Xu et al., 2015). The study by Wei Xu also found that trait mindfulness had a moderating effect on the relationship between stress and individual emotions (Xu et al., 2017). For individuals with high trait mindfulness, stress is a weaker positive predictor of their mood. So trait mindfulness plays a mediating role between stressful events and individual emotions. Therefore, when faced with stressful events such as the COVID-19 epidemic, maternal trait mindfulness may be able to alleviate the adverse relationship between work–family conflict and mothers' anxiety.

In addition, many scholars in recent years have introduced individual mindfulness into the field of family parenting, which is associated with child development outcomes. The advancement of numerous studies has led to the gradual rise of the Mindfulness-Based Intervention Program (MBI) for mothers. Intervention research results showed that a period of mindfulness intervention for mothers effectively reduced mothers' own stress and parenting pressure, improved anxiety and other emotional problems and negative parenting behaviors, and reduced children's problem behaviors (Coatsworth et al., 2018; Chaplin et al., 2021). Besides, family system theory believes that the various family factors that affect children's development do not work independently, but also have interactive joint effects (Cox and Paley, 1997), that is, as an individual factor of the mother in the family system, maternal trait mindfulness can

interact with the mother's anxiety and work–family conflict to some extent, thus affecting the development of children. Research confirmed that mothers' mindfulness not only affected their own physical and mental health but also migrated to their parenting behaviors, thus indirectly affecting child development (Gouveia et al., 2016; Corthorn, 2018; Han et al., 2021). Mothers with a higher level of mindfulness can perceive and pay attention to the current experience in life and have strong self-compassion (Pepping et al., 2013). In addition, in parent–child interaction, they are often well aware of negative emotional experiences, effectively regulate and improve their emotional states, better perceive children's feelings, promote children's healthy development, and reduce the risk of children's problem behaviors (Moreira and Canavarro, 2017; Benton et al., 2019). Thus, maternal trait mindfulness may also moderate the association between maternal anxiety and problem behaviors in preschoolers.

The present study

Based on the spillover theory (Staines, 1980), social learning theory (Puka et al., 2017), and family systems theory (Cox and Paley, 1997), the present study tested a moderated mediation model to clarify the mechanisms underlying the associations between work–family conflict and preschoolers' problem behaviors during the COVID-19 epidemic. This integrated model indicated how and when work–family conflict influenced preschoolers' problem behaviors during the COVID-19 epidemic (Figure 1). Based on the literature review, the following hypothesizes were generated:

> *H1*: Maternal work-family conflict is significantly associated with preschoolers' problem behaviors.
>
> *H2:* Maternal anxiety mediates the association between work-family conflict and preschoolers' problem behaviors.
>
> *H3*: Direct and/or indirect associations between work-family conflict and preschoolers' problem behaviors due to maternal anxiety varied by maternal trait mindfulness engagement.

Method

Participants and procedure

We conducted the study in June 2022. Due to the import of overseas infection cases and other reasons, the situation of the COVID-19 epidemic in China was still severe, during which parents and their children were both at home and mothers spent significantly more time with their children because of the government's isolation policy. Therefore, there was an unprecedented close connection between parents and their children during the COVID-19 epidemic. Then, we used a cross-sectional online questionnaire to assess the relationship between work–family conflict, maternal anxiety, trait mindfulness, and preschoolers' problem behaviors during the COVID-19 epidemic. And, the Research Ethics Committee of our University approved the study.

First, mothers were given a link that opened an online consent form describing their rights, which informed them that the data would be used only for research purposes, participation was voluntary, and refusal to participate and withdrawal from the study would not lead to negative consequences. Then, mothers decided whether they consented to their own and their children's participation in this study. Only if the mothers and their children agreed to participate was the online survey made available. For those mothers and their children who declined to participate, the survey ended. For all other mothers and their children, the survey began with questions regarding demographics (e.g., age), followed by questions on work–family conflict, maternal anxiety, trait mindfulness, and preschoolers' problem behaviors.

Finally, the current study recruited 1,116 mothers and their children via convenient cluster sampling from a city in Southeast China; 48 parents and their children refused to participate and withdrew from the study, for a non-response rate was 4.30% (48/1116). Invalid samples included subjects with response regularity and missing values in the data. All valid samples have completed all questions, and no missing values exist. The final effective sample included 1,068 mothers and their children. Of the children, 39, 424, 369, and 236 were in the infant, small, middle, and large classes, respectively. Child participants were aged between 2.5 and 6.8 years ($M = 4.50$, $SD = 0.84$ years; 49.81% boys). And in the mother samples,

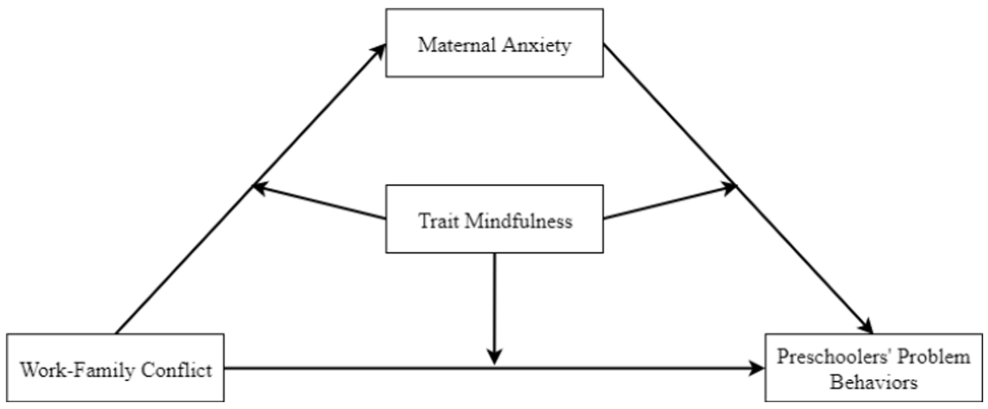

FIGURE 1
The conceptual moderated mediation model of work–family conflict on preschoolers' problem behaviors during the COVID-19 epidemic.

the participants were aged between 23 and 48 years (M = 38.09, SD = 8.92 years).

Measures

Work-family-conflict

The Work–Family Conflict Scale was developed by Carlson (Carlson et al., 2000), was introduced to China by scholars in 2007 and its effectiveness was verified (Gan, 2007). The scale consists of 18 items divided among the dimensions of work-family and family-work. And each dimension is divided into three levels: time-based, behavior-based, and stress-based. Items are answered on a five-point Likert scale ranging from 1 (totally disagree) to 5 (totally agree). In this study, higher scores indicated higher levels of work–family conflict faced by mothers during the COVID-19 epidemic. Cronbach's α was 0.954 in the current study.

Maternal anxiety

The Parenting Anxiety Scale was developed by Ma (2013). The scale is divided into two versions. The parent version of the questionnaire was used in this study. The scale consists of 16 items divided among the dimensions of parenting awareness, parenting behaviors, parenting support, and parenting influence. Among them, there are five items each on parenting awareness and parenting behaviors, and three items each on parenting support and parenting influence. Items are answered on a five-point Likert scale (1 = never or almost no to 5 = every day or almost every day). The scale was rated by the mother, with higher scores indicating higher levels of maternal anxiety. In the current study, Cronbach's α for this questionnaire was 0.804.

Preschoolers' problem behaviors

The Strengths and Difficulties Questionnaire (SDQ) was developed by Goodman (Durant et al., 1997). The test version of this study is the parent version revised by Chinese scholars, and its validity has been verified (Kou et al., 2005). There are 25 items in total, including four difficulty dimensions (20 items), emotional problems, conduct problems, lack of attention, and peer relationship problems, and the dimension of prosocial behavior strengths (5 items). In this study, four difficulty dimensions were selected to measure the problem behaviors of preschool children, and mothers judged them by using a two-point scale ranging from 0 = very inconsistent to 2 = very consistent according to the daily performance of the preschool children in the past six months. If the score is higher than 17, the child is considered to have problem behaviors. In the current study, Cronbach's α for this questionnaire was 0.801.

Maternal trait mindfulness

The Mindful Attention Awareness Scale (MAAS) was developed by Brown and Ryan (Brown and Ryan, 2003), and it was later translated into Chinese scale by Chinese scholars and tested and optimized (Chen et al., 2012). The scale consists of 15 items (e.g., "*I could be experiencing some emotion and not be conscious of it until sometime later*"). Items are answered on a five-point Likert scale (1 = almost always to 5 = almost never). All entries are reverse-scored. This study adopted the method of self-rating of mothers, with higher scores indicating greater trait mindfulness. In the current study, Cronbach's α for this questionnaire was 0.920.

Covariates

Previous studies have shown that maternal anxiety is influenced by demographic characteristics, such as age and family socioeconomic status (SES) (Nelson, 2010; Nomaguchi and Brown, 2011; Xiang et al., 2014; Kebriyaei et al., 2020). And Preschoolers' problem behaviors also are influenced by demographic characteristics, such as gender, age, and family socioeconomic status (SES) (Aebi et al., 2014; Flouri et al., 2014; Hosokawa and Katsura, 2018; Yu et al., 2020). These background variables were used as covariates in the analyses; gender was coded as 0 = girl, 1 = boy. For family SES, we collected household income, parents' education, and parents' occupations. A principal components analysis was performed, with family SES computed using the following formula: Family SES = (β1 × Z income + β2 × Z education + β3 × Z occupation) / εf, where β1–3 are the factor loadings and εf is the eigenvalue for the first factor (Cheng et al., 2021). In the current study, the participants' family SES range was −1.656 to 2.222.

Analytic plan

First, descriptive statistics and correlations were obtained. Second, we examined the mediation effect of maternal anxiety. Third, we further examined whether the mediation process was moderated by maternal trait mindfulness. The analysis of moderated mediation models was performed using Hayes's (Hayes and Scharkow, 2013) PROCESS macro (Models 4 and 59). In all analyses, we included preschoolers' gender, age, maternal age, and family SES as control variables.

Results

Common method deviation test

The data in this study were all from the mother's report. To control for the common method biases in this study, Harman's single-factor test was conducted (Podsakoff et al., 2003). The results indicated that altogether fourteen factors had an Eigenvalue of more than 1 and could jointly explain 25.08% of the variance, which is less than the critical value (40%). Therefore, there were no significant common method biases in this study.

Descriptive analysis

The means, standard deviations, and Pearson's correlation coefficients for all variables were shown in Table 1. Work–family conflict and maternal anxiety were significantly positively associated with preschoolers' problem behaviors, and the three variables were significantly negatively associated with maternal trait mindfulness.

Testing for mediation effect

To test Hypothesis 1 and Hypothesis 2, we adopted the steps recommended by predecessors to test the mediation effect (Wen and Ye, 2014a), and used regression analyses in turn, as shown in Table 2. Equation 1 suggested that work–family conflict had a significant impact on problem behaviors in preschoolers (β = 0.317, p < 0.001). Equation 2 suggested that the effect of work–family conflict on

TABLE 1 Means, standard deviations, and correlations of the main study variables.

	$M \pm SD$	1	2	3	4	5	6	7	8
1. Gender of children	–	–							
2. Pediatric age	4.50 ± 0.84	−0.017	–						
3. Maternal age	36.42 ± 4.97	0.027	0.079**	–					
4.Family SES	−1.66 ± 2.22	−0.015	−0.010	−0.001	–				
5. Work–family conflict	45.55 ± 15.06	0.040	0.023	0.033	−0.102**	–			
6. Maternal anxiety	38.09 ± 8.92	0.068*	0.052	−0.050	−0.139***	0.490***	–		
7. Preschoolers' problem behaviors	8.95 ± 4.47	0.111***	0.032	−0.106**	−0.113***	0.326***	0.489***	-	
8. Trait mindfulness	58.12 ± 10.45	−0.036	−0.044	0.025	0.078*	−0.595***	−0.522***	−0.378***	–

N = 1,068; gender of children was dummy coded (0 = male, 1 = female); *p < 0.05, **p < 0.01, ***p < 0.001.

TABLE 2 Testing the mediating effect of work–family conflict on preschoolers' problem behaviors.

Predictors	Equation 1		Equation 2		Equation 3	
	Dependent: PPB		Dependent: MA		Dependent: PPB	
	β	t	β	t	β	t
WFC	0.317	11.036***	0.480	18.034***	0.118	3.880***
MA					0.415	13.584***
R^2	0.137		0.257		0.265	
F	33.763***		73.462***		63.754***	

N = 1,068. The beta values are standardized coefficients. WFC, work–family conflict; PPB, preschoolers' problem behaviors; MA, maternal anxiety. *p < 0.05, **p < 0.01, ***p < 0.001.

maternal anxiety was significant (β = 0.480, p < 0.001). And Equation 3 suggested that included in the regression equation, both work–family conflict and maternal could significantly positively predict preschoolers' problem behaviors (β = 0.118, p < 0.001; β = 0.415, p < 0.001), which demonstrated that maternal anxiety mediated the association between work–family conflict and preschoolers' problem behaviors.

In this study, we employed Hayes's (Hayes, 2017) PROCESS macro for SPSS (Model 4) to test this moderated mediation model. The mediating effect value was 0.199, and the 95% confidence interval was (0.162, 0.240), excluding 0, as shown in Table 3; the direct effect value after controlling for mediating variables was 0.118 (p < 0.001). And results showed that maternal anxiety had a significant relationship between work–family conflict and preschoolers' problem behaviors, with a ratio of 0.199/ (0.199 + 0.118) accounting for 62.90% of the total effect.

TABLE 3 Effects and bootstrapping results with the path.

Path	Indirect effect	Bootstrap standard errors	95% CI	
			Lower	Upper
WFC to PPB through MA	0.1992	0.0197	0.1617	0.2400

N = 1,068. WFC, work–family conflict; PPB, preschoolers' problem behaviors; MA, maternal anxiety.

Testing for moderated mediation

To test Hypothesis 1 and Hypothesis 2, we adopted the steps recommended by predecessors to test the mediation effect (Wen and Ye, 2014b), and used regression analyses in turn, as shown in Table 4. Equation 1 suggested that when trait mindfulness was not included as a moderator in the regression equation, work–family conflict had a significant effect on preschoolers' problem behaviors (β = 0.156, p < 0.001), and this effect was not mediated by maternal trait mindfulness (p > 0.05). After incorporating trait mindfulness as a moderator into the regression equation, Equation 2 showed that work–family conflict had a significant effect on maternal anxiety (β = 0.269, p < 0.001), and this effect was not mediated by maternal trait mindfulness (p > 0.05). Equation 3 revealed that the effect of work–family conflict on preschoolers' problem behaviors was not significant (p > 0.05), but maternal anxiety had a significant main effect on preschoolers' problem behaviors (β = 0.360, p < 0.001), and more importantly, maternal trait mindfulness significantly moderated this relationship (β = −0.078, p < 0.01). The above results suggested that trait mindfulness could moderate the relationship between maternal anxiety and preschoolers' problem behaviors.

For descriptive purposes, we plotted the relationship between maternal anxiety predicting problem behaviors in preschoolers with low and high levels of maternal trait mindfulness engagement (1 SD below the mean and 1 SD above the mean, respectively; Figure 2). From Table 5 and Figure 2, it revealed that for the group of mothers with high levels of anxiety, a high level of mindfulness of mothers would help improve the problem behaviors of children.

Discussion

As expected, the current study found a significant relationship between work–family conflict and preschoolers' problem behaviors

TABLE 4 Testing the moderated mediation effects of work–family conflict on preschoolers' problem behaviors.

Predictors	Equation 1		Equation 2		Equation 3	
	Dependent: PPB		Dependent: MA		Dependent: PPB	
	β	*t*	*β*	*t*	*β*	*t*
WFC	0.156	4.459***	0.269	8.529***	0.059	1.749
TM	−0.271	−7.721***	−0.354	−11.158***	−0.138	−3.962***
WFC × TM	−0.006	−0.240	0.023	1.027	0.027	0.954
MA					0.360	11.150***
MA × TM					−0.078	−2.850**
R^2	0.185		0.336		0.283	
F	34.348***		76.459***		46.291***	

N = 1,068. The beta values are standardized coefficients. WFC, work–family conflict; PPB: preschoolers' problem behaviors; MA, maternal anxiety; TM, trait mindfulness. $^{**}p < 0.01$, $^{***}p < 0.001$.

TABLE 5 Conditional indirect effects of maternal anxiety on Preschoolers' problem behaviors.

	Effect	Boot SE	Boot LLCI	Boot ULCI
Low TM	0.438***	0.039	0.361	0.515
Average TM	0.360***	0.032	0.296	0.423
High TM	0.282***	0.045	0.193	0.370

$^{***}p < 0.001$. *N* = 1,068. Bootstrap sample size = 5,000. LL, low limit; CI, confidence interval; UL, upper limit; Boot, bootstrap. Poor, mean, and great levels of teacher support depict 1 SD below the mean (low), mean value (average), and 1 SD above the mean (high).

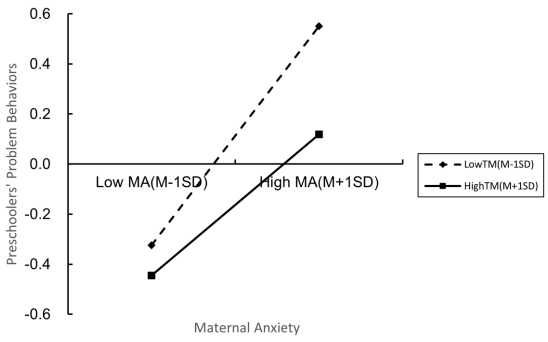

FIGURE 2
Maternal trait mindfulness as a moderator of the relationship between maternal anxiety and preschoolers' problem behaviors during the COVID-19 epidemic.

during the COVID-19 epidemic, which is similar to previous studies, which supported Hypothesis 1 (Edhborg et al., 2003; Adisa et al., 2021; Schmeer et al., 2023). The main findings elucidated the psychological mechanisms via which work–family conflict was associated with preschoolers' problem behaviors by maternal anxiety as a mediator and maternal trait mindfulness as a moderator. The results indicated that the effect of work–family conflict on preschoolers' problem behaviors occurred via maternal anxiety. Moreover, the relationship between work–family conflict and preschoolers' problem behaviors via maternal anxiety was moderated by maternal trait mindfulness, which indicated that maternal trait mindfulness provided an important protective role against preschoolers' problem behaviors during the COVID-19 epidemic.

Maternal anxiety mediated the association between work–family conflict and preschoolers' problem behaviors, thereby supporting Hypothesis 2. In the current study, we extracted work–family conflict associated with the COVID-19 epidemic as a risk factor and maternal anxiety as an intermediary factor (Cox and Paley, 1997; Buehler and Gerard, 2002). The results supported the work–family conflict theory (Greenhaus and Beutell, 1985; Eby et al., 2005)， and proved that when individuals faced high-level work–family conflict, more anxiety would be generated, the same with the research results of Chinese scholars on mothers' parenting anxiety (Zhang and Lin, 2020). After further analysis, this result also supported the spillover theory (Cox and Paley, 1997; Buehler and Gerard, 2002). Higher levels of maternal anxiety associated with conflict were associated with more problem behaviors in children, and the results of this study were supported by numerous empirical studies conducted before and after the COVID-19 pandemic (Hanetz-Gamliel et al., 2021; Zhong et al., 2021; Frigerio et al., 2022). The results demonstrated that both work–family conflict (risk factor) and maternal anxiety (intermediary factor) were important predictors of preschoolers' problem behaviors, and maternal anxiety (intermediary factor) played an important mediating role in the association between work–family conflict (risk factor) and preschoolers' problem behaviors.

A higher level of work–family conflict is associated with more maternal anxiety (Borgmann et al., 2019) and thereby with more problem behaviors in preschoolers (Cox and Paley, 1997; Buehler and Gerard, 2002). As a challenge brought to many families, the COVID-19 epidemic has led to a significant increase in more mothers working at home (Arntz et al., 2020; Prime et al., 2020; Settersten et al., 2020), and it is also closely related to the physical and mental health of mothers and their children. Thus, COVID-19 and its countermeasures are more stressful current events for parent–child groups, including mothers working from home and their preschool children, which increases maternal anxiety. The results of this study showed that when the mother had a higher level of anxiety, it would have a certain negative impact on the development of children and would make children appear more problem behaviors.

The moderated mediation roles of maternal anxiety and trait mindfulness

The main objective of the study was to explore the moderating effect of maternal trait mindfulness on the direct link between

work–family conflict and preschoolers' problem behaviors, and the indirect link via maternal anxiety. First, the current study found that maternal anxiety was significantly, negatively, and directly associated with work–family conflict and preschoolers' problem behaviors. Consistent with previous studies, maternal trait mindfulness was an important protective factor against their own negative emotions (Gross, 1998; Haun et al., 2018; Shallcross and Spruill, 2018) and reduced preschoolers' problem behaviors (Moreira and Canavarro, 2017; Benton et al., 2019). Interventions that raise the level of mindfulness in mothers can effectively improve the individual's anxiety and reduce preschoolers' problem behaviors (Coatsworth et al., 2018; Chaplin et al., 2021). In addition, the results indicated that for mothers with high levels of anxiety, high levels of mindfulness of mothers would help improve children's problem behaviors, and this conclusion was also supported by previous empirical studies (Gross, 1998; Moreira and Canavarro, 2017; Haun et al., 2018; Shallcross and Spruill, 2018; Benton et al., 2019). Maternal trait mindfulness did not moderate the direct link between work–family conflict and preschoolers' problem behaviors, and did not moderate the link between work–family conflict and maternal anxiety; only the interaction between maternal anxiety and trait mindfulness significantly predicted preschoolers' problem behaviors, which partly supported Hypothesis 3. Mothers with low trait mindfulness showed stronger associations between maternal anxiety and preschoolers' problem behaviors than mothers with high trait mindfulness, suggesting that the association between maternal anxiety and preschoolers' problem behaviors increases progressively with decreasing levels of maternal trait mindfulness. As a protective factor, maternal trait mindfulness can help mothers with high anxiety improve their children's problem behaviors. The results also supported the family systems theory (Cox and Paley, 1997). Based on the family systems theory and the reality of the COVID-19 epidemic, we considered maternal anxiety as a family risk factor (Teyhan et al., 2014). The results of the moderated mediation model showed that trait mindfulness played a significant moderating role in the latter half of the mediating process. Therefore, subsequent intervention studies could attach importance to the role of maternal mindfulness level as a protective factor.

In addition, a fair amount of maternal anxiety may lead to problem behavior in preschoolers (Shamir-Essakow et al., 2005; Bögels and Brechman-Toussaint, 2006; Nicol-Harper et al., 2007). Combining family system theory with the empirical evidence above, it is indicated that there existed protective factors that moderate the relationship between maternal anxiety and preschoolers' problem behaviors (Lv et al., 2003). As mothers are the primary caregivers and significant persons of their children, young children's problem behaviors are inevitably influenced by some of the mother's traits, such as mindfulness (Goodman et al., 2011; Corthorn, 2018). And the moderating role of maternal trait mindfulness was similar to that reported in previous similar studies, as studies have found that maternal mindfulness indirectly affects children's problem behaviors through mindful parenting and positive and negative parenting behaviors (Han et al., 2021). At the same time, due to age, preschoolers' coping methods in the face of negative events are not mature (Vu et al., 2016); accordingly, when they are exposed to maternal negative emotions for a long time during the COVID-19 epidemic, they may perform problem behaviors such as anxiety similar to their mothers (Elgar et al., 2004). And living with anxious mothers for a long time will also have adverse effects on children's social interaction and academic performance (Downey and Coyne, 1990). After a long period of COVID-19 that has rebounded several times, mothers inevitably have a lot of negative emotions when facing the dual pressures of work and family. During the COVID-19 epidemic, while preschoolers were studying at home, mothers were also working from home, which not only resulted in more interactions between mothers and children than usual but also resulted in a more profound impact on children in all aspects. Therefore, it is urgent to alleviate negative emotions such as maternal anxiety and other negative emotions on children's development by improving the level of maternal mindfulness.

Practical implications

This study has important implications for preventing preschoolers' problem behaviors during the COVID-19 epidemic. The work–family conflict caused by COVID-19 presents a major challenge to the mental health of mothers and the healthy development of preschoolers, especially anxiety and other negative emotions (Arntz et al., 2019; Kim et al., 2020; Song and Gao, 2020; Verweij et al., 2021). Maternal anxiety is an important risk factor for problem behaviors in preschools. According to previous studies and the results of this study, interventions to reduce maternal anxiety helped reduce preschoolers' problem behaviors during the COVID-19 epidemic. Most importantly, we found that maternal trait mindfulness acted as a buffer against the impact of maternal anxiety on preschoolers' problem behaviors. Therefore, when the COVID-19 epidemic is far from over, mothers, as the main caregivers of preschoolers, should try to improve their mindfulness through mindfulness training programs for the healthy development of children; this will help alleviate the adverse effects of the COVID-19 epidemic and self-anxiety on preschoolers' problem behaviors.

Limitations and future research

Although the current study examined the risk and protective factors for preschoolers' problem behaviors in the special context of the COVID-19 epidemic, several limitations of this study are worth mentioning. First, we used a cross-sectional study design during the COVID-19 epidemic; therefore, it is unclear whether the epidemic will continue to affect preschoolers' problem behaviors after the COVID-19 epidemic ends in China. Second, the participants were recruited only from China; therefore, the findings might not be generalizable to populations from other countries during the COVID-19 epidemic. This study was conducted during the COVID-19 epidemic, so there may be a potential historical effect. Finally, the current study recruited participants via convenient cluster sampling from a middle school in Southeast China via an online survey that was conducted during the period of repeated rebound of the epidemic in China. In-depth family background information of participants was not collected. Therefore, future studies could examine in greater depth the different influences of other family characteristics on this research question, such as urban and rural mothers, and single and non-single mothers. In addition, we did not measure fathers' work–family conflict

and other psychological variables, which could be explored in depth in future research based on family systems theory.

Conclusion

WFC was positively associated with preschoolers' problem behaviors, and maternal anxiety was an important mediator of this association. So, WFC could cause maternal anxiety and lead to more problematic behaviors in children. Besides, maternal anxiety was positively associated with preschoolers' problem behaviors, and trait mindfulness was an important moderator of this association.

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 humans were approved by Institutional Review Board of Kunsan National University. The studies were conducted in accordance with the local legislation and institutional requirements. The participants' parents/guardians provided their written informed consent to participate in this study.

Author contributions

XJ: Conceptualization, Data curation, Methodology, Writing – original draft. JA: Investigation, Supervision, Writing – review & editing.

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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 role of parenting in developmental trajectories of risk for adolescent substance use: a bioecological systems cascade model

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Parenting is a key influence and prevention target for adolescent substance use, and changes dramatically in form and function during adolescence. This theoretical synthesis reviews evidence of associations of substance use-specific parenting behaviors, dimensions, and styles with adolescent substance use, and integrates key developmental and family theories (e.g., bioecological, dynamical systems, family systems, developmental cascades) and methodological-conceptual advances to illustrate the complex role that parenting plays for the development of adolescent substance use in combination with child and contextual influences. The resulting bioecological systems cascade model centers the dynamic co-development of parenting and child influences in developmental cascades that lead to more or less risk for adolescent substance use. These trajectories are initiated by intergenerational influences, including genetics, parents' familial environments, and child-parent attachment. Culture and context influences are a holistic backdrop shaping parent-adolescent trajectories. Parenting is influences are conceptualized as a complex process by which specific parenting behaviors are informed by and accumulate into parenting dimensions which together comprise general parenting styles and are informed by the broader family context. The co-development of parenting and child biobehavioral risk is shaped by both parents and children, including by the genetics and environments they do and do not share. This co-development is dynamic, and developmental transitions of individuals and the family lead to periods of increased lability or variability that can change the longer-term trajectories of children's risk for substance use. Methodological avenues for future studies to operationalize the model are discussed.

KEYWORDS

adolescent substance use, parenting (MeSH), dynamic systems, biobehavioral, development, substance use-specific parenting

Introduction

At its core, parenting is a series of behaviors, or ways in which parents act in order to socialize and protect the health and safety of their children. As children grow, the parenting behaviors required to support child health and safety can change dramatically. Adolescence, defined as the developmental period between pubertal onset (a biological marker) and the

transition to adulthood (an increasingly blurry sociological marker), is a developmental period of change in parenting (Smetana and Rote, 2019). In adolescence, specific parenting goals and behaviors must evolve to support adolescent autonomy development while mitigating developmentally normative risks that could lead to significant changes in the child's developmental trajectory. Adolescence is also the beginning of the onset window for substance use. Empirical evidence, mostly from animal models and supported in some longitudinal models of humans, shows that substance use itself can alter the trajectory of brain development including in areas of the brain that can affect behavior (Thorpe et al., 2020), particularly if introduced in adolescence (Lees et al., 2020). This makes prevention or delay of substance use a critical parenting goal during adolescence. As developmental goals become more varied and complex, the same parenting behaviors can promote or discourage different developmental goals at different times (Grusec and Davidov, 2015; Smetana, 2017). Specifically, to achieve prevention or delay of substance use, parents must adopt a new set of parenting behaviors specific to substance use. However, some of the same parenting behaviors intended to curb substance use may work in opposition to the goal of encouraging autonomy development. Changes in parenting do not occur in a vacuum, but rather are inextricably linked to children's biobehavioral risk and responses, are repeatedly perturbed by developmental transitions, and are continually shaped by intergenerational, cultural and contextual, and family factors.

The present theoretical synthesis begins with brief reviews of the conceptualization and evidence of associations of substance use-specific parenting behaviors, dimensions, and styles with adolescent substance use, and key developmental and family theories. Following this, the first contribution of this paper to the literature is an elaboration of a bioecological systems cascade model of substance use risk. This model describes how developmental forces shape the co-development of parenting and child biobehavioral risk and how this co-development occurs in response to transitions that solidify into larger-scale changes multiple timescales within the context of the family and culture. Next, I provide an overview of key methodological-conceptual advances relevant for understanding the role of parenting in developmental trajectories for adolescent substance use, including key findings from each advance as it relates to parenting and adolescent substance use. Following this, a second contribution of this paper is the presentation of a methodological roadmap integrating methodological-conceptual advances for operationalizing and testing the bioecological systems cascade model.

Substance use-specific parenting behaviors, dimensions, and styles

Recent theoretical perspectives (Smetana, 2017; Morris et al., 2021; Oropesa Ruiz, 2022) describe three major conceptual layers to parenting. Parenting behaviors are defined as the specific strategies parents use with their children. The ways in which parents engage in specific parenting behaviors are informed by and, through repetition, accumulate into parenting dimensions. Commonly studied parenting dimensions include demandingness, parental control (which can be psychological or behavioral in nature), responsiveness, warmth, or involvement. These dimensions together comprise styles of parenting, which are carried out by specific parenting behaviors (Oropesa Ruiz, 2022).

Substance use-specific parenting behaviors

Parenting behaviors that are commonly examined and linked to more adolescent use include parents' own substance use (theoretically linked to adolescent use via modeling and increased availability in the home for parents to use; Trucco, 2020), permissive rules about substance use (Trucco, 2020; Mehanović et al., 2022), and ineffective punishment, including parental harsh discipline (Marceau et al., 2021). Communication about substance use is more nuanced. An integrative review found that conversations about health risks are related to lower substance use, whereas conversations about parents' own use, permissive messages, and conversations about consequences were related to higher use (Carver et al., 2017).

Parental monitoring, which comprises knowledge of as well as parental control over adolescents' whereabouts and activities is perhaps the most robustly studied parenting behavior in relation to adolescent substance use. Research has accumulated showing that in early studies, despite being termed "monitoring," parental *knowledge* was actually measured (Stattin and Kerr, 2000) and further knowledge is primarily gathered through child freely disclosing information (e.g., rather than a parenting behavior; Kerr et al., 2010). In the past couple of decades, increased attention has been given to parent- and child-based sources of knowledge. Parent-based sources of knowledge include parental solicitation—asking children about where they are going, with whom they spend time, and what they are doing, and parental control—creating rules (i.e., curfews; rules about drinking) that limit where, who, and what children are doing. The primary child-based source of knowledge is disclosure—children freely offering information to parents about where they go, with whom, and what they were doing or plan to do, and on the opposite end of the spectrum, secrecy (Lionetti et al., 2019). Links between adolescent secrecy and increased substance use is consistent across cultures (Kapetanovic et al., 2020a).

Although correlated (Keijsers, 2016), sources of parental knowledge are often differentially associated with adolescent substance use. More child disclosure is linked most robustly to less substance use later, though parental solicitation is typically not linked to substance use later, and parental control is only sometimes linked (Stavrinides et al., 2010; McCann et al., 2016; Kapetanovic et al., 2020b). Critically, some aspects of monitoring are not always protective: consistent parental solicitation and control was related to a higher probability of substance use initiation and more severe smoking (Marceau et al., 2020b), and parental solicitation at one assessment predicted increased substance use at the next (Kapetanovic et al., 2020b) and specifically for older adolescents (Berglund et al., 2022). These findings suggest different mechanisms by which child- and parent-driven parental knowledge are associated with substance use, and highlight the critical role of evocative child effects as child-based sources of knowledge are consistently more strongly associated with substance use outcomes

than parent-based sources (Keijsers, 2016). Although these results are limited in terms of causal inference, they hint that increasing the consistency of child disclosure may help prevent substance use, but that increasing the consistency (as opposed to responsivity) of parent-based sources of knowledge (i.e., solicitation) could backfire and lead to higher rates of substance use (Marceau et al., 2020b).

Parenting dimensions

The mixed findings for parent-based sources of knowledge could stem in part from the observation that same parenting behavior can be communicated to the child in a variety of ways and with distinct emotional tones, for example along dimensions of warmth to punitiveness and/or calm to high affect (which could be positive like excitement or negative like fear). The accumulation of the form (i.e., specific behavior), and function (i.e., intended parenting goal), and emotional tone of parenting behaviors together inform or make up overall parenting dimensions. Although demandingness and responsiveness or warmth are highlighted in the literature on parenting styles, additional dimensions have been examined in the literature, such as hostility and involvement. In addition, more relational dimensions (e.g., a reflection or characterization of the parent-child relationship more so than the parent or the child within the relationship), including lower closeness (Amutah-Onukagha et al., 2023) and more conflict (Breivik et al., 2009), have also been linked to substance use (Rusby et al., 2018). As noted above, adolescence comes with unique tensions in balancing parenting goals and opposing behavior—for example, exerting behavioral control to reduce opportunities for substance use could also stifle adolescent autonomy development. This tension and balance is reflected in classical findings of increased conflict and decreased closeness in middle adolescence that resolves later in adolescence (Laursen and Collins, 2009; Marceau et al., 2015b; Xie et al., 2021). In general, more warmth, responsiveness, involvement, and closeness are related to less substance use, whereas more conflict and hostility is related to more substance use (Marceau et al., 2020a; Trucco, 2020).

Parenting styles

In turn, these dimensions have been reduced into a set of parenting styles. One of the most influential models of parenting as it relates to the development of adolescent substance use is Baumrind's conceptualization of parenting styles (Baumrind, 1966), later modified by Maccoby and Martin (1983). In current conceptualizations, two dimensions of parenting—responsiveness (also operationalized as warmth or involvement) and demandingness (also operationalized as control) are set along two axes, creating four quadrants reflecting distinct styles of parenting: *authoritative*, high demands (specifically behavioral control) and high responsiveness, *authoritarian*, high demands (specifically psychological control) and low responsiveness, *permissive or indulgent*, low demands and high responsiveness and *neglectful*, low demands and low responsiveness. Generally, authoritative parenting styles are protective against substance use, although indulgent styles may also confer less risk than authoritative and neglectful styles (Calafat et al., 2014). A complementary model to considering parenting styles as aggregates of dimensions that exert main effects on child behavior, Darling and Steinberg (1993) proposed a more integrated approach, highlighting how parenting styles act as more of a backdrop or context for which different parenting practices are related to child outcomes.

Key theoretical frameworks for parenting and adolescent substance use

When examining the role of parenting for adolescent substance use, parenting is often placed in the microsystem of Bronfenbrenner's bioecological model, used as a theoretical backdrop to studies of individual differences. This dovetails with a broader view of the development of adolescent substance use, which is often conceptualized in terms of developmental cascades including multiple risk factors across multiple domains (genetic, prenatal, parenting, peers, neighborhoods, stress, child characteristics) that accumulate across development (Dodge et al., 2009; Marceau et al., 2021). Recent developmental perspectives on adolescent substance use have placed individual developmental cascades within the context of the ecological systems framework (Trucco and Hartmann, 2021). These advances in developmental models have occurred simultaneously and yet somewhat apart from advances in family theories and methodologies.

Family systems theory highlights that the parent-adolescent relationship is only one specific sub-system within a family—the family system often includes marital relationships, sibling relationships, multiple parent-child relationships, and extended kinships (Cox and Paley, 2003). These dyadic sub-systems are not independent—hostility and conflict in the marital relationship for example can spill over to cause hostility in the parent-adolescent relationship, or can lead to alliances, enmeshment, or compensatory behaviors in parent-adolescent relationships (Cox and Paley, 2003). Advances in family theory have underscored the importance of considering multiple family relationships for understanding associations of parenting and adolescent substance use (Neiderhiser et al., 2013; Xia et al., 2020).

The dynamic systems meta-theory is a theoretical orientation that conceptualizes development in any domain as a series of more stable structural patterns and phase transitions that move the system into a new stable structure (Witherington, 2007). Applied to parent-adolescent dyads, stable patterns of interaction in middle childhood are disrupted by transitions around the start of adolescence (e.g., puberty, school transitions) which lead to increased variability in the interactional patterns between parents and youth that foreshadow phase shifts in relationship quality (Granic et al., 2003). This theory has been largely supported over the past few decades, mainly regarding emotional dynamics. For example, Branje (2018) highlights the role of emotional variability during conflict interactions to shape the trajectory of mothers' control and adolescents' disclosure. Lougheed (2020) describes parent-adolescent dyads as temporal interpersonal emotion systems, whereby individual interactions allow parents and youth to co-construct the emotional tone of the relationship,

and repeated interactions co-constructing similar emotional tones and interaction patterns (i.e., responses to the others' emotions, behaviors, and words) stabilize over days, weeks, and years.

Dynamic systems models have been linked to antisocial behavior (Granic and Patterson, 2006), a strong predictor of adolescent substance use, though not yet explicitly to adolescent substance use outcomes. Although dynamic systems theories are complementary to family systems theories, in adolescence most work using dynamic systems perspectives is specific to mother-adolescent dyads' emotional tone during interactions. Applying dynamic family systems approaches to examine multiple parents and the substance use of multiple children in families is a critically important future direction.

A bioecological systems cascade model

Figure 1 depicts a theoretical integration of the conceptualization of parenting behaviors, dimensions, and styles with ecological systems, developmental cascade, and family and dynamic systems models as they relate to the development of adolescent substance use. Briefly, this integration produces a bioecological systems cascade model that centers the dynamic co-development of parenting and child influences within parent-adolescent developmental cascades that lead to more or less risk for adolescent substance use. Parent-adolescent developmental cascades are initiated by intergenerational influences, including genetics, parents' familial environments, and child-parent attachment and, drawing on ecological models, shaped by culture and context influences. Parenting and child biobehavioral risk are conceptualized as dynamic and co-developing. Child biobehavioral risk includes both psychological/behavioral (e.g., psychopathology) and biological (e.g., stress response, neurodevelopment, puberty) components. Parenting influences are described by the three layers reviewed above, whereby specific (including substance-use specific) parenting behaviors are informed by and form parenting dimensions and arise in general parenting styles which, drawing from family systems theory, are also informed by the broader family context. Incorporating the dynamic systems frame, adolescents' developmental transitions (e.g., school transitions, puberty) lead to periods of increased lability or variability in parent-child relationships that can change the longer-term trajectories of adolescents' risk for substance use. Integrating family systems theory, developmental transitions of the family are expected to lead to similar periods of increased lability or variability that too can catalyze longer-term trajectory changes.

Parent-adolescent trajectories of risk

In the center of **Figure 1**, parent-adolescent trajectories of risk are conceptualized in line with developmental cascades models. Although to a large extent development is stochastic (i.e., partially random, and probabilistic rather than deterministic), it is hypothesized that developmental forces that shape trajectories in a way that makes some developmental trajectories more likely than others. These developmental forces can be conceptualized in terms of constraints (forces that funnel individuals and families toward more narrow or canalized developmental trajectories, like when two rivers meet and form one) and catalysts (divergent forces that open new developmental trajectory possibilities, like an obstruction that can lead to the branching of a river into multiple streams). Developmental cascades to substance use are therefore described by diverse trajectories of risk (e.g., Trucco et al., 2016, 2018; Zucker et al., 2016; Marceau et al., 2020a, 2021), which begin to differentiate and increase (in terms of risk for substance use) for some around puberty, and result in varying levels of risk for adolescent substance at the peak time of risk in late adolescence and early adulthood. In the bioecological systems cascade model, developmental cascades do not only describe adolescent risk trajectories (as in most studies of developmental cascades), but rather developmental cascades reflect the co-developing trajectories of parent- and child/adolescent- risk behaviors for substance use.

Intergenerational influences and culture and context

Depicted on the left-hand side of **Figure 1**, key developmental constraint forces that can act as funnels at the earliest stages parent-adolescent developmental cascades of substance use risk include intergenerational influences and cultural and contextual influences. Intergenerational influences include genetic and environmental influences (e.g., McGue et al., 2014; Jami et al., 2021; Sally et al., 2022), which may be transmitted in part via behavioral genetic mechanisms (reviewed below) and early child-parent attachment (Schindler, 2019). These factors are expected to influence child biobehavioral risk but also the parenting context, and critically, their co-development (described in the section "Transactional development"). Culture and contextual influences (Chassin et al., 2019; Rothenberg et al., 2020; Lansford, 2022) include many of the classical distal influences including country, culture laws, community, media, and parents' work environments. For example, some communities and/or religions generally discourage alcohol and other substance use, and families in those communities would begin at reduced risk for adolescent substance use. Key micro- and meso-systems highlighted in the literature to date, include schools, neighborhoods, peers, and especially the family system, see Trucco (2020) for review.

Culture and context influences can operate as early constraints setting initial developmental trajectories and can continue to shape development over time, for example via a social control/opportunity mechanism (Shanahan and Hofer, 2005). Socio-cultural environments (e.g., the key micro- meso-systems as well as classic distal influences highlighted above) that are associated with more social control (e.g., stronger social norms around not using substances, or higher social sanctions for using) can act as constraints that reduce the expression of (a) youths' genetically informed predispositions (an intergenerational influence) to engage in substance use and/or (b) parents' choices surrounding socially accepted substance-specific parenting. On the other hand, socio-cultural environments that promote individual differences and/or have lower social control can act as catalysts of divergent trajectories that allow for greater expression of youths' genetically informed predispositions to engage in substance use

and/or parents' parenting choices. In line with this model, gene-environment interaction work has shown that these types of cultural influences can serve as a protective factor and suppress the expression of individual differences and genetic influences that would lead to more risk for adolescent substance use (Barr and Dick, 2020). These cultural factors also shape the form and function of substance use-specific parenting behaviors, for example by informing parents' own views via social norms, rewards, and sanctions on for example, appropriate discipline or monitoring strategies (Lansford, 2022). Cultural normativeness may also influence how parents and children interpret parenting behaviors, and thus moderate or shape transactional developmental influences between child and parent behaviors (Lansford, 2022).

Transactional development

Integrating a developmental perspective grounded in dynamic systems, across childhood and adolescence, transactional influences between child behaviors and parenting behaviors and context are expected to shape parent-adolescent trajectories of risk (depicted by the bidirectional arrow at the center of **Figure 1**). In line with dynamic systems theories, increased variability in parenting and adolescent behaviors and emotional tenor at major transitions (pubertal milestones, school transitions) and smaller transitions (e.g., breaks from routines such as the start and end of school breaks, shifting extracurricular schedules) open opportunities for re-balancing in the parent-adolescent dyad (e.g., bottom right corner of **Figure 1**; Hollenstein and Lougheed, 2013; Lougheed, 2020).

For example, family shifts in routine like transitioning from the school year to a summer schedule may produce changes in the amount of time families spend together and the topics of conversation. A family that becomes less structured during the summer may find that youth have more free time and more autonomy in choosing which friends they see and what they do together—including increased opportunity for substance use. Parents can embrace the relaxed structure, thereby being less restrictive (which may allow more autonomy development) or can respond by imposing more structure or oversight/monitoring to protect the youth from dangerous situations or substance use engagement. Depending on the needs of the adolescent, either choice could lead to adolescent-parent interactions that are more positive (adolescents appreciating more relaxed time or thriving on more structure) or negative (adolescents making poor choices that elicit consequences or pushing back against oversight).

For another family, the same transition from school to summer may lead to a different but equally structured schedule, with parents driving (e.g., by selecting care options) where their children are and what they are doing, for example. This family may experience more daily conflict over differences in opinion between how scheduled the adolescent would like to be vs. what the parent has decided. That increase in daily conflict across many days or weeks may then solidify into a new interactions style that itself promotes

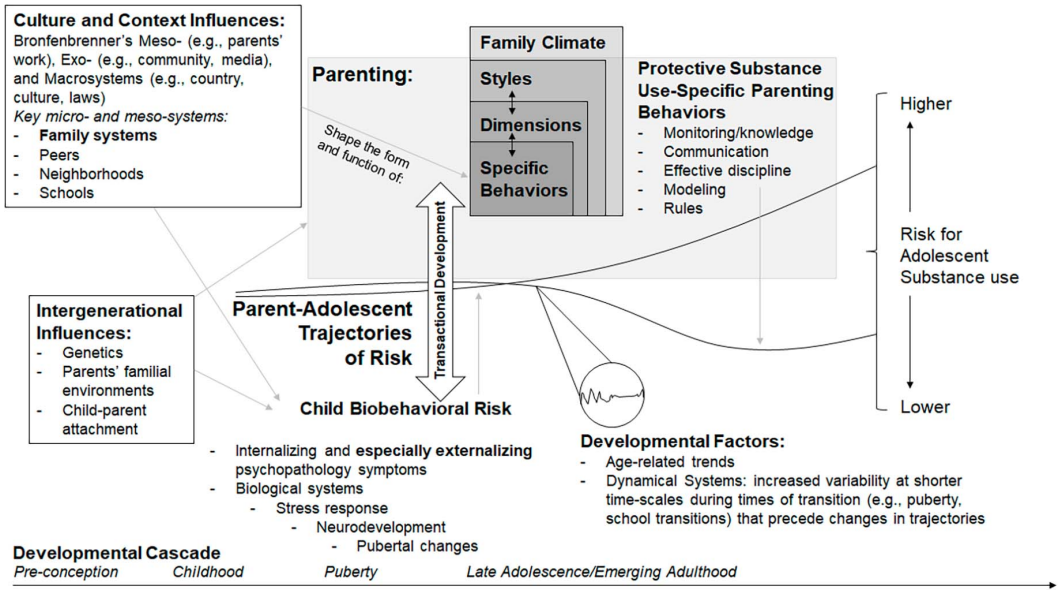

FIGURE 1
A bioecological systems cascade model for the role of parenting in developmental trajectories of risk for adolescent substance use. Developmental cascades of risk are conceptualized as dynamic co-development shaped by transactional processes between child biobehavioral risks (center, **bottom**) and parenting influences (center, **top**). Parenting risk includes substance use-specific parenting behaviors, which both inform parenting dimensions and are shaped by them, just as parenting dimensions inform and are shaped by parenting styles, contextualized by the family climate. The two lines in the center represent two exemplar individual parent-adolescent trajectories across childhood and adolescence culminating in late adolescent/emerging adulthood substance use risk (right side of the figure). These exemplar trajectories represent the longer-term age-related trends captured by developmental cascades of risk that unfold over time (timeline depicted across the bottom of the figure). In the lower left, intergenerational influences are conceptualized as "starting points" for developmental cascades of individual trajectories of risk. Parentadolescent developmental cascades (indeed the entirety of the model) are shaped by cultural and contextual influences (**top**, left). The course of each individual parent-adolescent trajectory is further influenced by developmental factors (**bottom** right), including shorter-term periods of increased variability induced by individual (child or parent) and family transitions which have the capacity to alter longer-term developmental trajectories (**bottom**, right).

disengagement from the family and increases risk for substance use (although this will not necessarily be the case given the stochasticity of development).

In both hypothetical family situations, navigation of changing circumstances opens a window of opportunity for change in parenting behaviors and child biobehavioral risk through shorter-term changes in parent-adolescent interaction patterns that together have the potential to shift substance use risk trajectories. Embedded in a family systems frame, transitions need not even apply directly to the focal adolescent. That is, changes experienced by siblings and parents (e.g., work, marital transitions) would also be expected to increase variability in parent-adolescent behaviors, emotions and relationship quality dimensions in daily interactions that have the potential to canalize into new interactional patterns that push youth and parents towards or away from risker trajectories with regard to adolescent substance use.

Child biobehavioral risk

A core mechanism of transactional processes between parents and youth is child evocative effects, which underscore that children to some extent evoke the parenting that they receive, in part through their genetically influenced behaviors (Neiderhiser et al., 2004, 2007) in ways that change over time (Marceau et al., 2016). Typically, studies focus on youth internalizing and externalizing symptoms for capturing the child's behavioral risk for substance use. Psychopathology symptoms are influenced by intergenerational, cultural and contextual influences including genetics (King et al., 2004; Elkins et al., 2007), and have been shown to evoke parenting behaviors in part through adolescents' genetic influences (Marceau et al., 2013).

The bioecological systems cascade model also highlights the importance of including additional key biological systems identified in the literature, including neurodevelopment (e.g., Koyama et al., 2017), stress response (e.g., Marceau and Abel, 2018), and pubertal changes (e.g., Marceau and Jackson, 2017; Marceau et al., 2019, 2021) for understanding how children's biobehavioral development shape parent-adolescent trajectories of risk for substance use (bottom of **Figure 1**). For example, youth who go through puberty (a biological but also social transition) at an earlier age may be viewed as older due to their physical appearance, and thus parents may be more likely to relax rules about drinking (and generally treat their child more like an adult) which can lead to increased risk of substance use (e.g., Bucci et al., 2021). This parental response to a biological transition in children may be driven by parents' perceptions and/or youths' advocation for more mature treatment (social responses). However, because brain maturation and pubertal development do not necessarily occur simultaneously (e.g., some but not all components of brain development are driven by puberty; Herting and Sowell, 2017), these changes in substance use-specific parenting, if moving toward more permissive when youth are not yet ready for more autonomy, can be particularly harmful.

Parenting

The role of parenting includes substance use-specific parenting behaviors, which both inform parenting dimensions and are shaped by them, just as parenting dimensions inform and are shaped by parenting styles. Substance use-specific parenting protective factors are expected to mediate the parenting context, influence, or to *be* the specific parenting mechanisms most proximally related to adolescent substance use. Further, parenting is expected to change during transitions as described above, and as adolescent behavior changes. That is, youths' progression to a next milestone of risk for substance use (e.g., from biobehavioral risk to initiation, regular use, heavy/problematic use, and substance use disorder; Jackson et al., 2021), especially when known by the parent, may also serve as a transition that catalyzes divergence or opens new possibilities of parent-adolescent trajectories of risk depending on how the family responds. For example, parents may respond to their adolescent being caught initiating alcohol with increases in their protective substance-use specific parenting behavior. The adolescent may then either respond positively and not progress toward more substance use with minimal changes to the parent-adolescent relationship or react negatively to these new autonomy-restricting parenting behaviors with hostility in daily conflicts and conversations. In this latter case, and particularly if adolescent hostility is met by parent hostility in return, the new more hostile interaction patterns during repeated parent-adolescent interactions can become canalized into a new interaction schema enforced by both members of the dyad that changes where the dyad falls in terms of parenting dimensions (e.g., increased hostility) and styles. As the adolescent progresses to more severe substance use, again parents may change their behaviors and choices to, for example, a stricter stance to try to mitigate risk or to a more permissive stance to try to repair the relationship. Each parenting choice would elicit a different response from the adolescent depending on the intergenerational, cultural, and family context which would have the opportunity to further shift trajectories of risk.

Because of the critical role of the family system for a single dyad, in this case the parent-child dyad, these behaviors are positioned within the context of the family climate. Supports, strains, and changes in other family dyads could also inform parental and adolescent responses to each other. In general, in supportive broader family contexts, the family context may buffer against any harmful effects of increased conflict or decreased closeness that occur during transition points and changes in parenting and child biobehavioral risk. However, in stressful broader family contexts, parents and youth may have fewer resources to draw on to cope with these changes, which could exacerbate the speed and severity with which the relationship and parent-adolescent trajectories shift.

In summary, according to the bioecological systems cascade model, parenting and child biobehavioral risk are constantly co-developing, with more variability in the short-term due to any number of transitions faced by families leading to slightly altered trajectories in the medium term that can canalize into larger differences in the long-term, and in the end-point of parent-adolescent trajectories of adolescent substance use risk. This model emphasizes individual differences in parent-adolescent dyads and the critical role of contexts and transitions for continually altering trajectories of risk. This model also helps to explain why the literature mapping developmental trajectories of adolescent substance use via mediation and moderation analyses is so fraught with mixed findings: Most studies examine sample averages without addressing variability in trajectories and contexts. In order to successfully test these ideas, the integration of advanced study designs and statistical methods are required.

Recent advances provide important tools for testing this integrative model, reviewed below.

Methodological-conceptual advances

Within-family processes and between-family differences

One of the major advances in the study of parenting and adolescent development is attention to within-family vs. between-family processes. Within-family variation captures lability (variability or fluctuations) and developmental processes within a single family and can only be captured via repeated measures within families over time. Between-family variation, on the other hand, describes more stable differences from one family to another rather than changes within a family. Conceptually, parenting styles have been interpreted more as a stable characteristic of parents, and thus are likely best captured in terms of between-family differences.

Parenting dimensions, on the other hand, have been the subject of much longitudinal research. A growing body of literature has shown developmental trends as well as lability, or fluctuations over months or years at the within-family level, of parenting dimensions (Marceau et al., 2015b; Lippold et al., 2018; Zheng and McMahon, 2022) and behaviors (e.g., parental knowledge and solicitation; Keijsers, 2016; Lippold et al., 2016; Marceau et al., 2020b). These studies have ultimately focused on understanding between-family differences in how within-family processes are related to substance use. That is, by examining repeated measures of a parenting dimension or behavior via multilevel models of change or latent growth curve modeling, researchers can obtain an intercept score, a slope score, and a series of residual scores. The range (or standard deviation) of those residual scores conceptually index lability, or how dramatic the fluctuations over time in the parenting dimension or behavior are, after accounting for the families' longer-term developmental trajectory (Marceau et al., 2015b). Using these scores, investigators can answer questions related to longer-term trajectories like "Are the families with steeper declines in parental knowledge over time the same families that have adolescents with more substance use, compared to families with less steep declines in parental knowledge over time?" and "Do families with higher within-family fluctuations in parental knowledge over time have adolescents with more substance use compared to families with less within-family fluctuations in parental knowledge over time?" This approach has largely found support for within-family processes (both longer-term developmental change and lability in warmth, hostility, and aspects of parental monitoring) being associated with adolescence substance use (Lippold et al., 2016, 2018; Marceau et al., 2020b).

Using this methodology, investigators can also ask questions related to core features of the bioecological systems cascade model, including the parent-child dynamics at transitions in novel ways, for example: "Do families with youth who are in the middle of puberty have higher within-family fluctuations in parental knowledge over time than families with youth who are pre-puberty?" This approach can be extended in the future to index changes and lability in other key components of parenting (e.g., substance use-specific parenting behaviors, parenting styles) over time in addition to the dimensions that have been studied thus far.

Finally, within- and between- person processes have been directly tested via the use of random-intercept cross-lagged panel models (and other similar advanced panel model techniques capable of separating within- and between-family processes; see Orth et al., 2021 for a review). These models have been used to robustly examine associations of parenting dimensions and behaviors with child behavior that are known risks for substance use (e.g., Lougheed et al., 2022), albeit with far fewer investigations for substance use outcomes. One recent study yielded evidence of some between- and some within-family contribution to associations of parenting dimensions and behaviors with adolescent substance use (Robillard et al., 2022). Further application of these models to substance-specific parenting behaviors at multiple timescales will help to identify the hypothesized transactional developmental processes between child characteristics and parenting over time, and the timescale(s) in which they operate.

Variable-centered and person-centered approaches

Applied to parenting, variable-centered methods focus on individuals' levels of parenting styles, dimensions, and behaviors, implemented through observed or constructed scores, or latent variable modeling. These variables may then be used in, for example, developmental cascade models predicting substance use (Dodge et al., 2009; Marceau et al., 2020a, 2021; Trucco and Hartmann, 2021). Or, parenting dimensions or levels can be dichotomized based on some theoretically meaningful cut-off and aggregated into typologies, as often done to create the classical parenting styles. An advantage to this theory-driven typology approach is that theoretically meaningful groups or dimensions are created that are similar across studies (as they are researcher-imposed). However, the groups may not reflect the sample or population well, and the number of variables and thresholds for each variable that can be considered at once is limited (as the number of groups exponentially increases with each variable added). Thus, there is a balance between theoretically meaningful groups and creating groups that can be populated by enough people in the sample that they are useful. Using dimensional variables, there may be floor or ceiling effects (as is often the case for survey measures of self-reported parental warmth, for example).

Person- (or family-) centered approaches, on the other hand, group individuals based on the co-occurrence of measured parenting dimensions or behaviors, typical for latent class analysis (using categorical variables) or latent profile analysis (using continuous variables). The data-driven nature of person-centered approaches carries strengths and weaknesses. An advantage to this approach is that novel insights can arise for understanding how different parenting dimensions and behaviors co-occur in a sample. The groups can also be formed using many different variables, allowing for complex interactions among variables in multidimensional space to be captured, which may be particularly useful for more comprehensive measures of parenting in the family context. For example, these approaches have been proposed a way to view complex interactions (Ennett et al., 2016), and

examine the co-occurring patterns of parenting behaviors and dimensions to form typologies which may or may not map on to traditional parenting styles. However, the results from these person-centered approaches are specific to the variables included in the analysis and the sample analyzed leading to substantial challenges in interpreting and replicating findings across studies and suffer greater generalizability and robustness challenges with smaller samples sizes.

Person-centered approaches have been leveraged to form groups on a wide array of specific family and parenting-related variables to understand how combinations of risk factors are associated with adolescent substance use. For example, studies have included measures of family functioning (Cordova et al., 2014; Rojas et al., 2023), family routines (e.g., frequency per week of family dinners, housework, fun activities, and religious activities; Abar et al., 2020), and family structure and timing of family structure transitions (Johnston et al., 2020). Others have focused on parenting dimensions specifically, such as hostility and warmth dimensions across three family dyads (Xia et al., 2020), and closeness to resident and non-resident parents in stepfather families (Amato et al., 2016). A recent study examined multiple parenting behaviors specifically regarding media parenting (e.g., device access, communication and monitoring of online activities; Cox et al., 2021). A set of studies focused specifically on communication about substance use, incorporating parent-based and family communication styles (Choi et al., 2017), topics and frequency of parent-teen communication about substance use (Abar et al., 2011; Koning et al., 2012), and adolescent disclosure, secrecy, and lying (Baudat et al., 2022). Across nearly all the disparate family based latent profiles, higher risk profiles emerged from combinations of known risk factors that were linked to substance use in expected directions.

Table 1 reviews studies that have included parenting dimensions that theoretically underlie parenting styles (e.g., responsiveness, demandingness, monitoring, involvement, discipline), sometimes alongside substance use-specific parenting behaviors, in relation to adolescent substance use outcomes. While some studies found empirically derived profiles that were mostly similar to parenting styles and were linked to substance use outcomes in expected directions (e.g., Luyckx et al., 2011; LoBraico et al., 2020), others found profiles that did not match precisely the classical parenting styles and did not link to substance use (e.g., Young et al., 2011; Dembo et al., 2015). Several studies included substance-use specific parenting behaviors in addition to more classical parenting dimensions, yielding groups that also differed in terms of pro- vs. anti-alcohol sentiments by parents, with pro-alcohol stances (e.g., more permissive communication, more parental alcohol use modeling, more approval of adolescent substance use) associated with more substance use (Abar, 2012; Abar et al., 2014; Varvil-Weld et al., 2014).

It is important to note that this literature review was restricted to studies conducting latent profile analysis of parenting and family behaviors. A growing body of literature has used similar person-specific strategies to place multiple cultural and contextual factors along with parenting in profile analyses to understand broader risks for adolescent substance use (e.g., from an Bronfenbrenner's ecological systems perspective). Although these person-centered approaches show great promise for understanding how parenting behaviors, dimensions, and styles are related within-individuals/families and jointly influence behavior, thus far the vast majority of these studies are cross-sectional in nature (see Cordova et al., 2014 for an exception).

Future directions that merge advances in within and between-sources of variance and person-centered approaches will be able to address more complex developmental questions relevant to the bioecological systems cascade model. For example, combining these lines of research [e.g., using latent transition analysis (Lanza et al., 2010) or repeated measures of latent profiles/classes in other developmental models], researchers can ask questions such as "Are there profiles of parenting behaviors over time, when considering intercepts, slopes, and lability of multiple parenting behaviors and dimensions, that put youth at increased risk for substance use?" Second, a critical extension of this approach for testing the bioecological systems cascade model is to incorporate both parenting and child biobehavioral risk factors to yield family based profiles that capture transactional development to best inform substance use risk trajectories. Longitudinal extensions including both parent and child biobehavioral risk when applied to the interaction level (e.g., using observed data during conversation tasks or daily diary measures) could yield insights about whether and how dyadic profiles differ and develop across timescales.

Behavioral genetic approach

A key limitation of the parenting work reviewed thus far is the frequent omission of an individuals' genetic inheritance (which can change in expression over time) in studies seeking to understand the role of parenting for substance use development (Marceau et al., 2020a, 2021). A meta-analysis of multiple genetically informed designs using a variety of measures (e.g., observer ratings, parent and youth reports on several different instruments) found that parenting dimensions of warmth, control, and negativity are influenced children's and parents' genes as well as environments (except parents' genes did not contribute to their use of control; Klahr and Burt, 2014). They also found that children's shared environments contribute to the parenting they receive, consistent with the common interpretation of parenting effects as environmental influences in non-genetically informed literature. In addition, genetic influences play an important role in the intergenerational transmission (Jami et al., 2021) and development of substance use (Hicks et al., 2011; Deak and Johnson, 2021; Lopez-Leon et al., 2021). Relatedly, there are marked differences in parenting when parents are suffering substance use disorders (Chassin et al., 2019). This evidence suggests that parenting influences on adolescent substance use are at least in part confounded by genes that parents and adolescents share.

Inherited genetic risk for substance use likely explains much of the correlation between parent substance use and adolescent substance use (as opposed to parent modeling or substance availability mechanisms; Jami et al., 2021). However, for other parenting behaviors, genetically informed research has yielded findings that suggest a combination of evocative gene-environment correlations (where parenting behaviors are elicited by the adolescents' genetically informed substance use or behavioral risk for substance use like externalizing

TABLE 1 Literature review of latent profile and class analyses examining aggregate effects of parenting variables in relation to substance use.

References	Notes	*N*	Age	Dimensions (inputs)	Groups	Group description	Associations with substance use
Luyckx et al., 2011	Examined parenting trajectories	1,049	12 annual assessments from age 6 to 18	Parent-reported monitoring, positive parenting, and parental discipline	Indulgent (19%)	Moderate, decreasing monitoring; high, decreasing positive parenting; high increasing inconsistent discipline	Indulgent and especially Uninvolved had increases in alcohol and cigarette use over time
					Uninvolved (17%)	Low, decreasing monitoring; low, decreasing positive parenting; high, stable inconsistent discipline	
					Authoritarian (29%)	High, decreasing monitoring; low, decreasing positive parenting; low, stable inconsistent discipline	
					Authoritative (36%)	High monitoring; high positive parenting; low stable inconsistent discipline	
LoBraico et al., 2020	Family based intervention (control group only)	5,300	6th grade	Adolescent-reported family conflict, positive family climate, parental involvement, effective discipline, parental knowledge, and adolescent positive engagement	Coercive (15%)	High family conflict; low positive family climate, parental involvement, effective discipline, adolescent positive engagement, and parental knowledge	Coercive > Disengaged and Permissive > High functioning for drunkenness frequency
					Disengaged (41%)	Low positive family climate, parental involvement, adolescent positive engagement, and parental knowledge	
					Permissive (11%)	High parental involvement, adolescent positive engagement, parental knowledge, and family conflict; low effective discipline	
					High functioning (34%)	High positive family climate, parental involvement, effective discipline, adolescent positive engagement, parental knowledge; low family conflict	
Abar, 2012		1,143	First-year university students	Adolescents' retrospective reports of mothers' and fathers; alcohol modeling, perceived parent approval of alcohol use, alcohol communications, parental monitoring and knowledge, parental trust and support, parental access, and mother/father-teen conflict	High quality (2012: 19%; 2014: 14%)	High parental trust and support, access, alcohol communications, low mother-teen and father-teen conflict	Pro-alcohol linked to the most alcohol use in college (Abar, 2012); pro-alcohol parenting profile had the highest baseline and steepest increases in drinking across several phenotypes (Abar et al., 2014)
					High monitoring (2012: 31%; 2014: 35%)	High parental monitoring and knowledge, relatively higher communication about alcohol, lower approval of student drinking	

(Continued)

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TABLE 1 (Continued)

References	Notes	*N*	Age	Dimensions (inputs)	Groups	Group description	Associations with substance use
Abar et al., 2014		285	Longitudinal subset of Abar, 2012		Anti-alcohol (2012: 30%; 2014: 31%)	Low maternal and paternal alcohol modeling, parental approval of alcohol use, monitoring knowledge, trust and support, access and communication; high perceived mother-teen and father-teen conflict	
					Pro-alcohol (2012: 21%; 2014: 21%)	Heavier maternal and paternal alcohol use, higher parental approval of alcohol use and parent-teen conflict; low monitoring, knowledge, trust and support	
Varvil-Weld et al., 2012		370	Incoming first year college students who enrolled in an intervention (control group only)	Student-reported perceived positive communication, negative communication, monitoring, approval of alcohol use, and parent alcohol use	Positive + pro-alcohol (37.8%)	High positive communication and monitoring, parent approval of alcohol use, and parent alcohol use; low negative communication	Positive + pro-alcohol use had the highest pre-college drinking, and were most likely to be in the high-risk consequences subset
					Positive + anti-alcohol (34.6%)	high positive communication; low negative communication, parent approval of alcohol use, and parent alcohol use	
					Negative mother (19.5%)	Lower positive communication with mothers, parental monitoring; higher negative communication with mothers	
					Negative father (8.1%)	Lower positive communication with fathers, monitoring; high negative communication with fathers, father alcohol use	
Varvil-Weld et al., 2014	Used same measures and methods as Varvil-Weld et al., 2012	1,900	Incoming first year college students who enrolled in an intervention, includes the subsample reported in Varvil-Weld et al., 2012	Student-reported perceived positive communication, negative communication, monitoring, approval of alcohol use, and parent alcohol use	Positive + pro-alcohol (38.2%)	High positive communication and monitoring, parent approval of alcohol use, and parent alcohol use; low negative communication	Intervention to reduce alcohol use was more effective for college students in the positive + anti-alcohol and negative father groups
					Positive + anti-alcohol (34.9%)	High positive communication; low negative communication, parent approval of alcohol use, and parent alcohol use	
					Negative mother (16.5%)	Lower positive communication with mothers, parental monitoring; higher negative communication with mothers	
					Negative father (10.4%)	Lower positive communication with fathers, monitoring; high negative communication with fathers, father alcohol use	

(Continued)

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TABLE 1 (Continued)

References	Notes	*N*	Age	Dimensions (inputs)	Groups	Group description	Associations with substance use
Ennett et al., 2016		1,530	13 year olds	Mothers' attitude toward adolescent alcohol use, communication about negative consequences of alcohol use, permissiveness, and perceived ease of accessibility of alcohol at home, mothers' and fathers' alcohol use, and parenting style dimensions of responsiveness and demandingness	Conservative socialization (53.01%)	Mothers report 3+ messages about negative consequences of alcohol, No permissive messages; low access to alcohol at home, approval of use, and parental use; high parental demandingness and responsiveness	Alcohol use increasing more across grades 6 through 10 in the tolerant groups compared to the conservative groups
					Conservative + low-authoritative (11.57%)	Lower demandingness and responsiveness, higher parent alcohol problems, single-parent households	
					Tolerant + low parental use (29.15%)	High permissive alcohol messaging, access to alcohol at home, demandingness and responsiveness; low negative messages about alcohol, parent alcohol use, approval of Adolescent drinking, White, higher educated	
					Tolerant + high parental use (6.26%)	High parent alcohol use and alcohol problems, slightly less permissive alcohol messaging than tolerant + low use, high demandingness and responsiveness, White	
Dembo et al., 2015	Drug-involved truant youth	190	11–15 years old	Parent involvement, positive parenting, poor monitoring/supervision, inconsistent discipline, and corporal punishment	Low involvement + low positivity (21%)	Lower involvement, positive parenting	No associations with substance use
					High involvement + high positivity (61%)	Lower corporal punishment, higher involvement and positive parenting	
					Uses corporal punishment (18%)	Higher corporal punishment	
Young et al., 2011		1,700	11–15 years old	Parental Bonding Instrument (8 items)	Optimal parenting (20%)	Most helped, loved (tied with typical group), understood, allowed to make decisions and do things they like, likely to be made to feel better; least often 'treated like a baby' (tied with typical group)	No associations with substance use
					Typical parenting (54%)	Second highest scores on positive indicators;	
					Moderate parenting (23%)	Third highest scores on positive indicators, least controlled	
					Neglectful and controlling parenting (3%)	Least helped, loved, understood, allowed to do things they like or make decisions, or made to feel better; most often 'treated like a baby'	

These studies are the result of a PUBMED query on 5/22/23: ("latent profile" or "latent class") AND (parenting OR parent-child OR family) AND (adolescen*) AND ("substance use" OR "alcohol" OR "drug" OR "tobacco" OR "marijuana" OR "cannabis"). The search yielded 409 Results. Review of titles and abstracts yielded 52 articles that used latent profile analysis or latent class analysis where the indicator variables included parenting variables, and associations with adolescent substance use were presented. Review of full texts then yielded this final set of 9 articles that included exclusively parenting behaviors and dimensions (as opposed to parenting behaviors alongside other risk and protective factors such as peer characteristics, sociodemographic characteristics, etc.) and associations of these classes with substance use outcomes.

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problems), and direct environmental influences consistent with the predominant interpretation of parenting effects in the literature (Marceau et al., 2013, 2015a; Jami et al., 2021). Genetic correlations between monitoring and substance use indicating possible evocative child effects (Neiderhiser et al., 2013; Olivares et al., 2016) as well as environmental effects (after controlling for genetic influences; Neiderhiser et al., 2013; Samek et al., 2015).

Evidence from behavioral genetic studies call into question the interpretation of findings from studies that have examined parents' psychopathology and/or substance use in latent profile analyses. These studies generally have found that groups were differentiated by types and comorbidities of psychopathology, and more severe and more comorbid profiles tend to be associated with more substance use (Flouri and Ioakeimidi, 2018; Lowthian et al., 2020; Essau and de la Torre-Luque, 2021; Burdzovic Andreas et al., 2022). These studies typically conclude that parents' psychopathology is an environmental risk factor, when the groups are likely informed by both genetic and family environmental influences. It is important to note that these findings are consistent with intergenerational transmission of psychopathology and substance use models, but as they are not genetically informed, cannot speak to the mechanisms of transmission. In the future, it will be important to conduct this work in genetically informed designs (e.g., twin studies, adoption studies, studies including measured genetic variants) that can help to disentangle mechanisms of influence.

Integrating methods to test bioecological systems cascade models

This integrative review describes a bioecological systems cascade model for the role of parenting in developmental trajectories of risk for adolescent substance use. This model integrates bioecological frameworks by highlighting the role of culture and context influences for shaping parenting, child biobehavioral risk, and their transactional development. This transactional development is informed by intergenerational influences, including genetics, parents' familial environments, and child-parent attachment, which are conceptualized as laying the groundwork, or setting the start-point for each parent-adolescent's developmental trajectory. Analytically, these intergenerational influences would best be conceptualized as an early influence beginning developmental cascades. Culture and context influences are best characterized as a holistic backdrop that may shape parent-adolescent trajectories, and analytically would best be conceptualized as a moderator of developmental trajectories. Further, testing portions or the whole of this bioecological systems cascade model would be much stronger if accounting for shared genetic influences and by demonstrating when specific influences operate via gene-environment correlations, by using genetically informed designs.

Parenting influences are conceptualized as a complex process by which specific parenting behaviors are informed by and accumulate into parenting dimensions which together comprise general parenting styles and are informed by the broader family context (in line with family systems theory). When considering adolescent substance use as an outcome, these styles are unlikely to map onto the classical parenting styles exactly, and likely include pro- and anti-alcohol (or marijuana, or other substance use) attitudes which are likely also passed down intergenerationally. Analytically, incorporating longitudinal data at multiple timescales in both person- and variable-centered approaches to examining the interactive, combined role of multiple parenting behaviors and dimensions are likely to yield important information about how parenting co-develops with child biobehavioral risk. As reviewed above, there is a solid literature base examining parenting cross-sectionally under this conceptualization. However, to move this work forward, we must include not only mothers, but fathers and other caregivers in these models, as well as other members, relationships, and attributes of the family system, as well as by testing the mechanisms by which parenting influences operate which would be greatly aided by leveraging genetically informed designs.

The co-development of parenting and child biobehavioral risk is conceptualized as dynamic, and shaped both by parents, children, and the genetics and environments (including broader culture and context influences) that they do and do not share. As noted above, one way to incorporate this co-development of multiple layers of parenting with multiple aspects of child biobehavioral risk is though variable- and family centered data aggregation techniques applied to longitudinal data at the specific timescales they are expected to operate (e.g., moment-to-moment for parenting and child behaviors, in the mid-term like over months for parenting dimensions and slower biological and behavioral transitions like puberty and substance use uptake progression).

The mechanisms by which day-to-day interactions canalize or cement themselves into longer-term patterns of interaction and trajectories are conceptualized in terms of dynamical systems, whereby periods of transition introduce variability into the dyadic and family systems, which allows for shifts in longer-term trajectories. This perspective means that times of transitions are critical to leverage in intervention and prevention work as developmentally sensitive periods for reducing substance use risk. Analytically, a combination of time-varying effects models (Nilsson, 2016; Mak et al., 2020), latent cross-lagged panel models that separate within- and between-family variance, and other techniques for disaggregating between-family levels and within-family changes would provide insights into how these dyadic and family system dynamics unfold over time.

Ideally, studies using multiple timescales of measurement (e.g., measurement burst designs where data are collected on shorter time scales repeatedly across longer timescales) would be leveraged to understand the transactional development of child and parenting risk for substance use. Specifically, repeated measures on shorter time scales can be aggregated into dyadic process features (e.g., dyadic patterns of specific parenting behaviors and adolescent responses over days or weeks) that can then be modeled longitudinally over time. An additional analytic advancement critical to integrating dynamical systems theories in this model is to introduce transitions (e.g., not only adolescent transitions like schools or extracurricular involvement, but also family transitions to capture the core tenets of family systems theory, adolescent biological transitions like pubertal milestones, and adolescent behavioral transitions like substance use milestones) as "knots" in developmental trajectories in the longer-term developmental

models (e.g., using methods stemming from piecewise growth curves). Doing so would allow for the timing (e.g., age, grade, stage of puberty) at children's knot/transition points, as well as the individual/families' slopes of change for shorter time-scale dyadic process features to be explicitly modeled to provide insights on how dyadic dynamic systems of substance-specific parenting behaviors are related to individual child trajectories of substance use risk.

Conclusion

The proposed bioecological systems cascade model draws together several theoretical approaches (e.g., Bioecological, Dynamical Systems, Family Systems, Developmental Cascades) to illustrate the complex role that parenting plays in the development of adolescent substance use. There is already empirical support for many aspects of this model. Recent and future advancements in study design and analytic methods, some of which are delineated above, will allow for more robust testing of this complex developmental model. Embracing more complex models like the bioecological systems cascade model proposed here will help the field move toward a more realistic depiction of the variability and changes inherent in families and help move the field away from describing sample average patterns that dismiss the variability that exists within and across families over time. Using methods of data reduction that can map onto less frequently studied but meaningful theoretical concepts, such as quantifying the timing and types of transitions, variability at multiple timescales, and co-development of parenting and child biobehavioral risk provide rich avenues of future research into the role parents and families play in the development of adolescent substance use. As we move toward embracing complexity, it will be critical to include diverse samples, with respect to socioeconomic advantage, social context (including cultural factors), family structures, parents (e.g., genetic related and unrelated parents; mothers and fathers; same- and differing gendered co-parents; one through multi-parent families; other caregivers), and adolescents (e.g., gender diversity, neurodiversity, and adolescents' cultural contexts). Doing so will enable us to understand similarities and differences in how, when, and which aspects of parenting help to shape adolescent risk for substance use.

Findings from tests of this model are expected to inform prevention and intervention strategies, particularly by identifying specific circumstances (e.g., substance use-specific parenting behaviors in specific family and cultural-context climates) at specific timepoints (e.g., developmental knots that are marked by transitions, the likely developmental timing of which may be predicted by measurable intergenerational factors) are most likely to produce canalized changes in the positive or negative direction. Insights from this model may also yield a better understanding of when different parenting behaviors can help or do more harm than good in terms of adolescent substance use risk. Parents of adolescents face the challenge of striking the right balance between autonomy-granting and protective behaviors. The right balance undoubtedly depends on the child's characteristics, and the developmental, cultural, and family context in which the family finds themselves. While daunting, the many transitions faced by adolescents and parents allows for repeated opportunities to readjust interaction patterns and shape parent-adolescent trajectories in the most positive directions afforded by the family and cultural context. In order to understand the process of striking this balance, and in turn to help parents navigate this balance, it is important to embrace the complexity of the child-parent relationship in the context of the family, development, and larger cultural context to understand the role of parenting for the development of adolescent substance use. Given the availability of large, genetically informed, longitudinal samples, the increasing focus on diversifying samples, and advancements in our methodological tools, it is possible to do so.

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.

Author contributions

KM: Writing – original draft.

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Conflict of interest

The author declares 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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Harsh parenting among veterans: parents' military-related PTSD, mentalization, and pre-military trauma

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Objectives: Veteran parents experiencing posttraumatic stress disorder (PTSD) may resort to harsh parenting. The indirect pathway from parental military-related PTSD to harsh parenting, and the moderating role of parents' pre-military trauma histories, has been less explored. Informed by mentalization theory, as well as trauma-sensitive and posttraumatic growth perspectives, we aim to explore the associations between veteran parents' military-related PTSD, mentalization, harsh parenting, and prior trauma before military service.

Methods: Data were collected from an online research panel of 509 veteran parents with children under 10. We employed Structural Equation Models to test indirect and moderating effects.

Results: We identified an indirect effect of parental pre-mentalization from military PTSD to harsh parenting [corporal punishment: $b = 0.35$, $p < 0.001$, 95% CI (0.23, 0.46); psychological aggression: $b = 0.14$, $p < 0.001$, 95% CI (0.09, 0.19)]. Multi-group analysis on four parent groups (parents with only pre-military physical trauma, parents with only pre-military psychological trauma, parents with both pre-military physical and psychological trauma, and parents with no pre-military physical or psychological trauma) highlighted differences in these associations, particularly between parents with only pre-military physical trauma and those without any physical and psychological trauma. The military-related PTSD effects on psychological aggression, corporal punishment, and pre-mentalization were all significantly higher for parents without pre-military physical and psychological trauma.

Conclusion: Modifying parents' interpretation of their child's mental states can potentially counteract the effects of veterans' military PTSD on harsh parenting. Family-based programs should be created considering veteran parents' pre-military trauma histories.

KEYWORDS

veterans, posttraumatic stress disorder, harsh parenting, pre-mentalization, pre-military trauma

Introduction

Veterans frequently suffer from posttraumatic stress disorder (PTSD; Creech and Misca, 2017). PTSD is a traumatic stress reaction to "actual or threatened death, serious injury, or sexual violence" (DSM-5, American Psychiatric Association, 2013, p. 271), including symptoms of (1) intrusion; (2) the presence of persistent avoidance of stimuli associated with the trauma; (3) negative alterations in cognitions and mood associated with the traumatic event(s); (4) marked alterations in arousal and reactivity as it relates to the trauma (DSM-5, American Psychiatric Association, 2013, p. 271). Due to their combat experience, veterans are often exposed to actual or threatened death and serious injuries, making them more susceptible to experiencing PTSD. Data from the US Department of Veterans Affairs (VA) indicates that veterans are diagnosed with PTSD at a higher rate than the general population. Specifically, 23% of veterans from Operation Enduring Freedom (OEF) and Operation Iraqi Freedom (OIF) have been diagnosed with PTSD, a rate approximately four times higher than the general population (Creech and Misca, 2017). This elevated PTSD prevalence increases veteran parents' likelihood of adopting harsh parenting behaviors (Christie et al., 2019). Considering nearly two-fifths of U.S. military personnel are parents (Creech and Misca, 2017), the repercussions of PTSD potentially extend beyond veterans to their children. Consequently, these children might encounter adverse environments that can detrimentally affect their socio-emotional development (Creech and Misca, 2017).

Parental mentalization, the appropriate interpretation of their child's internal states, fosters parenting sensitivity and encourages positive parenting practices (Cohen et al., 2022). On the other hand, compromised mentalization is associated with distorted sense of identity, which results in a reduced sense of responsibility for one's own behaviors. People with compromised mentalization may treat others as physical objects, and then disregard the psychological effects of their brutal behaviors on others (Fonagy et al., 1997).

However, traumatic symptoms can significantly hinder a parent's ability to mentalize (Allen et al., 2012; Janssen et al., 2022). Notably, parents with PTSD might adopt a pre-mentalization mode, a distorted way of interpreting their child's subjectivity as malevolent, potentially leading to harsh parenting or child maltreatment (Edler et al., 2022). Further complicating matters, veterans often confront with additional challenges. Those with military backgrounds have higher incidences of pre-military trauma, such as experiencing physical punishment from their own caregivers and emotional mistreatment (Blosnich et al., 2014). Consequently, veteran parents face the compounded effects of military-related PTSD and pre-military trauma, which may complicate the association between their PTSD and harsh parenting.

To develop effective prevention and intervention for children in veteran families facing the risk of harsh parenting, it is essential to understand the underlying mechanisms connecting military-related PTSD to harsh parenting and how pre-military trauma histories might influence these pathways. Thus, this study aims to first investigate the indirect effect of parental pre-mentalization between the association of veteran parents' military-related PTSD and harsh parenting. Given the well-established direct effect of veterans' PTSD on harsh parenting in existing literature, our study shifts focus to the indirect effect of parental pre-mentalization. We focus on the indirect effect of parental pre-mentalization due to its relatively limited research coverage and its higher potential for modification through psychotherapies; Second, we aim to determine if traumatic experiences of veteran parents prior to military service moderate the associations between parental military-related PTSD, pre-mentalization, and harsh parenting.

PTSD and harsh parenting

Parental PTSD significantly predisposes individuals to harsh parenting. Children with parents suffering from PTSD often report increased emotional abuse and neglect, as the trauma hinders parents from validating their children's feelings (Yehuda et al., 2001). Additionally, PTSD symptoms, like heightened arousal and reactivity can lead to over-reactive or harsh parenting (Franz et al., 2022). Christie et al. (2019) posits that PTSD symptoms, including anger, reduced affect, and attention and memory impairments, correlate with irritable and aggressive parenting behaviors.

Veterans' distinct experiences amplify the importance of understanding how PTSD symptoms influence parenting (Creech and Misca, 2017). Their worldviews shaped by military-related PTSD can disrupt foundational aspects of trust, intimacy, power, and control, which in turn, influence the parent-child relationship (Hopson, 2017). Research on veterans with PTSD indicates reduced parenting satisfaction, elevated parenting stress, increased negative parenting behaviors, challenges in managing anger, and potential escalation to violent actions (Christie et al., 2019). As studies on parenting delve deeper into the relationship between parental PTSD and harsh parenting, it's crucial to pinpoint the underlying mechanisms that lead to this phenomenon.

PTSD, mentalization, and harsh parenting

One connection between PTSD and aggressive behavior is deficits in social cognition (Nietlisbach and Maercker, 2009; Sharp et al., 2012), which lead to the concept of "mentalization." Mentalization, also operationalized as "reflective functioning," refers to a person's capacity to perceive human behavior as driven by mental states, such as thoughts, feelings, desires, and beliefs (Fonagy et al., 2018). Effective mentalization enables individuals to predict and influence others' behaviors, fostering successful social interactions (Sharp et al., 2012). Those with good mentalizing capacity view others as separate beings with unique mental states, and they will actively seek to understand these states.

Research suggests a connection between PTSD and compromised mentalization (Allen et al., 2012; Janssen et al., 2022). Individuals with PTSD symptoms may struggle with their mentalizing capacity, particularly discerning between inner emotions and external realities, as well as differentiating their inner mental states from those of others. For example, flashbacks and avoidant symptoms can blur the lines between imagination and reality and between genuine dangers and feelings of fear (Palgi et al., 2014). Hyperarousal symptoms might prompt an

individual to misinterpret ambiguous situations as threats and assume negative intentions in others (Taft et al., 2008). Also, neuroscientific evidence shows that certain brain regions vital for mentalization, especially the medial frontal lobes, appear to be compromised in those with PTSD (Frith and Frith, 2003; Sharot et al., 2007).

In the context of parenting, parental mentalization denotes "a parent's capacity to represent and understand the breadth of his/her child's internal experience" (Slade, 2005, p. 275). Luyten et al. (2017) specified three specific dimensions of impaired parental mentalization: (1) pre-mentalizing, (2) over certainty, and (3) lack of genuine interest and curiosity. Pre-mentalizing refers to parents' interpreting their child's mental states in a distorted manner, often perceiving them as malevolent. Over certainty is defined as parents' limited awareness of the opacity of their child's mental states, resulting in an intrusive or presumptuous understanding. Parents' lack of genuine interest and curiosity refers to parents' minimal interest in exploring their children's mental states.

Parental mentalization is strongly associated with parenting practice (Smaling et al., 2016a,b; Yule, 2021; Cohen et al., 2022; Edler et al., 2022). Higher levels of parental mentalization were associated with reduced parents' insensitivity (Smaling et al., 2016a) and decreased physical aggression (Smaling et al., 2016b). During the COVID-19 pandemic, Cohen et al. (2022) found that parents exhibiting greater mentalization demonstrated positive parenting behaviors, even amidst parental distress caused by the pandemic. Conversely, parental pre-mentalization, characterized by a distorted way of interpreting their child's subjectivity as malevolent (Luyten et al., 2017), has been linked to less supportive reactions to children's emotions (Edler et al., 2022) and a decrease in emotionally validating parenting behaviors (Yule, 2021).

While the links between PTSD and compromised mentalization, as well as between pre-mentalization and harsh parenting, are well documented, these dynamics are underexplored in parents with military backgrounds. In studies that focus on military individuals, connections between PTSD and mentalization often appear inconclusive, possibly due to limited sample sizes (Mazza et al., 2012). Given that pre-mentalization signifies a severely diminished mentalizing ability (Burkhart et al., 2017) and established research links it to detrimental parenting behaviors (Yule, 2021; Edler et al., 2022), our study aims to elucidate the relationship between military-related PTSD, pre-mentalization, and harsh parenting practices.

Parents' pre-military trauma as a potential moderator

While military-related PTSD stands out as a prominent concern for parents with military backgrounds, it's crucial to recognize that these parents, like everyone else, might suffer from trauma before their military services. Analysis from the 2010 Behavioral Risk Factor Surveillance System reveals that individuals with military backgrounds have a heightened susceptibility to adverse childhood experiences (ACEs) such as being maltreated by their family members (Blosnich et al., 2014). Some might turn to the military as refuge from turbulent household environment. Given the disproportionately high rates of ACEs among military personnel, questions arise about how these pre-military traumatic experiences may compound with military-related PTSD, further influencing the wellbeing of their children.

There are two prevailing frameworks offering divergent theoretical perspectives on the moderating role of veteran parents' pre-military trauma. From the trauma-sensitive viewpoint, trauma can heighten a survivor's susceptibility to psychological distress and vulnerability in the face of subsequent traumatic events (Selye, 1976; Solomon, 1993). Thus, bearing prior traumatic histories before joining in the military might increase the negative repercussions of parents' military-related PTSD. Following this reasoning, the risks associated with pre-mentalization and harsh parenting could intensify among parents who have faced military-related PTSD if they have also encountered traumas before their military service, such as pre-military physical or psychological trauma. Furthermore, varying types of past trauma might influence reactions to PTSD differently. For instance, research on women who have faced partner violence indicates that psychological abuse has a more profound association with PTSD symptoms compared to those who have only faced physical abuse (Taft et al., 2005).

In contrast to the trauma-sensitive perspective, the posttraumatic growth framework posits that individuals can surpass their pre-trauma levels of adaptation, psychological functioning, or life awareness in the aftermath of trauma (Tedeschi et al., 1998). Posttraumatic growth manifests across three domains: self-perception, interpersonal relationships, and life philosophy (Tedeschi and Calhoun, 1995). Several studies have shown that individuals with a history of trauma often report a fortified sense of self, a renewed appreciation for life, and the development of adaptive coping mechanisms (Shakespeare-Finch and De Dassel, 2009; Wang et al., 2019), which may act as buffers against negative behaviors, such as harsh parenting. It's noteworthy that posttraumatic growth is prevalent among U.S. veterans. For instance, amidst the COVID-19 pandemic, many veterans reported experiencing pandemic-induced posttraumatic growth, such as heightened appreciation of life, improved interpersonal relationships, and bolstered personal resilience (Pietrzak et al., 2021). The way an individual perceives the influence of prior trauma on their personal development is integral in fostering posttraumatic growth. Drawing from a study on ex-prisoners-of-war (POWs) during the pandemic, those who viewed their prior war-related traumas as instrumental in shaping their coping mechanisms exhibited lower PTSD incidences compared to those who deemed such experiences detrimental (Solomon et al., 2021). Thus, pre-military trauma might not inevitably escalate the risks of pre-mentalization and harsh parenting for veteran parents living with PTSD.

The absence of prior research examining the interactive effects of veteran parents' pre-military trauma and military-related PTSD on their parenting underscores the significance of this study. Investigating how pre-military trauma moderates the relationship between military-related PTSD, pre-mentalization, and harsh parenting will broaden our understanding on veteran families and contribute novel insights to the field.

The current study

Based on the theoretical propositions about mentalization (Sharp et al., 2012), we hypothesized that higher levels of military-related PTSD symptoms would be linked to higher levels of pre-mentalization in veteran parents. Sequentially, higher levels of pre-mentalization would be associated with harsh parenting. Informed by the trauma-sensitive and posttraumatic growth theories, we would examine whether those associations vary by parents' pre-military trauma. According to trauma sensitive theory, the associations between military-related PTSD, pre-mentalization, and harsh parenting would be stronger for parents with a history of pre-military trauma compared to those without such history. According to posttraumatic growth theory, those associations would be weaker for parents with a history of pre-military trauma, suggesting an individual's potential for growth after trauma (Figure 1: Conceptual Model).

Through examining the indirect effect of parental pre-mentalization, our study enhances the understanding of the pathway between PTSD and parenting behaviors. This research also holds implications for preventing child maltreatment, as harsh parenting may escalate to such levels. By incorporating trauma-informed perspectives, we further discern how pre-military trauma in veteran parents moderates the relationship between military-related PTSD, mentalization, and parenting outcomes. By addressing the dual knowledge gap—veteran parents in parenting research and parenting in military studies, our study findings can inform professionals to provide better services for veteran families.

Materials and methods

Participants and procedure

Upon securing approval from the university's institutional review board (IRB), we collaborated with Qualtrics to recruit a purposive sample of veterans parenting children under the age of ten. This focus on younger children was deliberate, as they are more susceptible to harsh parenting compared to their older counterparts. Qualtrics, a renowned technology firm, aids researchers in participant recruitment through its representative online research panel. This panel consists of a curated group of respondents pre-consented to partake in online survey research (for details, refer to https://www.qualtrics.com/research-services/online-sample/). Nowadays, social scientists increasingly use online research panels provided by companies such as Qualtrics, Amazon.com's Mechanical Turk, and Facebook advertisements for survey research due to their efficiency in recruitment, high-quality data, and reduced logistical costs (Dupuis et al., 2013). The advantages of these platforms were particularly pronounced during the pandemic when our study's data collection occurred, because it was hard to reach participants in person. Among various online research panels provided by technology firms, Qualtrics stands out for its demographic and political representativeness (Boas et al., 2020).

For our study's purposes, Qualtrics implemented two specific eligibility criteria for its online research panel: (1) confirmed veteran status and (2) parenting a child currently aged below 10 years. If the potential respondents self-reported that they met these two criteria, they would be screened into the study. Participants completed all questionnaires using Qualtrics' online survey platform. Before starting the survey, they were required to review and consent to a form attached at the beginning. This form included essential details such as a statement that the project is research and participation is voluntary, a brief overview of the study (including its purpose, duration, and procedures), potential risks or discomforts, expected benefits, and information about incentives. The survey started only after participants gave their consent. Each participant received a $10 incentive as a token of appreciation for their time. Participants received the incentives regardless of their answers. This amount was determined in consultation with our university's IRB officer to ensure it was not coercive but merely a modest gesture of gratitude.

In relation to sample size, Kline (2015) recommends a minimum of 200 participants to ensure sufficient power for detecting significant results using structural equation modeling. Balancing fiscal constraints with the pursuit of rigorous research, we aimed for a sample size of approximately 500. Of the 2,349 respondents from the research panel who expressed interest, 509 met the criteria, successfully passed attention checks, and provided complete data.

Table 1 presents the demographics of our participants. Most participants were male (76.2%), with an average age of 39 years. Their children were 60.6% boys and 39.4% girls, averaging 6.5 years old. A majority of our sample identified as White/European American (78.6%). Additionally, 67.6% of participants held a bachelor's degree or higher. The majority (81.1%) were married, and over half of the participants reported a household income exceeding $70,000.

Measurement

Parental PTSD

Parental PTSD was measured by a 17-item PTSD Checklist – Military Version (PCL-M; Weathers et al., 1991) commonly used by Veteran Services (VA) for military-related PTSD screening. PCL-M could be used for aiding in diagnostic assessment and monitoring change in PTSD symptoms among veterans. PCL-M mainly assesses four categories of PTSD symptoms based on DSM-IV: re-experiencing, avoidance, negative alteration in cognition & mood, and hyperarousal. Sample questions included "Suddenly acting or feeling as if a stressful military experience were happening again" and "Avoid thinking about or talking about a stressful military experience or avoid having feelings related to it." Responses were measured by a 5-point Likert scale ranging from 1 ("Not at all") to 5 ("Extremely"), with a higher score indicating severe PTSD symptoms. Weathers et al. (1993) suggest a threshold score of 50 as ideal for identifying a likely diagnosis of combat-related PTSD. Prior research showed a 0.97 test-retest reliability and 0.89 or above internal consistency coefficients of the PCL-M (Weathers et al., 1993). In this study sample, the reliability α of the PCL-M was 0.97.

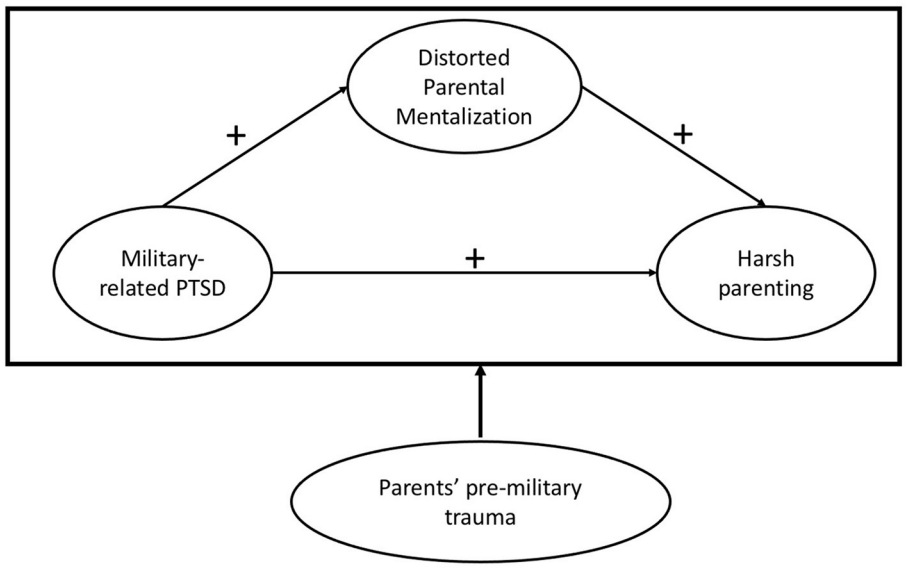

FIGURE 1
Conceptual model.

Parental pre-mentalization

The parental pre-mentalization was assessed by the 6-item pre-mentalization subscale of the Parental Reflective Functioning Questionnaire (PRFQ; Luyten et al., 2017). The scale developer defined pre-mentalization as "a nonmentalizing stance, malevolent attributions, and an inability to enter the subjective world of the child" (Luyten et al., 2017, p. 8). Sample questions include, "The only time I'm certain my child loves me is when he or she is smiling at me." "My child cries around strangers to embarrass me." "I find it hard to actively participate in make-believe play with my child." "My child sometimes gets sick to keep me from doing what I want to do." "When my child is fussy, he or she does that just to annoy me." "Often, my child's behavior is too confusing to bother figuring out." The response ranged from 1 to 7 (1 = "strongly disagree," 2 = "disagree," 3 = "somewhat disagree," 4 = "neither agree nor disagree," 5 = "somewhat agree," 6 = "agree," 7 = "strongly agree"). Parental pre-mentalization sub-scale has been shown a good reliability (α = 0.7) in a study on mothers with children aged 0 to 36 months (Luyten et al., 2017). One validation study suggested good construct validity of parental pre-mentalization as it was negatively associated with parental coping and satisfaction (De Roo et al., 2019). The reliability α of the parental pre-mentalization was 0.97 in this study.

Harsh parenting

Harsh parenting was measured by two distinct elements: corporal punishment and psychological aggression. Corporal punishment aims to inflict physical discomfort or pain, without causing harm or injury. Psychological aggression involves actions like shouting at a child or labeling them with derogatory terms like "dumb" or "lazy" (Straus et al., 1998). In this study, corporal punishment and psychological aggression were both assessed by four-item sub-scales of the Dimensions of Discipline Inventory (DDI, Straus and Fauchier, 2007).

Sample questions for corporal punishment were "How often did you spank, slap, smack, or swat this child?" "How often did you use a paddle, hairbrush, belt, or other objects?" Questions measuring psychological aggression included "How often did you shout or yell at this child?" "How often did you try to make this child feel ashamed or guilty?" The responses ranged from 0 to 9 (e.g., 0 = "Never and not in the past year, but in a previous year;" 9 = "Two or more times a day").

Based on the DDI manual developed by Straus and Fauchier (2007), we recoded the responses of corporal punishment and psychological aggression as 1 = "ever happened in the past year" and 0 = "never happened in the past year." In the Straus and Fauchier (2007)'s study, the reliability α of the measures of corporal punishment and psychological aggression ranged from 0.74 to 0.81. In our study, they were 0.79 and 0.73, respectively.

Parents' pre-military trauma

Parents' pre-military trauma was assessed by two questions from the Deployment Risk and Resilience Inventory-2 designed to assess military members' traumatic life experiences before joining the military (Vogt et al., 2013). Parents' history of physical trauma was measured by a dichotomous item (Yes/No), "I was physically punished by a parent or primary caregiver," while psychological trauma was also assessed by a dichotomous item (Yes/No), "I was emotionally mistreated." Using these two questions, we were able to categorize our participants as veteran parents who (1) experienced both pre-military physical and psychological trauma, (2) experienced only pre-military physical trauma only, (3) experienced only pre-military psychological trauma, and (4) had no pre-military physical or psychological trauma.

TABLE 1 Sample characteristics ($N = 509$).

	N	%	*M* (*SD*)	Range
Child characteristics				
Age	498		6.5 (2.62)	0–10
Sex (male)	308	60.6		
Parent/family characteristics				
Age	508		39 (9.3)	21–76
Gender (male)	387	76.2		
Race/Ethnicity				
Native American/Native North American	10	2.0		
Asian and Asian American/Pacific Islander	12	2.4		
Hispanic/Latinx	32	6.3		
Black/African American	43	8.4		
White/European American	400	78.6		
Multiracial	12	2.4		
Education level				
High school diploma/GED	33	6.5		
Some college (no degree obtained)	70	13.8		
Associate degree/Trade school	61	12.0		
Bachelor's degree	170	33.4		
Master's degree	152	29.9		
Doctoral/Professional degree	23	4.5		
Household income				
<$10,000	4	0.8		
$10,000–39,999	69	13.5		
$40,000–69,999	87	17.1		
$70,000–99,999	125	24.6		
$100,000–149,999	151	29.7		
More than $150,000	73	14.3		
Relationship status				
Married	413	81.1		
Divorced	47	9.2		
Separated	8	1.6		
Widowed	8	1.6		
Never married	33	6.5		

Covariates

As parents' and children's demographic and socioeconomic characteristics would confound parenting behavior (Belsky, 1984), we included covariates of child age and gender, as well as parents' age, gender, race, relationship status, education and family household income. Child and parent's age were continuous variables. Child and parent's gender were recoded as a binary variable (1 = "male," 0 = "female") from the original response items (1 = "male," 2 = "female," 3 = "transgender male," 4 = "transgender female," 5 = nonbinary/gender fluid) because no respondent identified with other gender categories. Parental race (Native American/Native North American, Asian and Asian American/Pacific Island, Hispanic/Latinx, Black/African American, other/multiracial, reference group = White/European American), relationship status (widowed, divorced, separated, never married, reference group = married) were categorical variables, while parental education (1 = "less than high school," 2 = "high school diploma/GED," 3 = "some college," 4 = "associate's degree/trade school," 5 = "bachelor's degree," 6 = "master's degree," 7 = "doctoral/professional degree") and family household income (1 = "<$10,000," 2 = "$10,000–39,999," 3 = "$40,000–69,999," 4 = "$70,000–99,999," 5 = "$100,000–149,999," 6 = "More than $150,000") were ordinal variables.

Analytic plan

Several steps were conducted to examine our research questions. First, we established a good fitting measurement model for the latent variables, first separately and then together. We used several fit indices to assess model fit, including Chi-square, Comparative Fit Indices (CFI), Tucker-Lewis Index (TLI), Root Mean Squared Error of Approximation (RMSEA), and Standardized Root Mean Squared Residual (SRMR) using standard cut-offs as recommended (Hu et al., 1995; Kline, 2015). An RMSEA/SRMR of 0.05 and below and a CFI/TLI of 0.95 and above indicate a good model fit; an RMSEA/SRMR of 0.05–0.08 and a CFI/TLI of 0.90–0.95 indicate an acceptable fit (Hu et al., 1995). After establishing the measurement models, we tested our hypothesized structural model using the entire sample. All models were fit using Mplus 8.7 (Muthén and Muthén, 2017), and the maximum likelihood (ML) estimator was used to handle nonnormality distribution. There was no missing data among the study variables.

Following, we used group analysis to examine the hypothesized structural model for each of the four trauma groups (parents experienced pre-military physical trauma only, experienced pre-military psychological trauma only, experienced both trauma, and no physical or psychological trauma). Prior to fitting our structural model, we examined measurement invariance across each of the four trauma groups. For binary items, we used the weighted least squares means and variance adjusted estimator (WLSMV) to fit latent variables of corporal punishment and psychological aggression. For continuous items, we used maximum likelihood with robust standard errors (MLR) to fit latent variables of Military PTSD and Pre-mentalization. We followed Wu and Estabrook's (2016) recommendation to examine measurement invariance for the latent variables with binary indicators using the WLSMV estimator that suggest fitting a configural, combined metric and scalar, and strict/unique models. For continuous indicators, we used MLR and followed typical specifications that included configural, metric, and scalar invariance models.

We used the Satorra-Bentler Chi-square difference test for models using MLR and the built-in DIFFTEST option in Mplus for models using WLSMV in combination with a change in CFI

TABLE 2 Fit indices for four measurement model ($N = 509$).

Models	Chi-square (*df*)	CFI	TLI	SRMR	RMSEA	90% CI
1–Military PTSD	35.86 (2)***	0.96	0.89	0.02	0.18	[0.13, 0.24]
2–Pre-mentalization	22.04 (9)***	0.99	0.98	0.02	0.05	[0.03, 0.08]
3–Corporal punishment	5.54 (2)***	0.99	0.99	0.02	0.06	[0.00, 0.12]
4–Psychological aggression	1.42 (2)***	1	1	0.01	0.00	[0.00, 0.08]

CFI, Comparative Fit Index; TLI, Tucker-Lewis Index; RMSEA, Root Mean Squared Error of Approximation; SRMR, Standardized Root Mean Squared Residual. ***p < 0.001.

and RMSEA <0.01 to assess each test of measurement invariance (Svetina et al., 2020). After establishing measurement invariance for all latent variables, we examined the structural model for each of the four groups. We then examined differences in the magnitude of the effects across groups using Wald tests. Formal tests of the indirect effect of pre-mentalization to military-related PTSD to corporal punishment or psychological aggression were examined using Bootstrapping confidence intervals. For the sake of model parsimony, all models controlled for race and income, as other covariates were not significant.

Results

Descriptive statistics

The average veteran parents' military-based PTSD symptoms was 40.58 ($SD = 18.63$) on a scale of 17–85, suggesting that, on average, veteran parents experienced a slightly above low level of military-related PTSD. The level of pre-mentalization was 19.05 ($SD = 9.13$) on a scale of 6–42, showing the average level of sample participants "somewhat disagreed" with the statement of pre-mentalization. Finally, corporal punishment was 1.35 ($SD = 1.48$), and psychological aggression was 1.89 ($SD = 1.45$) on a scale of 0–4, showing the sample's low average levels of harsh parenting.

Measurement model

For the measurement models, a total of four Confirmatory Factor Analysis (CFA) models were fit for each latent variable (Table 2). Initially, the military PTSD measure had 17 items which was quite a lot for a latent variable. To address this, we used parceling to aggregate the items to reflect four substantively meaningful dimensions of PTSD: re-experiencing, avoidance, negative alteration in cognition and mood, and hyperarousal. The four-item parcels reflecting military PTSD symptoms were then used to create the latent variable. The model with the parcels had an acceptable fit, $\chi^2_{(2)} = 35.86$, $p < 0.001$, CFI = 0.96, TLI = 0.89, SRMR = 0.02, RMSEA = 0.18. The six items reflecting pre-mentalization had a good model fit, $\chi^2_{(9)} = 22.04$, $p < 0.001$, CFI = 0.99, TLI = 0.98, SRMR = 0.02, RMSEA = 0.05. The four items used to measure corporal punishment had good model fit, $\chi^2_{(2)} = 5.54$, $p < 0.001$, CFI = 0.99, TLI = 0.99, SRMR = 0.02, RMSEA = 0.06. Lastly, the four items used to measure psychological aggression had good model fit, $\chi^2_{(2)} = 1.42$, $p < 0.001$, CFI = 1, TLI = 1, SRMR = 0.01, RMSEA = 0.00.

Structural model

After establishing good fitting measurement models for each latent variable separately and then together, we fit the structural model to examine the main effect of military PTSD, pre-mentalization, corporal punishment, and psychological aggression. The results (see Figure 2) showed that greater levels of military PTSD were associated with the presence of corporal punishment toward children ($b = 0.18$, $p < 0.001$), greater levels of pre-mentalization ($b = 0.43$, $p < 0.001$) and greater levels of psychological aggression ($b = 0.12$, $p = 0.015$). Higher levels of pre-mentalization were positively associated with the presence corporal punishment ($b = 0.75$, $p < 0.001$) and psychological aggression ($b = 0.72$, $p < 0.001$). There were significant indirect effects of pre-mentalization between military PTSD and psychological aggression [$b = 0.14$, S.E. = 0.03, $p < 0.001$, 95% (0.09, 0.19)], and also between military PTSD and corporal punishment [$b = 0.35$, S.E. = 0.06, $p < 0.001$, 95% (0.23, 0.46)].

In terms of covariates, we found that being white was significantly associated with higher levels of pre-mentalization ($b = 0.15$, $p = 0.001$). We also found that above medium income was significantly associated with greater levels of pre-mentalization ($b = 0.34$, $p < 0.001$), corporal punishment ($b = 0.19$, $p < 0.001$), and psychological aggression ($b = 0.09$, $p = 0.049$). The findings on covariates may be explained within the context of the COVID-19 pandemic. Our data was collected in 2021 when vaccines were not widely distributed, a time when individuals still struggled with profound shifts in their lifestyles and accompanying stressors. It is possible that families accustomed to robust support systems, such as being White and rich, may require more adaptation to the challenges of the COVID-19 pandemic, such as the unavailability of daycare, the necessity of sharing spaces due to remote work, and the absence of recreational activities. The more significant the changes in a parent's professional and personal spheres, the greater the stress they could feel, potentially leading to a higher likelihood of exhibiting pre-mentalization and harsh parenting.

Measurement invariance

To answer the research question that examined differences in our hypothesized structural model across four parent groups with different past trauma, we first established measurement invariance across the groups. We used the MLR estimator for continuous variables and the WLSMV estimator for categorical variables following Wu and Estabrook's (2016) recommendations to examine measurement invariance across groups. These tests

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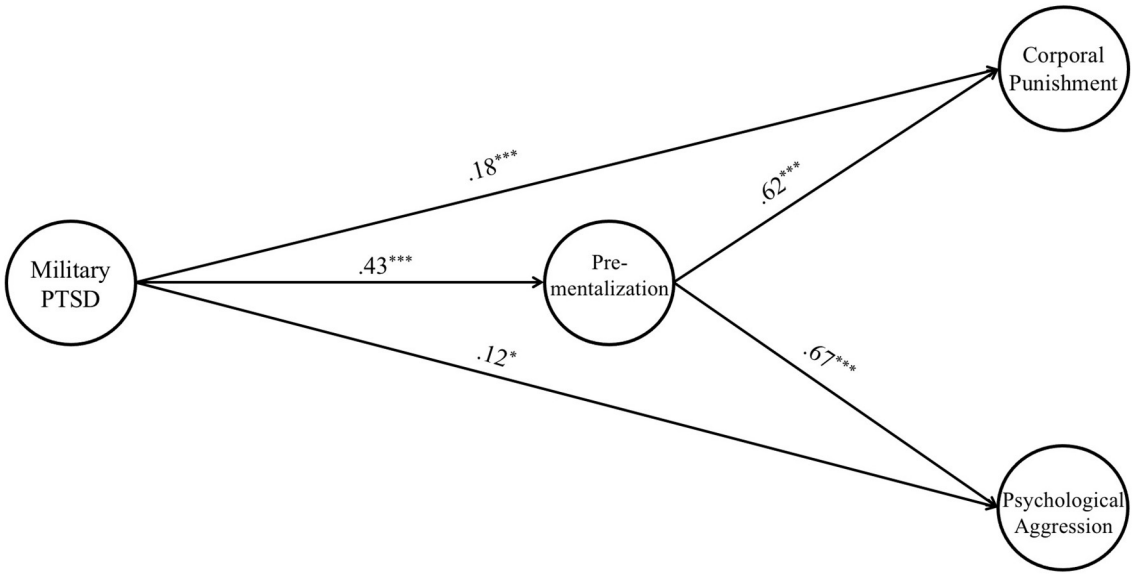

FIGURE 2
Main effect of veteran's pre-mentalization mediates PTSD toward psychological aggression and corporal punishment ($N = 509$). $X^2 = 458.63$, df = 157, CFI = 0.90, TLI = 0.88, RMSEA = 0.06, SRMR = 0.09. Report standardized coefficient. Controls parental race and poverty status. Solid line indicates significant and dash line refers to insignificant path. *$p < 0.05$, ***$p < 0.001$.

TABLE 3 Fit indices for measurement invariance models.

Models	χ^2 (*df*)	CFI	ΔCFI	TLI	RMSEA	ΔRMSEA	SRMR
Continuous variables							
Configural model	285.05 (*136*)***	0.95	—	0.94	0.09	—	0.05
Metric model	303.67 (*160*)***	0.95	0	0.95	0.08	0	0.06
Scalar model	391.06 (*184*)***	0.936	0.014	0.94	0.09	0.01	0.08
Partial scalar model	340.76 (*178*)***	0.95	0.01	0.95	0.09	0.01	0.07
Categorical variables							
Configural model	97.35 (*76*)***	0.99	—	0.99	0.05	—	0.06
Metric-scalar model	120.63 (*88*)*	0.99	0	0.99	0.05	0	0.06
Strict model	153.54 (*112*)***	0.99	0	0.99	0.05	0	0.08

Continuous variables consist of military PTSD and pre-mentalization. Continuous measurement invariance uses robust maximum likelihood. Categorical variables include corporal punishment and psychological aggression. Categorical measurement invariance use WLSMV. CFI, Comparative Fit Index; TLI, Tucker-Lewis Index; RMSEA, Root Mean Squared Error of Approximation; SRMR, Standardized Root Mean Squared Residual. Partial Scalar Model released constrained of 2 intercepts. *$p < 0.05$, ***$p < 0.001$.

of measurement invariance were run in separate steps, given the testing procedures were slightly different (see Table 3). For the continuous variables (i.e., military PTSD and pre-mentalization), we first examined the configural invariance model in which factor loadings, intercepts, and residual variances were freely estimated. The configural invariance model had an acceptable fit [$\chi^2_{(136)} = 285.05$, $p < 0.001$, CFI = 0.95, TLI = 0.94, SRMR = 0.09, RMSEA = 0.05], and was used as the baseline model for subsequent measurement invariance tests. Next, we examined the metric model, in which all loadings were constrained to be equal across groups. The metric model had a good fit [$\chi^2_{(160)} = 303.67$, $p < 0.001$, CFI = 0.95, TLI = 0.95, SRMR = 0.08, RMSEA = 0.06], and the change in CFI and RMSEA were both <0.01 (ΔCFI = 0.0, ΔRMSEA = 0.0). After establishing metric invariance, we examined the scalar model that constrained intercept to be the same across groups. However, the change in CFI was >0.01, and to address this, we released the constraints on three intercepts to establish partial scalar invariance. The partial scalar model yielded good model fit [$\chi^2_{(178)} = 340.76$, $p < 0.001$, CFI = 0.95, TLI = 0.95, SRMR = 0.09, RMSEA = 0.07], and the change in CFI and RMSEA were both <0.01 (ΔCFI = 0.01, ΔRMSEA = 0.01). As such, the partial scalar invariance model was established across the four groups.

A slightly different approach was applied for the categorical variables (i.e., psychological aggression and corporal punishment). We started with a configural model that yielded good model fit [$\chi^2_{(76)} = 97.35$, $p < 0.001$, CFI = 0.99, TLI = 0.99, SRMR = 0.05, RMSEA = 0.06]. Then we assessed metric-scalar invariance

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TABLE 4 Group analysis of structural model.

	Both trauma	Physical trauma	Psychological trauma	No physical and psychological trauma
	B (*SE*)	*B* (*SE*)	*B* (*SE*)	*B* (*SE*)
Military PTSD -> Corporal punishment	0.14 (0.10)	−0.01 (0.08)	0.29 (0.14)*	0.27 (0.05)***
Military PTSD -> Psychological aggression	−0.33 (0.14)*	−0.17 (0.10)	0.52 (0.19)**	0.25 (0.06)***
Military PTSD -> Pre-mentalization	0.54 (0.06)***	0.33 (0.08)***	0.48 (0.11)***	0.42 (0.05)***
Pre-mentalization -> Corporal punishment	0.68 (0.11)***	0.72 (0.08)***	0.51 (0.17)**	0.58 (0.06)***
Pre-mentalization -> Psychological aggression	1.04 (0.13)***	0.66 (0.09)***	0.39 (0.22)	0.61 (0.06)***
Residual variance				
Military PTSD	0.93 (0.05)***	0.99 (0.01)***	0.98 (0.04)***	0.97 (0.02)***
Pre-mentalization	0.40 (0.07)***	0.82 (0.07)***	0.67 (0.12)***	0.69 (0.05)***
Psychological aggression	0.24 (0.06)***	0.30 (0.07)***	0.43 (0.13)**	0.37 (0.05)**
Corporal punishment	0.27 (0.08)***	0.50 (0.09)***	0.29 (0.15)*	0.36 (0.06)*
Fit statistics				
χ^2	820.12			
df	706			
CFI	0.97			
TLI	0.96			
RMSEA	0.04			
SRMR	0.11			

Estimates shown are standardized coefficients. Estimates for parental race and poverty status are regressed on all latent variables in structural model. df, degree of freedom; CFI, Comparative Fit Index; TLI, Tucker-Lewis Index; RMSEA, Root Mean Squared Error of Approximation; SRMR, Standardized Root Mean Squared Residual. *p < 0.05. **p < 0.01. ***p < 0.001.

together in one model based on recommendations by Wu and Estabrook (2016). This model had good model fit [$\chi^2_{(88)} = 120.63$, $p < 0.001$, CFI = 0.99, TLI = 0.99, SRMR = 0.05, RMSEA = 0.06], and the change in CFI and RMSEA were both <0.01 (ΔCFI = 0.0, ΔRMSEA = 0.0). As a final step, we tested the strict invariance model, which constrained residuals to 1 for all latent variables over time. The strict model suggested good model fit [$\chi^2_{(112)} = 153.54$, $p < 0.001$, CFI = 0.99, TLI = 0.99, SRMR = 0.05, RMSEA = 0.08], and the change in CFI and RMSEA were both <0.01 (ΔCFI = 0.0, ΔRMSEA = 0.0).

Group analysis

After establishing measurement invariance for each latent variable, we fit our structural model and examined group differences by comparing the magnitude of each association across the four groups. The four groups included experiencing pre-military physical and psychological trauma ($n = 107$), experiencing only pre-military physical trauma ($n = 100$), experiencing only pre-military psychological trauma ($n = 42$), and experiencing no pre-military physical or psychological trauma ($n = 260$). Wald Tests were used to compare whether the magnitude of all effects as a group was significantly larger in some groups compared to others. As shown in Table 4 and Figure 3, a total of six group comparisons were conducted; however, only experiencing pre-military physical abuse significantly differed from experiencing no pre-military physical or psychological trauma (Wald = 16.86, $p = 0.004$).

To identify which specific paths were significantly different between the two groups, we examined each of the paths separately. Figure 3 (Group 2 & 4) revealed that out of the five path comparisons, the effect of experiencing PTSD on psychological aggression, corporal punishment, and pre-mentalization, respectively, were all significantly higher for individuals in the group who experienced no pre-military physical or psychological trauma (compared to those experiencing only pre-military physical trauma).

Indirect effects

As a final step, we formally tested the indirect effect of pre-mentalization as a potential mechanism across the four groups. There were significant indirect effects of pre-mentalization between military PTSD and corporal punishment for the groups that experienced pre-military physical and psychological trauma [$b = 0.49$, S.E. = 0.13, $p < 0.001$, 95% (0.23, 0.75)], experienced physical trauma [$b = 0.29$, S.E. = 0.10, $p = 0.002$, 95% (0.11, 0.48)], and no physical or psychological trauma [$b = 0.41$, S.E. = 0.10, $p < 0.001$, 95% (0.22, 0.60)]. In addition, there were significant indirect effects of pre-mentalization between military PTSD and psychological aggression for the groups that experienced pre-military physical and psychological trauma [$b = 0.38$, S.E. = 0.10 $p < 0.001$, 95%

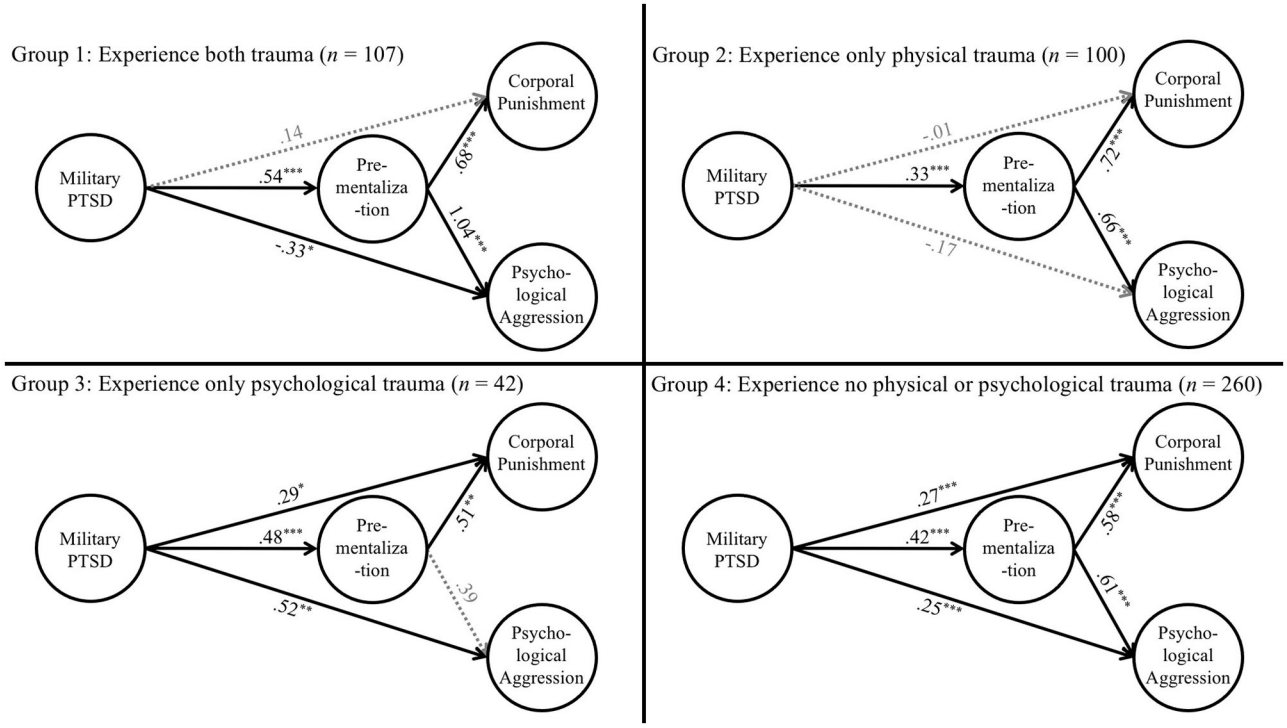

FIGURE 3
Group analysis. Group 1: Experience both trauma ($n = 107$). Group 2: Experience only physical trauma ($n = 100$). Group 3: Experience only psychological trauma ($n = 42$). Group 4: Experience no physical or psychological trauma ($n = 260$). *p < 0.05. **p < 0.01. ***p < 0.001.

(0.18, 0.59)], experienced physical trauma [$b = 0.12$, S.E. = 0.04, $p = 0.005$, 95% (0.04, 0.20)], and no physical or psychological trauma [$b = 0.14$, S.E. = 0.03, $p < 0.001$, 95% (0.08, 0.20)].

Discussion

Based on an online sample of 509 veteran parents, this study (1) used structural equation modeling to investigate the indirect effect of parental pre-mentalization between the association of veteran parents' military-related PTSD and harsh parenting, and (2) conducted multi-group analysis to determine if traumatic experiences of veteran parents prior to military service moderated the associations between parental military-related PTSD, pre-mentalization, and harsh parenting.

Our results suggest that pre-mentalization was a significant indirect effect of the association between military-related PTSD and harsh parenting, which supported our hypothesis based on mentalization theories. Specifically, veteran parents exhibiting higher PTSD symptoms were more inclined to employ pre-mentalization (i.e., interpreting their children's intention as negative), which in turn predisposed them to harsh parenting behaviors, such as corporal punishment and psychological aggression. This trend aligns with previous findings from other demographics, underscoring pre-mentalization as a critical factor in parent-child interactions (Dieleman et al., 2020; Yule, 2021; Edler et al., 2022). For example, Dieleman et al. (2020) showed that parents' pre-mentalization mediated the relationship between self-critical perfectionism and psychologically controlling parenting of adolescents.

Group analysis revealed intriguing patterns. The relationship between military-related PTSD and pre-mentalization was attenuated for parents who had only pre-military physical trauma compared to those without pre-military physical or psychological trauma. Additionally, there was an absence of a direct link between military PTSD and harsh parenting for parents who had only pre-military physical trauma. These findings lend some credence to the posttraumatic growth framework. We speculate that pre-military physical trauma may have equipped parents with coping mechanisms or fostered a transformed perspective on physical violence, particularly given their military experiences. Such adaptations might buffer the influence of PTSD symptoms on their parenting behaviors. This observed posttraumatic growth among veteran parents with a history of pre-military physical trauma resonates with existing literature on veterans, though prior studies primarily emphasized growth following military trauma or during the COVID-19 pandemic (Pietrzak et al., 2010; Tsai et al., 2015; Angel, 2016).

Our results did not show significant differences between groups of parents who experienced pre-military psychological trauma, parents who faced both pre-military physical and psychological trauma, and parents who had no pre-military physical or psychological trauma. This underscores the distinct interplay between types of pre-military trauma and military-related PTSD in veteran parents. While parallel research on the

veteran population remains scant, our findings are somewhat consistent with studies that investigate the differential impacts of maltreatment types on PTSD. For instance, the association between psychological abuse and PTSD symptoms were more intense (Taft et al., 2005), which can be attributed to the oppressively fear-inducing environment established by the psychological abuser that profoundly undermines the victim's self-concept (Taft et al., 2008). Therefore, compared to their counterparts experiencing only pre-military physical trauma, people with psychological trauma may face more challenges in developing growth toward their PTSD symptoms. Nevertheless, these conclusions should be approached with caution, considering that the non-significance results could be caused by the limited sample size for each trauma subgroup, especially those who experienced only pre-military psychological trauma ($N = 42$).

Limitations

Several limitations of our study warrant attention. Firstly, given our cross-sectional design, our results can only suggest associations rather than causations. Although our model is firmly rooted in theoretical and empirical foundations that guarantee reliable interpretations, future studies could employ a longitudinal approach to better understand causative relationships. Secondly, the reliance on self-reported measures for harsh parenting raises concerns about potential underreporting due to social desirability biases. Research involving children of veteran parents could provide a more holistic view. Additionally, self-reported measure on pre-mentalization may also not objectively represent participants' level of mentalization. As accumulating studies suggest main cortical areas involved in mentalization (Monticelli et al., 2021), future studies may consider using tools developed by neuroscience, such as functional magnetic resonance imaging (fMRI), to measure mentalization. Thirdly, our online data collection method might have inadvertently excluded those without internet or computer access, potentially skewing results. Lastly, with our sample being predominantly White males, the experiences of racial/ethnic minorities might be underrepresented. Nonetheless, our study sheds light on the seldom explored topic of harsh parenting by veteran fathers, offering a valuable contribution to parenting research on fathers.

Strengths

While our study has certain limitations, it also has strengths. Our research adds innovations to parenting studies by examining the intricate interplay between PTSD, pre-mentalization, and harsh parenting within the understudied veteran population. Additionally, we revealed the profound intergenerational impacts of trauma by showing influences of parents' past traumas on the association between parental PTSD, pre-mentalization, and harsh parenting. We suggest the potential posttraumatic growth of veteran parents who experienced pre-military physical trauma. While contemporary research on parental mentalization has been largely mother-centric (Charpentier Mora et al., 2023), our study, with its focus on veteran parents, underscores the vital role of paternal mentalization in the realm of parenting.

Implications

Implications for clinical practice

The research findings offer insights for interventions with veteran families. While certain veteran parents with pre-military physical trauma demonstrated posttraumatic growth, the general trend indicates that PTSD may influence a propensity toward harsh parenting via pre-mentalization. As such, mentalization-based programs offer a promising approach for intervention, which aims to enhance individuals' ability to perceive and interpret the mental states of themselves and others. Effective in addressing a range of mental health conditions, from PTSD to personality disorders (Bateman and Fonagy, 2012), recent adaptations of these programs have focused on strengthening parental mentalization to foster positive parent-child interactions (Pajulo et al., 2006; Suchman et al., 2006, 2012; Slade et al., 2020; Barlow et al., 2021). Such interventions explored parents' attachment histories, beliefs, and emotions, empowering them to identify and manage theirs and their child's emotional states. The efficacy of these programs is evidenced by programs like the Mother and Toddler Program (MTP) by Suchman et al. (2006), which resulted in enhanced caregiving behaviors and improved maternal-child relationships among substance-using mothers. Similarly, the "Minding the Baby" (MTB) program, tailored for at-risk mothers under 25, not only improved maternal mentalization skills but also fostered secure attachments in their children compared to matched controls (Slade et al., 2020).

Considering that mentalization-based programs are predominantly developed for mothers, it's imperative to recognize the need for and potential benefits of such programs tailored to veteran fathers. Given that veteran fathers might constitute a significant portion of those utilizing these services, feasibility studies specifically focusing on this demographic are crucial. Adaptations suited to the unique experiences and challenges faced by veteran fathers will enhance the effectiveness and uptake of such interventions.

Secondly, we advocate for integrating more family-centric interventions within V.A. services, especially those emphasizing the intricacies of veteran family parent-child dynamics. While the V.A. acknowledges the pivotal role family members play in a veteran's recovery journey, the wellbeing and holistic development of military children should be accorded equal priority. The vulnerabilities of veteran parents, rooted in military-related PTSD and disproportionately high pre-military traumas, can inadvertently cascade to their children through suboptimal parenting practices. Tailored interventions for these families can identify and mitigate the potential repercussions of a veteran's traumatic experiences, thereby break the cycle of generational trauma. Additionally, by integrating the framework of posttraumatic growth into intervention designs, service providers can develop empowering programs that resonate with military culture.

Implications for research

Existing research on veterans predominantly focus on the negative consequences of trauma, such as PTSD; however, it's equally important to understand positive changes that can arise after trauma. Our study suggests the potential of posttraumatic growth of veterans, while more studies are needed to reveal the mechanisms and factors that contribute to posttraumatic growth among veterans, so as to better help develop interventions. Finally, future studies could be devoted to examining the experiences of children in military households and elucidating the pathways underlying the intergenerational transmission of trauma and resilience.

Conclusion

Our research highlights the indirect effect of veteran parents' pre-mentalization in the pathway between military-related PTSD and harsh parenting. Furthermore, our findings underscore the complex interplay between a parent's pre-military trauma, military-related PTSD, and harsh parenting. We advocate for the V.A. to integrate more family-centric interventions, specifically those centered on mentalization, to enhance parent-child dynamics, especially in families where parents suffer from military-related PTSD and pre-service trauma.

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 humans were approved by Syracuse University Institutional Review Board. Written informed consent was not required in accordance with the local legislation and institutional requirements.

Author contributions

XW: Conceptualization, Data curation, Formal analysis, Funding acquisition, Methodology, Project administration, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing. QL: Formal analysis, Methodology, Writing – original draft, Writing – review & editing. GM: Formal analysis, Methodology, Supervision, Writing – review & editing. AK: Writing – original draft. DY: Conceptualization, Writing – review & editing. AH: Writing – original draft.

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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 effect of parental psychological control on children's peer interactions in China: the moderating role of teachers' emotional support

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Background: Peer interactions are critical to young children's social development, and proximal-system has a direct influence on personal growth. The study aims to analyze the relationship between parental psychological control and young children's peer interactions, as well as the moderating role of teachers' emotional support in this association.

Methods: A total of 241 children aged 3–6 years, alongside their parents, and 27 teachers, participated in the study. Teachers reported children's peer interactions whilst parents reported their psychological control. The level of teachers' emotional support was co-coded by two researchers.

Results: The results of the study indicated that parental psychological control was significantly and negatively related to young children's peer interactions; teachers' emotional support was significantly and positively related to young children's peer interactions; the cross-level moderating effect validates our hypothesis that teachers' emotional support has a moderating effect between parental psychological control and young children's peer interactions, buffering the impact of parental psychological control on young children's peer interactions.

Conclusion: These findings expand our comprehension of the association between parental psychological control, teachers' emotional support, and young children's peer interactions, and provide guidance for integrating the components of the proximal system and devising interventions to establish a home-school harmony environment that fosters children's social development.

KEYWORDS

psychological control, peer interactions, young children, teacher support, China

1 Introduction

Children begin to establish and maintain social relationships with their peers as well as adults in their environments during early childhood. Peer interactions not only helps children develop their social skills (Ladd, 2005), but also has an important effect on their cognition, emotion and social adaptability (Groh et al., 2014). Research has found that early interactions with peers contribute to the formation of children's internal schemes of social relations and also provide them with opportunities to directly and indirectly learn how to interact with others, what socially acceptable behaviors are like, and how to appropriately regulate their behaviors to achieve social goals (Beauchamp and Anderson, 2010). Thus, positive peer interactions are generally associated with reduced aggressive behaviors and increased prosocial

behaviors, more sociability, communication, and assertiveness (Fantuzzo et al., 2005; Girard et al., 2011; Booren et al., 2012; Acar et al., 2015). Conversely, experiencing peer interactions problems can also reduce children's cognitive and executive function levels, leading to cognitive impairment and social dysfunction (Zhang et al., 2022), which in turn leads to withdrawal and antisocial behavior in children (Bulotsky-Shearer et al., 2014; Holmes et al., 2016). It can be seen that peer interactions, as an important way to establish social relations in early childhood, has a significant impact on children's social adaptations and future development.

Peer interactions is a proximal process (Lin et al., 2016), in which significant others, such as parents and teachers, have an important influence on children's social development (Thompson et al., 2003; Denham et al., 2007). Psychological control is an important dimension to measure the quality of parenting, which refers to parenting behaviors that parents use to intrude and control children by inducing children's guilt (Schaefer, 1965). Prior studies have found that high levels of parental psychological control not only lead to internalized problems such as anxiety (Pettit et al., 2010; Settipani et al., 2013), depression (Soenens et al., 2005, 2012), and low self-esteem (Bireda and von Krosigk, 2015) in children, but also reduce their self satisfaction (Park and Han, 2020), disrupt their regulatory ability, and trigger aggressive behavior (Koçak et al., 2017), which has a certain negative impact on children's externalized behavior. Besides parents, teachers' supportive behavior also has a positive effect on children's social development. In early childhood, children who are more encouraged by their teachers will have better teacher-student relationships, academic and social development (Silver et al., 2005). Children who experienced higher levels of emotional and classroom quality in kindergarten exhibit better social skills and problematic behaviors in kindergarten and first grade, compared to those who do not experience such high-quality classrooms (Broekhuizen et al., 2016). In addition, the study has points out that teacher support or high quality teacher-student relationships serve as a buffer in the association between negative parenting and child psychological adjustment (Deng et al., 2021).

Previous studies have investigated the associations between teachers, family and children's social development, separately. However, most works were conducted in the family or school micro-system. There is a lack of research that analyzes the relationships and mechanisms between parental psychological control, young children's social development, and teachers within the dual system of the family and school. Thus, this study aims to investigate the impact of parental psychological control on young children's peer interactions, and whether emotional support from teachers moderates this relationship. This will provide a basis for the formation of a home-school synergy that jointly promotes children's social development.

1.1 Parental psychological control and children's peer interactions

Family is the most central micro-system for children development. Accumulating studies have investigated the link between parenting styles and children's social development (Bronfenbrenner,1989; Chen et al., 1997; Ren and Pope Edwards, 2015). Psychological control refers to parenting behaviors that intrude upon children's thoughts and feelings, and has been characterized as used by parents who excessively implement manipulative parenting techniques, such as guilt-induction, shaming, and love withdrawal. As psychological control is thought to inhibit children's development of a secure sense of self, it would lead to disturbances in psychological functioning (Barber and Harmon, 2002; Soenens and Vansteenkiste, 2010). Studies have found that parental psychological control forces children to comply with their parents' needs and wishes rather than their own, which interrupts children's need satisfaction (Deci and Ryan, 2000; Soenens and Vansteenkiste, 2010), undermines their self-control (Nanda et al., 2012). Similarly, some research suggests that parental psychological control can make children overly dependent on others (Aunola et al., 2013). This may have a negative impact on children's self-schema (Mcleod et al., 2007) and psychological autonomy (Oudekerk et al., 2015). As a result, the child may become overly compliant in their peer interactions and may even become a victim of bullying (Chen et al., 2021). Research has shown that parental psychological control predicts a negative impact on children's friendship quality, resulting in increased levels of loneliness (Soenens et al., 2008). Typically, parents with higher levels of psychological control tend to be less sensitive and responsive to children's needs, result in insecure attachments with children, deprive children of a 'safe base' for exploring new tasks and developing new relationships, and consider themselves untrustworthy and unsupportive (Cook et al., 2012). Furthermore, children who experience psychological control from their parents may feel insecure in their negative attachment relationships and may resort to using the same methods to control peers (Michiels et al., 2008).

Although the concept and research of psychological control originated in Western countries, Chinese parents generally exhibit higher levels of psychological control compared to their Western counterparts (Shek, 2007; Scharf and Goldner, 2018). This can be attributed to the influence of Confucianism, which emphasizes hierarchical and harmonious relationships and has had a significant impact on Chinese culture. In line with this philosophy, parents hold a position of authority (Hoang and Kirby, 2020), and children are expected to show absolute obedience toward their parents as a sign of respect. Additionally, when parents intervene excessively in their children's lives, it is often perceived as an expression of love. To maintain hierarchy and harmony, Chinese parenting styles tend to include psychological control as a characteristic feature. As parental psychological control is prevalent in China, there is a growing interest in investigating it in Chinese culture. Several studies have shown that parental psychological control is positively associated with children's internalizing and externalizing behavioral issues in Chinese culture (Wang et al., 2007; Li et al., 2018). Children who have parents with psychological control tend to report higher levels of depression (Bullock et al., 2018), loneliness (Li et al., 2019), and social anxiety symptoms (Luebbe et al., 2018). Additionally, a positive association has been found between parental psychological control and aggression (Chen et al., 2020) as well as antisocial behaviors (Sun et al., 2017). Some studies also revealed that when a mother has a high degree of psychological control, her children are at an increased risk of developing poor peer relationships. When the level of psychological control exercised by the mother is high, social avoidance significantly and positively predicts children's antisocial behaviour and peer rejection (Zhao and Wang, 2010; Zhu et al., 2020).

Early childhood experiences can significantly affect future development. A review of the existing literature shows that studies have primarily focused on the effects of parental psychological control

on children's social development during mid-childhood or adolescence. It remains uncertain the relationship between parental psychological control and young children's peer interactions. Clarifying this association in preschool years can provide vital information for theoretical and cross-cultural studies on children's early social development and family education.

1.2 Teachers' emotional support and children's peer interactions

School is another important micro-system factor for child development, and teachers are the primary adult figures within this micro-system. Teachers' emotional supportive behaviors, including showing concern, respect, understanding, encouragement, and trust, can positively impact children's autonomy, efficacy, and social development (Fredricks et al., 2004; Skinner et al., 2008). The study showed that the greater teacher support children felt, the higher the gain in positive functioning (grades, social initiative with teachers and peers), and the lower the increase in negative functioning (deviant peer association, parent–child conflict, depression), This was also associated with stronger interpersonal skills (Barber and Olsen, 2004). In the preschool years, emotional interactions between teachers and children are key to the social development of young children. Positive attention, encouragement, and praise from teachers during interactions with children enhance the confidence of left-behind children in interpersonal communication (Lei and Li, 2020). Teachers' warm and sensitive behaviour can enhance the self-confidence and efficacy of young children in interacting with others. Conversely, teachers' insensitive and unresponsive behaviour may lead to maladaptation in both self and interpersonal relationships (Verschueren and Koomen, 2012). When teachers create a warm and caring atmosphere in the classroom, children develop a sense of security and trust, which makes children willing to participate in group activities and actively interact with their peers (Downer et al., 2010; Ruzek et al., 2016). Moreover, children's perception by their peers can be influenced by teacher's expectations and approval.

Research has confirmed the beneficial effects that teacher support and and emotional interactions on children's social interaction skills. However, there is a relative scarcity of studies investigating the correlation between teachers' emotional support and young children's peer interactions. In sum, teachers who offer emotional support to their students can strengthen their bond, and a positive teacher-student relationship may help mitigate social adjustment difficulties in children. As a consequence, it is necessary to explore the correlation between teachers' emotional support and young children's peer interactions. This can help establish cordial teacher-child relationships and foster the social development of children.

1.3 The moderating effect of teachers' emotional support

According to the risk and protective factor framework, child development is the dynamic interplay between risk and protective factors (Deng et al., 2021). Whereby risk factors predispose children to negative developmental outcomes, and protective factors increase resilience and decrease the likelihood of negative outcomes (Masten, 2001; Wang et al., 2013). As an essential part of the proximal process, the teacher not only plays a direct role in the child's development, but also acts as a protective shield against family risks that may have a negative impact on children. Some research has found that positive relationship with teachers compensated for unsafe relationships with parents. The warmth and trust provided by teachers eased conflicts between parents (Lynch and Cicchetti, 1997), buffered children with negative family experiences from misbehavior (Wang et al., 2013), and reduced the anxiety caused by mothers' psychological control (Deng et al., 2021).

To date, the majority of current research on parental psychological control and children's peer interactions have focused on the negative effects of family micro-systems, but there is a dearth of research on protective factors that mitigate these harmful effects. Considering the positive impact of teachers' emotional support on children's peer interactions and the protective role of positive teacher-child relationships between children and family risks, this study aims to examine whether teachers' emotional support can moderate the relationship between parental psychological control and children's peer interactions.

1.4 The present study

Warm and supportive positive parenting can strongly guarantee children's social development, whereas negative parenting practices, such as abnormal parent–child interactions and negative parental control, are the primary risk factors for the psychological and social issues of children. In China, at the adolescent stage, high levels of psychological control by parents have become increasingly prevalent due to the influence of hierarchical authority ideology and social competition pressure. With growing awareness of the significance of early childhood development and increasing parental investment in early education, it is crucial to examine the psychological control of parents with young children. While previous studies has highlighted the negative effects of parental psychological control on young children's social adaptation and the positive effects of teachers' emotions on their social development, the relationship between these factors remains largely unexplored, particularly with regard to their interaction within proximal processes. Based on relevant theories and literature evidence, we formulated a hypothetical relationship model. The research hypotheses were as follows:

> *H1*: Parental psychological control is negatively correlated with young children's peer interactions.
>
> *H2*: Teachers' emotional support is positively with young children's peer interactions.
>
> *H3*: Teachers' emotional support plays a moderating role between parental psychological control and young children's peer interactions.

2 Methods

2.1 Participants

To identify participants, the researcher communicated with kindergarten administrators, announced the research, and solicited volunteers. In China, early childhood teachers are almost exclusively

female; therefore, the classroom teachers who volunteered to participate in this research was all female. Subsequently, the consent letters was sent the parents by the classroom teachers. The participants included 241 young children (aged 3–6) from 5 preschools in China, along with their pater or mater and 27 classroom teachers. Among the sample of children, there were 128 boys (53.10%) and 113 girls (46.90%) and 19.90% were aged 3–4, while 33.60% were aged 4–5 and the remaining 46.50% were aged 5–6. Additionally, the survey included 170 mothers (70.50%) and 71 fathers (29.50%), who were actively involved in childcare and had frequent interactions with their children. Among the surveyed parents, 48.10% had a high school education or below, 32.80% had completed junior college, and 19.10% held a bachelor's degree or higher. Furthermore, the study involved 27 female teachers, of whom 8 (29.63%) had less than 3 years of experience, 13 (48.15%) had worked for three to 5 years, and 6 (22.22%) possessed more than 5 years of experience.

2.2 Procedure

We conduct data collection based on the following processes and criteria. Step 1: The measurement of children social competence were implemented one by one by the classroom teachers. The whole evaluation process complete in 3 months. Step 2: The teachers and the researchers jointly distributed the questionnaires of the psychological control assessment to the parents. It took 1 month to collect all the questionnaires. Step 3: The teachers' emotional support was recorded and evaluated by two coding team members (both with systematic, targeted training). In the specific operation process, the interactive scenes between teachers and children were recorded and selected on video by means of collective teaching activities, area activities, life activities and outdoor activities in the daily life of the kindergarten. During the coding process, two coding team members watched the whole contextual video carefully together and discussed it. The edited recording units were all about 30 min, and at least 6 observation units were collected for each teacher. The entire recording, excerpt and coding process took about 6 months. The Kendall concordance coefficient encoded by the two researchers was 0.97.

2.3 Measurement

2.3.1 Children's peer interactions measurement

Children's peer interactions were measured with *Children's Social Competence with Peers Scale for 3–6 year old children* (CSCPS) (Li, 2008). The scale was designed and developed by a Chinese scholar in 2008 according to the *peer interactions scale* (PIS) (Williams et al., 2007) and *Teacher-rated Peer Competence Scale (TPCS)* (Howes et al., 1988). The scale consists 20 items covered by four dimensions: social initiative, verbal and non-verbal ability, prosocial behavior and social disorder. The participants rated their responses on a 5- point Likert scale (form 1 = Never to 5 = Always). Confirmatory factor analysis (CFA), CFI = 0.968, TLI = 0.957 were all greater than 0.90; χ^2/df = 1.860 < 3, RMSEA = 0.060 < 0.08, SRMR = 0.038 < 0.05. Therefore, the scale was suitable for use in the current research. Cronbach's alpha was 0.855, 0.781, 0.765, and 0.882, respectively, for each dimension, the total internal consistency coefficient of the scale was 0.898.

2.3.2 Parental psychological control measurement

Parental psychological control was measured with the Chinese version of the Parental Control Scale for 3–5 year old children (Chen, 2007). The scale consists 34 items covered by 13 dimensions: Love withdrawal, Control, Control by guilt induction, Suppression of aggression, Control by anxiety induction, Negative affect, Protectiveness, Supervision, Emotional support, Rational guidance, Parental independence, Expression of affect, encouragement of independence. The participants rated their responses on a 5-point Likert scale (form 1 = Strongly disagree to 5 = Strongly agree). Confirmatory factor analysis (CFA), CFI = 0.993, TLI = 0.991 were all greater than 0.90; χ^2 / df = 1.0539 < 3, RMSEA = 0.015 < 0.08, SRMR = 0.035 < 0.05. As a result, the scale was suitable for use in the current research. Cronbach's alpha was 0.699–0.898, respectively, for each dimension, the total internal consistency coefficient of the scale was 0.908.

2.3.3 Teachers' emotional support measurement

Classroom Assessment Scoring System (CLASS) was a common tool for evaluating the quality of classroom in kindergarten recently (Pianta, 2012; Ishimine and Tayler, 2014). Emotional Support which is a part of CLASS was adopted for evaluating teacher in the study. The scale consists 16 items covered by four dimensions: Positive climate, Negative climate, Teacher sensitivity and Regard for student perspectives. The observers assessed on a 7-point Likert scale, scores of 1–2 indicate low on this dimension, 3–5 indicate mid-range, and 6–7 indicate high. Cronbach's alpha encoded by the two researchers was 0.913, 0.807, 0.845, and 0.705 respectively, for four dimensions. The total internal consistency coefficient of the scale was 0.907.

2.4 Data analysis

Descriptive statistical analysis and Pearson's correlation analysis were used to determine the performance level of each variable on different demographic factors, as well as correlations among variables, using the SPSS 26.0. Furthermore, parents' psychological control and teachers' emotional support as the relevant variable of peer social competence, which can be described as a nested relationship because they were influencing factors from different levels. Therefore, this study retained these predictors at the appropriate level of analysis using the Mplus 8.3. The effects of predictors at different levels on the outcome variables were analyzed using Multilevel Structural Equation Modeling to test for moderating effects.

3 Results

3.1 Common method deviation analysis

Since the parental control data were derived from self-reports, there may be common methodological bias and reduce the validity of the study. Harman single factor method was used to test the common method bias before data analysis. The results showed that all 13 variables had a value >1. The variation explained by the first unrotated factor was 26.32%, which is <40 percent, indicating that there is no substantial common method bias in this study.

3.2 Preliminary analyses

Descriptive statistics and correlations for all observed variables are shown in Table 1.

Firstly, children exhibit a medium level of peer interactions ($M = 2.873$), and there exist discernible variations between gender and age. Girls demonstrate a higher aptitude for peer interactions ($M = 2.996$, SD = 0.663) than boys ($M = 2.765$, SD = 0.703), and as children age, their proficiency in this area develops accordingly. Therefore, gender and age were considered for subsequent analysis. Secondly, the degree of psychological control exerted by parents is lower than medium ($M = 2.480$). Overall, fathers display a higher level of psychological control than mothers. Additionally, there were significant differences in the degree of psychological control concerning the gender and age of children and the educational level of the parents. Specifically, boys experienced greater psychological control from their parents than girls ($t = 3.196$, $p < 0.01$), and parents with lower educational levels exerted higher levels of psychological control. Consequently, we also controlled for effects of parents' gender and educational levels. Thirdly, teachers' emotional support is at the middle and upper level ($M = 5.043$), and there is no substantial variation in the emotional support given by teachers in different types of activities.

Correlation analysis of the three variables (as displayed in Table 1) demonstrated a significant negative correlation between PPC and CPI ($r = -0.339$, $p < 0.01$), and a positive correlation between TES and CPI ($r = 0.176$, $p < 0.01$). Typically, the strength of the linear association between two variables is initially evaluated by the correlation coefficient. If the correlation reaches a statistically significant level, the linear relationship has significance and further regression analysis can be carried out for prediction and interpretation.

3.3 Moderating role of TES in PPC and CPI

The Multilevel Structural Equation Modeling (MSEM) is used to evaluate measurement and structural models across multiple levels of the analysis in situations where nesting is present. In this study, we utilized MSEM to evaluate children's peer interactions at both the individual-within and group-between levels.

First, a null model analysis was performed to examine the intraclass correlation coefficients (ICC), in order to determine the presence of between-group variance of model variables and to check the significance of between-level residual variance. The results of the null model analysis showed that the between-group variance t_{00} was 0.058, the within-group variance σ^2 was 0.042 and the ICC was 0.122, surpassing the threshold of 0.06. Therefore, inter-group variation must not be disregarded and a multilayer analysis becomes imperative.

Secondly, we investigated the extent to which parental psychological control and were associated with children's peer interactions. We used it as a predictor variable in Model 1 and controlled other main effects terms (e.g., gender, age). The results showed that the effect of parental psychological control was significant and negative ($r = -0.456$, $p < 0.05$), indicating that parental psychological control had a negative predictor of children's peer interactions.

Next, to ascertain whether the relationships between the key study variable teachers' emotional support and children's peer interactions, the group mean of parental psychological control in Model 2 was placed into Model 3 as the predictor variable. Due to the analysis of cross-level data, Random Coefficient Prediction (RCP) was considered to make it more appropriate for multilevel analysis to test the hypotheses (Preacher et al., 2016). The results of the multilayer regulation effect test showed that the cross-layer regulation effect was significant ($r = 1.847$, SE = 0.462, $p < 0.001$). Results for the multilevel models were depicted in Table 2.

Table 2 also presents the cross-level moderate effect of teachers' emotional support. By adding teachers' emotional support variable, the relationship between parental psychological control and children's peer interactions can be significantly positively moderated ($\beta = 1.847$, $p < 0.001$). This means that teachers' emotional support attenuated the negative impact of parental psychological control on children's peer interactions. Following Aiken and West's (1991) procedure, the moderation effect was plotted by computing slopes one standard deviation above and below the mean of the moderator. The cross-level moderation effect is presented in Figure 1. The results show that parental psychological control has a significant negative effect on children's peer interactions ($\beta = -0.596$, $p = 0.000$) when teachers' emotional support is low (-1SD), while when teachers' emotional support is high (+1SD), parental psychological control has no significant effect on children's peer interactions ($\beta = -0.102$, $p = 0.586$). It can be seen that teachers' emotional support plays a certain moderating role between parents' psychological control and children's peer interactions.

To delve deeper into the regulatory function of teachers' emotional support in the facets of parents' psychological control and children's peer interactions, all variables except gender were

TABLE 1 Descriptive statistics and correlations of observed variables.

Variables	1	2	3	4	5	6	*M (SD)*
1.Child gender							0.469 (0.500)
2.Child age	−0.011						2.266 (0.772)
3.Parents gender	0.042	−0.108					0.710 (0.457)
4.Parents education	−0.024	0.018	−0.055				1.709 (0.768)
5.Paternal psychological control	−0.202**	0.302**	−0.186**	−0.133*			2.480 (0.574)
6.Teachers' emotional support	0.002	0.208**	−0.129*	0.043	0.076		5.043 (0.162)
7.Children peer interactions	0.167**	0.312**	−0.05	0.244**	−0.339**	0.176**	2.873 (0.693)

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

TABLE 2 Predictors of peer interaction with multilevel weights.

Predictors	Model 1		Model 2		Model 3	
	β	*SE*	*β*	*SE*	*β*	*SE*
Child gender	0.099	0.101	0.235	0.128	0.081	0.104
Child age	0.271*	0.118	0.242***	0.035	0.189**	0.064
Parents gender	−0.114	0.064	−0.015	0.120	−0.114	0.061
Parents education	0.132***	0.039	0.203***	0.051	0.107*	0.053
Children peer interactions	2.118***	0.273	1.879***	0.165	2.362***	0.073
Paternal psychological control	−0.456*	0.189			−0.436**	0.148
Teachers' emotional support			0.462***	0.143	0.601***	0.115
Paternal psychological control×teachers' emotional support					1.847***	0.462

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

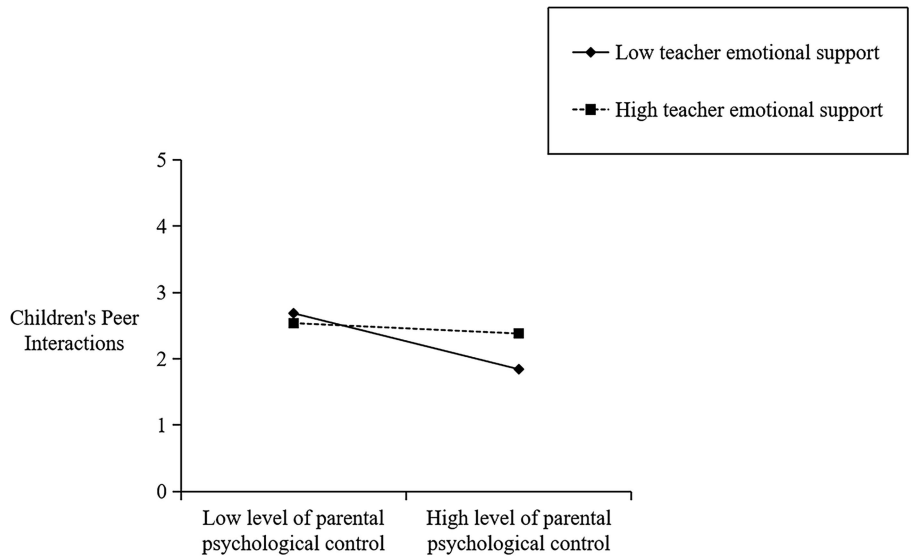

FIGURE 1
Plot of cross-level interaction: teacher emotional support as a moderator of the effect of parental psychological control regressed on children's peer interactions.

standardized. Table 3 displays the cross-level interaction effect of teachers' emotional support on the specific dimensions of children's peer interactions. As shown in Table 3, teachers' emotional support is a crucial predictor of social initiative ($\beta = 1.475$, $p < 0.001$), revealing that it fosters a positive association between parental psychological control and children's peer interactions. As depicted in Figure 2, when there is a low level of emotional support from the teacher (-1SD), parental psychological control has a negative impact ($\beta = -0.689$, $p = 0.000$) on their children's peer interactions. Conversely, when the level of emotional support from teachers is high (+1SD), parental psychological control does not have a significant effect on children's peer interactions ($\beta = -0.211$, $p > 0.05$). In addition, Table 3 also reveals that teachers' emotional support has a moderating effect on the relationship between parental psychological control and verbal and non-verbal abilities ($\beta = 1.650$, $p < 0.001$) and social impairment ($\beta = 2.548$, $p < 0.001$) (see Figures 3,4), but not between parental psychological control and prosocial behaviors ($p > 0.05$).

4 Discussion

The objective of this study was to examine the association between psychological control exerted by parents and the peer interactions of preschool children in China. Additionally, the study sought to establish whether emotional support provided by teachers could moderate this relationship. According to our findings, children's peer interactions were linked to both parental psychological control and teachers' emotional support. Furthermore, our research revealed that teachers' emotional support can serve as a protective factor against the negative influence of parental psychological control on children's peer interactions. To our knowledge, this study is the first to reveal the moderating role of teachers' emotional support in the connection between parental psychological control and children's peer interactions. This constitutes a valuable addition to our comprehension of the correlation between parental psychological control and peer interactions. Moreover, the findings of our study may be utilized to recognize efficient interventions in order to enhance the relations between home and school, and to augment the level of peer interaction among children.

TABLE 3 Multilevel model (random slope model) of teachers' emotional support's moderating role in relations between parental psychological control and children's peer interactions.

Variables	Social initiative		Prosocial behavior		Verbal and non-verbal abilities		Social impairment	
	β	*SE*	*β*	*SE*	*β*	*SE*	*β*	*SE*
Constant	2.510***	0.366	2.121***	0.640	3.050***	0.089	1.965***	0.057
Child gender	0.017	0.112	0.232	0.105	0.025	0.085	0.039	0.211
Child age	0.154***	0.036	0.199	0.268	0.126***	0.023	0.282***	0.043
Parents gender	−0.114	0.086	−0.052	0.089	−0.084	0.070	−0.296	0.181
Parents' education	0.105	0.056	0.158**	0.050	0.009	0.038	0.101	0.072
Paternal psychological control	−0.450***	0.155	−0.397	0.210	−0.330**	0.117	−0.662***	0.208
Teachers' emotional support	0.536***	0.183	1.071	0.708	0.594***	0.102	0.059	0.314
Cross-level interaction	1.475***	0.395	2.078	1.255	1.650***	0.393	2.548***	0.548

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

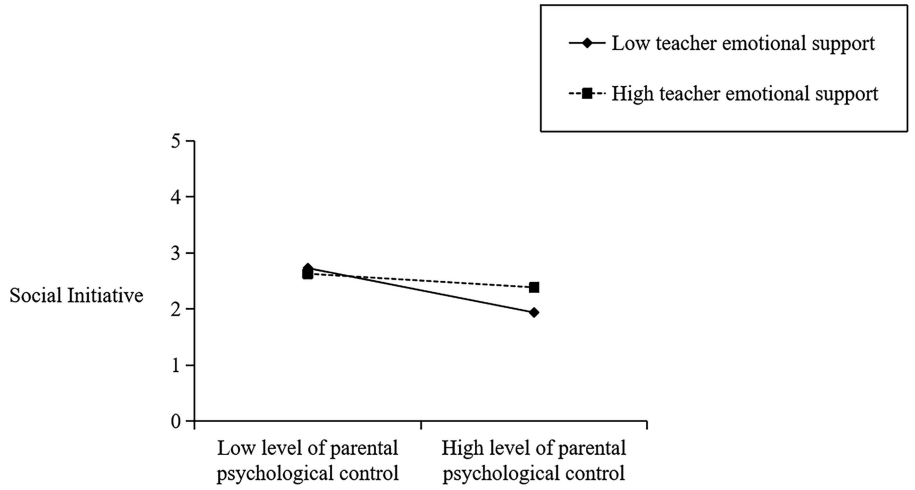

FIGURE 2
Plot of cross-level interaction: teacher emotional support as a moderator of the effect of parental psychological control regressed on children's social initiative.

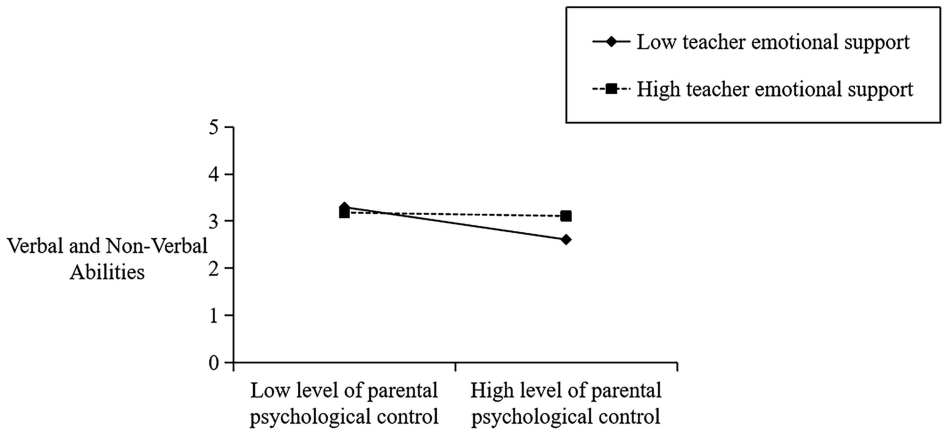

FIGURE 3
Plot of cross-level interaction: teacher emotional support as a moderator of the effect of parental psychological control regressed on children's verbal and non-verbal abilities.

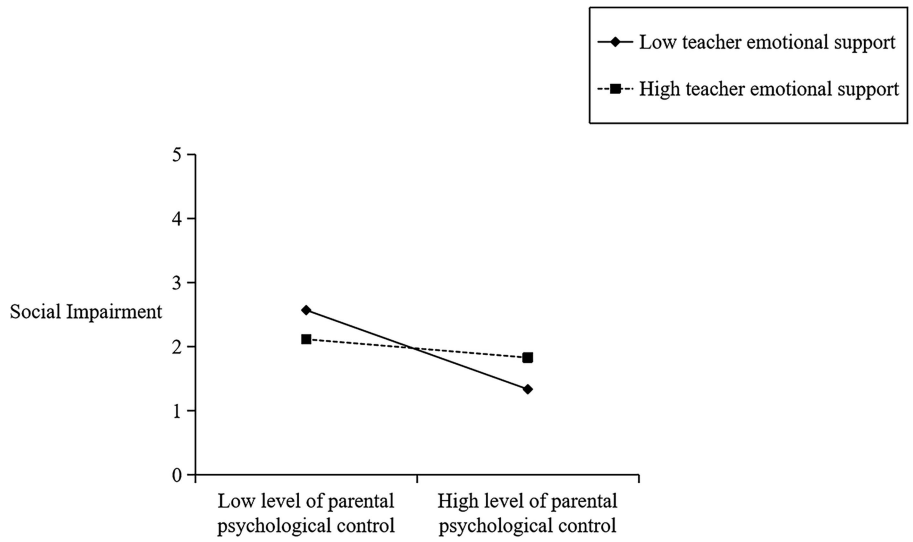

FIGURE 4
Plot of cross-level interaction: teacher emotional support as a moderator of the effect of parental psychological control regressed on children's social impairment.

4.1 Relationship between parental psychological control and children's peer interactions

Our results confirm the existence of parental psychological control in preschoolers and indicate its problematic impact on young children's peer interactions. These findings corroborate previous research by Chinese scholars showing that negative parental psychological control predicts social withdrawal in children (Cao, 2011) and that maternal psychological control exacerbates negative adjustment in socially avoidant children (Zhu et al., 2020).

The results of several cross-cultural studies can explain these phenomenons. According to the research, there is a prevalent educational model in China that emphasizes parental authority and children's obedience (Lai et al., 2014), which is influenced by traditional cultural concepts. In this model, Chinese parents tend to exert a high level of psychological control over their children (Wang et al., 2007) and utilize love withdrawal (Wu et al., 2002) and trigger children's feelings of guilt as a means of moral socialization (Fung and Chen, 2001). It is evident that Chinese traditional family culture and educational ideologies could be a possible factor that motivates the parent–child relationship and psychological control by parents.

Some studies have analyzed the type of parental psychological control, Soenens et al. (2010) proposed and tested the idea that the validity of a distinction between two domain-specific expressions of psychological control, that is, dependency-oriented and achievement-oriented psychological control. Dependency-oriented parental mental control is often manifested by manipulating the attachment bond with children and use their love and care to control their children. Such parents, particularly mothers, may struggle with the separation resulting from their children's ongoing growth and view the advancement of their children's autonomy as a potential danger to their parent–child relationship. To prevent their children's emotional and psychological independence, these parents employ psychological control tactics, such as love withdrawal, which restrict their children's interactions outside of the family unit. As a result, these children become dependent on their parents for emotional and psychological support (Barber and Harmon, 2002). Parents who are achievement-oriented and press themselves perform highly may behave in a controlling manner toward their children. They demand perfection and high levels of achievement from their children, and may use psychological control to achieve their expectations. Research has suggested that parental environments with a high emphasis on ego-oriented perspectives of achievement may hinder the children's optimal development and motivation for achievement (McArdle and Duda, 2004).

It has been found that children aged three to 6 years old are at a crucial stage of social development and the establishment of an independent personality. Parents are more likely to exert dependency-oriented psychological control and display overprotective and possessive behaviour toward their children at this stage. When parents interfere excessively in their children's personal lives without regard for their autonomy, it may lead to tension, anxiety, and over-dependence, and finally, social withdrawal. Grolnick et al. (2007) presented parents who value their children's performance may attempt to manage their thoughts, feelings, and behaviors to reduce their likelihood of failure. This could occur even if their children are currently performing well, since the risk of future failure is perceived as a threat. Fundamentally, parents may perceive it necessary to enforce instructions on their children, irrespective of the impact on their children's independence and sense of importance or capability, still resorting to psychological manipulation. Especially in China, where filial piety is highly valued, parents have significant expectations for their children to achieve elite status in order to fulfill their duty of support. However, due to the uneven distribution of social resources, only a select few are able to achieve this. Consequently, social pressure and competition are on the rise, and parental control over children is becoming more intense (Fong, 2004).

In summary, in China, due to competitive social reality and high parental expectations for preschool children development, some parents may underestimate their children's abilities. They have the tendency to dominate their children in an autocratic way and force them to achieve perfection in their performance to satisfy specific psychological expectations. These parents force their children to do as

they say, depriving them of opportunities for independent thinking and exploration, which undermines their self-efficacy and hinders their autonomous psychosocial functions.

According to the principles of attachment and self-determination theories, negative parenting could impair children's capacities to form the correct expectations of healthy relationships, both at the home and with peers. In this context, parental psychological control can evoke feelings of insecurity in the parent–child relationship, and the resulting relational insecurity can undermine children's self-assurance in peer interactions, which in turn, may lead to elevated aggression levels. In China, researchers found that high level of psychological control may dent children's self-worth (Gao et al., 2018), self-reliance and self-esteem, and even harm children's socioemotional development (Xing et al., 2017). Consistent with previous research in the United States and China, parental psychological control is associated with childhood aggression in Russia (Nelson et al., 2013). In conclusion, both in China and other countries, parental psychological control is a negative parenting style with adverse effects, which needs to take effective intervention measures to reduce its potential risk.

4.2 Effect between teachers' emotional support and children's peer interactions

This study further found that teachers' emotional support was significantly and positively associated with children's peer interactions. It is similar to the findings of Pianta (2012), the high level of teachers' emotional support in kindergarten classes has a beneficial relationship with children's peer interactions. Moreover, according to the correlation analysis of each dimension of teachers' emotional support and children's peer interactions, it is evident that there exists a significant and positive correlation, particularly pronounced with regards to children's prosocial behaviors. Mashburn et al. (2008) noted that high-quality emotional support can promote not only language and academic learning but also social and emotional development. The results of Pakarinen et al. (2020) also showed that teachers' emotional support can enhance children's social expectations in the classroom, thereby impacting their subsequent prosocial behaviors.

The multiple motivation theory suggests that emotional support from teachers can boost students' motivation, while students' stronger beliefs in their abilities can encourage them to form positive relationships with their peers (Skinner et al., 2008). Typically, the beliefs and behaviors of teachers in their classrooms and their care and support for pupils as a whole shape the specific classroom culture by influencing the children's classroom environment, which in turn influences their peer interactions (Chang, 2003). Emotionally supportive interactions in the classroom provide young children with ample opportunities to practice skills related to peer relationships (Hamre et al., 2013) and create a specific climate that is conducive to the development of children's social competence and behaviour (Xing et al., 2017). This is because emotionally supportive interactions can serve as a safe base to help children take social risks, such as the risk of rejection in peer interactions (Verschueren and Koomen, 2012). Thus, to introduce the role of teachers in children's peer interactions, the concept of "invisible hand"is presented as a metaphor to describe the potentially influential on children's peer relationships and their broader interpersonal growth (Farmer et al., 2011), illustrating emotionally and behaviorally supportive teacher-child interactions is positively associated with children's social and emotional skills (Broekhuizen et al., 2017). Several longitudinal studies have demonstrated that conflicts between teachers and children during the early stages of preschool and kindergarten correlate with greater internalization difficulties which may arise later in the academic year (Roorda et al., 2014). First-year pupils demonstrated reduced instances of negative and disruptive conduct in classrooms that provided increased high levels of emotional support and evaluation feedback (Wilson et al., 2007), thereby affirming the significance of providing emotional support in the preschool stage.

Our study also found that teachers scored the highest on emotional support in outdoor games, which was consistent with some of the previous research results (Broekhuizen et al., 2017). The reason is during the naturalistic play situation, which is full of interaction and cooperation, teachers have more opportunities to provide support for children to enhance their social skills.

4.3 Teachers' emotional support moderates parental psychological control and children's peer interactions

The result of the multilayer moderating effect in this study show that teachers' emotional support has a significant moderated effect between parental psychological control and children's peer interactions. This finding was consistent with previous research findings. Spjeldnes et al. (2010) investigated the buffering effect of teacher support on the association between interparental conflict about child-rearing issues and preschool children social skills. It was discovered that when children perceive their parents' high level of psychological control, it is easy to form a low-security parent–child relationship. However, teachers' emotional support in the classroom environment promotes the development of teacher-child relationship, which compensates for children to some extent to alleviate the negative effects of family adverse factors in children's social development (Liu et al., 2023).

According to the multiple attachment theory, children can receive varying emotional support and connection from teachers, viewing them as an additional attachment object. This relationship can be seen as an extension of the parent–child attachment relationship, and it also contributes to safeguarding and promoting the social development of children. As a protective factor, emotional support from teachers imparts a positive influence in enhancing children's social development and proficiency in associating with peers. Additionally, it helps mitigate the negative effects of family risk factors, narrowing the developmental gap among children.

This study further reveals that parental psychological control has a negative effect on children's peer interactions, and this effect is significant in the low teachers' emotional support condition. While, in the high teachers' emotional support condition, this negative effect of parents' psychological control on children's peer interactions is not significant. This indicates that high-level teachers' emotional support can mitigate the negative impact of parents' psychological control on children's peer interactions. This result is similar to previous studies on the relationship between children and the psychological development of young children. Li et al. (2014) suggested that teacher-child relationship showed moderating role in the associations between mother–child relationship and social adaptive behaviors especially for migrant children. Lower teacher-child conflict buffered the negative effects of mother–child conflict on migrant children's peer interactions; higher teacher-child

closeness attenuated the negative effects of mother–child conflict on migrant children's internalizing problem behaviors. It's noteworthy that in another study, although teacher-child relationship can mitigate the negative effect of family cumulative risk on children's resilience, it still plays a rather limited function like a drop in the ocean (Liu et al., 2023). Therefore, the extent to which teachers' emotional support moderates its effects may also be limited by the extent of family cumulative risk. Additionally, this study explored the relationship between teachers' emotional support, parental psychological control, and children's peer interactions. The findings suggest that when parents exhibit high levels of psychological control, teachers' emotional support for moderating children's prosocial behavior may not have a significant impact. This highlights the direct and profound influence of family factors on children's social development, particularly the need to address parents' psychological control issues.

In conclusion, our study provides evidence that high levels of teachers' emotional support can moderate the impact of high parental psychological control on children's peer interactions to some extent. However, as parental psychological control strengthens, the extent to which teachers' emotional support can moderate it requires further confirmation.

5 Conclusion

Based on the ecosystem theory and the risk-protective factor framework, this study identifies the factors that impact young children's peer relationships. The study developed a moderating model to explore the influence of parental psychological control and teachers' emotional support on their peer interactions. The findings indicate that excessive parental psychological control poses a risk to young children's peer interactions. Moreover teachers are integral to the development of young children, their positive emotional support can offset the negative impacts of parental psychological control and bolster healthy peer interactions.

From this point of view, the results of this paper may have important practical significance. First, parents and educators must recognize that home and school are the primary environments where children develop, and that the actions and words of influential individuals in the proximal environment can significantly impact the development of social, such as young children's peer interactions. Secondly, it is crucial to highlight positive role of teachers and continuously improving their professional competence. Teachers should provide emotional support to young children during educational activities, such as interactive games and classroom discussions to enhance their peer interaction skills. Thirdly, parents' ability to educate and raise their children could be influenced by various factors, such as their educational level. Thus, teachers can leverage their professional strengths to offer appropriate guidance to parents and assist them in adopting positive parenting approaches while raising their children.

6 Limitations and further directions

First, regarding variable selection, it is worth noting that parental psychological control may affect many different aspects of young children's social development. However, this study focused solely on young children's peer interactions. Subsequent studies can further verify the correlation between parental psychological control and the social cognition, social–emotional, self-awareness, and self-management of young children. Apart from the emotional support provided by teachers that this study focused on, there may be other factors relating to teacher-child relationship and quality of teacher-child interactions, which could serve as moderating variables between parental psychological control and young children's peer interactions. These factors need further verification and analysis in subsequent studies.

Second, concerning sample selection, this research selected children, parents, and classroom teachers from 5 kindergartens in a specific region of China using the convenience sampling principle, which has limitations on the sample size and distribution. In future research, modifications can be made to the sample selection to ensure broader applicability of the findings.

Third, in terms of research design, this study was cross-sectional and, therefore, it was unable to determine the causal relationship between variables. Future studies may attempt longitudinal follow-up studies to explore more definitive causal relationships between variables.

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 humans were approved by the Ethical Committee of Northeast Normal University. The studies were conducted in accordance with the local legislation and institutional requirements. Written informed consent for participation in this study was provided by the participants' legal guardians/next of kin.

Author contributions

RC: Writing – original draft, Writing – review & editing. SL: Writing – original draft, Writing – review & editing. SH: Writing – original draft, Writing – review & editing. JY: Writing – original draft, Writing – review & editing.

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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 association between parents phubbing and prosocial behavior among Chinese preschool children: a moderated mediation model

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Introduction: The popularization and widespread use of smartphones and other electronic devices have led to the occurrence of "parents phubbing", which may have a negative impact on child-parent relationship and preschoolers' prosocial behavior.

Methods: To clarify this process, a questionnaire survey was conducted with 3,834 parents from 20 kindergartens in Zhuhai, China. This study examined the relationship between between parents phubbing, closeness child-parent relationship, authoritative parenting style and children's prosocial behavior.

Results: According to the study, we found a significant negative correlation between parents phubbing and preschoolers' prosocial behavior. Closeness child-parent relationship mediated between parents phubbing and preschoolers' prosocial behavior through mediation effects analysis. In other words, parent phubbing was negatively associated with closeness child-parent relationship, which in turn predicted less child prosocial behavior. In addition, authoritative parenting styles have a moderating effect. As the level of authoritative parenting style increases, the negative impact of parent phubbing on the prosocial behavior of preschool children is attenuated.

Discussion: This study contributes to the understanding of the relationship between parents phubbing and prosocial behaviors of preschool children, as well as the internal mechanisms at work. Practically, the study suggests that parents should reduce the incidence of phubbing in their contact with their children and, at the same time, work to improve the child-parent relationship and promote the development of prosocial behaviors in children.

KEYWORDS

Chinese preschool children, parents phubbing, prosocial behavior, closeness child–parent relationship, authoritative parenting style

Introduction

Prosocial behavior refers to an individual consciously engaging in behaviors that benefit others in a social interaction situation, encompassing sharing, helping, cooperating, and comforting (Carlo, 2014). Children generally demonstrate prosocial behaviors of helping others with simple tasks after the age of one (Warneken and Tomasello, 2007). During early

childhood, children's prosocial behaviors will gradually increase, such as sharing objects with others and comforting others (Dunfield and Kuhlmeier, 2013). Prosocial behavior in childhood is an outward manifestation of the development of personality traits and moral character, and is an important reflection of social development (Wang and Wang, 2021). Children who frequently exhibit pr-social behavior can gain higher peer acceptance, have good interpersonal relationships, and thus reduce problematic behaviors such as social withdrawal and aggression (Liu et al., 2022). In addition, prosocial behavior has a special role in human development and is morally important for the formation of a code of conduct in the process of integrating into complex social environments (Wu and Li, 2015).

The preschool period is the basic stage of children's social development, and it is also the period of their most rapid development. The development of prosocial behavior in children is taken seriously in many countries around the world. For example, the Head Start program in the United States, which is one of the major projects of the early education program of the United States Government, emphasizes the social–emotional aspects of children's development (McCrae et al., 2016). The Early Years Foundation Stage in the United Kingdom also states the objectives and guiding principles for promoting children's social development (Forrester et al., 2022). Family Support Services in Germany aims to promote the social–emotional development of children by providing various services such as family education programs and parent–child activities (Ris et al., 2020). In China, preschool children's prosocial behavior has received extensive attention from the government and society. China's various preschool education regulations and related documents refer to the specific content and educational goals of children's prosocial behavioral development. For example, the Outline of Guidance for Kindergarten Education (for Trial Implementation), issued in 2001, clearly states that the educational objectives of the social field for young children include: "to be willing to interact with others, to learn mutual assistance, cooperation and sharing, and to be compassionate; and to understand and abide by the basic rules of social behavior in daily life" (Developed by the Ministry of Education of the People's Republic of China, 2001). The Learning and Development Guidelines for Children aged 3 to 6, issued in 2012, mention that the learning and development goals in the social domain for young children include "being willing to interact with others, being able to get along with peers, enjoying and adapting to group life, and abiding by basic norms of behavior" (Li and Feng, 2012). *The Outline for the Development of the Chinese Child* (2021–2030), issued in 2021, emphasizes the need to create friendly, equal and respectful teacher-student and classmate relationships, as well as to enhance parent–child interactions and establish equal and harmonious child–parent relationships (National Bureau of Statistics, 2021). It can be seen that the development of prosocial behavior in preschool children has received extensive attention from the Chinese government and society.

Parents phubbing and children's prosocial behavior

In today's era of rapid development of new media technology, all kinds of new media are emerging, and the number of families with smart phones, voice assistants and tablet computers is increasing (Chaibal and Chaiyakul, 2022). Information technology has brought about a change in people's lifestyles and also a change in interpersonal communication, with the popularization and widespread use of smartphones and other products leading to a kind of "phubbing" that is not conducive to interpersonal communication and interaction. The word phubbing, which first appeared in Australia's Macquarie Dictionary, is a new type of word synthesized from phone and snubbing, which came about as a way to get people to put down their cell phones and get back to talking to each other again. According to Aagaard's (2020) research, phubbing refers to a social phenomenon in which an individual's eyes are glued to a mobile device while interacting with another person, ultimately leading to a breakdown in conversation or communication. Chinese scholar Hong et al. (2019) argued that parents phubbing usually occurs in the home environment, where parents appear to be distracted by cell phone use in the presence of their children. Parents phubbing may affect the development of prosocial behavior in preschool children (Hong et al., 2019).

Specifically, when parents are too immersed in their cell phones, computers, or other screen devices, they neglect to interact with their children, who may feel neglected and isolated. This lack of attention can lower a child's self-esteem and reduce their motivation for prosocial behavior (Wang et al., 2022). Piaget's theory of cognitive development suggests that during the concrete operations stage, children begin to be able to take into account the views and feelings of others (Piaget, 2008). When parents are actively involved in their children's lives and show concern for them, children are more likely to develop positive prosocial behaviors, such as the ability to share, cooperate, and care for others (Hu and Feng, 2022). Additionally, the preschool years are a critical time for children to learn social skills, and if parents are constantly looking down at their phones, they may not be able to provide their children with enough opportunities for social interaction (Niu et al., 2020). Prosocial behavior often involves the ability to express, share, and communicate emotions, and if parents rely too much on electronic devices in front of their children, the children may lack opportunities to learn to express and communicate their emotions. This may result in children having difficulty understanding and responding to the emotions of others, reducing their level of prosocial interaction with peer (Xu and Xie, 2023). Thus, parents phubbing may have a negative impact on preschoolers' prosocial behavior, i.e., the higher the level of parents phubbing, the worse the development of preschoolers' prosocial behavior may be.

The mediating role of closeness child–parent relationship

Bronfenbrenner points out that in ecosystem theory, microsystems are the systems that are most closely and directly linked to the individual, including families, schools, communities, etc. (Bronfenbrenner, 1975). The family in the microsystem is a complex whole in which the child–parent relationship is recognized as a key factor influencing the development of young children (Lussier et al., 2002). Child–parent relationships are usually categorized into close, conflictual and dependent child–parent relationships (Zhu et al., 2022). Closeness child–parent relationship is a model of parenting based on deep emotional connection, open communication, mutual support, respect for individual differences, sharing of time and experiences, and providing a sense of security (Rinaldi et al., 2023). Closeness child–parent relationships may mediate the link between parents phubbing and children's prosocial behavior. Firstly, parents

phubbing may be detrimental to the development of a closeness child–parent relationship. When parents look down at screens, they tend to spend less time interacting with their children, which can lead to less child–parent communication and intimacy (Hefner et al., 2019). Additionally, closeness child–parent relationships require a commitment of time and attention, and screens distract parents from connecting with their children on a deeper level (Sundqvist et al., 2020). Secondly, closeness child–parent relationships further influence children's prosocial behavior. Closeness child–parent relationships provide children with the emotional support and security they need, and this support helps to develop children's trust and emotional well-being, making them more willing to develop positive prosocial relationships with others (Saral and Acar, 2021). Furthermore, closeness child–parent relationships emphasize open and honest communication, enabling children to better understand the feelings of others and to respond positively, an ability that underpins the development of prosocial behavior in children (Calatrava et al., 2023). Thus, the closeness child–parent relationship may play some role in the relationship between parents phubbing and preschool children's prosocial behavior. In other words, parents phubbing influences preschool children's prosocial behavior by affecting the closeness child–parent relationship.

The moderating role of authoritative parenting style

The authoritative parenting style is a parenting style that fosters autonomy and social skills through positive child–parent communication and educational guidance (Nie et al., 2022). This type of parenting has a positive impact on the establishment of child–parent relationship and the development of children's prosocial behavior (Ontai and Thompson, 2008). Thus, we can speculate that authoritative parenting styles perhaps moderated the relationship between parents phubbing, closeness child–parent relationship and prosocial behavior in preschool children. Firstly, the authoritative parenting style emphasizes parental understanding and communication, as well as the need to meet the children's emotional needs, which contributes to a close child–parent relationship (Mercer, 2011; Lavric and Naterer, 2020). It is clear from the above that parents phubbing is detrimental to the development of closeness child–parent relationship, which in turn further influences the development of children's prosocial behavior. However, authoritative parenting styles contribute to closeness child–parent relationships. Therefore, authoritative parenting removes to some extent the negative impacts of parents phubbing and promotes the establishment of closeness child–parent relationship and the development of children's prosocial behavior. In other words, authoritative parenting styles perhaps moderated the relationship between parents phubbing and closeness child–parent relationship, closeness child–parent relationship and preschoolers' prosocial behavior.

Secondly, authoritative parenting style emphasizes children's learning to share, cooperate and care for others, and promotes social interaction and emotional expression, which also contributes to the development of prosocial behaviors among preschoolers (Winsler et al., 2005; Zhao et al., 2023). We have pointed out above that parents phubbing has a negative impact on the prosocial behavior of preschool children. However, authoritative parenting style promotes the development of prosocial behavior in preschool children. Thus, authoritative parenting styles may have moderated the relationship between parents phubbing and preschool children's prosocial behavior.

The present study

Research on preschoolers' prosocial behavior has focused on two main areas: first, the developmental characteristics of preschoolers' prosocial behavior itself. For example, it has been noted that preschoolers' prosocial behavior increases with age and is directed more toward same-sex peers as they grow older (Song et al., 2021). At the same time, it has also been noted that most of the prosocial behaviors of preschool children are not reinforced in a timely manner (Cigala et al., 2015). Secondly, the influencing factors of prosocial behavior in preschool children. Some studies have pointed out the possible influence of factors such as gender, family economic status, and parents' education level on the development of prosocial behavior in preschool children (Schachner et al., 2018; Tavassoli et al., 2023). In conclusion, previous studies have mainly focused on the characteristics of preschool children's own development of prosocial behaviors, as well as studies of related influencing factors (Kokanovic and Opic, 2018; Hu and Feng, 2022; Ozbal and Gonen, 2023). However, fewer studies have focused on the impact of parents phubbing on the prosocial behavior of preschool children. In the current era of rapid development of new media, parents phubbing is a common phenomenon in family life, and this phenomenon has an important impact on the development of preschool children's prosocial behavior. Therefore, the present study focused on the impact of parents phubbing on preschool children's prosocial behavior, incorporating variables such as closeness child–parent relationship and authoritative parenting styles, and developed a mediated moderation model (see Figure 1).

In addition, this study proposes the following hypothesis: Parents phubbing has a negative influence on preschoolers' prosocial behavior (H1); Closeness child–parent relationship mediates between Parents phubbing and Children's prosocial behavior (H2); Authoritative parenting style moderates the relationships among Parents phubbing, Closeness child–parent relationship, and Children's prosocial behavior (H3).

Methods

Participants

The study conducted an online survey of parents of 3,834 kindergarten preschoolers from 20 kindergartens in Zhuhai, China. To ensure the questionnaire quality, we first contacted the kindergarten directors to explain our research intentions and obtained their support. In addition, we provided instructions to the kindergarten parents and obtained their support. By anonymously filling out the questionnaire, a total of 3,483 valid questionnaires were finally collected according to the rejection criteria such as missing answers, reverse question items, and the same answers to consecutive questions. The sample composition was as follows: among the participants, there were 702 fathers, accounting for 20.16%, and 2,781 mothers, accounting for 79.84%; among the participants' children, there were 1767 boys,

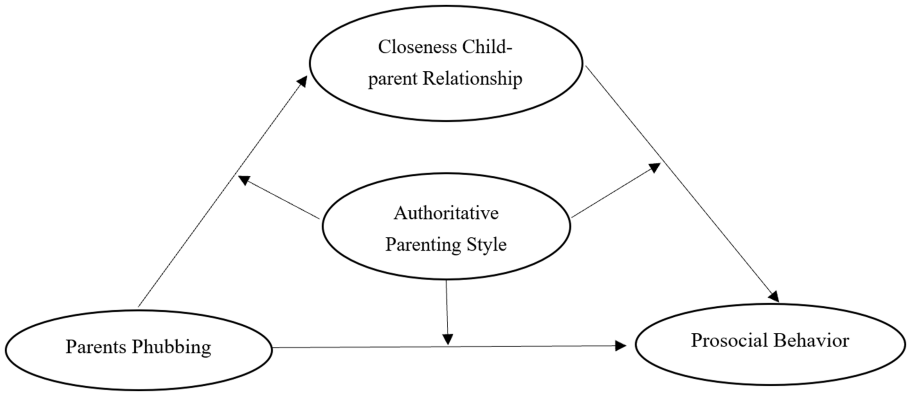

FIGURE 1
The hypothetical model.

TABLE 1 Composition of participants.

Boys	1767 (50.73%)	3 years	904 (25.95%)
Girls	1716 (49.27%)	4 years	1044 (29.97%)
Only child	909 (26.1%)	5 years	1207 (34.65%)
Non-only child	2574 (73.9%)	6 years	328 (9.42%)
Single-parent families	80 (2.7%)	Total	3483
Non-single-parent families	3403 (97.7%)		

Only child, only one child in the family; Non-only child, more than one child in the family.

accounting for 50.73%, and 1716 girls, accounting for 49.27%; there were 909 only child, accounting for 26.1%, and 2,574 non-only child, accounting for 73.9%; 80 were single-parent families, accounting for 2.3%, and 3,403 were non-single-parent families, accounting for 97.7%; among the children, 904 were 3 years old, accounting for 25.95%, 1,044 were 4 years old, accounting for 29.97%; 1,207 were 5 years old, accounting for 34.65%, and 328 were 6 years old, accounting for 9.42%. All measurements and procedures were permitted by the Institutional Review Board (IRB) of the first author's institution (Table 1).

Measures

The questionnaire items in this study were translated and adapted from prior studies. For the translation, we had two doctoral students in the field of educational psychology translate separately and then compare and revise. We then invited two educational psychologists to review them. In addition, to validate the questionnaire in, a small preliminary test was conducted before its formal implementation.

The parents phubbing

The parents phubbing scale is adapted from Roberts and David's phubbing scale, which is a one-dimensional scale with nine questions (Roberts and David, 2016). Questions include, "I look at my cell phone while eating with my child" "I often look at my cell phone when talking with my child" "I hold my cell phone in my hand when I am with my child" and so on etc. The questionnaire was rated on a scale of 1–5, from 1 "very inconsistent" to 5 "very consistent," and the average score was taken as the final score, with the higher the score the more serious the parents phubbing. The Cronbach's alpha coefficient for this questionnaire was 0.767.

The closeness child–parent relationship

Closeness child–parent relationship was adopted from Pianta's Child–Parent Relationship Scale (Pianta and Virginia, 1992), which consists of three dimensions: conflictual child–parent relationship, closeness child–parent relationship, and dependent child–parent relationship. The closeness dimension was selected for this study with a total of 10 questions. The questions include "I have a close relationship with my child" "I can easily empathize with my child" "My child shares his/her things with me" and so on. The questionnaire was rated on a scale of 1–5, from 1 "not at all" to 5 "very much," and the average score was taken as the final score, with the higher the score the higher the level of closeness child–parent relationship. The Cronbach's alpha coefficient for this questionnaire was 0.710.

The preschoolers' prosocial behavior

Preschoolers' prosocial behavior was measured using the 5-item prosocial behavior subscale of the Goodman Strengths and Difficulties Questionnaire (Goodman, 1997). Questions included "child is sensitive to others' feelings" "happy to share things with other children" "happy to help if someone is hurt, depressed, or sick" and so

TABLE 2 Means, standard deviations, and correlations of the variables ($N = 3483$).

Variables	M	SD	1	2	3	4	5	6	VIF
Age	3.791	0.669	1						1.008
Gender	3.978	0.564	0.060	1					1.003
Parents phubbing	1.490	0.500	0.063**	−0.020	1				1.010
Closeness child–parent relationship	2.280	0.955	0.007	0.051**	−0.043*	1			1.821
Authoritative parenting style	3.857	0.613	−0.046**	0.025	−0.078**	0.669**	1		1.828
Prosocial behavior	2.524	0.633	0.100**	0.110**	−0.063**	0.659**	0.590**	1	

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

on. The questionnaire is rated on a scale of 1–5. The questionnaire was rated on a scale of 1–5, from 1 "not at all" to 5 "very much," and the average score was taken as the final score, with higher scores indicating higher levels of prosocial behavior. The Cronbach's alpha coefficient for this questionnaire was 0.812.

The authoritative parenting style

The authoritative parenting style was adopted from the Parenting Style Questionnaire developed by Robinson et al. and consists of three dimensions: warmth and involvement dimension, reasoning/induction dimension, and democratic participation dimension, with 23 items (Robinson et al., 1995). Questions include "I praise my child when he or she behaves well" "I give my child reasons for following rules" "I take my child's preferences into account when making family plans" and so on. The questionnaire was rated on a scale of 1 to 5, from 1, "not very much," to 5, "very much," and the average score was taken as the final score, with higher scores indicating higher levels of authoritative parenting. The Cronbach's alpha coefficient for this questionnaire was 0.913.

Results

In this study, the mediation model with moderation was tested using SPSS version 25.0 and Hayes' PROCESS version 4.0. First, descriptive statistics were analyzed using SPSS, and means and standard deviations between the main variables were calculated. In addition, the relationships between parents phubbing, closeness child–parent relationship, preschoolers' prosocial behavior, and authoritative parenting style were assessed using Pearson's correlation. Second, the mediating effect of closeness child–parent relationship was tested by Model 4 of PROCESS, and the moderating effect of authoritative parenting style was tested by Model 59 of PROCESS.

Common method bias

Since the data rely on Parent' subjective self-reports, there may be some covariations, which means that common method bias needs to be examined. First, We designed the questionnaire using the basic layout method as well as the anonymous response format with reverse scoring questions. In addition, the Harman single factor test was used to determine the common method deviation or systematic measurement error (Harman, 1976). As shown by the findings, six factors had eigenvalues greater than 1, and the first factor of the amount of variation explained was 22.66%, which is below the threshold criterion of 40% (Podsakoff et al., 2003). Thus, the common method bias in this study was not so strong to influence the relationship between variables.

Descriptive and correlation statistics

The descriptive and correlation analysis of the major variables are provided in Table 2. The results showed that significantly negatively correlations between parents pubbing and children's prosocial behavior; closeness child–parent relationship and parents pubbing had negative correlations. Additionally, there was a positive correlation between closeness child–parent relationship, authoritative parenting style and children's prosocial behavior. Parents pubbing was negatively associated with authoritative parenting style. The study also demonstrated that there was a significant correlation between parents pubbing, children's prosocial behavior and age, and closeness child–parent relationship, children's prosocial behavior and gender. In addition, the VIF values of each variable is less than 10, which shows that there is no problem of multicollinearity between the variables.

Results of the mediating effect of closeness child–parent relationship

This study used Model 4 in the SPSS PROCESS macro by Hayes (2012) to assess the mediating roles of parents phubbing and children's prosocial behavior. All data were processed and transformed into Z-scores. The results (refer to Tables 3, 4) showed a significant negative correlation between parents phubbing and prosocial behavior in preschool children ($\beta = -0.73$, $t = -4.096$, $p < 0.01$). And when mediating variables were put in, the relationship between parents phubbing and children's prosocial behavior remained significant ($\beta = -0.043$, $t = -3.195$, $p < 0.01$). In addition, parents phubbing was a significant negative predictor of closeness child–parent relationship ($\beta = -0.042$, $t = -2.565$, $p < 0.01$), while closeness child–parent relationship was a significant predictor of children's prosocial behavior ($\beta = 0.712$, $t = 51.494$, $p < 0.05$). Furthermore, the upper and lower limits of the bootstrap 95% CI for the direct effect of parents phubbing on children's prosocial behavior and the mediating effect of closeness child–parent relationship did not contain 0 (refer to Table 4), indicating that parents phubbing can directly and negatively predict children's prosocial behavior through closeness child–parent relationship. The direct effect (−0.043) and the mediating effect (−0.030) respectively accounted for 58.9 and 41.1% of the total effect (−0.073).

TABLE 3 The mediation model of child–parent relationship.

Regression equation ($N = 999$)		Fitting index			Coefficient significance	
Outcome variable	Predictor variable	R	R^2	F(df)	β	t
Prosocial behavior	Parents phubbing	0.164	0.027	31.640 (3)	−0.730	−4.096**
Closeness child–parent relationship	Parents phubbing	0.068	0.005	5.263 (3) **	0.042	−2.565**
Prosocial behavior	Closeness child–parent relationship Parents phubbing	0.672	0.451	704.969 (4) **	0.712 −0.043	51.494** −3.195**

**$p < 0.01$.

TABLE 4 Analysis of total effect, direct effect, and mediating effect.

	Effect	Boot SE	Boot LLCI	Boot ULCI	Percentage of in effect value
Total effect	−0.073	0.018	−0.038	−0.069	
Direct effect	−0.043	0.013	−0.176	−0.041	58.9%
Mediating effect of closeness child–parent relationship	−0.030	0.013	−0.057	−0.040	41.4%

TABLE 5 The moderated mediation model analysis.

Regression equation ($N = 999$)		Fitting index			Coefficient significance	
Outcome variable	Predictor variable	R	R^2	$F(df)$	β	T
Closeness child–parent relationship	Parents phubbing Authoritative parenting style Parents phubbing×Authoritative parenting style	0.406	0.165	226.295 (3)**	0.162 0.215 −0.011	16.478 20.747** −0.674
Prosocial behavior	Parents phubbing Closeness child–parent relationship Authoritative parenting style Parents phubbing×Authoritative parenting style Closeness child–parent relationship× Authoritative parenting style	0.598	0.358	382.173 (5) **	−0.440 0.180 0.653 −0.005 −0.102	−2.694** 6.639** 37.067** −0.171 −2.607**

**$p < 0.01$.

Results of the moderation mediating model

The study examined the moderating effect of authoritative parenting style through Hayes' PROCESS macro (model 59). It was hypothesized that moderator influenced the three paths of the mediation model, and the actual paths of authoritative parenting style were further determined based on the results of data analysis. The results (refer to Table 5) suggests that authoritative parenting style has significantly moderating effect between closeness child–parent relationship and children's prosocial behavior ($\beta = -0.102$, $t = -2.607$, $p < 0.01$). Authoritative parenting style has no significant moderating effect between parents phubbing and closeness child–parent relationship ($\beta = -0.011$, $t = -0.674$, $p > 0.01$) and between parents phubbing and children's prosocial behavior ($\beta = -0.005$, $t = -0.171$, $p > 0.01$). This result showed that authoritative parenting style can only play a moderating role between closeness child–parent relationship and children's prosocial behavior (refer to Figure 2).

To more clearly reveal the moderating effect of authoritative parenting style, the study further conducted a simple slope test (refer to Figure 3). The results showed that as the level of authoritative parenting style increased, the relationship between closeness child–parent relationship and children's prosocial behavior became stronger (simple slope = 0.237, $t = 6.444$, $p < 0.01$). In addition, the mediating effect of closeness child–parent relationship tended to decrease at all three levels of authoritative parenting styles (refer to Table 6). As the level of authoritative parenting styles increased, parents phubbing was less likely to influence children's prosocial behavior by affecting the closeness child–parent relationship.

Discussion

The association between parents phubbing and preschool children's prosocial behavior

The results of the study showed that there was a significant negative correlation between parents phubbing and prosocial behavior of preschool children. In other words, parents phubbing will be detrimental to the development of prosocial behavior in preschoolers. This view supports most of the current research (Vanden Abeele et al., 2020; Pancani et al., 2021; Solecki, 2022). Children may feel neglected and isolated when their parents look down at a screen, and this sense of isolation may lead to a diminished interest in social interactions and reduce children's motivation to develop prosocial

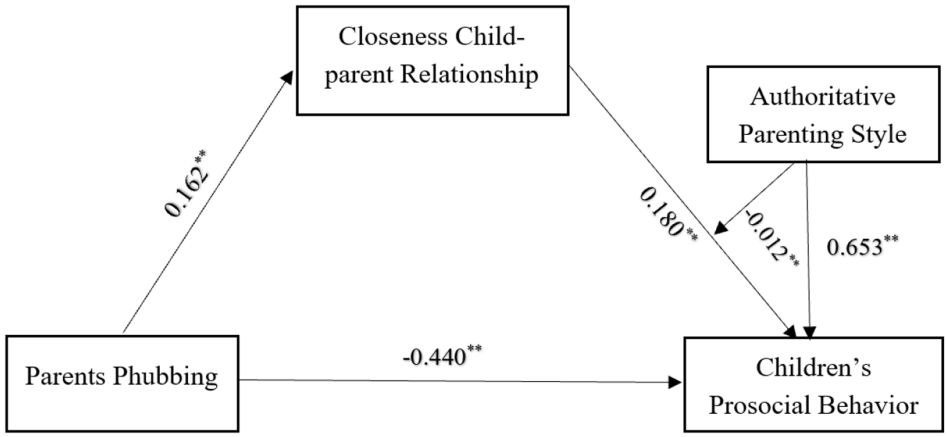

FIGURE 2
The moderated mediation model. **$p < 0.01$.

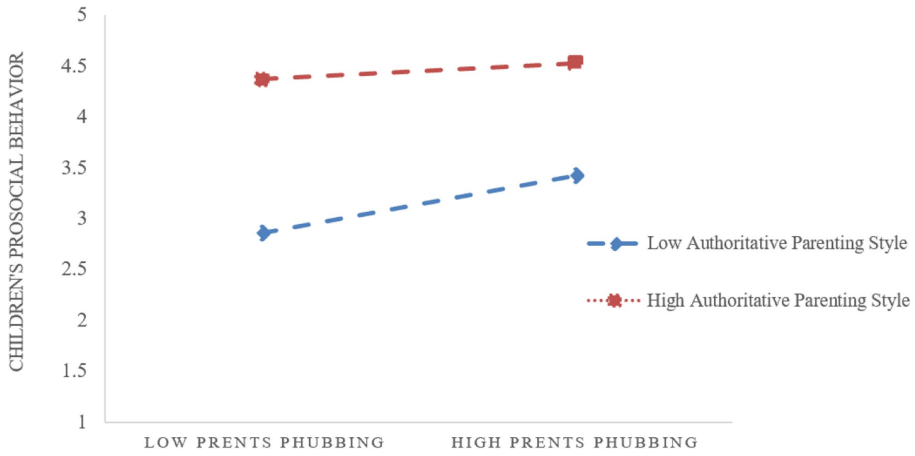

FIGURE 3
The moderating effect of authoritative parenting styles.

TABLE 6 Direct effects on different levels of authoritative parenting style.

	Authoritative parenting style	Effect	Boot SE	Boot LLCI	Boot ULCI
Direct effect	−1 (M-1SD)	0.040	0.008	0.024	0.057
	0 (M)	0.029	0.005	0.019	0.040
	1 (M + 1SD)	0.019	0.006	0.008	0.031
The mediating role of Closeness child–parent relationship	−1 (M-1SD)	−0.021	0.005	−0.021	−0.001
	0 (M)	−0.011	0.009	−0.038	−0.002
	1 (M + 1SD)	−0.010	0.004	−0.017	−0.001

behaviors (Hong et al., 2019). In addition, children often mimic the behavior of their parents or primary caregivers, and when parents overuse mobile phones or electronic devices, children also focus their interest on the screen and lack interaction with and learning from their peers. Therefore, parents phubbing may deprive children of positive social role models, thus affecting their social development. In addition to this, the language and emotional development of preschool children is closely related to parent–child interactions (Menashe and Atzaba-Poria, 2016). When parents look down at a screen, they are often unable to communicate effectively with their children, which can lead to suppression of the child's language skills as well as weakening the emotional connection between parent and child. Preschool children need emotional support and guidance from their parents to establish positive prosocial behavior, but this support will be insufficient when parents' attention is turned to screens. In conclusion, parents should strengthen communication and exchange with their children to reduce the occurrence of parents phubbing and promote the development of prosocial behavior.

Mediating effect of closeness child–parent relationship

Closeness child–parent relationship mediates the relationship between parents phubbing and preschoolers' prosocial behavior. That is, parents phubbing affects preschoolers' prosocial behavior by influencing closeness child–parent relationship and, in turn, preschoolers' prosocial behavior. First of all, parents phubbing has a negative impact on closeness child–parent relationship. This finding supports related studies (Mackay et al., 2022; Frackowiak et al., 2023). On the one hand, when parents spend most of their time on screens, children may feel that they need to compete with their electronic devices for their parents' attention, and this competition for attention can lead to tension and conflict in the parent–child relationship, hindering the development of a sense of intimacy. On the other hand, children need to feel emotionally supported and cared for by their parents, and parents phubbing may trigger insecurity and anxiety in children, negatively affecting the intimate child–parent relationship. In addition to this, parents devote most of their time to screens rather than engaging in activities with their children. This may lead to children feeling deprived of the opportunity to spend time with their parents, thus affecting the quality of the child–parent relationship (Ganotice et al., 2017).

Secondly, closeness child–parent relationships influence the development of prosocial behavior in preschool children. This finding supports many studies (Feldman, 2007; Pallini et al., 2014; Saral and Acar, 2021). Closeness child–parent relationships provide an important foundation upon which children can build a sense of emotional security. When children feel that they are loved, understood and accepted by their parents, they are more likely to build self-esteem and confidence (Calatrava et al., 2023). In addition, closeness child–parent relationships help to develop children's emotional intelligence, enabling them to understand and process their own and others' emotions. This emotional intelligence helps children to get along better with others and to respond positively to the emotional needs of others, thereby displaying more prosocial behavior. Furthermore, when children know they can rely on their parents to meet their emotional needs, they feel more confident to explore the outside world and interact with others. This trust and attachment helps children overcome social challenges and exhibit more prosocial behavior.

Moderating effect of authoritative parenting style

According to the results of the study, the mediating effect of closeness child–parent relationship tended to decrease at all three levels of authoritative parenting styles. In other words, as the level of authoritative parenting styles increases, the impact of parents phubbing on children's prosocial behavior tends to weaken. This is in keeping with the findings of related studies (Pinquart, 2017; Eti, 2023). On the one hand, the authoritative parenting style encourages the establishment of a positive and intimate relationship between parents and children. This establishment of intimacy helps preschoolers to feel loved and accepted by their parents, thus increasing their sense of emotional security (Wang et al., 2022). On the other hand, authoritative parents are usually willing to listen to their children's feelings and needs while providing a safe environment for them to explore their emotional world. This emotional support helps preschoolers to develop a sense of emotional security, which in turn makes them more willing to actively participate in society (Mortazavizadeh et al., 2022). In addition, authoritative parenting styles emphasize clear rules and boundaries. This clarity helps to reduce conflict and confusion and improves the stability of the family atmosphere. It also teaches children the importance of social behavior and develops their social skills.

Limitations and directions

There are still some limitations to this study. First, the source of data was only parent self-reported data, which may lead to some sample bias in the study. Due to the limitation of children's age, this study could only collect relevant data by distributing parent questionnaires, but this practice will have some bias, which will reduce the validity of the findings. Therefore, there is a need to minimize bias and increase reliability by adopting a variety of measures, such as third-party observation. Second, the study involves limited core variables. The main purpose of this study is to investigate the impacts of parents phubbing on preschoolers' prosocial behavior. Meanwhile, closeness child–parent relationship and authoritative parenting style were used as mediating and moderating variables, respectively, wanting to clarify the relationship between the variables through constructive modeling. However, there are many factors related to the influence of prosocial behavior in preschool children, which can only be explored in a limited way at present, and more factors will be included in the future to clarify the relevant influence mechanisms. Third, cross-sectional studies could not establish causality, and longitudinal and experimental studies are needed to confirm these associations. A series of follow-up studies may be needed in the future to continually verify causal associations between variables and clarify internal mechanisms of action. Finally, Zhuhai is a well-developed city in China, so generalization may be another limitation of this study.

Conclusion

This study explored the association between parents phubbing and prosocial behavior in preschool children. The findings indicated that parents phubbing had a significant negative relationship with prosocial behavior in preschool children. Among them, closeness child–parent relationship played a mediating effect, while authoritative parenting style moderated the relationship between closeness child–parent relationship and preschoolers' prosocial behavior. From the theoretical level, our study clarifies the mechanism of parents phubbing's influence on preschool children's prosocial behavior, which is helpful for us to understand the antecedents of preschool children's prosocial behavior. Meanwhile, this study enriches theories related to preschool children's social development. On a practical level, our study is an important guide for parenting. According to the results of this study, parents should reduce the occurrence of phubbing in front of their children and cultivate more closeness child–parent relationship, which will be beneficial to the development of preschool children's prosocial behavior.

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 humans were approved by Ethics Committee of Minzu University of China. The studies were conducted in accordance with the local legislation and institutional requirements. Written informed consent for participation in this study was provided by the participants' legal guardians/next of kin.

Author contributions

DS: Writing – original draft. YX: Writing – review & editing. LC: Writing – review & editing.

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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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Parent-adolescent discrepancies in educational expectations, relationship quality, and study engagement: a multi-informant study using response surface analysis

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Whether parental educational expectations for adolescents serve as a source of motivation or stress depends on the extent to which adolescents hold expectations for themselves. Previous research on the discrepancies between parental and adolescent educational expectations and their impact on learning engagement has been limited by traditional statistical tests, and lacking an examination of the internal mediating mechanism of parent–child relational quality from both parental and adolescent perspectives. This cross-sectional study, utilizing a multi-informant design, examined the association between discrepancies in parents' and adolescents' reports of expectations, and adolescents' study engagement, as well as the mediating role of parent–child relational qualities perceived by both parties. The sample for this study consisted of 455 adolescents and their parents from 10 classes in a junior high school in Wuhan, Hubei Province, China. The adolescents had an average age of 12.8years, and 51.6% of them were boys. Both parents and adolescents reported on their expectations and perceived relational quality, while adolescents also filled out questionnaires assessing their learning engagement. Data were analyzed using polynomial regressions with response surface analysis. The results revealed that when adolescents reported high expectations, regardless of whether their parents reported high or low expectations, adolescents reported satisfied relationships and high learning engagement. In contrast, parents reported satisfied relationships when both parties reported high expectations, or when parents reported higher expectations than adolescents. Lastly, the association between discrepancies in expectations and learning engagement was significantly mediated by adolescent-reported relationships but not parent-reported ones. These findings highlight the importance of considering multiple perspectives when studying the association between expectations and adolescent study engagement. This research advances our comprehension of the dynamics between parent-adolescent educational expectation discrepancies and adolescent learning engagement, offering insights for more nuanced and effective parenting strategies tailored to foster optimal educational outcomes.

KEYWORDS

parent-adolescent educational expectations, discrepancies, polynomial regressions, relationship quality, response surface analysis, study engagement

1 Introduction

Parents have long held high expectations for their children's future success (Pinquart and Ebeling, 2020). Parental educational expectations refer to parents' realistic predictions about their children's academic outcomes, such as course grades, skill development, and the highest level of education attained (Yamamoto and Holloway, 2010). Parental educational expectations have been found to be beneficial in fostering adolescents' learning engagement and academic progress (Pinquart and Ebeling, 2020). However, when parental educational expectations are excessive, they can cause stress for their children (Tan and Yates, 2011).

Academic-related stress is a pervasive issue among adolescents, with particularly acute manifestations in China, a society steeped in Confucian cultural traditions (Tan and Yates, 2011). This cultural backdrop places a premium on academic achievement, viewed not only as a personal accomplishment but also as a critical component of filial duty that enhances family honor. Conversely, academic shortcomings are perceived as failing to uphold family dignity, propelling adolescents into an arduous journey to meet or exceed their parents' high educational expectations (Tan and Yates, 2011). Such dynamics, emblematic of the Confucian valorization of education, may lead to a range of negative outcomes, including academic burnout, anxiety, and in severe cases, disengagement from the educational process (Peleg et al., 2016; Ribeiro et al., 2018; Pascoe et al., 2020). This study is specifically designed to delve into the relationship between the educational expectations discrepancies among Chinese adolescents and their parents and the adolescents' engagement in learning. Furthermore, it investigates the mediating role of perceived parent–child relationship quality from both perspectives. By focusing on this demographic within the context of Confucian cultural influence, we aim to contribute to a nuanced understanding of how educational expectations within such a cultural framework relate to student engagement and the perception of parent–child relationship quality.

Previous research has indicated that adolescents who perceive their parents' expectations to be higher than their own tend to have lower academic self-efficacy and future achievement. Conversely, adolescents who perceive their parents' expectations to be lower than their own tend to have a higher future achievement (Wang and Benner, 2014; Lv et al., 2018). Whether parental educational expectations serve as motivators or barriers can depend on the youth's own educational expectations. In other words, a youth's own level of educational expectations may serve as a benchmark for determining whether parental expectations are excessive. While previous research has laid a solid foundation for investigating the role of discrepancies in parent–child educational expectations (Pinquart and Ebeling, 2020), there are still some issues that require further investigation. First, in terms of statistical testing methods, previous research on discrepancies in parent–child educational expectations has often examined correlations between difference scores (e.g., algebraic, squared, or absolute difference between two scores) and the outcome variable (Wang and Benner, 2014; Lv et al., 2018). However, the "difference scores" method has several limitations, such as reduced dimensionality of variables, difficult interpretation of coefficients, lack of parameter restrictions, and decreased reliability (Shanock et al., 2010). These limitations can be overcome through polynomial regression with response surface analysis, which is specially developed to address variable matching and discrepancy (Edwards and Cable, 2009; Shanock et al., 2010; Schönbrodt et al., 2018). Therefore, this study aimed to apply polynomial regression and response surface analysis to conduct a more nuanced examination of the congruence and incongruence between adolescents' and parents' educational expectations. Second, to our knowledge, there is limited research exploring the internal mediation mechanisms between the discrepancies in parent-adolescent education expectations and adolescent academic behaviors from the perspective of family member relationships. The parent-adolescent relationship, a vital social family resource for youth and adolescents, plays a critical role in their learning and development (Coleman, 1988; Havermans et al., 2014). It may serve as a mediator in the relationship between parent-adolescent discrepancies in educational expectations and academic behaviors. Therefore, this study aimed to investigate the associations between parent-adolescent discrepancies in educational expectations and adolescents' study engagement, as well as the mediating roles of the quality of parent–child relationships. The current research can contribute to a better understanding of how discrepancies in parent-adolescent educational expectations function in adolescent learning and provide more effective and targeted recommendations for parenting practices.

Study engagement is a persistent, positive, fulfilling, study-related state of mind characterized by vigor, absorption, and dedication (Schaufeli et al., 2002). According to the definition of study engagement, a highly engaged learner is someone who has abundant energy and flexibility, a strong focus and interest, and a sense of meaning and challenge in the learning process (Schaufeli et al., 2002; Salmela-Aro and Upadaya, 2012). Previous studies have found that study engagement predicts the learning process and academic achievement and is also a crucial indicator of healthy student development (Upadyaya and Salmela-Aro, 2013; Martins et al., 2022). The self-system model of motivational development (SSMMD) developed by Skinner et al. (2008) provides a theoretical foundation for linking parent-adolescent discrepancies in educational expectations to adolescents' study engagement. The SSMMD depicts contextual predictors of students' social interactions with family, peers, and teachers that influence students' engagement in learning by acting upon their self-systems that are organized around three basic psychological needs: competence, autonomy, and relatedness (Ryan and Deci, 2000; Skinner et al., 2008). Therefore, the study employs the SSMMD to primarily elucidate and substantiate the relationship between parent-adolescent discrepancies in educational expectations and adolescent study engagement.

According to SSMMD, adolescents who hold higher educational expectations than their parents are likely to have a high degree of autonomy and, thus, intrinsic motivation in their academic pursuits (Zhen et al., 2017). Intrinsically motivated adolescents are more likely to remain highly focused and persistent in their learning, experiencing pleasure and value in their educational pursuits (Karimi and Sotoodeh, 2020). Conversely, when adolescents' educational expectations fall below their parents' expectations, adolescents may be pushed forward academically by their parents, and their need for autonomy is likely to be frustrated; they may become less engaged and more likely to avoid or give up when faced with academic challenges (Agliata and Renk, 2008). Additionally, adolescents with lower educational expectations may experience frustrated competence due to their inability to meet their parents' overly high educational expectations. Both thwarted needs for autonomy and competence can seriously undermine youths' intrinsic motivation, reducing engagement and causing them to feel academically passive and helpless (Karimi and Sotoodeh, 2020). Parent-adolescent congruent educational expectations can be further divided into two types: one in which both adolescents and parents have congruent and high educational expectations, and the other in which they have congruent but low educational expectations. Although neither type thwarts the child's need for autonomy, there may be substantial differences in their impact on adolescent study engagement. The former type is more likely to create a converging force of intrinsic and extrinsic motivation that promotes adolescent engagement in learning. In contrast, the latter is permissive and indulgent, and adolescents in this situation will likely show minimal study engagement.

Parent–child relationships are innate and one of the children's earliest and most important social contacts (Laursen and Collins, 2009). Wu et al. (2011) identified several essential components that constitute a high-quality parent–child relationship, such as understanding and communication, low excoriation and control, liking and respect, and growth and tolerance. Social family resource theory suggests that the parent–child relationship is a crucial family social resource for adolescents that plays a vital role in their learning and development (Coleman, 1988). Adolescents who spend more time with their parents and have higher-quality relationships are more likely to receive academic support and guidance from their parents (Coleman, 1988; Mo and Singh, 2008). Conversely, less parental presence and poorer parent–child relationships can negatively affect children's learning and growth (Popov and Ilesanmi, 2015). In addition, relationship needs are closely related to individuals' intrinsic motivation from the perspective of basic psychological needs (Ryan and Deci, 2000; Zhen et al., 2017). An environment with a higher sense of security and belonging will stimulate more intrinsically motivated behaviors. In the broader theoretical framework proposed by Skinner et al. (2008), a good parent–child relationship provides a warm and harmonious family atmosphere and a conducive learning environment for adolescents. Therefore, adolescents in good parent–child relationships exhibit more enthusiasm, curiosity, and interest in academics and are more committed to learning (Wu and Yang, 2012). Empirical studies have found that parent–child relationship quality significantly predicts children and adolescents' life satisfaction, academic engagement, academic competence, and scores on standardized achievement tests (Murray, 2009; Jiménez-Iglesias et al., 2017; Markkula et al., 2021; Li et al., 2022). Conversely, families with divorced parents have more parental conflict and poorer quality of parent–child relationships, leaving children with fewer family social resources and ultimately hindering their academic engagement (Havermans et al., 2014).

Self-determination theory is a macro theory of human motivation and personality that deals with people's inherent growth tendencies and innate psychological needs. The Relationship Motivation Theory within the Self-Determination Theory aids in elucidating the relationship between educational expectations and the quality of parent–child relationships. This theory underscores the significance of supportive significant others in meeting an individual's needs for autonomy, competence, and relatedness (La Guardia and Patrick, 2008). When these needs are satisfied, individuals experience higher self-esteem, vitality, positive affect, relationship satisfaction, and commitment. Conversely, when partners are excessively controlling, have unreasonable expectations, or are overly challenging or rejecting, optimal functioning is compromised (La Guardia and Patrick, 2008; Deci and Ryan, 2014). According to the Relationship Motivation Theory, adolescents who hold higher educational expectations than their parents tend to have more autonomy, which is positively correlated with their happiness and positive behavior (Deci and Ryan, 2000). This situation can lead to more positive parent–child relationships (Fredrickson, 2001). Conversely, when adolescents have lower educational expectations than their parents, their autonomy and competence are undermined, resulting in negative emotions such as anxiety and depression (Deci and Ryan, 2000; Vansteenkiste and Ryan, 2013). This situation increases the likelihood of parent–child conflict and can damage the quality of the relationship. When adolescents and their parents have congruent and high educational expectations, the matching expectations contribute to a good parent–child relationship. Conversely, when expectations are low on both sides, the level of connection between child and parent tends to be lower and the relationship quality poorer.

It is worth noting that as individual autonomy and self-awareness continue to increase in adolescence, young people's needs become more complex and varied (Smetana et al., 2006), leading to discrepancies between adolescents' and parents' perceptions of their relationship (Eccles et al., 1993; Nelemans et al., 2016). What parents perceive as a good parent–child relationship may not align with what adolescents need or want. Early research has indicated that due to the potential influence of social desirability bias, parents may tend to report what they perceive as ideal parenting behaviors, thereby overestimating the warmth and control they exhibit (Bögels and Van Melick, 2004; Waylen et al., 2008). Further, children's perceptions of parenting are more likely to impact their affect and behavior than parents' perceptions of parenting (Janssen et al., 2021). Therefore, it can be hypothesized that adolescents' perceptions of the parent–child relationship, rather than parental perceptions, may significantly mediate the association between parent–child discrepancies in educational expectations and study engagement.

In sum, the current study proposed the following research hypotheses: (1) There are congruent effects of educational expectations between parents and adolescents, indicating that adolescents demonstrate higher levels of engagement in learning when both adolescents and parents report congruent and higher educational expectations. (2) Additionally, higher quality parent–child relationships are reported by both parents and adolescents when both adolescents and parents report congruent and higher educational expectations. (3) The incongruent effects of educational expectations

would suggest that when adolescents hold higher levels of educational expectations than what is reported by their parents, they are notably more likely to report higher levels of engagement in learning and better parent–child relationships. (4) Conversely, parents report better relationship quality when they hold higher educational expectations than their adolescents. (5) Adolescents' reports of the parent–child relationship, rather than parents', may mediate the association between congruence and incongruence in adolescents' versus parents' reports of educational expectations and study engagement.

2 Methods

2.1 Sample and procedure

This research collected multi-informant data from parents and teenagers. Using a cluster random sampling approach, we surveyed 613 junior high school students and 519 parents from 10 classes at a junior high school in Wuhan, Hubei Province, China. After thoroughly matching adolescents and their parents, 455 parents-adolescent dyads comprised the total sample for our analyses. The adolescents (51.6% boys) had a mean age of 12.8 (SD = 0.67) years, with 240 (52.7%) students in grade 7 and 215 (47.3%) students in grade 8. Youth from intact families accounted for 92.5% of the sample, whereas those from divorced, remarried, and single-parent households accounted for 4.6, 2.2, and 0.5%, respectively. The mothers and fathers comprise 371 and 84 individuals, with average ages of 41.01 (SD = 3.56) and 44.38 (SD = 4.79), respectively. Regarding paternal education, 14.3% have a high school diploma or less, 27.4% have received specialized education, 41.7% hold a bachelor's degree, and 16.7% have a master's degree or higher. Concerning maternal education, 16.4% have a high school diploma or less, 23.7% have received specialized education, 48.2% hold a bachelor's degree, and 11.6% have a master's degree or higher.

Student data were collected in the school's computer classroom using Sojump, a popular online survey platform in China (similar to SurveyMonkey in the United States). A trained research assistant oversaw the entire administrative process, while a computer teacher was responsible for technical concerns and maintaining discipline. Informed consent was obtained from the adolescents. After obtaining informed parental consent, we gathered parent data online by releasing a link to the Sojump survey in a WeChat group for parents that had previously been created. The research was approved by the ethics committee.

2.2 Measures

2.2.1 Educational expectations

The study used the educational expectations scale developed by Wang and Liu (2005) to assess the educational expectations of adolescents and their parents. They found a close association between discrepancies in educational expectations among junior high school students and their parents and the quality of parent–child relationships through their self-developed education expectation scale (Wang and Liu, 2005). The scale consisted of eight items that evaluated parents' and teenagers' expectations regarding educational attainment (e.g., "Getting into a satisfactory college"), grades (e.g., "Higher test scores"), in-class performance (e.g., "Actively speak and ask questions in class" and "Attentive in class"), academic competence (e.g., "Highly efficient learning"), and others. Participants rated each item on a 4-point scale ranging from 1 (no expectation) to 4 (highest expectation), with higher scores indicating higher educational expectations. Previous studies (Liu, 2020) demonstrated high reliability, and in the present study, Cronbach's alpha coefficients for adolescent and parental educational expectations were 0.91 and 0.93, respectively, indicating excellent reliability.

2.2.2 Parent–child relationship

The study also used the parent–child relationship questionnaire developed by Wu et al. (2011) to separately assess adolescent- and parent-reported relationship quality. The questionnaire comprised 26 terms across four subscales: understanding and communication (e.g., "When I felt aggrieved, I was willing to tell my parents," "When my child felt aggrieved, (s)he was willing to talk about it with me"), excoriation and controlling (reverse coding) (e.g., "When I disobeyed my parents or did not do what they say, I would be severely scolded by them," "When my child disobeyed me or did not do what I say, (s) he would be severely scolded by me"), liking and respect (e.g., "When I talked, my parents listened patiently and attentively," "I could listen patiently and attentively when my child was talking"), and growth and tolerance (e.g., "When there was a conflict between parents and children, the parents did not think it was necessarily my fault.," "When there was conflict between parents and children, I did not think it was necessarily the child's fault."). Participants rated each term on a 5-point Likert scale ranging from 1 (completely untrue) to 5 (completely true), with higher scores indicating better parent–child relationship quality as perceived by adolescents or parents. This scale was effectively validated in Wu et al.'s (2022) study. The Cronbach's alpha coefficients for adolescent and parent questionnaires were 0.95 and 0.92, respectively.

2.2.3 Learning engagement

The Chinese version of the Utrecht Work Engagement Scale-student, revised by Fang et al. (2008), was employed to measure adolescents' academic engagement. The scale consisted of 17 items measuring three subscales: vigor (e.g., "When I am studying, I feel mentally strong"), dedication (e.g., "My studies inspire me"), and absorption (e.g., "When I am studying, I forget everything else around me"). Participants rated the items on a 7-point Likert scale ranging from 1 (never) to 7 (always). Fang and Ding's (2020) study confirmed the reliability of this scale in the Chinese population. The scale demonstrated good reliability in the present study ($\alpha = 0.96$).

2.3 Data analysis

The present study employed polynomial regression with response surface analysis to model and visualize complex interactions and discrepancies in a three-dimensional space, offering a more intuitive and comprehensive understanding of how these discrepancies relate to adolescent learning engagement (Edwards and Cable, 2009). Data analysis was performed according to the procedures outlined by Barranti et al. (2017) using the RSA package (Schönbrodt and Humberg, 2023) in R 4.1.2. First, we examined the frequency of difference observations between adolescent and parent educational

expectations, where a difference of more than half a standard deviation indicated a discrepancy (Shanock et al., 2010). Second, we standardized adolescent and parent reports of educational expectations using pooled standard deviations to ensure commensurate scaling and a shared midpoint (e.g., Van Petegem et al., 2020). Third, we conducted a series of polynomial regression analyses, regressing outcome variables on adolescent and parent-reported educational expectations, their squared terms, and their interaction term. Specifically, we used adolescents' reports of parent–child relationship (model 1), parents' reports of parent–child relationship (model 2), and study engagement (model 3) as dependent variables for the three polynomial regression models. Fourth, we examined the mediating roles of parent–child relationships in the model by adding adolescent and parent-reported parent–child relationships as predictor variables to model 3, constructing model 4 and model 5, respectively.

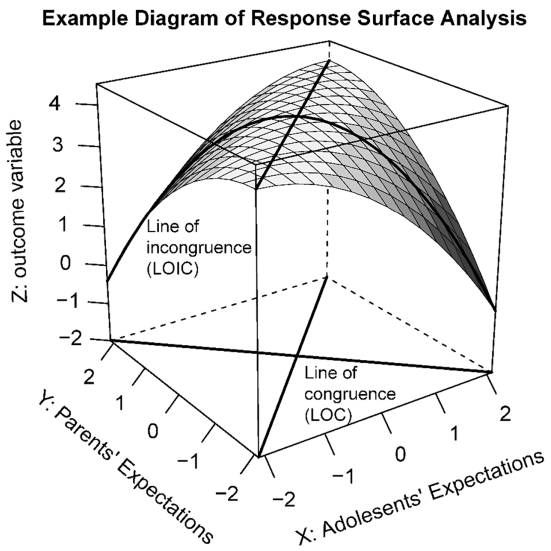

FIGURE 1
Example diagram of response surface analysis. Refer to Schönbrodt et al. (2018) for the response surface of the estimated regression equation Z = 4 + 0X + 0Y – 0.25×2 + 0.5XY – 0.25Y2.

Fifth, we used response surface analyses to interpret the results from the polynomial regression analyses (Schönbrodt et al., 2018). Response surfaces are a visual presentation of polynomial regression. It aids in visually depicting the three-dimensional distribution map of outcome variables, as illustrated in Figure 1. Line of Congruence (LOC) and Line of Incongruence (LOIC) adequately demonstrate the varied matching of education expectations between adolescents and parents. As shown in Figure 1, LOC refers to congruent education expectations between both parties. Along the LOC, moving from the outer to the inner direction, parent-adolescent education expectations consistently align, with values gradually increasing. LOIC signifies divergent education expectations between both parties. The left half of LOIC represents parents' education expectations being higher than adolescents, while the right half is the opposite. The slopes and curvatures along the LOC and LOIC reflect the shape and trends of the response surface of the outcome variable in the three-dimensional coordinate system (Schönbrodt et al., 2018).

Finally, to ensure the robustness of the results, we used the "block variable" approach (Edwards and Cable, 2009) and bias-corrected confidence intervals constructed from estimates based on 10,000 bootstrap samples to test for the mediating roles (MacKinnon et al., 2004).

3 Results

3.1 Preliminary analyses

The means, standard deviations, and correlations of the study variables are presented in Table 1. There was no significant difference in educational expectations between adolescents and parents, as evidenced by the mean scores ($t_{(454)} = 1.61$, $p = 0.123$). However, using a cut-off point of 0.5 standard deviations, the results revealed that 61% of parent-adolescent dyads had discrepancies in educational expectations. In contrast, 39% of adolescents reported similar scores to their parents. Of these informant discrepancies, 34% of adolescents reported higher educational expectations, and 27% reported lower expectations than their parents. The descriptive analyses showed several observations with discrepant values, indicating the importance of examining the link between congruence and incongruence in

TABLE 1 Means, standard deviations, and correlations among the study variables (n = 455).

Variables	1	2	3	4	5	6	7
1. Gender	1						
2. Grade	−0.04	1					
3. AEE	−0.02	−0.15***	1				
4. PEE	0.02	−0.14**	0.17***	1			
5. ARR	0.02	−0.20***	0.31***	0.04	1		
6. PRR	−0.07	−0.13**	0.12*	0.24***	0.16***	1	
7. Learning Engagement	−0.02	−0.18***	0.52***	0.11*	0.56***	0.13**	1
M	0.52	0.47	3.63	3.59	3.80	3.57	5.53
SD	0.50	0.50	0.52	0.47	0.77	0.28	1.17

n, sample size; M, Mean; SD, Standard Deviation. *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.
Gender was dummy-coded, with 0 representing girls and 1 representing boys. Grades were dummy-coded, with 0 representing grade 7 and 1 representing grade 8. AEE refers to adolescents' educational expectations; PEE refers to parents' educational expectations; ARR refers to adolescent-reported parent–child relationships; PRR refers to parent-reported parent–child relationships.

TABLE 2 Polynomial regression coefficients and response surface parameters.

	Relationship quality		Learning engagement		
	Model 1	Model 2	Model 3	Model 4	Model 5
Polynomial regression coefficients					
b_1-adolescent report	0.55***	0.03	1.17***	0.81***	1.16***
b_2-parents report	−0.15	0.15***	−0.04	0.06	−0.08
b_3- adolescent report^2	0.15*	0.01	0.03	−0.08	0.02
b_4- adolescent report × parents report	−0.12	−0.09*	0.05	0.13	0.07
b_5- parents report^2	−0.17*	0.03	−0.15	−0.03	−0.16
b_6-relationship (adolescents/parents)				0.66***	0.26
R^2	0.13	0.09	0.29	0.45	0.29
Response surface parameters					
a_1-slope along LOC (x = y)	0.40**	0.17***	1.13***	0.86***	1.08***
a_2-curvature along LOC (x = y)	−0.14	−0.05	−0.07	0.02	−0.06
a_3-slop along LOIC (x = −y)	0.70***	−0.12*	1.21***	0.75***	1.24***
a_4-curvature along LOIC (x = −y)	0.10	0.14	−0.17	−0.23	−0.20

Grade levels were controlled for throughout the analyses. *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.
The parent–child relationship in Model 4 (b_6) was from adolescents' reports, and the parent–child relationship in Model 5 (b_6) was from parents' reports.

educational expectations, parent–child relationships, and study engagement.

Table 1 also showed a significant positive correlation between adolescent- and parent-reported educational expectations. Further, significant two-by-two correlations were observed between adolescent-reported educational expectations, adolescent-reported parent–child relationship, parent-reported parent–child relationship, and learning engagement. Parent-reported educational expectations were significantly associated with the parent-reported parent–child relationship but not the adolescent-reported parent–child relationship. Additionally, adolescents' grade levels were significantly related to the outcome variables, with eighth-graders reporting lower levels of parent–child relationships and learning engagement than seventh-graders. No significant associations were found between adolescents' gender and any outcome variables. Therefore, we controlled for adolescents' grade levels in subsequent analyses.

3.2 Polynomial regression on parent–child discrepancies in educational expectations

In this section, we first presented the polynomial regression and response surface analysis of the parent-adolescent relationship quality reported by both parties on discrepancies in parent–child educational expectations. Next, we reported, without considering the mediating variables, the polynomial regression and response surface analysis of the study engagement on parent-adolescent education expectations.

The polynomial regression of the parent–child relationship reported by adolescents on discrepancies in parent–child educational expectations was included in model 1 of Table 2. The response surface analysis results showed a significant slope along the line of congruence (LOC) [a1 = 0.40, 95% CI (0.149, 0.656), $p = 0.002$] and a nonsignificant curvature along LOC [a2 = −0.14, 95% CI (−0.391, 0.120), $p = 0.299$], indicating a linear additive effect of the surface along LOC. These outcomes suggest that when adolescents and parents report higher educational expectations, adolescents tend to report higher levels of parent–child relationships. Additionally, the slope along the line of incongruence (LOIC) was positive and statistically significant [a3 = 0.70, 95% CI (0.429, 0.964), $p < 0.01$], indicating a linear effect of the LOIC. Specifically, adolescents who reported higher educational expectations than their parents tended to have better quality parent–child relationships (see Figure 2A). The curvature of the LOIC was not statistically significant [a4 = 0.10, 95% CI (−0.236, 0.428), $p = 0.570$].

The polynomial regression of the parent-reported parent–child relationship on discrepancies in parent–child educational expectations was included in model 2 of Table 2. There was a significant slope along the LOC [a1 = 0.17, 95% CI (0.080, 0.267), $p < 0.001$] and a nonsignificant curvature along LOC [a2 = −0.05, 95% CI (−0.145, 0.051), $p = 0.345$], indicating a linear additive effect of the surface along LOC. These outcomes imply that parents tend to report higher levels of parent–child relationship when both adolescents and parents report higher educational expectations. Moreover, the slope along the LOIC was negative and statistically significant [a3 = −0.12, 95% CI (−0.227, −0.012), $p = 0.030$], indicating a linear effect of the LOIC. Thus, parents who reported higher educational expectations than their children tended to have higher-quality parent–child relationships. The curvature of the LOIC was marginally significant [a4 = 0.14, 95% CI (−0.004, 0.277), $p = 0.056$], suggesting that whether adolescents or parents hold high educational expectations is related to better parent–child relationships as reported by parents (see Figure 2B).

Similarly, in Model 3 (Table 2), the polynomial regression of study engagement on discrepancies in parent–child educational expectations was examined. The slope along LOC was significant [a1 = 1.13, 95% CI (0.778, 1.476), $p < 0.001$], indicating a linear additive effect of the surface along LOC, while the curvature along LOC was nonsignificant [a2 = −0.07, 95% CI (−0.465, 0.322), $p = 0.721$]. Thus, adolescents were more likely to report higher levels of learning engagement when adolescents and parents had higher educational expectations. The slope along LOIC was statistically significant [a3 = 1.21, 95% CI (0.771, 1.652), $p < 0.001$], whereas the curvature was not statistically significant [a4 = −0.17, 95% CI (−0.729, 0.392), $p = 0.555$]. These

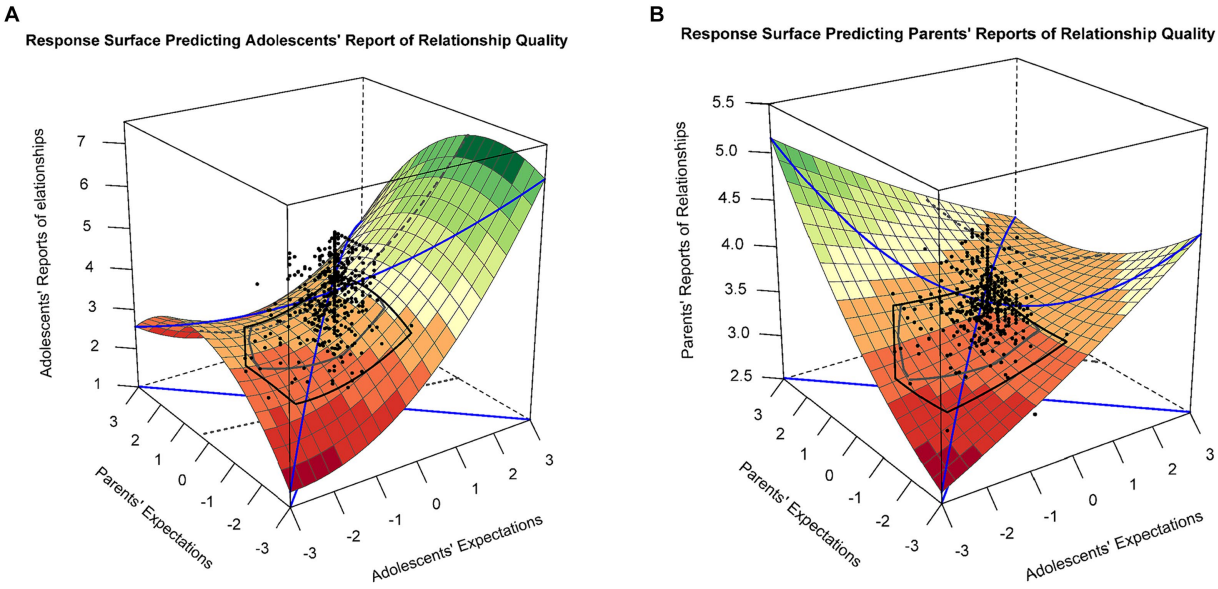

FIGURE 2
(A) Response surface for the polynomial regression of educational expectations predicting adolescents' reports of parent–child relationships.
(B) Response surface for the polynomial regression of educational expectations predicting parents' reports of parent–child relationships.

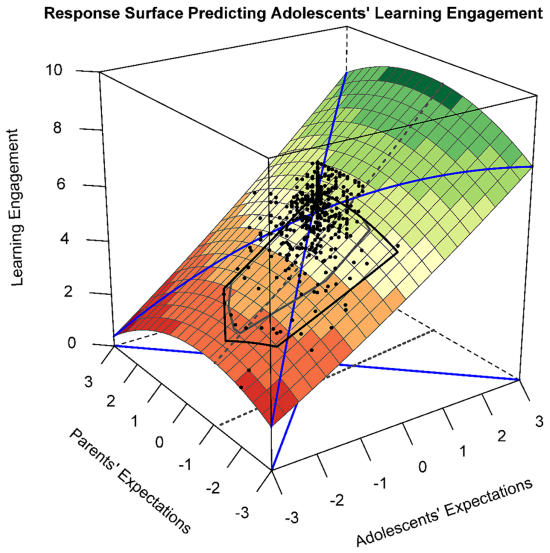

FIGURE 3
Response surface for the polynomial regression of educational expectations predicting adolescents' study engagement.

outcomes suggest that adolescents with higher educational expectations than their parents reported higher levels of learning engagement (see Figure 3).

3.3 Testing the mediating effect of parent–child relationship

Substituting Model 1 into Model 4 yielded an equation for testing the mediating effects of the adolescent-reported parent–child relationship and a response surface plot of the mediating effect. Similarly, substituting Model 2 with Model 5 yielded an equation for testing the mediating effects of the parent-reported parent–child relationship and a corresponding response surface plot of the mediating effect.

For the response surface analyses of the mediating effects of the adolescent-reported parent–child relationship (see Figure 4A), there was a significant slope along LOC [a1 = 0.27, 95% CI (0.092, 0.441), $p = 0.003$] and a nonsignificant curvature along LOC [a2 = −0.09, 95% CI (−0.283, 0.104), $p = 0.363$], indicating a linear additive effect of the surface along LOC. That is, high educational expectations could further promote adolescents' engagement in learning by improving their positive perceptions of the parent–child relationship when both adolescents and parents hold high educational expectations. Furthermore, the slope along the LOIC was positive and statistically significant [a3 = 0.46, 95% CI (0.257, 0.665), $p < 0.001$], but the curvature was not significant [a4 = 0.06, 95% CI (−0.214, 0.342), $p = 0.653$]. Thus, evidence for a linear effect of the LOIC was obtained, indicating that adolescents with higher educational expectations than their parents reported higher satisfaction with the parent–child relationship, which, in turn, facilitated their learning engagement.

For the response surface analyses of the mediating effects of the parent-reported parent–child relationship, neither the slope nor curvature along LOC was significant [a1 = 0.04, 95% CI (−0.019, 0.108), $p = 0.173$; a2 = −0.01, 95% CI (−0.044, 0.020), $p = 0.460$], nor were they significant along LOIC [a3 = −0.03, 95% CI (−0.079, 0.018), $p = 0.221$; a4 = 0.03, 95% CI (−0.026, 0.096), $p = 0.264$]. Additionally, the mediated effect response surface showed a nearly horizontal plane in the three-dimensional coordinate system (see Figure 4B). These results indicated that the parent's perception of the parent–child relationship did not significantly mediate the relationship between the discrepancies in parent–child educational expectations and study engagement.

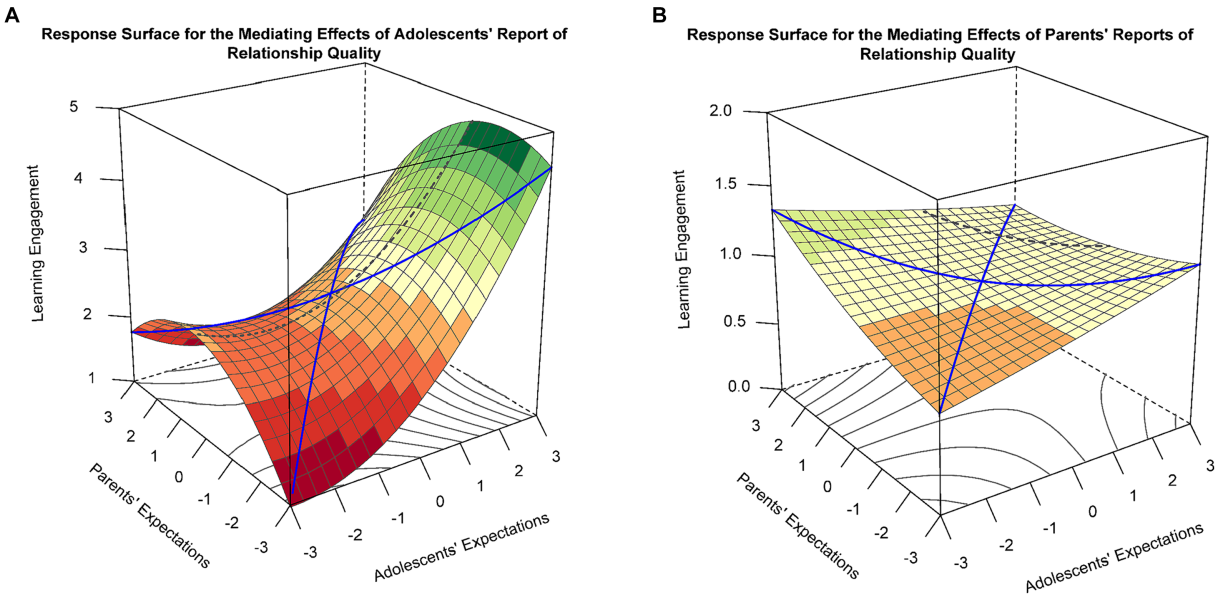

FIGURE 4
(A) Response surface for the mediating effects of adolescents' reports of parent–child relationships. **(B)** Response surface for the mediating effects of parents' reports of parent–child relationships.

We utilized the "block variable" approach to test for mediating effects to ensure the results' robustness. Path analyses revealed that the block variable, which was derived from the discrepancies between parent–child educational expectations, was a significant predictor of adolescent-reported relationship quality ($a = 0.32$, $p < 0.001$), which, in turn, predicted higher levels of study engagement ($b = 0.44$, $p < 0.001$). The indirect effect of adolescent-reported relationship quality was significant [$ab = 0.14$, 95% CI (0.10, 0.19)], accounting for 29.16% of the total effect. Conversely, the block variable was also found to predict parent-reported relationship quality ($a = 0.27$, $p < 0.001$); however, relationship quality was not predictive of study engagement ($b = 0.08$, $p = 0.105$). The indirect effect was insignificant [$ab = 0.02$, 95% CI (0, 0.05)]. The conclusions drawn from the "block variable" tests of mediating effects were consistent with the above.

4 Discussion

The concerns of Chinese parents regarding their children's education and the academic burden faced by adolescents are pressing issues that require attention. In response, the General Office of the State Council of China issued a document titled "Opinions on Further Reducing the Burden of Homework and Off-Campus Training for Students at the Compulsory Education Stage," which outlines guidelines for creating a favorable educational environment, alleviating parental stress, and promoting the overall growth and development of students. This multi-informant study utilized the self-system model of motivational development, self-determination theory, and the basic psychological needs hypothesis to examine whether the congruence or incongruence between adolescents' and parents' educational expectations was related to adolescents' study engagement. Addressing the significant educational concerns within the Chinese context, our study introduces two main contributions: first, the application of polynomial regression and response surface analysis for a more nuanced examination of the congruence and incongruence between adolescents' and parents' educational expectations; second, an in-depth exploration of the internal mediation mechanisms through the lens of parent–child relationships, offering dual-perspective insights that enrich our understanding of educational dynamics.

Traditional approaches to examining discrepancies in educational expectations have relied heavily on difference scores (Wang and Benner, 2014; Lv et al., 2018), which, despite their utility, present several limitations such as reduced dimensional complexity and interpretational challenges (Shanock et al., 2010). This study advances the methodological framework by employing polynomial regression and response surface analysis, an innovative approach that not only addresses these limitations but also offers a more nuanced understanding of the congruence and incongruence between adolescents' and parents' educational expectations (Edwards and Cable, 2009; Shanock et al., 2010; Schönbrodt et al., 2018). By doing so, our research enhances the reliability and interpretability of the findings.

Furthermore, this study meticulously explores the internal mediation mechanisms that underlie the relationship between discrepancies in educational expectations and adolescent academic behaviors. While previous research has touched upon the surface of parent–child educational dynamics (Wang and Benner, 2014), our investigation delves deeper into the mediating role of parent–child relationships, offering insights from both parents' and adolescents' perspectives. This dual-perspective approach, grounded in robust theoretical frameworks such as the self-system model of motivational development and self-determination theory, underscores the complexity of educational expectations within the family context. It reveals how these dynamics contribute to adolescents' learning engagement, thereby providing a comprehensive understanding of the factors that correlate educational outcomes.

4.1 Parent-adolescent discrepancies in educational expectations and study engagement

Our study found that high congruence between adolescents' and parents' reports of educational expectations resulted in greater engagement in learning for adolescents compared to low congruence. Specifically, higher levels of learning engagement were reported when both adolescents and parents held higher educational expectations. This result supports the study's Hypothesis 1. Parents with higher educational expectations tend to be more involved in their children's education, including activities such as parenting, tutoring, and participating in school decisions (Lin et al., 2009; Li et al., 2018). When adolescents hold similar educational expectations to their parents, these expectations can serve as a motivational boost, leading to a synergistic effect that promotes their commitment to learning. Conversely, when both adolescents and parents hold low educational expectations, adolescents tend to have low academic motivation and are least engaged in learning.

The study found that adolescents with higher educational expectations than their parents reported increased levels of learning engagement, supporting Hypothesis 3 and highlighting an incongruence effect. These findings are consistent with previous research showing that parents' overly high educational expectations can lead to stress for their children (Tan and Yates, 2011; Peleg et al., 2016; Ma et al., 2018). Academic-related stress is a significant issue for adolescents, particularly in China, where traditional Confucian culture is highly valued (Tan and Yates, 2011). Confucian culture emphasizes academic excellence as a form of filial duty that brings honor to the family, while academic failure is viewed as a source of familial shame. To avoid disappointing their parents, adolescents may exert great efforts to meet their parents' high educational expectations, leading to long-term academic pressure and adverse outcomes such as declining grades, test anxiety, burnout, boredom, and even dropping out of school (Peleg et al., 2016; Ribeiro et al., 2018; Pascoe et al., 2020).

From the perspectives of the self-system model of motivational development and self-determination theory, adolescents' social interactions with their parents influence their engagement in learning by contributing to adolescents' perceptions about themselves, which are organized around three basic psychological needs: competence, autonomy, and relatedness (Ryan and Deci, 2000; Skinner et al., 2008). Therefore, adolescents' needs for autonomy and competence may be thwarted when their parents' educational expectations exceed their own; further, they experience lower academic motivation (Ryan and Deci, 2000; Wu et al., 2018). In such cases, parents' heavy investment in their children's education may not be beneficial, as it is more likely to result in a drag effect. Conversely, when adolescents' educational expectations surpass their parents', they are more academically autonomous and experience higher internal motivation, leading to a stronger focus and persistence in their studies, as well as a greater sense of joy and value in the learning process. Additionally, children who exceed their parents' educational expectations are a source of pride for their parents, which can lead to increased praise and recognition, further strengthening their academic engagement. These findings suggest that adolescents' own educational expectations are the primary intrinsic driver for promoting engagement in learning. Whether parental educational expectations exert a positive influence on study engagement depends on the adolescents' educational expectations, with those who have higher expectations consistently favoring enhanced engagement in their studies.

4.2 The mediating roles of parent–child relationship

The current study found evidence for the congruent effects of educational expectations in predicting the parent–child relationship reported by adolescents and parents. Specifically, in families where both adolescents and parents reported high educational expectations, they were more likely to report good relationships. This result supports Hypothesis 2 of the study. The high level of congruence in educational expectations between adolescents and parents suggested that their shared high educational expectations may synergistically promote adolescents' academic development and positive social adjustment. In contrast, when both parties had low educational expectations, it was detrimental to maintaining a good parent–child relationship. This may be due to the lack of emotional bonding between parents and adolescents in families with low educational expectations, where parents may be more permissive and hands-off in their parenting style (Wu and Yang, 2012).

Interestingly, when there were discrepant educational expectations between adolescents and parents, their reports of the parent–child relationship were quite different. Adolescents reported better parent–child relationships when their educational expectations were higher than their parents' expectations, while the opposite was true for parent-reported parent–child relationships. This result supports Hypotheses 3 and 4 proposed in this study regarding the incongruent effects of parent–child relationships on parental educational expectations. This finding aligns with previous research on adolescent-parent discrepancies in views of the parent–child relationship (Nelemans et al., 2016). Both parents and adolescents held their own views on the parent–child relationship. Adolescents viewed gaining more autonomy in school and receiving parental praise as positive aspects of a good parent–child relationship. Specifically, adolescents' higher educational expectations than their parents contributed to greater autonomy, which satisfied their need for autonomy according to self-determination theory (Ryan and Deci, 2000). The satisfaction of autonomy brings more positive emotions, which can broaden and build resources that help adolescents build a solid family support system and promote good parent–child relationships (Fredrickson, 2001). In addition, adolescents with high educational expectations are often perceived as more enterprising and ambitious, which may make them more likely to be favored by their parents. Conversely, when adolescents' educational expectations are lower than their parents', parents' excessive educational expectations may become a trigger for parent–child conflict and damage the parent–child relationship (Chiang and Ellis, 2019). In contrast, parents viewed a good parent–child relationship as the responsibility of training children and having them achieve success in terms of academic performance. This interpretation is further confirmed by the non-linear effect along the line of incongruence. When either adolescents or parents hold higher educational expectations than the other party, it is associated with better parent–child relationships reported by parents. This result suggests that, from parents' perspective, parents may be satisfied either when they themselves hold higher educational expectations or when they have an enterprising child.

It should be noted that the results of the mediating effect test for parent–child relationships revealed that child-reported, but not parent-reported, parent–child relationships significantly mediated the association between discrepancies in parent–child educational expectations and study engagement. This result supports Hypothesis 5 proposed in this study. This finding aligns with previous research indicating that adolescents' perceptions of the family environment are a stronger predictor of their adjustment than parents' perceptions (Human et al., 2016). Additionally, our findings confirm that adolescent-reported parent–child relationships are more likely to be significant family social resources, substantially facilitating learning engagement.

4.3 Implications

The present study investigated the association between parent–child discrepancies in educational expectations and study engagement among adolescents from both the parents' and adolescents' perspectives. Additionally, the study explored the mediating roles of parent-reported and adolescent-reported parent–child relationships. The response surface analysis approach was utilized to graphically and insightfully reveal the relationship between different matches of parent–child educational expectations and adolescent learning engagement, along with its internal mediating mechanisms. The study's findings not only enhance the understanding of how parent–child discrepancies in educational expectations are linked to adolescents' learning engagement but also provide targeted recommendations for parents and educational practitioners to promote youth engagement in learning.

The present study demonstrated that higher parental educational expectations may not always lead to greater academic engagement in children but rather depend on the level of adolescents' educational expectations. Parental expectations are more likely to motivate adolescents when their expectations are comparable to or higher than their parents'. Although adolescents tend to be more engaged in learning when their educational expectations exceed those of their parents, this advantage may be limited in the long term due to the potential lack of parental involvement and support when parents have lower educational expectations (Li et al., 2018). Therefore, it is preferable for both parents and adolescents to hold high and comparable educational expectations.

Moreover, attention should be given to the perceived functional differences in the parent–child relationship between parents and adolescents. The study found that adolescent-reported parent–child relationships could mediate the link between parent–child discrepancies in educational expectations and study engagement, whereas parent-reported parent–child relationships did not. Adolescents may require more autonomy and self-awareness, which may lead to a more complex set of needs that differ from what their parents perceive as a good parent–child relationship (Eccles et al., 1993). Discrepancies between parents' and adolescents' perceptions of parent–child relationships have been linked to adolescents' internalizing and externalizing problems (Ohannessian, 2012; Ohannessian and De Los Reyes, 2014; Nelemans et al., 2016). This suggests that parents should be more empathetic in their child-rearing practices and pay closer attention to their children's wants and desires. To enhance children's engagement in learning, parents should provide more autonomy support that encourages the child's intrinsic motivation (Froiland and Worrell, 2017).

4.4 Limitations and future lines of research

Building on the insights from our study, there are several avenues for future research that merit attention. Firstly, due to the cross-sectional nature of our research, we acknowledge that establishing causality between parental expectations, adolescent study engagement, and relational qualities remains a challenge. Longitudinal studies are thus essential to decipher the directional influences and temporal changes in these relationships over time.

Secondly, our study's focus on a Chinese context raises questions about the universality of our findings. Given the documented higher educational pressures faced by students in China and other Asian countries compared to their Western counterparts (Tan and Yates, 2011), it is crucial for future research to investigate whether these patterns hold true across different cultural and educational landscapes. Comparative studies across diverse cultural settings could illuminate the interplay between cultural norms, parental expectations, and adolescent academic outcomes, providing a more nuanced understanding of these dynamics.

Thirdly, the predominance of data from mothers in our study, as opposed to fathers, presents a unique lens through which we viewed our findings. Although our analyses suggest that the inclusion of data from both parents does not significantly alter the results, literature indicates that mothers and fathers may engage differently in their children's education (Phares et al., 2009). Future research could benefit from delving deeper into these differences, exploring how maternal and paternal roles distinctly influence adolescents' educational experiences and outcomes. This could involve qualitative approaches to capture the depth of parental involvement or quantitative measures to assess the impact of each parent's expectations on adolescent well-being and academic engagement.

Moreover, additional variables such as adolescent self-esteem, parental styles, and the educational environment could provide further insights into the mechanisms through which parental expectations affect adolescent development. Investigating these factors would not only enrich our understanding of the parent-adolescent dynamic but also offer actionable insights for educational practitioners and policymakers aiming to foster environments that support healthy academic motivation and engagement.

5 Conclusion

This study provides evidence for associations between parent-adolescent discrepancies in educational expectations and study engagement, as well as adolescent- and parent-reported parent–child relationships. Specifically, the congruent effects of educational expectations between parents and adolescents suggest that adolescents demonstrated higher levels of engagement in learning when both adolescents and parents reported congruent and higher educational expectations. Furthermore, higher quality parent–child relationships were reported by both parents and adolescents when both adolescents and parents reported congruent and higher educational expectations. Second, the incongruent effects of educational expectations between

parents and adolescents suggest that when adolescents held higher levels of educational expectations than what was reported by their parents, they were notably more likely to report higher levels of engagement in learning and better parent–child relationships. Conversely, parents reported better relationship quality when they held higher educational expectations than their adolescents. Lastly, the association between discrepancies in expectations and study engagement was significantly mediated by adolescent-reported relationships but not parent-reported ones.

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 humans were approved by Central China Normal University, Ethic Committee, EC, Institutional Review Board. The studies were conducted in accordance with the local legislation and institutional requirements. Written informed consent for participation in this study was provided by the participants' legal guardians/next of kin.

Author contributions

YS: Conceptualization, Formal analysis, Methodology, Software, Visualization, Writing – original draft, Writing – review & editing. JW: Conceptualization, Data curation, Investigation, Resources, Writing – review & editing. ZZ: Funding acquisition, Project administration, Supervision, Validation, Writing – review & editing. YT: Funding acquisition, Supervision, Validation, Writing – review & editing, Project administration. WL: Methodology, Writing – review & editing. HX: Methodology, Writing – review & editing.

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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 association between family adaptability and adolescent depression: the chain mediating role of social support and self-efficacy

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Objective: Previous research has shown a correlation between family adaptability and adolescent depression. However, there is a lack of studies that have investigated the underlying mechanism between family adaptability and adolescent depression. Based on the Ecological Systems Theory, this study aims to investigate the link between family adaptability and depression in adolescents, mediated by the sequential roles of social support and self-efficacy.

Methods: The sample consisted of 1086 students randomly selected from seven public middle schools in Shandong Province, Eastern China. All the participants filled in the structured self-report questionnaires on family adaptability, social support, self-efficacy, and depression. The data were analyzed using SPSS 25.0 and Structural Equation Modeling (SEM) in AMOS 24.0.

Results: The findings of this study are as follows: (1) Family adaptability is negatively associated with adolescent depression; (2) Social support plays a mediating role between family adaptability and adolescent depression; (3) Self-efficacy plays a mediating role between family adaptability and adolescent depression; (4) Social support and self-efficacy play a chain mediation role between family adaptability and adolescent depression.

Conclusion: It is suggested that early interventions and support should be provided to facilitate adolescents' family adaptability, social support, and self-efficacy, thus reducing their depression and improving mental health of adolescents.

KEYWORDS

family adaptability, social support, self-efficacy, depression, adolescents

Introduction

Recent data from the China Mental Health Survey indicates that the group of depressive disorder incidence in China gradually tends to be younger, with 30.28% of the incidence under the age of 18 (National Depression Blue Book, 2022). Depression is an important emotional manifestation of depressive disorders. If this emotion is intervened in a timely manner early in its emergence, it can significantly reduce an individual's risk of developing depressive disorders. The word "depression" used in this study is a depressive mood. Depression is a

common negative emotion among adolescents (Miller et al., 2023; Schwartzman et al., 2023; Wang et al., 2023). It is considered a common intrinsic maladaptive response (Chi et al., 2020), characterized by a non-specific period of sadness, unhappiness, or emotional distress in response to adverse situations or events in daily life and learning (Yang et al., 2000). Adolescent depression is associated with many factors. Evidence suggests that the lifestyle, stress, and trauma that adolescents encounter during their developmental careers can increase their risk of developing depressive disorders (Fox et al., 2010; Yin et al., 2022; Zhang et al., 2024). Studies have shown that parent–child, teacher-student, and peer relationships are negatively correlated with depression in adolescents (Bradford et al., 2017; Cao et al., 2023; Hasty et al., 2023). The better the relationship, the lower the risk of depression in adolescents. It is easy to see how depression affects adolescents not only in terms of academics, relationships, and social adjustment, but also as a predictor of their mental health (McLeod et al., 2016). In the short term, depression can negatively impact adolescents' academic performance, social functioning, and interpersonal relationships (Chavez et al., 2023). In the long term, adolescents are prone to self-injury, suicide, and other behavioral problems once they are depressed (Ding et al., 2022; Neslusan et al., 2023), and at the risk of developing related psychiatric disorders in adulthood (Robin et al., 2017). Therefore, it is particularly important to improve the mental health level of adolescents, to prevent and reduce adolescent depression.

Family adaptability and adolescent depression

Family adaptability refers to the capacity of a family system to adjust and respond to the changing circumstances and challenges that arise throughout different stages of family development (Olson, 1989). It is considered a crucial component in assessing the overall functioning of the family unit. Ecological Systems Theory suggests that an individual psychological development is the result of the interaction of environmental and individual factors (Bronfenbrenner and Ceci, 1994). In terms of environmental factors, the family is the most direct environmental system for the individual, and the development of individual behavior is closely related to factors such as emotional connection and communication patterns among family members (Bronfenbrenner, 1986). Relevant empirical studies have provided evidence supporting the significant predictive role of family adaptability in relation to adolescent depression (Ruiz-Robledillo et al., 2019; Liu X. et al., 2020). These studies have consistently shown that family adaptability negatively predicts levels of depression among adolescents. The findings from Nam et al. (2016), Xu and Zhang (2018), and Huang et al. (2022) further support this assertion, indicating that higher levels of family adaptability are associated with lower levels of depression in the adolescent population.

The study by Freed et al. (2016) yielded similar findings, indicating that higher levels of family adaptability in adolescents were associated with a lower likelihood of experiencing depression (Freed et al., 2016). Individuals who come from families with high levels of adaptability tend to receive various positive behavioral influences and emotional support, which serve as protective factors against adverse behaviors and promote positive behaviors. Consequently, the risk of developing depression is reduced (Jia and Yuan, 2018). Wang Enna et al. conducted a 3-year longitudinal follow-up of 1,301 Chinese students in grades 7–9 year, and the results showed that the association between family adaptability and adolescent depression was dynamic and time-dependent (Wang et al., 2021). The correlations and regression analyses of family adaptability and adolescent depression have only been discussed in existing studies, and the mechanisms of the two have not been investigated, such as the study by Li et al. (2021) There is a gap in the literature describing the mechanisms of family adaptability and depression, so the present study wanted to revalidate the relationship between the two and address the previous limitations. Drawing upon the aforementioned studies, it is evident that family adaptability exerts a substantial influence on adolescent depression. Adolescents with higher levels of family adaptability are more likely to be positive and confident in life (Daniel et al., 2020). Conversely, adolescents with lower levels of family adaptability are more likely to be pessimistic and backward in life, lose confidence, and increase their risk of depression (Lee et al., 2017). Based on this view, the following hypothesis is proposed:

> *H1*: Family adaptability is negatively associated with adolescent depression.

Social support as a mediator

Social support is the emotional, psychological, physical, informational, instrumental, and material assistance provided by others to maintain one's health or to facilitate one's adaptation to difficult life events (Dunst et al., 1986). Ecosystem theory suggests that the environment to which adolescents are exposed is not limited to the family, but peers and teachers in school also play important roles in their psychological development (Teresa et al., 2021; Adekunle et al., 2022), reflected primarily in social support. There is a discrepancy between the social support objectively provided by the outside world and the social support subjectively perceived by adolescents. Therefore, Zimet proposes the concept of perceived social support, and all references to "social support" in this study refer to perceived social support. Adolescents perceive social support as a subjective experience of support, which is the emotional experience and satisfaction of the individual himself/herself feeling respected, supported, and understood (Wataru et al., 2020; Raymond and Gou, 2022). Zimet classified perceived social support into three dimensions, namely family support, friend support, and other support (leaders, relatives, co-workers) (Zimet et al., 1988). According to the main effect model of social support, social support has a general gaining effect (Cohen and Wills, 1985). Studies have shown that social support can reduce individuals' dysphoria (e.g., feelings of loneliness, anxiety, depression, etc.) (Eva et al., 2014; Yu et al., 2022), and individuals who receive more social support have lower levels of depression (Banks and Weems, 2014; McKillop et al., 2017). In other words, increasing social support can effectively reduce the level of depression (Yu et al., 2016). Social support is beneficial in relieving the individual's stress and reducing their tendency for depression to occur (Kong et al., 2013; Chris et al., 2022). Social support was found to increase individuals' positive experiences, enhance their self-evaluation, improve their positive self-concept, reduce loneliness, and alleviate depression triggered by stressful events (Denton et al., 2015). High levels of social support are positively associated with increased resilience to

frustration, enhanced resilience, and reduced emotional problems. Conversely, lower levels of social support are found to exacerbate negative emotions and are more likely to contribute to the development of depression among adolescents (Fan et al., 2013; Reza et al., 2014). Meanwhile, there is a significant positive correlation between family adaptability and social support (Zhang et al., 2018; Lei and Kantor, 2020). In general, adolescents with high family adaptability are more conducive to enriching emotional communication with others, and in the process of establishing intimate relationships with family members, adolescents can learn how to deal with interpersonal problems properly, which enhances their interpersonal skills and makes them have better interpersonal adaptability in school and social environments (Wang et al., 2020), and the improvement of interpersonal adaptability is conducive to adolescents to gain more social support (Lou et al., 2017). However, a search revealed no literature on social support as a mediator in family adaptability and adolescent depression. Taken together, it is concluded that family adaptability may indirectly influence adolescent depression via social support. Based on these, the following hypothesis is proposed:

> *H2*: Social support plays a mediating role between family adaptability and adolescent depression.

Self-efficacy as a mediator

Self-efficacy is understood as "an individual belief in one's capabilities to organize and execute the courses of action required in producing given attainments" (Bandura, 1997). In other words, self-efficacy is people's judgment of their own abilities. According to the ecosystem theory perspective, it is an individual factor that influences adolescent development. Studies have shown that self-efficacy is a potential predictor of adolescent depression (Tore et al., 2018; Li, 2019; Kumar and Rajeev, 2022). Specifically, it is well-known that high self-efficacy can reduce adolescent depression (Moeller and Seehuus, 2019; Tonga et al., 2020). Lau et al. (2022) conducted an experimental study with patients with neurological disorders, they found that self-efficacy was negatively correlated with depression, and that increasing the level of self-efficacy was an effective measure for preventing and intervening in adolescent depression (Lau et al., 2022). In a subsequent study conducted by Volz et al., it was found that self-efficacy negatively predicts the occurrence of depression in adolescents. Moreover, higher levels of self-efficacy were found to effectively decrease the likelihood of behavioral and psychological problems in adolescents, as well as reduce the incidence of depression (Volz et al., 2019). Meanwhile, studies have shown that family adaptability is an important factor influencing self-efficacy, Family adaptability is positively associated with individual self-efficacy (Stubbs, 2015; Yuan et al., 2021). The higher the family adaptability, the higher the adolescents' pleasure and happiness, and the high positive emotions enable adolescents to enhance their affirmation of their self-efficacy and expect things to go in a good direction (Lee and Shin, 2017), to believe in their ability to get the desired outcome and not to allow themselves to dwell on difficulties or problems (Bandura and Locke, 2003). The findings from the aforementioned studies indicate that there is a clear association between enhanced family resilience and increased self-efficacy. Specifically, the studies suggest that high levels of family adaptability contribute to the establishment of a positive family environment for adolescents. This positive environment not only directly reduces the likelihood of depression in adolescents but also further mitigates depression by fostering an increase in their self-efficacy. However, a search revealed no literature on self-efficacy as a mediator in family adaptability and adolescent depression. Therefore, this study hypothesized that self-efficacy may play a mediating role between family adaptability and adolescent depression. On this basis, the following hypothesis is proposed:

> *H3*: Self-efficacy plays a mediating role between family adaptability and adolescent depression.

Orth et al.'s (2016) study provides evidence supporting the notion that social support serves as a robust predictor of positive psychological factors, including self-efficacy, and plays a critical role in safeguarding the mental health of adolescents. Specifically, an increase in social support is associated with higher levels of self-efficacy among individuals (Ostaszewski and Zimmerman, 2006; An et al., 2018; Liu Q. et al., 2020). Social support provides individuals not only with material assistance, but also with psychological support and the promotion of self-efficacy (Adams et al., 2019). That is, individuals with high social support have a higher sense of self-efficacy to combat frustration and reduce the likelihood of depression (Bagci, 2018). Pan (2018) also found that adolescents who have more social support and encouragement were more confident in their ability to get things right when dealing with unexpected situations and new problems and tended to adopt a positive approach to the various problems they faced (Rosa et al., 2022). All of the above studies suggest that social support is an important predictor of self-efficacy. In view of this, the following hypothesis is proposed:

> *H4*: Social support and self-efficacy play a chain mediation role between family adaptability and adolescent depression.

In summary, it is proposed that adolescents with elevated levels of family adaptability are more likely to have increased access to essential support and assistance from their family, friends, and society when confronted with challenges. This heightened support provides them with greater confidence to navigate various tasks and challenges, leading to enhanced self-efficacy. Consequently, these factors act as protective mechanisms against the development of depression and other negative emotional states. In light of this, the present study, drawing upon the Ecological Systems Theory, aims to investigate the potential influence of family adaptability on adolescent depression, mediated by the roles of social support and self-efficacy. Moreover, this study explores the potential chain mediating effect of social support and self-efficacy in the relationship between family adaptability and adolescent depression. Based on the aforementioned analysis, the following model is proposed (Figure 1).

Materials and methods

Sampling and procedure

A total of 1,143 adolescents were selected as participants for this study through random sampling from seven schools in Shandong

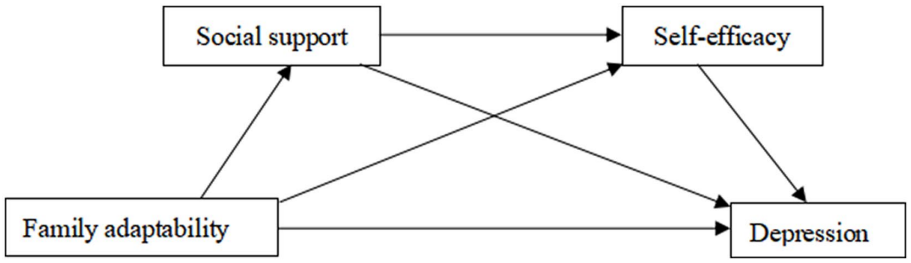

FIGURE 1
The proposed theoretical model.

Province, China. After excluding the invalid questionnaires with missing answers or consistent responses, 1,086 valid questionnaires were collected, with an effective rate of 95%. Participants were age 12–15 ($M = 13.72$, SD = 0.99). Among them, 465 (42.8%) were boys, and 621 (57.2%) were girls; the valid respondents included 388 (35.7%) in the 6th grade, 182 (16.8%) in the 7th grade, 434 (40.0%) in the 8th grade, and 82 (7.6%) in the 9th grade. The place of residence was urban 628 (57.8%) and rural 458 (42.2%).

Questionnaire design

Family adaptability and cohesion evaluation scale (FACES II-CV)

The measurement of family adaptability was conducted using the Adaptability Subscale of the Family Intimacy and Adaptability Scale, which was revised by Olson (1989). This subscale consists of 14 items, such as "Each member in our family is free to express his or her opinion." A 5-point Likert scale was used, with scores of 1–5 indicating "hardly ever" to "almost always," with higher scores indicating higher family adaptability. The scale has good reliability and validity. The Cronbach's α value of the scale in this study was 0.814. $\chi^2/df = 4.308$, IFI = 0.936, CFI = 0.936, TLI = 0.922, GFI = 0.957, AGFI = 0.940, and RMSEA = 0.055.

Perceived social support scale (PSSS)

The Appreciative Social Support Scale (Blumenthal et al., 1987), developed by Zimet et al. (1988), was employed in this study. This scale comprises 12 items. It includes family support (e.g., "I can get emotional help and support from my family when I need it"), friend support (e.g., "My friends share my happiness and sadness"), and other support (e.g., "Some people (leaders, relatives, colleagues) are a real source of comfort for me when I am in trouble"). The 7-point Likert scale was used, with scores ranging from 1–7 indicating "strongly disagree" to "strongly agree," with higher scores indicating higher perceived social support. The reliability and validity of the scale were good. The Cronbach's α value of the scale in this study was 0.902, $\chi^2/df = 7.905$, IFI = 0.936, CFI = 0.944, TLI = 0.924, GFI = 0.942, AGFI = 0.908, and RMSEA = 0.080.

General self-efficacy scale

The Chinese version of the General Self-Efficacy Scale (GSES) developed by Schwarzer et al. (1997) was used, with 10 questions, such as "I can face difficulties calmly because I can trust my ability to deal with problems." The scale is scored on a 4-point Likert scale, with scores from 1 to 4 indicating "not at all true" to "completely true," with higher scores indicating a stronger sense of self-efficacy. The reliability and validity of the scale were good. The Cronbach's α value of the scale in this study was 0.823, $\chi^2/df = 8.004$, IFI = 0.927, CFI = 0.927, TLI = 0.890, GFI = 0.954, AGFI = 0.915, and RMSEA = 0.080.

Center for epidemiological studies depression scale (CES-D)

The Radloff Center for Epidemiological Studies Depression Scale compiled in 1977 was used (Radloff, 1977), with 20 items, such as "I feel that my life is a failure," of which 4, 8, 12, and 16 are reverse scoring questions, such as "I feel that there is hope for the future." The scale is used to assess depressed mood or state of mind and focuses more on the individual's emotional experience and involves fewer somatic symptoms in depression (Hong et al., 2024). The questions were scored on a 4-point scale. 4-point Likert scale was used. The frequency of the corresponding situation or feeling in the past week was evaluated: "not or basically not (less than 1 day)" scored 0, "sometimes or some of the time (1–2 days)" scored 1, "from time to time or half of the time (3–4 days)" was scored as 2, "most or all of the time (5–7 days)" was scored as 3. A total score of ≤15 means no depressive symptoms, 16–19 means possible depressive symptoms, and ≥ 20 means definitely depressive symptoms. The higher the score, the higher the degree of depression. The Cronbach's α value of the scale in this study was 0.877. $\chi^2/df = 4.702$, IFI = 0.903, CFI = 0.903, TLI = 0.887, GFI = 0.930, AGFI = 0.910, and RMSEA = 0.058.

Statistical analysis

SPSS 25.0 and AMOS 24.0 were used for statistical analysis. (1) The Harman single-factor test was carried out to test for the common method variance (Tang and Wen, 2020). All items of family adaptability, self-efficacy, social support, and depression were extracted for inclusion in the exploratory factor analysis. The unrotated exploratory factor analysis resulted in a total of 11 factors with a characteristic root greater than 1. The maximum factor variance explained was 20.788%, which is less than the critical value of 40%; therefore, there was no serious common method bias in this study; (2) Descriptive statistics, reliability test and Pearson correlation analysis were carried out on family adaptability, social support, self-efficacy, and depression; (3) The chain mediation test was conducted using AMOS 24.0. Bootstrap in this study was based on 5,000 samples and 95% confidence intervals were generated to test the significance of indirect effects. Bootstrap in this study was based on 5,000 samples

and generated the 95% confidence interval to test the significance of indirect effect.

Results

Descriptive statistics and correlation analyses

The mean and standard deviation of each variable and the results of the correlation matrix between the variables are detailed in Table 1.

As shown in Table 1, their pathways were supported by the data. Specifically, family adaptability and adolescent depression established a significant negative relationship ($r = -0.407$, $p < 0.01$); family adaptability and social support established a significant positive relationship ($r = 0.507$, $p < 0.01$); social support was significantly negatively related to adolescent depression ($r = -0.360$, $p < 0.01$); family adaptability was significantly and positively related to self-efficacy ($r = 0.376$, $p < 0.01$); self-efficacy was significantly negatively related to adolescent depression ($r = -0.298$, $p < 0.01$); and social support significantly and positively related to self-efficacy ($r = 0.348$, $p < 0.01$). The relationship between the variables supports the subsequent hypothesis testing.

Testing for mediation effect

To analyze the mediating effect, AMOS is used to test the mediating effect. The bootstrap proposed by MacKinnon (2012) was used for significance testing, with a sample size of 5,000 and a confidence level of 95%. The model was fitted by AMOS, the fitting index of the model was $\chi^2/df = 5.411$, IFI = 0.990, CFI = 0.990, TLI = 0.970, GFI = 0.992, AGFI = 0.966, and RMSEA = 0.064. Each index is in an acceptable range, and the model is ideal.

The significance of the mediating effect was tested using the nonparametric percentage Bootstrap procedure with bias correction, with 5,000 repetitive samples and 95% confidence intervals calculated. Accordingly, the results of the mediating effect of social support and self-efficacy between family adaptability and adolescent depression were analyzed (see Table 2 for details). The total effect value was −0.385. The direct effect value of family adaptability on adolescent depression was −0.251. Hypothesis 1 was established. The total indirect mediating effect size for social support and self-efficacy was −0.134 with a 95% confidence interval of [−0.179, −0,095], which does not contain 0, indicating that there is a significant mediating effect of social support and self-efficacy between family adaptability and depression. This total indirect mediating effect arose through three mediating paths: the first indirect effect Ind1: family adaptability → social support → depression had an indirect effect of −0.085 with a 95% confidence interval of [−0.122, −0.051], which did not contain 0, indicating that social support mediated a significant effect between family adaptability and depression. Hypothesis 2 was established. The second indirect effect Ind2 had a path of family adaptability → self-efficacy → depression, with an effect size of −0.035 and a 95% confidence interval of [−0.057,−0.018], which does not contain 0, indicating that self-efficacy mediates a significant effect between family adaptability and depression. Hypothesis 3 was established. The third mediated path Ind3 is: family adaptability → social support → self-efficacy → depression, with a mediated effect size of −0.014 and a 95% The confidence interval was [−0.024,−0.007] not containing 0, indicating that the chain mediating effect of social support and self-efficacy between family adaptability and depression was significant. Hypothesis 4 was established.

The specific pathways of family adaptation acting on depression through social support and self-efficacy are detailed in Figure 2.

Differences between the three chained mediated pathways were compared, and the data results are detailed in Table 2. The difference between indirect effect 1 and indirect effect 2 was significant, Bootstrap did not contain 0 at the 95% confidence interval [−0.094, −0.007], and the mediated effect from social support alone (63.7%) was higher than the effect from self-efficacy (25.9%). The difference between indirect effect 1 and the difference between indirect effect 3 was significant, Bootstrap did not contain 0 at the 95% confidence interval [−0.109, −0.035], and the mediating effect from social support alone (63.7%) was higher than the effect from social support and self-efficacy together (10.4%). The difference between indirect effect 2 and indirect effect 3 was significant, Bootstrap at the 95% confidence interval [−0.043, −0.007] did not contain 0, and the mediating effect of self-efficacy alone (25.9%) was higher than the effect of social support and self-efficacy together (10.4%). In conclusion, social support mediated the relationship between family adjustment and depression (63.7%), with a greater effect than the mediating effect of self-efficacy (25.9%) and the chain mediating effect of social support and self-efficacy (10.4%).

Discussion

Depression, as an important component of adolescent mental health, has become increasingly important to the healthy growth of adolescents, and its research has received more and more attention. Depression not only has a negative impact on daily life, learning and social adjustment, but also aggravates the psychological burden of adolescents (Tang et al., 2019). However, existing studies have mainly explored the influencing factors of adolescent depression, and have paid less attention to the formation mechanisms of adolescent depression. Therefore, based on the

TABLE 1 Descriptive statistics and correlation analysis ($N = 1,086$).

	M	SD	1	2	3	4
1 Family adaptability	46.866	9.744	1			
2 Social support	62.579	12.933	0.507**	1		
3 self-efficacy	25.971	5.417	0.376**	0.348**	1	
4 Depression	14.923	9.224	−0.407**	−0.360**	−0.298**	1

*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$, same below.

TABLE 2 Mediating effects between family adaptability, self-efficacy, social support and depression variables (N = 1,086).

	Effect	Boot SE	Boot LLCI	Boot ULCI	The proportion of total indirect effect
Total effect	−0.385	0.018	−0.442	−0.331	
Direct effect	−0.251	0.021	−0.317	−0.182	
Total indirect effect	−0.134	0.010	−0.179	−0.095	
Ind1	−0.085	0.004	−0.122	−0.051	63.7%
Ind2	−0.035	0.034	−0.057	−0.018	25.9%
Ind3	−0.014	0.028	−0.024	−0.007	10.4%
Ind1 – Ind2	−0.051	0.022	−0.094	−0.007	
Ind1 – Ind3	−0.072	0.019	−0.109	−0.035	
Ind2 – Ind3	−0.021	0.009	−0.043	−0.007	

Boot SE, Boot LLCI and Boot ULCL refer to the standard error, lower and upper limits of the 95% confidence interval of the indirect effects estimated by the bias-corrected percentile Bootstrap method, respectively.

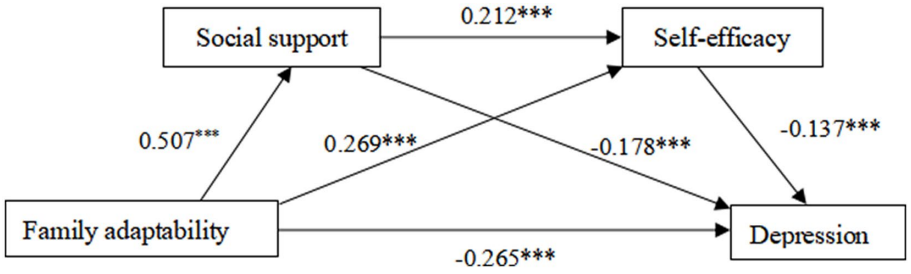

FIGURE 2
The chain mediation model.

Ecological Systems Theory, this study constructs a model of family adaptability, social support, self-efficacy and adolescent depression, and explores the effects and pathways of family adaptability, social support and self-efficacy on adolescent depression. The model helps us understand how and under what conditions family adaptability affects adolescent depression, providing potential guidance for improving levels of adolescent depression and enhancing adolescent mental health.

The relationship between family adaptation and adolescent depression

As shown in Table 1, the correlation between family adaptability and depression is 0.407, which is a moderate correlation and significant at the 0.01 level. The findings suggest that family adaptability predicts adolescent depression with an effect size of −0.251 (Table 2). H1 was valid, which is consistent with the results of previous studies (Wang et al., 2021). The predictive effect remained significant after the inclusion of mediating variables. That is, the less well-adjusted the adolescent is in the family, the more likely he or she is to show emotional problems such as anxiety and depression (Li et al., 2021; Ying et al., 2022). This may be due to the fact that adolescents with low family adaptability lack the necessary emotional communication and support in the family, which not only makes the adolescents less adaptable in facing problems and challenges, but also predisposes the adolescents to feel more stressed and thus depressed (Berryhill and Smith, 2021). In summary, the results of this study further underscore that family adaptability can significantly and negatively predict depression in adolescents. The findings also corroborate the applicability of ecosystem theory and its theoretical guidance in the Chinese family education context.

The mediating role of social support

The findings suggest that social support plays a mediating role between family adaptability and adolescent depression with an effect size of −0.085 (Table 2). H2 was valid, which is consistent with He et al.'s (2021) study that family adaptability is significantly and positively associated with social support. Individuals with high family adaptability have clear roles for their family members. Everyone can perform their own duties, cooperate with each other, and listen to the opinions of each member when they encounter problems. And they can adjust the family environment and change certain family roles at any time to cope with family changes. This allows individuals to feel loved and wanted in their families. At the same time, they have family members to help them when they encounter difficulties, thus enhancing the level of family support for individuals. (Jewell et al., 2015). The findings of this study shows that social support is significantly and negatively associated with adolescent depression, which is consistent with previous studies (Davidson and Adams, 2013; Wang et al., 2018). Social support does have an important role in relieving adolescents' stress, contributing to stabilizing their

emotional state and having a positive impact in promoting adolescents' mental health (Qi et al., 2020; Ringdal et al., 2020). For adolescents, social support has a transitional role when they face crises, making them feel more trusted, respected, tolerant, understanding, and concerned, and less anxious and depressed (Xing et al., 2016; Kang et al., 2022). The present study enriches the explanatory mechanism of family adaptability affecting adolescent depression from the perspective of ecological systems theory. Since the family is the most direct environmental system of an individual and society is the largest environmental system affecting an individual, increased family adaptability can increase social support, and increased social support can effectively reduce the occurrence of depression. In summary, the results of this study further underscore the significance of family adaptability as a negative and significant predictor of depression in adolescents.

The mediating role of self-efficacy

The findings suggest that self-efficacy serves as a significant partial mediating variable in the relationship between family adaptability and adolescent depression with an effect size of −0.035 (Table 2). H3 was valid. In the present study, family adaptability was found to be positively associated with self-efficacy, a finding that is consistent with previous studies (Yuan et al., 2021; Jackson et al., 2022). Adolescents who experience high levels of family resilience tend to possess enhanced problem-solving skills and confidence in their decision-making abilities when faced with challenges, thus bolstering their self-efficacy (Ali et al., 2020). Additionally, Li, 2021 also found that high family resilience ensures that adolescents receive more life care and emotional support during their development, which helps to regulate their psychology. It helps adolescents to establish good psychological adaptability strategies and role adaptation, thus enhancing their ability to cope with difficulties and directly improving their self-efficacy (Li, 2021). Moreover, self-efficacy has been found to influence individuals' attitudes toward learning, as well as their cognition and emotions (Xu and Li, 2021; Liu et al., 2023). Further, self-efficacy is significantly and negatively associated with adolescent depression (De et al., 2018; Maurya et al., 2023), and the same results are found in this paper. Self-efficacy plays a key role in an individuals' emotion regulation process, which helps them to maintain a high level of self-confidence when facing problematic situations, and this enables them to cope with stress effectively, manage their negative emotions better, and reduce the frequency and duration of depression (Tang et al., 2010; Bandura, 2012; Liu D. et al., 2020; Wen et al., 2021). Individuals with high self-efficacy have positive attitudes toward themselves and are more inclined to view external setbacks and difficulties as temporary, which helps to reduce depression caused by psychological stress (Pu et al., 2017; Li, 2019). In summary, self-efficacy serves as another crucial pathway through which family adaptability affects adolescent depression.

The chain mediating role of social support and self-efficacy

Another important finding of this study is that family adaptability can influence the onset of depression in adolescents through a chain mediating effect of social support and self-efficacy. The effect value of the chain mediated path is −0.014 (Table 2). H4 was valid. Specifically, social support was found to positively predict self-efficacy, which aligns with previous research (Adams et al., 2019; Liu Q. et al., 2020). Social psychology suggests that the social environment provides individuals with emotional support, instrumental support, and evaluative support, which facilitates the continuous reconstruction and refinement of personal beliefs, ultimately enhancing individual self-efficacy (Zhou et al., 2014). Moreover, a higher sense of self-efficacy has been consistently linked to a reduction in depression among individuals, as supported by previous studies (Bagci, 2018; Lee et al., 2020). In summary, family adaptability can enhance self-efficacy via social support, thereby reducing the likelihood of adolescent depression. Overall, this study analyzes the complex relationship among family adaptability, social support, self-efficacy and adolescent depression based on Ecological Systems Theory, which enriches the research related to adolescent depression to some extent.

The theoretical and practical implications

This study holds several theoretical and practical implications. From a theoretical standpoint, it contributes to the existing literature on factors influencing adolescent depression. Specifically, it establishes a negative association between family adaptability and adolescent depression, highlighting that higher levels of family adaptability are associated with better mental health outcomes and reduced likelihood of depression among adolescents (Jia and Yuan, 2018). This enriches the literature on factors influencing adolescent depression. Furthermore, this study shows that social support and self-efficacy influence the association between family adaptability and adolescent depression through the role of chain mediators, contributing to the understanding of the mechanisms of family adaptability on adolescent depression. Adolescents with high family adaptability can improve social support and develop their self-efficacy, thus reducing adolescents' depression. From a practical perspective, this study provides directions for preventing and reducing adolescent depression in terms of environmental factors (family adaptability, social support) as well as individual factors (self-efficacy). In terms of family adaptability, family members should help each other, communicate and understand each other when they encounter problems, and establish a democratic family atmosphere; at the same time, family members should negotiate together to establish relatively clear internal family norms, each doing his or her own job, and establishing a strong internal organization. In terms of social support, parents and teachers should not only focus on students' grades but also on other needs of adolescents and provide corresponding encouragement and support; not only material but emotional support and assistance should be given to meet various psychological needs of adolescents and help them to build a well-established social support system; at the same time, schools can adopt scientific means to conduct regular surveys on students' mental health, and adopt scientific methods to regularly screen students' mental health and intervene early for students who are screened for possible anxiety or depression to reduce the likelihood of depression. On the one hand, schools should design activities according to the characteristics of adolescents, set up more incentives to encourage students to participate in them, provide them with opportunities and platforms to show themselves, and increase their chances of success, so as to enhance their sense of self-efficacy. On the other hand, parents should be good at recognizing their children's sparkling points and give them correct guidance, positive encouragement and timely feedback to continuously strengthen their sense of self-efficacy. At the same time, adolescents

should also make full use of the "role model effect" and set reasonable goals for themselves to maintain their self-belief and improve their self-efficacy.

Limitations and future research directions

While this study has provided insights into the internal mechanisms of family adaptability and adolescent depression, there are several limitations that can be addressed in future research to further enhance the understanding in this area. Due to the self-reporting approach used in this study, the following problems existed: (1) This study only used cross-sectional research, which is a correlational study and cannot explore the causal relationship between variables and reflect the continuous and stable relationship between variables, and future follow-up surveys can be conducted on some families to longitudinally to explore the influence of family adaptability on adolescent depression, in order to improve the external validity of the study. (2) The sample of this study was taken from only seven middle schools in a province in northern China, and the ecological validity of the results may be low. Therefore, the results of this study cannot be easily generalized to southern China and other cultural contexts. In the future, the sample can be enlarged for re-administration or cross-cultural studies can be attempted. (3) There are many other factors that can influence adolescent depression, such as family caregiving, self-esteem, and so on, and more variables can be used to produce more comprehensive and practically meaningful results in future studies. By exploring the interactions and combined effects of various factors, a more holistic understanding of the complex nature of adolescent depression can be achieved.

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 humans were approved by Biomedical Ethics Committee of Jining University. The studies were conducted in accordance with the local legislation and institutional requirements. Written informed consent for participation in this study was provided by the participants' legal guardians/next of kin.

Author contributions

YL: Writing – original draft, Writing – review & editing. GJ: Writing – review & editing, Writing – original draft. ZZ: Writing – review & editing, Writing – original draft. ML: Writing – review & editing. GC: Writing – review & editing, Writing – original draft.

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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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Associations between challenging parenting behavior and creative tendencies of children: the chain mediating roles of positive emotion and creative self-efficacy

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Background: Parenting behavior has been reported to be closely associated with children's creativity, yet the association between challenging parenting behavior and children's creative tendencies, as well as the potential mechanisms connecting the two, remains ambiguous. Based on the Social Cognitive Theory and the Self-efficacy Theory, this study aims to examine the correlation between Chinese parents' challenging parenting behaviors and their children's creative tendencies, as well as the chain mediating role of children's positive emotions and creative self-efficacy.

Methods: In total, 2,647 families were surveyed with questionnaires completed by parents on the Challenging Parenting Behaviors Scale and by children on the Positive/Negative Emotions Scale, the Creative Self-efficacy Scale, and the Williams Creative Tendency Test Scale, and analyzed using structural equation modeling (SEM) in SPSS 22.0 and Mplus 8.3.

Results: The findings indicate that challenging parenting behavior has a positive correlation with children's positive emotions, creative self-efficacy, and creative tendencies. Through positive emotions, creative self-efficacy, and a chain mediated pathway between these two variables, challenging parenting behaviors increase children's creative tendencies.

Conclusion: The favorable impacts of challenging parenting behaviors on children's creative tendencies, with the mediating effects of children's positive emotions and creative self-efficacy, may help Chinese parents better grasp the mechanisms underlying this association.

KEYWORDS

challenging parenting behaviors, creative tendencies, positive emotions, self-efficacy, SEM

1 Introduction

Over the years, traditional beliefs such as "shun tian cong ren" (obedience to authority) and "ting fu mu yan" (listening to parents' words), traditional educational concepts such as emphasis on discipline, conformity, and mastery of knowledge and experience, as well as an education assessment system centered around standardized exams, have to some extent led to the neglect of fostering children's creativity and independent thinking in Chinese education. Creativity is one of the fundamental competencies of the 21st century. Childhood is a critical time for developing and fostering creativity (Alfonso-Benlliure et al., 2013), but the ease and naturalness of creativity development in childhood have been generally overestimated (Albert, 2010). Studies have shown that stimulating children's imagination and creativity can help them develop their interests and talents, improve their critical thinking and problem-solving skills, and lay the groundwork for their future individual development and social adaptation. Therefore, it is of great significance to grasp this critical period to improve the current situation of creativity development of Chinese children. More focus should be placed on children's "creative tendencies" than on their "creative thinking" and "creative achievement" (Runco, 2003). The familial environment of childhood has a significant impact on the creative development of children. Parents are the primary nurturers and participants in a child's development, and children are invariably influenced by their parenting concepts, styles, and specific behaviors (Ngaosusit, 2005; Martin et al., 2007). Numerous studies have demonstrated that children's creative tendencies can be fostered through education (Dong, 1985). Specifically, the influence of parenting behaviors in the family on children's creative tendencies is essential for enhancing children's willingness to innovate and improving their creative abilities. Therefore, it is crucial to investigate the mechanisms that foster children's creative tendencies in the family setting.

The significance of the early familial environment for children's creative potential has been well-established (Sternberg and Lubart, 1996; Jankowska and Karwowski, 2018). As an essential factor in the early family environment, parenting style is closely related to the creative development of children (Gralewski and Jankowska, 2020). With the acceleration of China's modernization process, changes in the family structure, and the renewal of values, the roles and interactions in Chinese families have changed, and the association between Chinese parents and their children has become more equal and looser, and the parenting concepts of Chinese parents have gradually shifted from being strict and authoritative to being understanding, respectful and supportive. Especially in the context of China's rapid economic and social development, the creative ability, which has an important impact on children's future development, has been increasingly emphasized by Chinese parents. As a result, the new generation of Chinese parents tend to choose positive parenting styles that are more open and respectful of children's independence and individuality. According to existing studies (Grossmann et al., 2010; Fletcher et al., 2013; Fliek et al., 2015), challenging parenting behavior is a relatively new type of parenting behavior, particularly parenting behavior that encourages and stimulates children to engage in risk-taking behaviors within the safe range by encouraging, scaring, teasing, chasing, and beating children in games, which encourages children to continuously push their limits and step outside of their comfort zone (Bögels and Phares, 2008), thus cultivating children's bravery, confidence, risk-taking spirit, initiative, and exploration. Short videos of young Chinese parents "tricking" their children are common on the Internet, reflecting the fact that this kind of parenting behavior is becoming more and more common among the new generation of Chinese parents. Meanwhile, the correlations between positive parenting styles, creative tendencies, positive emotions, and creative self-efficacy have each been well researched in previous studies (Lim and Smith, 2008; Miller et al., 2012; Mehrinejad et al., 2015; Lazarus et al., 2016; Gralewski and Jankowska, 2020; Dechaume and Lubart, 2021). However, there is a dearth of research that examines challenging parenting behaviors and children's creative tendencies, as well as the mediating roles of positive emotions and creative self-efficacy, from an integrated perspective of the external environment and internal psychological motivation. According to the study, some parents give their children a great deal of freedom to explore new things, whereas others restrict their children with strict rules (Maccoby and Martin, 1983). This suggests that parenting behavior is a significant external environmental factor that influences children's creative tendencies. Challenging parenting behaviors, as positive parenting behaviors, have a positive effect on children's creative tendencies. Positive emotions and creative self-efficacy are internal psychological factors that influence creative tendencies. The mechanisms by which external environmental factors and internal psychological factors together influence children's creative tendencies are unproven. Notably, the majority of previous studies have only examined the inhibiting effects of challenging parenting behaviors on children's negative emotions but have neglected to examine their potential impact on children's creative tendencies.

Based on social cognitive theory and self-efficacy theory, this study aims to examine the association between challenging parenting behaviors and children's creativity tendencies in the context of Chinese parents' parenting concepts, which have evolved to focus more on positive parent–child communication, interaction, and respect due to social development and cultural changes. This will contribute to a deeper understanding of the longitudinal impact of parental caregiving on children's development and provide practical recommendations for scientifically nurturing parents. Furthermore, to uncover the underlying mechanisms of fostering early childhood creativity tendencies, this study aims to explore the mediating factors (i.e., positive emotions and creative self-efficacy) between challenging parenting behaviors and children's creativity tendencies. This will provide valuable insights at the family level to guide parents in China and other countries to promote children's motivation for innovation and the development of their creative abilities.

1.1 Challenging parenting behavior and creative tendencies

Parenting behavior is one of the most influential factors in the creative development of children (Yeh, 2004). Parenting behavior, as a concrete expression and practice of parenting style, is essentially a daily interaction between parents and their children (Jankowska and Karwowski, 2018), in which parents

repeatedly transmit their approval of their children and their own perceptions to children, thus promoting or inhibiting the skills and traits of children's creativity (Kwaśniewska et al., 2017). According to Majdandžić et al. (2016), challenging parenting behavior is a positive parenting behavior that includes both physical play (e.g., playful games, competitive games, etc.) and social-emotional aspects (e.g., social bravery, encouragement of assertiveness and performance, etc.). It has been demonstrated that attitudes and behaviors in parent–child interactions are significant predictors of children's creative abilities (Csikszentmihalyi, 1997; Gute et al., 2008; Kwaśniewska et al., 2017). This is because parents with challenging parenting behaviors typically provide their children with a relaxed, unrestricted, and vivacious home environment, which contributes to the development of creative activities and encourages creativity in children (Heinert, 1983). As a form of affective creativity, creative tendency consists of the four characteristics of risk-taking, curiosity, imagination, and challenge (Williams, 1980), is similarly influenced by the external environment. According to the Social Cognitive Theory (Bandura, 1997), the intrinsic motivations that influence an individual's behaviors are supported or hindered by the external environment. When the external parenting environment is authoritarian and oppressive, children lack self-confidence, struggle to exercise autonomy, and have a suppressed propensity to innovate (Fearon et al., 2013). In contrast, children are more likely to think and act creatively when the external parenting environment is free and pleasurable (Hein et al., 2014). Therefore, this study proposes research hypothesis 1: challenging parenting behaviors positively contribute to children's creative tendencies.

1.2 Challenging parenting behavior, positive emotion, and creative tendencies

Children's positive emotions may act as a mediator between challenging parenting behaviors and children's creative tendencies. According to the Social Cognitive Theory, parenting behaviors are goal-directed and non-goal-directed behaviors demonstrated by parents in specific contexts during parent–child interactions that influence children's cognition, emotions, and behaviors directly (Berkien et al., 2012). It has been shown that parenting styles in the parenting environment are closely related to the development of emotional behavior in children (Eisenberg et al., 1998), specifically, parental attention, encouragement, and positive support can stimulate positive emotions in children, whereas excessive restriction, control, and punishment can inhibit positive emotions in children or even cause emotional problems. Similarly, it has been demonstrated that challenging parenting behaviors are effective in preventing the development of negative emotions in children. For instance, both Smout et al. (2020) and Möller et al. (2016) concluded that challenging parenting behaviors predicted children's anxiety levels and that children exhibited reduced anxiety levels when their parents, particularly their fathers, adopted challenging parenting behaviors. Additionally, parenting styles and behaviors produce a corresponding emotional climate. According to the definition of challenging parenting behaviors provided by existing studies, challenging parenting behaviors are clearly positive parenting behaviors that emphasize support, encouragement, and recognition (Majdandžić et al., 2016). Therefore, parents with challenging parenting behaviors can form positive emotional interactions with their children by expressing and transmitting positive emotional messages to them during parent–child interactions, thus allowing children to gain confidence and courage from them, stimulating their curiosity and imagination, and bringing them positive emotion. Studies have confirmed that the experience of frequent positive emotions serves to broaden humans' thoughts and behaviors (Isgett and Fredrickson, 2004), and positive emotions influence an individual's ability to focus on the task, ability to learn, and confidence (Langebćk et al., 2012), thus creating conditions for individuals to think and act creatively. In summary, this study proposes research hypothesis 2: children's positive emotions mediate the association between challenging parenting behaviors and children's creative tendencies.

1.3 Challenging parenting behavior, creative self-efficacy, and creative tendencies

Creative self-efficacy may serve as a crucial mediator between challenging parenting behaviors and children's creative tendencies. Bandura pioneered the concept of self-efficacy in 1977; subsequently, Tierney and Farmer (2002, 2004) further clarified the concept of creative self-efficacy, defining it as the individual's beliefs and expectations regarding their own creative performance in creative activities. The influence of intrinsic motivation on the propensity to be creative is significant (Runco and Nemiro, 1994). As one of the most important internal motivators of individuals, creative self-efficacy is an intrinsic drive that propels and sustains individuals in creative activities, and it determines the degree of psychological tendency and behavioral effort to engage in creative activities. Numerous studies have shown that people with high creative self-efficacy are usually highly creative (Choi, 2004; Gong et al., 2009) and creative self-beliefs influence individuals' decisions to make creative moves (Dollinger, 2011), this means that people who believe they have creative potential will put more effort into creative tasks (Schack, 1989; Choi, 2004), and are characterized by creative engagement in their work (Carmeli and Schaubroeck, 2007; Tierney and Farmer, 2011). It is evident that self-perceptions and confidence in one's abilities influence an individual's thoughts, emotions, and behavioral tendencies. Children with low creative self-efficacy typically lack self-confidence, choose to escape when they encounter frustration, become more skeptical of their ability to generate creative ideas, and are consequently reluctant to actively seek effective solutions to problems, thereby stifling their creative tendencies and reducing their own creativity. In contrast, children with high creative self-efficacy have more positive self-evaluations and participate in a wider range of activities (Atwood-Blaine et al., 2019). On the basis of these findings, this study proposes research hypothesis 3: creative self-efficacy mediates the relationship between challenging parenting behaviors and children's creative tendencies.

1.4 Positive emotion and creative self-efficacy

Positive emotions may predict a sense of creative self-efficacy. According to the Self-efficacy Theory, self-efficacy plays a subjective role through cognitive processes, which are usually accompanied by motivational factors or processes (Gao, 1998). Bandura (1982) notes that emotional and physical conditions affect the development of self-efficacy. Existing research also suggests that positive emotions, such as pleasure and self-confidence, will enable individuals to maintain an optimistic and positive mindset in the face of difficulties, setbacks and failures, and to have the interest, confidence, courage, and motivation to think and act creatively, and thus be more likely to achieve positive outcomes, thereby creating a virtuous cycle with positive effects on self-efficacy (Puente-Diaz and Arroyo, 2016, 2018). In contrast, negative emotions, such as anxiety and worry, will cause individuals to underestimate their own ability level and find it challenging to perform the things and tasks they are engaged in, resulting in a heightened sense of incompetence, forming a vicious circle and negatively affecting self-efficacy (He and Wong, 2022). In addition, Woodman et al. (1993) argued that individual and situational factors interact to influence creativity. Consequently, children's perceptions of their environment and others influence the development and maintenance of their creative self-efficacy. This means that when children perceive a positive external environment and positive feedback from others, they will be in a positive emotional state and are more likely to acquire a sense of creative self-efficacy, which provides motivation and incentive to think creatively and engage in creative activities that are challenging or innovative in nature (Yang and Zhang, 2012), thereby reinforcing their creative tendencies. In summary, this study proposes research hypothesis 4: challenging parenting behaviors are linked to children's creative tendencies through the mediating roles of positive emotion and creative self-efficacy.

Based on the results of previous studies on challenging parenting behaviors and children's creative tendencies, this study aims to investigate whether children's positive emotions and creative self-efficacy mediate the relationship between challenging parenting behaviors and children's creative tendencies. Based on the Social Cognitive Theory and the Self-efficacy Theory, an integrated hypothesis model (**Figure 1**) was proposed to reveal the complex associations. In this study, the following hypotheses were proposed: First, challenging parenting behaviors would positively influence children's creative tendencies (H1). Second, children's positive emotions will mediate the relationship between challenging parenting behaviors and children's creative tendencies (H2), implying that challenging parenting behaviors may be a positive predictor of children's positive emotions, which may in turn increase children's creative tendencies. Then, children's creative self-efficacy mediates the relationship between challenging parenting behaviors and children's creative tendencies (H3), implying that challenging parenting behaviors may be a positive predictor of children's creative self-efficacy, which may in turn increase children's creative tendencies. Finally, challenging parenting behaviors influence children's creative tendencies through a chain mediating effect of child positive emotions and child creative self-efficacy (H4), implying that challenging parenting behavior may be a positive predictor of child positive emotions, and child positive emotions may positively predict child creative self-efficacy, which may increase children's creative tendencies.

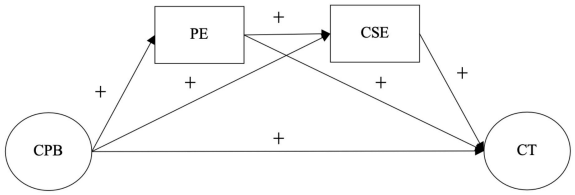

FIGURE 1
Conceptual framework of positive emotion and creative self-efficacy as mediators.

2 Materials and methods

2.1 Participants

From September 1st to September 20th, 2022, we collected student and parent data through an online survey questionnaire in 13 primary and secondary schools in Shanxi Province, inland China. To ensure the validity of the questionnaire, we contacted the principals of the schools and explained the purpose of our research. We also provided advance explanations to parents and children about the content of the study-related questions and were available to answer any questions or concerns during their participation to ensure the accuracy of the research results. The distribution of the questionnaire was authorized by the principals, and informed consent was obtained from parents and students. To ensure that students and parents filled out the questionnaire voluntarily according to their true intentions, we first requested their voluntary participation in the research project. The participating students and parents were able to complete the survey in a calm and undisturbed environment. The questionnaire was administered anonymously to minimize external pressure on participants' responses. The study randomly selected 13 primary and secondary schools and distributed 3,500 student questionnaires and 3,500 parent questionnaires. The response rate for student questionnaires was 98%, and the response rate for parent questionnaires was 97.79%. We excluded 587 invalid student questionnaires (obviously incorrect or not matched to the respondents) and 580 invalid parent questionnaires, resulting in 2,647 valid student questionnaires and 2,647 valid parent questionnaires. **Table 1** shows demographic information, among the parents, there were 2,248 female respondents (mothers, 84.93%) and 399 male respondents (fathers, 15.07%). Among the students, there were 1,322 female respondents (girls, 49.94%) and 1,325 male respondents (boys, 50.06%). The response rate of the survey questionnaire was 75.63%. The average age of the minors was 12.58 years (SD = 1.67). All measures and procedures were authorized by the Institutional Review Board (IRB) of the first author's institution.

TABLE 1 Demographic information.

Variables	Types	Number	Percent (%)
Gender of children	Male	1,325	50.06
	Female	1,322	49.94
Gender of parent	Male	399	15.07
	Female	2,248	84.93
Children's educational level	Primary school	959	36.23
	Junior high school	1,688	63.77

2.2 Measures

2.2.1 Challenging parenting behavior

In this study, challenging parenting behaviors were investigated using the English version of the Parent Challenging Parenting Behavior Questionnaire (CPBQ 4-6), revised by Majdandžić et al. (2018). This questionnaire consists of 39 items, including six dimensions: teasing, rough-and-tumble play, encouragement of risk-taking, social daring, competition, and modeling. It is scored on a five-point scale, with "not at all" scoring 1, "basically not" scoring 2, 3 points for "not sure," 4 points for "mostly conform," 5 points for "fully conform," and reverse scores for questions 3 and 8. The higher the score, the higher the level of challenging parenting. This measure had a Cronbach's alpha coefficient of 0.931 and Majdandžić et al. (2018) confirmed that the structural validity index was good [χ^2/df = 1.53, comparative fit indices (CFI) = 0.973, root mean square error of approximation (RMSEA) = 0.059].

2.2.2 Creative tendencies

In this study, children's creative tendencies were measured using the Williams Creative Tendency Scale, revised by Lin and Wang (1999). The scale consists of 50 items, including four dimensions of risk-taking, curiosity, imagination, and challenge, and is scored on a 3-point scale, with "not at all" scoring 1, "partially" scoring 2, and "fully" scoring 3 points, and questions 4, 9, 12, 17, 29, 35, 45, and 48 were scored in reverse. Children with higher scores demonstrate more creative tendencies. This measure had a Cronbach's alpha coefficient of 0.933 and the structural validity index was good [χ^2/df = 9.827, RMSEA = 0.059, standard root mean square residuals (SRMR) = 0.068]. And Huang et al. (2021) measured the validity of the Williams Creative Tendency Scale using the Torrance Test of Creative Thinking as the criterion, confirmed that it has good reliability and validity.

2.2.3 Positive emotion

In this study, positive affect in children was measured using the Positive/Negative Affect Scale (PANAS) devised by Watson et al. (1988), and the Chinese version of PANAS was revised and introduced by Huang et al. (2003). The scale consists of 20 adjective entries reflecting emotions, including two subscales of positive and negative emotions, and is scored on a five-point scale, with "almost none" scoring 1, "relatively little" scoring 2, "moderate" scoring 3, "relatively much" scoring 4, and "extremely much" scoring 5. The higher the positive emotion score, the more energetic the individual is and the happier and more focused the emotional state is; the higher the negative emotion score, the more subjectively confused the individual feels and the more distressed the emotional state is (Zhang, 2001). This measure had a Cronbach's alpha coefficient of 0.817 and the structural validity index was good (χ^2/df = 18.511, CFI = 0.94, RMSEA = 0.083).

2.2.4 Creative self-efficacy

In this study, children's creative self-efficacy was measured using the Creative Self-Efficacy Scale (CSE) of the Short Form of Creative Self (SSCS), which was devised by Watson et al. (1988). The scale has six items and is scored on a five-point scale, with "not at all" scoring 1, "not basically" scoring 2, "not sure" scoring 3, "basically" scoring 4, and "fully conforming" scoring 5. The higher the score, the higher the child's sense of self-efficacy for creativity. This measure had a Cronbach's alpha coefficient of 0.903 and the structural validity index was good (χ^2/df = 8.413, CFI = 0.991, RMSEA = 0.054).

2.3 Statistics

Statistical analysis in this study was conducted using SPSS 22.0 and Mplus 8.3. Initially, Harman's single-factor analysis was first performed to test for common method bias. Second, descriptive statistics and Pearson correlation analysis were performed with SPSS 22.0 to estimate the means, standardized deviations, and correlations among the main variables. Considering that child gender, age, and parental gender may have additional effects on parental challenging parenting behaviors, we decided to control for these variables in our analyses. Third, structural equation modeling (SEM) in Mplus 8.3 was used to examine the mediating effects of positive emotions and creative self-efficacy on challenging parenting behaviors and children's creative tendencies. We calculated the following fit statistical scores to determine the degree of fit between the survey data and the hypothesized model: Chi-square (χ^2) tests for differences, CFI, Tucker Lewis fit index (TLI) with values greater than 0.90, RMSEA with values less than 0.08, and SRMR with values near 0.05 are indicators of a good fit (Wen et al., 2004). The sample was also repeated 1,000 times using bootstrapping to test the mediating effects of positive emotions and creative self-efficacy on parental challenging behaviors and children's creative tendencies.

3 Results

3.1 Common method variance analysis

Since the data relied on the subjective self-reports of parents and children, there may be covariates, so it is necessary to examine common method bias. In this study, the Harman's single-factor analysis for common method bias (Harman, 1976) was utilized. The test revealed 18 factors with characteristic roots greater than one, and the variance explained by the first common factor was 18.47%, which is significantly less than the empirical criterion of 40% (Podsakoff et al., 2003). Therefore, there was no significant common method bias in this study.

3.2 Descriptive and correlation analyses

Table 2 provides the means, standard deviations, and correlation coefficients for each variable. Spearman's correlations displayed that challenging parenting behaviors were positively and significantly correlated with children's positive emotion ($r = 0.30$), children's creative self-efficacy ($r = 0.32$), and children's creative tendencies ($r = 0.43$), children's positive emotions were positively and significantly correlated with children's creative self-efficacy ($r = 0.64$), and children's creative tendencies ($r = 0.48$), children's creative self-efficacy were positively and significantly correlated with children's creative tendencies ($r = 0.56$). In addition, there were significant positive correlations between children's positive emotions, children's creative self-efficacy, and each of the sub-dimensions of challenging parenting behaviors; between children's positive emotions, children's creative self-efficacy, and each of the sub-dimensions of children's creative tendencies; and between each of the sub-dimensions of challenging parenting behaviors and each of the sub-dimensions of children's creative tendencies.

3.3 Chain mediation model analysis

Mplus 8.3 was used to examine the mediating effects of positive emotion and creative self-efficacy on the relationship between challenging parenting behaviors and children's creative tendencies. Using the SEM method (Cheung, 2007), the chained mediation model demonstrated a satisfactory model fit ($\chi^2/df = 23.42$, $p < 0.001$, RMSEA = 0.08, CFI = 0.945, TLI = 0.928, SRMR = 0.036, $R^2 = 0.439$). The non-parametric percentile bootstrap method with bias correction was utilized to evaluate the mediating effect. The bootstrap method with 1,000 bootstrap samples was utilized for the analysis. Figure 2 depicts a chain mediation model, and Tables 3, 4 present the SEM path coefficients and the mediating role of positive emotions and creative self-efficacy between challenging parenting behaviors and creative tendencies, respectively. The findings indicate that:

First, challenging parenting behaviors had a significant positive predictive effect on children's positive emotions ($\beta = 0.457$, $t = 12.779$, $p < 0.001$), children's positive emotions had a positive predictive effect on children's creative tendencies ($\beta = 0.071$, $t = 6.748$, $p < 0.001$), challenging parenting behaviors positively predicted children's creative tendencies ($\beta = 0.171$, $t = 11.445$, $p < 0.001$), and the mediating effect test revealed that the 95% CI [0.023, 0.044] did not include 0, indicating that children's positive emotions mediated the relationship between challenging parenting behaviors and children's creative tendencies, and the ratio of the mediating effect amount (0.033) to the total effect amount (0.285) was 40.35%, confirming hypothesis 2.

Second, the positive predictive effect of challenging parenting behaviors on children's creative self-efficacy was significant ($\beta = 0.243$, $t = 7.522$, $p < 0.001$), and the positive predictive effect of children's creative self-efficacy on children's creative tendencies was significant ($\beta = 0.152$, $t = 13.445$, $p < 0.001$), and the mediating effect test revealed that the 95% CI [0.026, 0.048] did not include 0, indicating that children's creative self-efficacy mediated the relationship between challenging parenting behaviors and children's creative tendencies, with the ratio of the mediated effect size (0.037) to the total effect size (0.285) being 11.58%, confirming hypothesis 3.

Third, the positive effect of children's positive emotions on children's creative self-efficacy was statistically significant ($\beta = 0.647$, $t = 28.612$, $p < 0.001$), and the test of mediating effect revealed that the 95% CI [0.037, 0.056] did not include 0, indicating that children's positive emotions and children's creative self-efficacy play a chain role between challenging parenting behaviors and children's creative tendencies. The ratio of the mediated effect size (0.045) to the total effect size (0.285) was 15.79%, confirming hypothesis 4.

4 Discussion

Our study contributes to the existing literature by investigating potential mechanisms between challenging parenting behaviors and children's creative tendencies in an elementary and secondary school sample of Chinese children and their parents. This study examined a chain mediation model in which positive emotions mediated challenging parenting behaviors and creative tendencies, creative self-efficacy mediated challenging parenting behaviors and creative tendencies, and challenging parenting behaviors may directly influence children's creative tendencies via the chain mediation effects of positive emotions and creative self-efficacy. Overall, these pathways provide a comprehensive and constructive perspective that elucidates the connection between challenging parenting behaviors and children's creative tendencies. Additionally, the study provides preliminary evidence that the Social Cognitive Theory and the Self-efficacy Theory can be used to explain behaviors associated with children's creative tendencies. The results will be discussed below.

4.1 The association between challenging parenting behavior and creative tendencies

The present study found that challenging parenting behaviors were directly and positively associated with children's creative tendencies, which is consistent with the findings of Gralewski and Jankowska (2020) and Dong et al. (2022). Our hypothesis 1 holds. According to the Social Cognitive Theory, humans progressively acquire cognitive, emotional, and behavioral knowledge and skills through social interactions and the influence of their cultural environment. Thus, one possible reason for the direct and positive impact of challenging parenting behaviors on children's creative tendencies is that early childhood is the peak of parental physical play with children (Pellegrini and Smith, 1998), and parents are able to stimulate and satisfy children's curiosity and desire to explore external things and environments through daily challenging parenting behaviors, providing creative materials and challenging environments, thus prompting children to continuously learn new skills, acquire new experiences, and solve new problems. Simultaneously, children's sense of competition, autonomy, exploration, self-confidence, and adaptability increase as a result of their parents' daily challenging parenting behaviors (Paquette, 2004), and their cognitive, motor, social, and adaptive

TABLE 2 Descriptive statistics and correlation analysis of the main study variables.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Children's age	–														
2. Challenging parenting behavior	−0.14***	–													
3. Teasing	−0.09***	0.74***	–												
4. Rough-and-tumble play	−0.13***	0.80***	0.66***	–											
5. Encouragement of risk taking	−0.12***	0.80***	0.46***	0.55***	–										
6. Social daring	−0.14***	0.81***	0.45***	0.52***	0.69***	–									
7. Competition	−0.08***	0.81***	0.45***	0.49***	0.57***	0.64***	–								
8. Modeling	−0.08***	0.83***	0.49***	0.52***	0.57***	0.66***	0.75***	–							
9. Positive emotion	−0.11***	0.30***	0.16***	0.19***	0.29***	0.31***	0.25***	0.24***	–						
10. Creative self-efficacy	−0.04*	0.32***	0.16***	0.20***	0.29***	0.32***	0.28***	0.28***	0.64***	–					
11. Creative tendencies	−0.11***	0.43***	0.31***	0.30***	0.35***	0.36***	0.36***	0.38***	0.48***	0.56***	–				
12. Adventurousness	−0.09***	0.40***	0.30***	0.30***	0.30***	0.32***	0.33***	0.35***	0.40***	0.48***	0.90***	–			
13. Curiosity	−0.08***	0.39***	0.26***	0.27***	0.33***	0.34***	0.33***	0.34***	0.48***	0.57***	0.93***	0.77***	–		
14. Imagination	−0.11***	0.39***	0.27***	0.28***	0.32***	0.33***	0.33***	0.36***	0.46***	0.53***	0.93***	0.78***	0.82***	–	
15. Challenging	−0.11***	0.37***	0.29***	0.26***	0.31***	0.30***	0.31***	0.33***	0.40***	0.47***	0.88***	0.72***	0.76***	0.77***	–
M	12.58	3.47	3.06	3.33	3.92	3.69	3.62	3.21	3.64	3.72	2.22	2.13	2.30	2.21	2.25
SD	1.67	0.62	0.78	0.88	0.78	0.65	0.76	0.81	0.68	0.75	0.31	0.35	0.37	0.35	0.30

All tests are two-tailed. *$p < 0.05$, ***$p < 0.001$.

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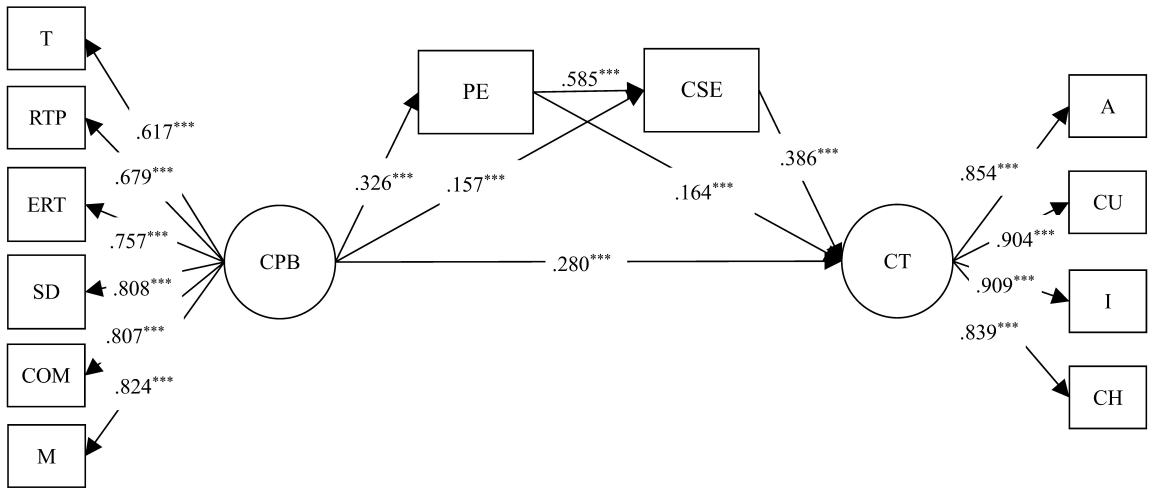

FIGURE 2
The chain mediation model. ***$p < 0.001$. CPB, challenging parenting behavior; CT, creative tendencies; PE, positive emotion; CSE, creative self-efficacy; T, teasing; RTP, rough-and-tumble play; ERT, encouragement of risk-taking; SD, social daring; COM, competition; M, modeling; A, Adventurousness; CU, Curiosity; I, Imagination; CH, Challenging.

TABLE 3 Structural equation modeling path coefficients.

SEM path	Standardized		Non-standardized	
	β	SE	β	SE
Challenging parenting behavior to positive emotion	0.326***	0.022	0.457***	0.036
Challenging parenting behavior to creative self-efficacy	0.157***	0.02	0.243***	0.032
positive emotion to creative self-efficacy	0.585***	0.019	0.647***	0.023
Challenging parenting behavior to creative tendencies	0.280***	0.023	0.171***	0.015
positive emotion to creative tendencies	0.164***	0.024	0.071***	0.011
creative self-efficacy to creative tendencies	0.386***	0.028	0.152***	0.011

All SE are jackknifed standard errors. ***$p < 0.001$.

TABLE 4 Perceived organizational support and psychological empowerment in the mediating effect analysis.

Effect	Path relationship	Effect size	Bootstrap, 95% CI	Relative mediation effect (%)
Direct effect	Challenging parenting behavior → creative tendencies	0.280	[0.237, 0.323]	98.25
Path 1	Challenging parenting behavior → positive emotion → creative tendencies	0.033	[0.023, 0.044]	11.58
Path 2	Challenging parenting behavior → creative self-efficacy → creative tendencies	0.037	[0.026, 0.048]	12.98
Path 3	Challenging parenting behavior → positive emotion → creative self-efficacy → creative tendencies	0.045	[0.037, 0.056]	15.79
Total mediating effect		0.115	[−0.021, 0.015]	40.35
Total effect		0.285	[0.253, 0.321]	100
Compare 1		−0.004	[−0.021, 0.015]	
Compare 2		−0.012	[−0.028, 0.001]	
Compare 3		−0.008	[−0.02, 0.003]	

skills develop (Paquette et al., 2003; Bögels and Phares, 2008), all of which enhance children's problem-solving skills and abilities, develop their creative thinking, and improve their creative abilities. The findings also provide additional evidence for the prominent role that challenging parenting behaviors play in the development of creative tendencies. Therefore, in the daily process of parenting,

it is crucial for parents not to blindly shield their child from all harm or shield them from any frustration. Instead, they should engage in appropriate teasing and moderate play with their child, rather than treating them as a delicate "porcelain doll." Additionally, parents can organize activities that require a certain level of effort to achieve specific goals, encouraging their children to think critically and develop the courage to explore new actions.

4.2 The mediating role of positive emotion

Consistent with previous research (Ren et al., 2017), the mediation analysis revealed that positive emotions mediated the association between challenging parenting behaviors and children's creative tendencies. Children's emotions are associated with parenting behaviors and parenting styles (Morris et al., 2010), and they are an important condition for the development of their creative tendencies. Positive emotions have a generally facilitating influence on children's creative tendencies, whereas negative emotions such as anxiety and depression have an inhibiting effect (Ren et al., 2017). Specifically, positive emotions enhance children's curiosity, imagination, and desire to investigate, increase their cognitive flexibility and autonomy, and thus increase the likelihood that children will think and act independently, fostering their creative tendencies. Therefore, children with positive emotions are more likely to participate in activities that require creativity. Parental support and encouragement embedded in challenging parenting behaviors can increase children's self-confidence and performance abilities, reduce children's anxiety (Möller et al., 2015; Lazarus et al., 2016; Smout et al., 2020), and have a positive effect on children's mood (Möller et al., 2016). Positive emotions emerged as an important mediator in the study, further demonstrating the significance of positive emotions in fostering children's creative tendencies. Research hypothesis 2 holds. Therefore, in the daily process of parenting, it is crucial for parents not to blindly shield their child from all harm or shield them from any frustration. Instead, they should engage in appropriate teasing and moderate play with their child, rather than treating them as a delicate "porcelain doll." Additionally, parents can organize activities that require a certain level of effort to achieve specific goals, encouraging their children to think critically and develop the courage to explore new actions.

4.3 The mediating role of creative self-efficacy

Consistent with the Social Cognitive Theory, the findings identified creative self-efficacy as a significant mediator of the relationship between challenging parenting behaviors and children's creative tendencies, which is consistent with prior research (Choi, 2004). The reason may be that in challenging parenting environments, parents provide children with moderate pressure and appropriate challenges to promote their growth and development (Grossmann et al., 2010), permit children to freely express their thoughts and feelings, fully respect children, and create a positive developmental environment for children. Parents also encourage children to push their limits through proactive physical and verbal behaviors (Majdandžić et al., 2016), and to do things they are usually afraid to do or fear to do, and to cope with fearful situations in a playful manner, so that children are braver when facing unfamiliar situations (Majdandžić et al., 2014), and to step outside of their comfort zone. According to the Self-efficacy Theory, when children receive positive support and feedback from their parents and are able to complete challenging tasks, they acquire confidence and a sense of identity, and their self-efficacy is enhanced (Cai, 2007). At the same time, the resulting strong belief and adventurous spirit will make children more likely to try to think and act in innovative and unconventional ways when confronted with new challenges and problems, which means that children gradually develop positive, confident, and independent creative thought, as well as the courage and freedom to explore and experiment on their own, thus enhancing their creative tendencies. Consequently, challenging parenting behaviors can indirectly affect children's creative tendencies by influencing their creative self-efficacy. Research hypothesis 3 holds. The child's growth process necessitates parents' patience when the child encounters problems and attempts various problem-solving approaches. It is crucial for parents not to rush or substitute the child in solving the problem, but rather assist them when they seek help, while also providing encouragement and support to persevere.

4.4 The chain mediating effects of positive emotion and creative self-efficacy

Finally, the present study found that challenging parenting behaviors can increase children's creative tendencies by fostering positive emotions and creative self-efficacy, and positive emotions and creative self-efficacy played a chain mediating role between challenging parenting behaviors and creative tendencies, which is consistent with our hypothesis 4 and validates the Social Cognitive Theory and the Self-efficacy Theory. According to research findings, challenging parenting behaviors, as well as positive and supportive parenting behaviors, can foster children's creative tendencies. Specifically, when parents use positive parenting behaviors that are encouraging, supportive, and moderately challenging, the positive emotions that children experience as a result of their challenging parenting behaviors will motivate children to think or act spontaneously and creatively, continuously increasing children's creative self-efficacy in the face of problems and challenges, which directly influences children's responses and processing of new situations and problems, which is consistent with the Social Cognitive Theory. With parental encouragement, support, and assistance, children successfully adapt to and manage new situations and problems; their creative self-efficacy increases; their willingness and capacity to think and act in a creative manner increases; and their creativity improves, which is consistent with the Self-efficacy Theory. Therefore, in the daily process of parenting, it is crucial for parents to view their children as autonomous individuals. Particularly in Chinese families, parents should relinquish their "big parent" identity and grant children greater autonomy to choose and explore independently. Simultaneously, parents must serve as both an "umbrella" and a

"leading light," encouraging children to embrace challenges with courage while also reflecting deeply on problems from multiple perspectives. By stepping outside of their comfort zones and providing ample protection, encouragement, and love, parents can help their children grow into confident adults.

This study also found that children's creative self-efficacy contributed more to their creative tendencies ($\beta = 0.386$, $p < 0.01$) than positive emotions ($\beta = 0.164$, $p < 0.01$). This may suggest that children's creative tendencies derive primarily from their sense of creative self-efficacy during interactions with parents who adopt challenging parenting behaviors, as they perceive themselves to be capable of coping with difficult or innovative problems and challenges (Dollinger, 2011). In conclusion, this study contributes to the research on children's creativity to some extent and provides empirical evidence that parents can provide children with positive emotional experiences through challenging parenting behaviors, thereby enhancing children's creative self-efficacy and, consequently, their creative tendencies.

5 The theoretical and practical implications

In the traditional Chinese family parenting culture, Chinese parents may tend to choose a more strict parenting style that emphasizes discipline, rules, respect for elders, and authority (Mimi Chang, 2007). They also place a high emphasis on their children's academic achievements and focus on cultivating their knowledge and skills. Therefore, this study may have certain implications and significance for Chinese parents. Specifically, the research's implications are both theoretical and practical. Theoretically, this study contributes to the literature in two ways. On the one hand, this study suggest that challenging parenting behaviors have positive effects on children's creative tendencies, which may contribute to a greater understanding by Chinese parents of the mechanisms underlying the relationship between parenting behaviors and children's creativity. Specifically, it is possible for Chinese parents to increase their children's willingness and propensity to think and act creatively by adopting challenging parenting behaviors that are motivating, supportive, and moderate (Lim and Smith, 2008). On the other hand, the study demonstrates that the mediating effects of positive emotions and creative self-efficacy can explain the relationship between challenging parenting behaviors and children's creative tendencies, thereby enriching the literature on child creativity research. This means that positive emotions and creative self-efficacy can substantially transmit the beneficial effects of challenging parenting behaviors on children's creative tendencies. Children require an environment that encourages and rewards creative thought in order to develop their creativity (Zhang and Sternberg, 2011). In challenging parenting environments, children could have a positive emotional state, a greater sense of creative self-efficacy, and stronger creative tendencies. Specifically, challenging behaviors by Chinese parents, such as teasing, rough-and-tumble play, and encouragement of risk-taking can foster positive emotions and creative self-efficacy in children, thereby reinforcing their creative tendencies. Actually, these findings may help Chinese parents and other child caregivers comprehend children's creative tendencies from the perspective of environmental factors (e.g., challenging parenting behaviors) and children's own characteristics (e.g., positive emotions and creative self-efficacy).

Regarding challenging parenting behaviors, Chinese parents should receive the necessary counseling, lectures and seminars, and appropriate support and guidance to help them recognize the importance of challenging parenting behaviors, increase their awareness and skills to engage in challenging parenting behaviors, and avoid overly easy or overly difficult challenges. In terms of positive emotions, Chinese parents should provide children with a challenging parenting environment in parent–child interactions, parental support such as encouragement, and recognition at the appropriate time, take care of children's emotional state at all times, and adjust their own challenging parenting behaviors in time to help children develop their own creative and problem-solving abilities. For example, Chinese parents in their parent–child interactions can avoid treating their children as "porcelain dolls" to be carefully protected, but instead engage in playful activities with their children. They can also change the traditional Chinese parenting style of being reluctant to express love and appreciation, and instead frequently praise and encourage their children, openly complimenting them to enhance their self-confidence and resilience. Regarding creative self-efficacy, Chinese parents should provide children with challenging parenting behaviors that are appropriate to their developmental level and needs. By providing children with meaningful challenges and opportunities to acquire new skills, obtain new experiences, and solve new problems, children's beliefs and expectations of self-creative performance are increased (Tierney and Farmer, 2002), thereby fostering their creative tendencies. For example, Chinese parents, when their children face everyday life problems or other issues, should avoid rushing to lecture and solve the problems for them. Instead, they should encourage their children to come up with multiple solutions and then allow the children to handle the situations themselves or provide some assistance as needed.

6 Limitations and future research directions

This research has several limitations. First, cross-sectional research cannot establish causal relationships across models; longitudinal and experimental investigations are required to confirm these associations. Second, this study regarded challenging parenting behaviors as a single variable and did not distinguish the influence of specific dimensions on children's creative tendencies. Future research should investigate whether the internal mechanisms of the influence of particular dimensions on children's creative tendencies vary. Finally, when only self-reported data are collected, sample bias may exist; the study's validity can be evaluated further. Therefore, multiple measures, such as third-party observations, are required to reduce bias and improve reliability.

7 Conclusion

Children's creative tendencies are one of the most significant manifestations of their imagination and creative abilities, as well

as a crucial aspect of their fundamental literacy development. This study examines the potential mechanisms between challenging parenting behaviors and children's creative tendencies. Challenging parenting behaviors are a set of measurable characteristics that children directly experience when interacting with parents who engage in challenging parenting behaviors and have an effect on children's cognition, emotion, and behavior during parent–child interactions. Through a separate indirect pathway involving the stimulation of children's positive emotions or creative self-efficacy, the study found that challenging parenting behaviors could positively predict children's creative tendencies. Additionally, challenging parenting behaviors may also be associated with children's creative tendencies via the chain-mediating effect of children's positive emotions and creative self-efficacy. These findings provide a theoretical foundation for enhancing children's creative tendencies and practical guidance for parents and other child caregivers to implement challenging parenting behaviors in order to foster children's creative tendencies. In summary, this study contributes in the following ways: firstly, it investigates the relationship between challenging parenting behaviors and children's creative inclination in the context of China based on social cognitive theory and self-efficacy theory, providing evidence for similar research in other countries. Secondly, by emphasizing the chain mediation effect of positive emotions and creative self-efficacy, it examines the mechanism of how challenging parenting behaviors influence creative inclination, offering a new perspective that explains children's creative inclination being primarily influenced by positive emotions and creative self-efficacy (individual factors) originating from challenging parenting behaviors (environmental factors), thus providing effective recommendations for parents to enhance children's willingness for innovation and development of creative abilities at the family level.

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 that involve human participants have undergone review and approval by the Institutional Review Board (IRB) of Minzu University of China. Each participant in the study has provided informed, voluntary, and consensual consent to participate. The studies were conducted in accordance with the local legislation and institutional requirements. Written informed consent for participation in this study was provided by the participants' legal guardians/next of kin.

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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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Impact of "intensive parenting attitude" on children's social competence via maternal parenting behavior

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"Intensive parenting" is a tendency to invest parents' time, money, and energy in their child. This also includes some gender bias concerning a mother being the best person to primarily raise her children. Some psychology scholars have pointed out that this attitude causes much stress, anxiety, depression, and a sense of guilt among mothers. However, its effects on children have yet to be revealed using an extensive survey, and this indicates the need to investigate any possible impact of an intensive parenting attitude on children. The aim of this study was to elucidate a link between a maternal intensive parenting attitude and their children's social competence through maternal parenting behavior. This was based on collecting data from 675 Japanese women who were mothers of preschoolers using the Japanese version of the Intensive Parenting Attitude Questionnaire, the Positive and Negative Parenting Scale, and the Strength and Difficulties Questionnaire. The results showed that the "Essentialism," "Fulfillment," and "Child-centered" components of intensive parenting attitude influenced the "involvement and monitoring" and "positive responsivity" of parenting behavior. Furthermore, these two parenting behaviors affected children's prosocial behavior and hyperactivity/inattention. These findings suggest that an intensive parenting attitude has some impact on children as well as mothers, both positively and negatively, pointing to a serious effect on society.

KEYWORDS

intensive parenting attitude, intensive mothering, positive responsivity, involvement and monitoring, prosocial behavior, hyperactivity/inattention

1 Introduction

Motherhood brings numerous changes to women's lives, including their appearance, inner hormonal balance, mental health, and perceptions (Hrdy, 2000). However, what may make a decisive difference is the people around and the society to which the mother belongs. Many scholars have suggested that the "myth of motherhood" has a considerable impact on people in some developed countries (e.g., United States, United Kingdom, and Japan)—the mother herself often embraces an ideal image of the "good mother."

Intensive parenting is an ideology that mothers' emotion, energy, time, and money should be focused on their children (Hays, 1996). It is suggested that this has been a major strategy of parenting in many developed countries. Furthermore, as the study of "intensive parenting" garnered increased attention, Liss et al. (2013) developed and validated a corresponding "intensive parenting attitude" scale. This questionnaire has five factors: Essentialism, the

notion that women are inherently better at parenting than men and are exclusively given the role of child-rearing; Fulfillment, the belief that parenting should be fulfilling and a delight; Stimulation, the idea that children should be cognitively and intellectually stimulated by parents; Challenging, the belief that parenting is difficult and the most demanding job; and Child-centered, the notion that parents should prioritize the needs of the child above all else. Both mothers' and fathers' time spent with children has increased since the 1960s (Sayer et al., 2004). However, while both parents have shown changes in their attitudes, it is especially evident in mothers due to the influence of a separate ideological sphere (Cha, 2010). While social scientists have attributed these differences in parenting attitudes to factors such as parental financial status (Elliott et al., 2015), working status (Christopher, 2012), or educational background (Walls et al., 2014), there is also a notable prevalence of a strong belief in intensive parenting in developed countries (Bennet et al., 2012; Ishizuka, 2019). For instance, intensive parenting has been studied extensively in countries like the United States (Gunderson and Barrett, 2015), the United Kingdom (Cappellini et al., 2019), Canada (Wall, 2010), France (Loyal et al., 2017), Australia (Craig et al., 2014), and Japan (Egami, 2020).

In Japan, a high degree of intensive parenting attitude was found among mothers with preschool children, and especially they strongly embraced Essentialism (Egami, 2020). A great deal of research has been conducted on mother–child ties and maternal devotion to children in Japan (Kashiwagi, 1998). While recently Japanese women have changed to being more individualistic and working outside after childbearing, there is a strong belief in the myth of motherhood and ideal images of good mothers (Aono and Kashiwagi, 2011). What or whom could this affect? Egami (2005, 2007, 2013) showed the influence of the belief in "maternal love," defined as unconditional maternal love for children, on mothers' behavior toward children. In particular, the influence of this belief had a double-sided effect on maternal behaviors. Despite a background of gender disparity—for example, see the Global Gender Gap Index 2023 (World Economic Forum, 2023)—Egami (2017) stated that adherence to maternal love and devotion to their children is much stronger than endorsement of the gender division of labor. Since intensive parenting attitude encompasses five key factors, central to which is the belief that parents should prioritize their children above all and remain devoted to them, such attitudes could be the driving force behind Japanese mothers' strong sense of child-rearing responsibility. Thus, it is crucial to investigate the impact of these attitudes on mothers in Japan where a high degree of intensive parenting attitude is prevalent among mothers of preschool children. In summary, since Japanese mothers might embrace the belief in maternal love and devotion to children regardless of socioeconomic status, educational background, and social support, it is invaluable to determine how strong such an intensive parenting attitude is for Japanese mothers generally, using a measure commonly used around the world.

1.1 Intensive parenting and its impact on mothers

Many scholars suggest that intensive parenting attitude harm maternal mental health and well-being (Wall, 2010; Liss et al., 2013; Rizzo et al., 2013; Meeussen and Van Laar, 2018; Prikhidko and Swank, 2018). Specifically, all factors of the intensive parenting attitude were positively correlated with separation anxiety in the Parental Investment in the Child Questionnaire (PIC) but Fulfillment was positively correlated with "delight" in the PIC and "satisfaction" in the Parenting Sense of Competence scale (Liss et al., 2013). Rizzo et al. (2013) found that Essentialism was negatively correlated with life satisfaction, and Challenging was positively correlated with depression and stress. Meeussen and Van Laar (2018) reported that mothers' intensive mothering beliefs affected parental burnout via maternal gatekeeping behaviors. Based on in-depth interviews, Wall (2010) indicated that intensive parenting could increase maternal stress, exhaustion, anxiety, and guilt. Similarly, qualitative methods showed that unrealistic expectation derived from intensive mothering led mothers to struggle with meeting that demand, as a result, they felt a sense of guilt and self-blame when they could not achieve being an ideal mother (Prikhidko and Swank, 2018). In short, an intensive parenting attitude partly had a positive effect on the maternal psychological state (i.e., parental efficacy and delight); however, mostly it could damage maternal mental health and well-being.

Moreover, an intensive parenting attitude can affect maternal behavior, especially to preschoolers. Schiffrin et al. (2015) found that maternal intensive parenting attitude—especially those rooted in Essentialism, Stimulation, and Child-centered—were related to anticipatory problem-solving behavior indicative of overparenting as described by Segrin et al. (2012). This overparenting behavior was, in turn, associated with a higher likelihood of enrolling children in structured activities, including creative and physical ones. Fischer (2022) reported that five-year-olds' parents who had a high degree of intensive parenting attitude showed higher probability of reading to their children more frequently. Also, Essentialism and Challenging of intensive parenting attitude were positively correlated with maternal "parent anger experience" and "parent anger expression" (Prikhidko and Swank, 2019). This study indicated that mothers who rated high on Essentialism and Challenging may be exhausted but have insufficient self-care because of a high degree of the responsibility for children. Then, they might become angry and finally blame their children. Furthermore, Egami (2020) conducted a comprehensive analysis of the intricate relationship between intensive parenting attitude and a spectrum of parenting behaviors (Ito et al., 2014), encompassing practices such as "positive responsivity," fostering a "respect for will" (the child's autonomy), active and diligent "involvement and monitoring," alongside tendencies toward "overprotection," the application of "harsh discipline," and behavioral "inconsistency." Consequently, every factor of intensive parenting attitude affected various maternal behaviors after controlling for social support. Apparently, Essentialism had a negative effect on positive responsivity. In contrast, Fulfillment had positive effects on both involvement and monitoring and positive responsivity. This result is consistent with some previous research (Liss et al., 2013). Interestingly, Stimulation positively affected positive responsivity, respect for will, and overprotection. According to the items related to Stimulation, mothers who embraced these beliefs tend to be education-minded parents. Although they may monitor their parenting behavior to ensure positive outcomes for their children, it is possible that they engage deeply in intensive parenting practices. As might be expected, Challenging was positively correlated with inconsistency and harsh discipline. This is because mothers being in a state of exhaustion will not have mild, stable, and consistent behavior toward their children.

Surprisingly, being Child-centered affected more kinds of child-rearing behavior than any other factor. In particular, mothers who rated high on Child-centered had lower involvement and monitoring, overprotection, and harsh discipline, but higher respect for will. These results suggested that those who rated high on Child-centered might have tried to respect their children's thought, seeking not to be intrusive toward their children's feelings, and to have a warm attitude toward them.

In addition, there is some research on the effect of intensive parenting attitude, which suggested a relationship between intensive parenting attitude and maternal career ambitions (Meeussen and Van Laar, 2018) or partner relationships (Williamson et al., 2023). However, its effects on children have yet to be revealed using both extensive questionnaires and in-depth interviews. Intensive parenting attitude is less likely to directly relate to children's outcomes since it is only the idea or belief of mothers. Still, there is a possibility of affecting children via the parenting behavior toward children. Since it is suggested that parenting behavior affects outcomes of child development, intensive parenting attitude could affect outcomes for children via maternal parenting behavior.

1.2 Parenting and child development

Many scholars and researchers have shown that parenting behavior can affect children's behavior and developmental outcome. For example, Baumrind (1966, 1967, 1978, 1996, 2012) suggested that authoritative parenting could develop children's self-control, positiveness, and friendly attitude. Authoritative parenting consists of inductive discipline, positive responsivity, respects for children's will, and clear communication with children. Since then, there have been a growing number of studies in this field. Recently, Eti (2023) found that the authoritative parenting style and supportive beliefs about children's emotions predicted children's social skills.

Related to intensive parenting attitude, studies on overparenting and "concerted cultivation" have increased. Some scholars have pointed out that overparenting has the potential to lead to developmentally inappropriate parenting through excessive advice, problem-solving behavior, and provision of unnecessary assistance, combined with risk aversion (Segrin et al., 2012). This could manifest as a problem when a child reaches emerging or young adulthood, since individuals at that age need to develop autonomy and a sense of control themselves (Winner and Nicholson, 2018; Segrin and Flora, 2019; Hong and Cui, 2023). The effects of overparenting on young children, e.g., preschoolers or school-aged, are not yet clear except for studies by Bayer et al. (2006) and Gar and Hudson (2008). Although there is a paucity of research specifically focusing on the effects of overparenting in young children, the practice of concerted cultivation has been more thoroughly examined and is commonly studied within this age group.

Concerted cultivation is to actively foster children's talents and skills through organized leisure activities and extensive reasoning behavior (Lareau, 2002). Concerted cultivation has been contrasted with "natural growth" (defined as providing the conditions under which children can grow but leaving leisure activities to children themselves and giving them clear directives) in some studies. Lareau (2002) stated that the predominant parenting style among middle- or upper-class families in the US is concerted cultivation, and that this style of parenting leads to an emerging sense of entitlement in the child. Although some scholars suggested that this type of parenting brought their children academic success (Carolan and Wasserman, 2015), others indicated that it may harm children's mental health in particular during adolescence (Leung, 2020). However, the effects on a young child's development have yet to be revealed.

There has been much research on the relationship between parenting (behavior or type) and child development in Japan. For example, Sugawara et al. (2002) found that a maternal warm attitude toward children predicted lower depression in school-aged children. In addition, in the study of Matsuoka et al. (2011), mothers' positive rearing was negatively correlated with tendency for Attention-Deficit/Hyperactivity Disorder (ADHD), a neurobiological condition characterized by core symptoms of inattention, hyperactivity, and impulsivity (Chen et al., 2022), in preschool, elementary, and middle school children. As described, Japanese scholars implied that mothers' positive parenting behaviors rather than a particular parenting behavior (i.e., overparenting) had a strong influence on their children. In their comprehensive meta-analysis, Ito et al. (2014) explored the multifaceted nature of parenting, initially categorizing behaviors into six distinct factors: involvement and monitoring, positive responsivity, respect for will, overprotection, inconsistency, and harsh discipline. Crucially, their study further distilled these factors into two overarching dimensions of parenting styles. The first three factors—involvement and monitoring, positive responsivity, and respect for will—were collectively identified as indicators of positive parenting behavior. In contrast, the latter three elements—overprotection, inconsistency, and harsh discipline—were found to typify negative parenting behavior. This bifurcation into positive and negative parenting behaviors offers a nuanced framework for understanding the complex dynamics inherent in parent–child interactions. In addition, they found that positive parenting behavior was correlated with school-aged children's prosocial behavior, but negative parenting behavior was correlated with conduct problems of children. Moreover, Murayama et al. (2018) indicated that negative parenting behaviors were related to school-aged children's experiences of bullying, including being the bully, the victim, and the bully-victim. Since the idea of second-order factors of parenting behavior is convincing evidence of parenting behavior in Japan, I used these scales and items applied to parenting behavior toward preschool children.

1.3 Research aims and hypotheses

This study examines the impact of intensive parenting attitude on child developmental outcomes through maternal parenting. First, the relationships of five factors of intensive parenting attitude, six factors of maternal parenting behavior, and five components of children's outcomes were tested using correlational analysis to understand the overall relationship. Then structural equation modeling (SEM) was used to clarify the impact of intensive parenting attitude on both mothers and children. However, as stated before, intensive parenting attitude would not directly relate to children's outcomes because the attitude is only the idea or belief of mothers. Therefore, I speculated that intensive parenting attitude indirectly influenced children's outcome via maternal parenting behavior because Egami (2020) showed that intensive parenting attitude affected both positive and negative maternal parenting behaviors. In addition, a growing body of

previous research, such as that by Eti (2023), suggested that maternal parenting behaviors had a strong effect on children.

As mentioned above, many previous studies suggested that Essentialism and Challenging of intensive parenting attitude have negative effects on maternal mental health and parenting behavior. In the study of Egami (2020), Essentialism was related to a low level of positive parenting behavior (e.g., positive responsivity), and Challenging had a relationship with high level of negative parenting behaviors (e.g., inconsistency and harsh discipline). In contrast, Fulfillment might increase maternal positive parenting behaviors (e.g., positive responsivity and involvement and monitoring). Finally, this implied that Child-centered and Stimulation were both positively and negatively correlated with maternal parenting behaviors. While Child-centered could decrease negative parenting behaviors (e.g., overprotection and harsh discipline), its high rating was also related to a low level of positive parenting behavior (e.g., involvement and monitoring). Stimulation might enhance maternal positive parenting behaviors (e.g., positive responsivity and respect for will); however, it could also increase negative parenting behavior (e.g., overprotection). Additionally, a number of scholars have stated that maternal parenting behavior does affect children, particularly their socioemotional development (e.g., Baumrind, 2012). Baumrind's (1966, 1967, 1978, 1996, 2012) concept of authoritative parenting, often equated with positive parenting, is linked to children's self-control, positiveness, and a friendly attitude. By contrast, maternal negative parenting behavior (i.e., harsh parenting) was correlated with the inability of children to regulate their emotions, as indicated by Chang et al. (2003).

Therefore, I constructed the process model such that the impact of intensive parenting attitude would appear in maternal parenting behaviors, and these parenting behaviors might be related to children's social outcomes. Specifically, the goal of this study was to test four hypotheses (see Figure 1):

> *H1*: Intensive parenting attitude will affect children's social development only via parenting behavior.
>
> *H2*: Essentialism and Challenging will increase negative parenting behavior and decrease positive parenting behavior. Then, these will lead to poor social development in children.
>
> *H3*: Fulfillment will increase positive parenting behavior and decrease negative parenting behavior. Then, these will be positively related to social development in children.
>
> *H4*: Child-centered and Stimulation will affect both positive and negative parenting behavior, so having double-sided effects on children.

To effectively test the four hypotheses, controlling for the age of the children was essential, as this can influence maternal parenting behaviors and the outcomes for these children. For instance, within the preschool age group, parents may differentiate their behaviors between 2- and 6-year-olds, especially for monitoring, protecting, controlling, and discipline (Peterson et al., 1993). In addition, the score of children's outcomes can vary just due to their age (Croft et al., 2015). In sum, this study aims to clarify the impact of intensive parenting attitude on not only mothers but also children through verification of the four hypotheses. Egami (2020) stated that Japanese mothers' tendency of intensive parenting attitude affected their parenting behavior toward their children. So, could the impact of intensive parenting attitude spill over to the children? If so, how does it relate to them? To what extent does it correlate with them? Which part of intensive parenting attitudes could influence them? Revealing these could show that the impact of intensive parenting attitude is significant in society.

2 Materials and methods

2.1 Procedure

Respondents were asked to answer the questionnaire anonymously via an Internet research company (Macromill Inc.), who ensured its compliance with the privacy policy established by the Japan Marketing Research Association. To measure the impact of intensive parenting attitude on parenting behavior over time, the survey was divided over two time periods: November 2017 and April 2018. Background

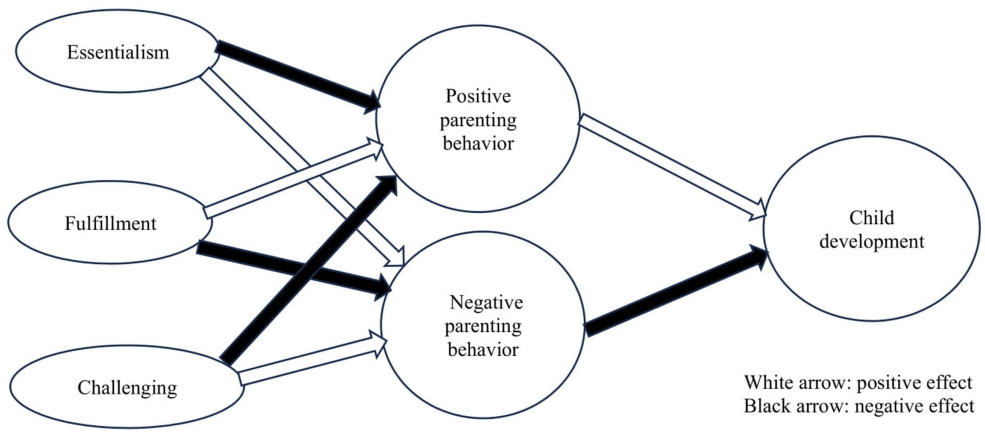

FIGURE 1
Hypothesized model of relations among intensive parenting attitude (excluding stimulation and child-centered), parenting behavior, and child development.

variables and the Japanese version of the Intensive Parenting Attitude Questionnaire (J-IPAQ) were collected during the first time period, November 2017. The Positive and Negative Parenting Scale (PNPS) and the Strength and Difficulties Questionnaire (SDQ) were measured at the second period.

2.2 Participants

Participants were 675 Japanese mothers aged 22–48 years (mean 34.7, standard deviation 5.0). They had at least one preschool-age child (aged 1 years 6 months to 6 years 10 months), thereby holding relatively intense child-rearing responsibility. Most of them were housewives (59.1%), and the rest were full-time workers (13.8%), part-time workers (20.0%), or freelancers (7.1%). The majority were married (97.3%). Household annual income level was classed from 1 (less than ¥2 million) to 9 (more than ¥20 million). Class 3 (¥4 million to less than ¥6 million) was the majority (29.5%), followed by class 2 (¥2 million to less than ¥4 million; 18.7%) and class 4 (¥6 million to less than ¥8 million; 13.3%). Average household annual income was about ¥5.7 million in Japan at that time, so most of them fitted into the average income category. About one-quarter of them (23.4%) had at least a high school education, 35.7% graduated professional training college or junior college, and 36.9% of them had a bachelor's degree. The length of education was 9–21 years (mean 14.2, standard deviation 1.77).

2.3 Measures

2.3.1 J-IPAQ

Egami (2020) constructed a Japanese version of the intensive parenting attitude questionnaire, and both validity and reliability were confirmed. The original IPAQ of Liss et al. (2013) included five categories: Essentialism, Fulfillment, Stimulation, Challenging, and Child-centered. Essentialism, in the context of motherhood, posits that mothers have a natural and exclusive role in raising their children. Fulfillment is the notion that child-rearing always brings joy and rewards for parents. Stimulation is the idea that parents must develop their children's intellectual ability. Challenging refers to the difficulty, exhaustion, and tiredness accompanying parenting. Child-centered is the belief that children must be the center of parents' lives and children's needs should be prioritized before anything else. The IPAQ includes 25 items; however, J-IPAQ consists of 20 items (Egami, 2020). The J-IPAQ is rated from 1 (strongly disagree) to 6 (strongly agree), the higher the score, the greater the degree of each dimension of intensive parenting attitude. Cronbach alpha in this study was 0.73 for Essentialism (six items), 0.75 for Fulfillment (three items), 0.57 for Stimulation (four items), 0.63 for Challenging (four items), and 0.68 for Child-centered (three items).

2.3.2 PNPS

Ito et al. (2014) constructed the PNPS, which consists of 35 items, divided into involvement and monitoring, positive responsivity, respect for will, overprotection, inconsistency, and harsh discipline. The PNPS is rated from 1 (not at all) to 5 (extremely). Positive parenting behavior includes involvement and monitoring, positive responsivity, and respect for will. Negative parenting behavior contains overprotection, inconsistency, and harsh discipline. The higher the score, the greater the degree of each group of parenting behavior. This study changed PNPS item expression "school" to "preschool, nursery, or kindergarten" because of the children's age (the creator of this scale gave permission). The original scale has 35 items, eight items were eliminated from this study after confirmatory factor analysis (Egami, 2020). Cronbach alpha was 0.84 for involvement and monitoring (six items), 0.82 for positive responsivity (five items), 0.61 for respect for will (four items), 0.62 for overprotection (three items), 0.81 for inconsistency (three items), and 0.85 for harsh discipline (six items) in this study.

2.3.3 SDQ

The SDQ is well-known scale measuring psychological attributes of children (Goodman, 1997). This study used the Japanese version of SDQ (for the parents of 2–4-year-olds) based on Matsuishi et al. (2008). It contains 25 items divided into five categories: "emotional symptoms," "conduct problems," "hyperactivity/inattention," "peer relationship problems," and "prosocial behavior." The SDQ is rated from 0 (not true) to 2 (certainly true). The higher the score, the greater the degree of each dimension of psychological attributes. Cronbach alpha in this study was 0.80 for prosocial behavior (five items), 0.67 for hyperactivity/inattention (five items), 0.62 for emotional symptoms (five items), 0.49 for conduct problems (five items), and 0.49 for peer relationship problems (five items).

3 Results

Descriptive statistics are shown in Table 1. Stimulation, Challenging, respect for will, overprotection, emotional symptoms, conduct problems, and peer relationship problems were not used in the following analysis because of low internal consistency (Cronbach$\alpha < 0.65$). The factors' scores for J-IPAQ and PNPS were averaged by the number of items, but were summed up for the contained items in SDQ. Descriptive statistics and correlation analysis were performed using IBM SPSS Statistics (ver. 27.0) and structural equation modeling (SEM) analysis using Amos (ver. 28.0).

3.1 Correlation analysis

Correlations between all measures are shown in Table 2. Some correlation relationships appeared but correlation coefficients were relatively low. Most factors of intensive parenting attitude were correlated with parenting behavior. While Essentialism was positively correlated with the negative parenting behavior, both Fulfillment and Child-centered were negatively correlated with such behavior and positively correlated with positive parenting behavior. As expected, the factors concerning intensive parenting attitude were rarely related with children's outcomes. Still, Essentialism was positively correlated with hyperactivity/inattention, and Fulfillment was positively correlated with prosocial behavior of children. Then, most maternal parenting behaviors had a connection with children's outcomes. My research indicates a distinct relationship between parenting behaviors and child outcomes. Positive parenting, marked by involvement and monitoring or positive responsivity, correlates with beneficial outcomes in children, such as improved social skills and lower behavioral problems. This suggests that positive parenting actively fosters a nurturing

environment crucial for children's healthy development. On the other hand, negative parenting behaviors, including harsh discipline or inconsistency, are linked to adverse child outcomes, such as behavioral problems and lower prosocial behavior. Importantly, this study's findings highlight that negative parenting does not inversely contribute (i.e., by its absence) to positive child outcomes. This distinction underscores that positive child development is more directly a result of positive parenting practices, rather than merely the absence of negative ones. These insights affirm the critical role of positive parenting in promoting not just the avoidance of harm, but in actively supporting comprehensive child development.

3.2 SEM analysis

The theoretical model proposed in this study, accounting for the influence of children's age on both parenting behaviors and children's outcomes, was rigorously tested using SEM (Tables 3, 4 and Figure 2). However, the analysis yielded an implausible score, indicating that the model did not accurately reflect the data (Model 1). This outcome suggests that the theoretical framework, as constructed, may not adequately capture the complexities of the relationships between intensive parenting attitude, maternal parenting behaviors, and children's developmental outcomes. Further refinement and testing of the model are necessary to develop a more accurate representation of these dynamics. Therefore, inconsistency and harsh discipline were eliminated since their standardized coefficients yielded 1 (Model 2). Next, the non-significant paths were deleted (Model 3). Then, for fixed parameters, some covariances were added (Model 4). After confirming validity and reliability of all factors (Table 4), some items were removed because they caused the score of AVE and CR to decrease. Finally, the proposed model (as shown in Figure 2) fitted the data reasonably well: $\chi^2(409) = 653.14$ ($p < 0.001$), GFI = 0.94, AGFI = 0.93, CFI = 0.96, RMSEA = 0.03, AIC = 827.14, CAIC = 1306.92. Due to the large sample size of the study, the chi-square score was significant. Based on correlation coefficients in Table 2, multicollinearity was not found among scales. All items' coefficients and the score of AVE (average variance extracted; validity score) and CR (composite reliability; reliability score) are shown in Table 4. Fornell and Larcker (1981) suggest that the criteria (AVE ≧ 0.4, CR ≧ 0.6) are desirable; however, when AVE is near 0.4, the scale has validity and reliability, if CR is over 0.6. Thus, most scales confirmed both validity and reliability except for Child-centered. Still, the proposed model including Child-centered was accepted since the factor's Cronbach α was relatively high ($\alpha = 0.68$) despite including only three items. Additionally, Child-centered in J-IPAQ was confirmed in Egami (2020), which used a similar sample to that for this study and the coefficient scores in these data were all significant.

Figure 2 presents relationships between intensive parenting attitude and children's outcomes through parenting behaviors as well the standardized coefficient of each path. As mentioned above, Hypothesis 1 is that intensive parenting attitude has no direct effect on children's outcomes; nonetheless, the analysis confirmed an indirect effect of parenting behavior on children's outcomes, thereby substantiating the hypothesis. Hypotheses 2 and 3 that Essentialism and Challenging have negative impacts on children's outcomes through parenting behavior, and that Fulfillment has positive impacts, were both partially supported. Moreover, Hypothesis 4 that Stimulation and Child-centered would have both positive and negative effects on children's outcomes via parenting behavior was partly supported.

TABLE 1 Descriptive statistics of the main variables ($N = 675$).

	M	*SD*	Possible range	Actual range
Essentialism	3.69	0.78	1–6	1.17–6
Fulfillment	4.35	0.89	1–6	1–6
Child-centered	3.93	0.81	1–6	1–6
Involvement and monitoring	3.04	0.97	1–5	1–5
Positive responsivity	4.25	0.59	1–5	1.20–5
Inconsistency	2.97	0.71	1–5	1–5
Harsh discipline	2.79	0.67	1–5	1–5
Prosocial behavior	5.50	2.43	0–10	0–10
Hyperactivity/ inattention	3.95	2.22	0–10	0–10

TABLE 2 Correlations between the measures ($N = 675$).

	1	2	3	4	5	6	7	8
Essentialism								
Fulfillment	0.14***							
Child-centered	0.28***	0.46***						
Involvement and monitoring	−0.06	0.14***	−0.01					
Positive responsivity	−0.07	0.35***	0.23***	0.17***				
Inconsistency	0.13**	−0.08*	−0.02	−0.02	−0.22***			
Harsh discipline	0.10*	−0.13**	−0.12**	0.03	−0.28***	0.69***		
Prosocial behavior	−0.02	0.21***	0.05	0.51***	0.26***	−0.06	−0.06	
Hyperactivity/ inattention	0.11**	−0.10**	0.06	−0.30***	−0.22***	0.12**	0.18***	−0.42***

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

TABLE 3 The goodness-of-fit score in all models ($N = 675$).

Model	Chi-square	GFI	AGFI	CFI	RMSEA	AIC	CAIC
Model 1	1995.06***	0.87	0.86	0.88	0.05	2223.06	2851.74
Model 2	1291.20***	0.90	0.88	0.88	0.05	1457.20	1914.92
Model 3	1010.81***	0.92	0.90	0.92	0.04	1190.81	1687.13
Model 4	772.40***	0.93	0.92	0.95	0.03	956.40	1463.75
The proposed model	653.14***	0.94	0.93	0.96	0.03	827.14	1306.92

***$p < 0.001$.

The more Essentialism mothers had, the less positive responsivity they exhibited ($\beta = -0.23$) (Figure 2). Consequently, less positive responsivity was associated with reduced prosocial behavior in children ($\beta = 0.15$). The more Fulfillment mothers experienced, the greater their involvement and monitoring ($\beta = 0.48$). Then parenting behavior could increase prosocial behavior ($\beta = 0.62$) and decrease hyperactivity/inattention ($\beta = -0.54$) of children. Finally, the more Child-centered they were, the less involvement and monitoring they exhibited ($\beta = -0.33$) yet they displayed more positive responsivity ($\beta = 0.46$). Through these path lines, being Child-centered had double-edged impacts on children's outcomes.

4 Discussion

This study examined the impact of intensive parenting attitude on children's social developmental outcomes via maternal parenting behavior. In summary, most of the hypotheses were supported to some degree. Schiffrin et al. (2015) found that intensive parenting attitude was related to anticipatory problem-solving behavior and children's gross motor skills through enrollment in structured activities including creative and physical activities. However, their study was limited to only one parenting behavior and its effect was seen only in the outcomes of gross motor skill of children. In contrast, Egami (2020) suggested that intensive parenting attitude affected maternal parenting behavior; however, its influence on children was not examined. Therefore, the results of this study, including correlations, are worthy of a closer look.

First, Japanese mothers embraced Essentialism at a high rate (Egami, 2020). Given that Essentialism was positively correlated with negative parenting behaviors (i.e., inconsistency and harsh discipline), there is a need to investigate the risk of this belief to both mothers and children in Japan. As suggested by Rizzo et al. (2013) and others, Essentialism could harm not only mothers but also their children. Second, Fulfillment was positively related with positive parenting behaviors (i.e., involvement and monitoring, and positive responsivity) and negatively with negative parenting behaviors. Because this result seems consistent with that of Liss et al. (2013), mothers' parental efficacy and delight in parenting could lead to their positive parenting behavior. Finally, being Child-centered was related to parenting behaviors (positive responsivity and harsh discipline). Correlation analysis revealed the positiveness of Child-centered attitude; however, SEM analysis showed that this belief had double-sided effects. Although Schiffrin et al. (2015) indicated that Child-centered attitude might affect anticipatory problem-solving behavior, Egami (2020) found that it had a negative relationship with overprotection which was closely related to anticipatory problem-solving behavior. Moreover, while being Child-centered was correlated with low life satisfaction of mothers in the study of Rizzo et al. (2013), it was correlated with parental delight and efficacy for Liss et al. (2013). Probably, Child-centered belief can have both positive and negative aspects for mothers, and might depend on the culture and situation surrounding them.

As mentioned above, there were many patterns of correlations between intensive parenting attitude and maternal parenting behavior, however, correlations between intensive parenting attitude and child outcomes were rarely seen. While measurements of intensive parenting attitude were conducted in April 2018, social development of children was obtained in November 2017. Given this timeline, "intensive parenting attitude" can be considered a potential predictor of the perception of social development in children. This may indicate that the positive view of child-rearing leads to a positive bias on child development. Conversely, Essentialism tends to have a negative effect on child development and to indicate mothers' tiredness (Meeussen and Van Laar, 2018). The correlation pattern of maternal parenting behavior and child outcomes was the same as found by Ito et al. (2014), other than the relationship between negative parenting behavior and children's positive outcomes. Since these data were collected at the same time, children's outcomes might affect maternal behavior, and vice versa.

Although the correlational analysis revealed numerous relationships among variables, only a subset of these correlations was substantiated by the SEM analysis. The results indicated that Essentialism diminished the capacity of mothers to engage warmly with their children, which negatively impacted maternal positive responsivity and consequently reduced children's prosocial behavior. This aligns with research suggesting that Essentialism can foster a negative mindset in mothers (Liss et al., 2013; Rizzo et al., 2013; Meeussen and Van Laar, 2018), thereby impairing their ability to interact positively with their children. In Japan, Egami (2005, 2007) showed that belief in maternal love negatively influenced mothers' emotional regulation and expression toward children according to the situation surrounding mothers. Therefore, Essentialism damaged not only mothers' mental health but also that of young children. Next, as expected, Fulfillment increased involvement and monitoring and positively influenced children's prosocial behavior and negatively affected hyperactivity/inattention. According to Liss et al. (2013), Fulfillment can lead to maternal parenting efficacy and delight. Thus, mothers who embrace Fulfillment pour their energy into parenting behavior and engage positively with their children. Lastly, this study showed that Child-centered attitude had a double-sided effect on positive parenting behavior—it increased positive responsivity but

TABLE 4 List of all item's coefficients and the score of AVE and CR ($N = 675$).

Factor	Item number	Standardized coefficient	AVE	CR	Factor	Item number	Standardized coefficient	AVE	CR	Factor	Item number	Standardized coefficient	AVE	CR
Essentialism	2	0.53***	0.38	0.74	Involvement and monitoring	6	0.59***	0.43	0.82	Prosocial behavior	1	0.58***	0.38	0.75
	4	0.40***				10	0.82***				4	0.58***		
	12	0.67***				19	0.65***				9	0.71***		
	17	0.74***				20	0.60***				17	0.62***		
	20	0.67***				24	0.57***				20	0.58***		
Fulfillment	7	0.72***	0.48	0.74		29	0.68***							
	14	0.72***			Positive responsivity	11	0.63***	0.48	0.82	Hyperactivity/ inattention	2	0.52***	0.40	0.66
	18	0.65***				13	0.73***				21	0.64***		
Child-centered	11	0.47***	0.25	0.49		18	0.73***				25	0.72***		
	19	0.64***				27	0.68***							
	24	0.36***				35	0.70***							

***$p < 0.001$.

10.3389/fpsyg.2024.1337531

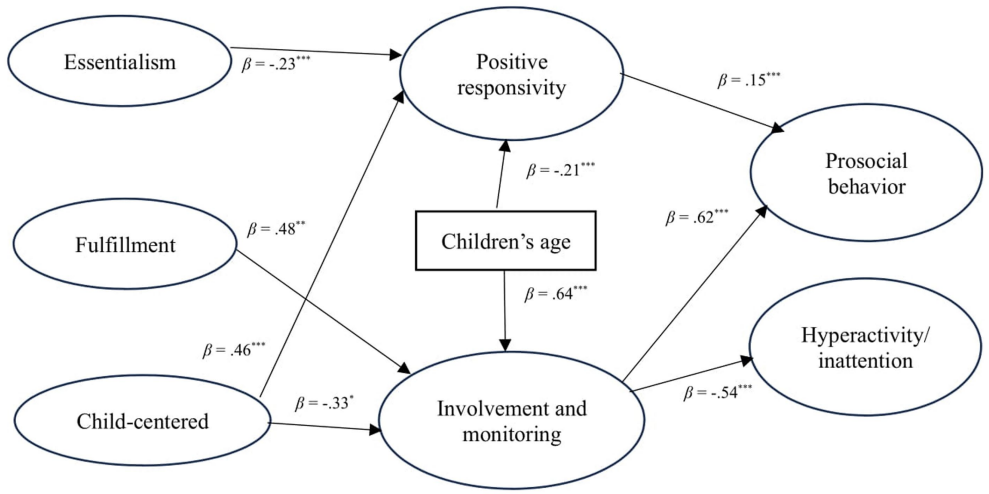

FIGURE 2
Graphical overview of significant paths in the final model (***$p < 0.001$, **$p < 0.01$, *$p < 0.05$).

decreased involvement and monitoring. This indicated that Child-centered attitude had both positive and negative impacts on children's social development outcomes. As mentioned above, being Child-centered had a double-sided effect in some previous studies. Interestingly, Egami (2020) noted that Child-centered was negatively related to involvement and monitoring and overprotection; however, Schiffrin et al. (2015) showed that it had a positive relationship with anticipated problem-solving behavior. Similarly, while Child-centered attitude was negatively correlated with maternal life satisfaction (Rizzo et al., 2013), it was positively related to delight and efficacy as a parent (Liss et al., 2013). The belief of "for the sake of children" (i.e., a child centered approach) might make parents think from a child's point of view. This idea can work differently under a wide variety of circumstances and cultures. In Japan, this may lead to more lenient parenting behavior (e.g., a natural growth strategy) as well as positive attitudes toward children. The findings suggest that an intensive parenting attitude has both positive and negative effects on mothers and children alike, pointing to potentially far-reaching implications for our society at large.

4.1 Conclusion

Hypothesis 1 was supported and Hypotheses 2, 3, and 4 were partially supported. Therefore, intensive parenting attitude had some effects on children as well as mothers. At the same time, this had a double-sided impact. Some factors of intensive parenting attitude might be related to parenting efficacy and positive maternal feelings related to child-rearing (Liss et al., 2013; Egami, 2020), and others could be connected to less positive responses toward children through maternal stress and tiredness. The "parenthood paradox," as mentioned in Rizzo et al. (2013), reflects a unique dilemma in which maternal efforts to achieve perfection in parenting can ironically lead to increased stress and negative attitudes toward their children. This phenomenon underscores the unintended consequences of intensive parenting, potentially impacting a child's social and emotional development. It highlights the need for a balance between high parental aspirations and realistic expectations, suggesting a shift in societal attitudes toward a more compassionate and feasible approach to parenting.

4.2 Limitations and future directions

This study revealed the impact of intensive parenting attitude on child development via maternal parenting behavior. However, the study has some limitations. First, the data of maternal parenting behavior and children's developmental outcomes were collected at the same time. Therefore, it is impossible to establish a clear causal relationship between maternal parenting behavior and outcomes for children. This underscores the need for a longitudinal research approach. Second, the data for this study were derived from mothers' self-reports only; however, mixed methods are required to produce more solid data. For example, in-depth interviews of mothers or observations of mother–child interactions are needed for research on intensive parenting attitude and maternal parenting behaviors. Third, this study utilized the parent-rated version of the SDQ to assess child behavior. While this version effectively captures the child's behavior at home, it is important to note that it may not fully represent their behavior in other environments, such as in the educational settings. Typically, the SDQ is also available in a teacher-rated version, which can provide complementary insights into the child's behavior across different settings. The absence of the teacher-rated SDQ in this study could be considered a limitation, as it restricts the scope of behavioral assessment in the home. Therefore, the results should be interpreted with caution, especially when generalizing about the child's overall behavior or the impact of intensive parenting attitude. Fourth, this study's analysis on intensive parenting attitude is limited to three factors because of the low reliability of the other two factors (Stimulation and Challenging). In addition, the low AVE and CR

scores of Child-centered require further consideration and careful interpretation. Child-centered in this study might be labeled as a provisional factor, and there is a need for further replication. Future research on intensive parenting attitude should examine how all five factors of intensive parenting attitude affect maternal mental parenting behavior, especially negative parenting behaviors and children's social outcomes. Through these research plans, the impact of intensive parenting attitude would give strong messages to our society, which includes mothers and children. Furthermore, there has been little research on intensive parenting attitude in Asia. Convincing research findings are needed to offer extensive and effective support for child-rearing, especially in Asian countries, including Japan.

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 humans were approved by the Ethics Committee in the Faculty of Education, Ehime University. The studies were conducted in accordance with the local legislation and institutional requirements. The participants provided their written informed consent to participate in this study.

Author contributions

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Conflict of interest

The author declares 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 contribution of psychological capital and parental age to job satisfaction: a comparison of parents of children with autism spectrum disorder and parents of typically developing children

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Introduction: A recent concern is the frequency with which children are classified as having autistic spectrum disorder (ASD). Parents of children with ASD report difficulties in all areas of life, including the workplace. Previous studies show psychological capital (PsyCap), defined as a combination of hope, self-efficacy, optimism and resilience, is a key factor in job satisfaction and coping in numerous areas. I examined the relations of PsyCap with job satisfaction in parents of ASD children and parents of typically developing children.

Methods: The study involved 141 participants, 127 women, 14 men. About half ($n = 69$) had a child with ASD (mean age 41.41, SD 5.79), and about half ($n = 72$) had a typically developing child (mean age 43.65, SD 7.29). Measurements comprised the Job Satisfaction Questionnaire and the PsyCap questionnaire (PCQ). Data were collected online.

Results: Positive relations between PsyCap and job satisfaction was found for both groups. Parents of children with ASD had higher levels of resilience than their comparators. With increased age, parents of children with ASD reported decreased job satisfaction; parents of typically developing children reported increased job satisfaction.

Discussion: The study expands the understanding of how parents of children with ASD cope at the occupational level. Their job satisfaction decreases with age. Organizations who employ parents of children with special needs in general and ASD in particular should take this into account and discuss their employees' changing needs to maximize their job satisfaction and give them room for professional development under flexible conditions.

KEYWORDS

psychological capital, autism spectrum disorder, job satisfaction, parents, age

Introduction

A concern in recent professional literature is the frequency with which children are classified as having an autistic spectrum disorder (ASD). An estimated one in 68 children is diagnosed on the autistic spectrum regardless of ethnicity or socio-economic status (Marshall et al., 2008; Fuentes et al., 2016). Parents of children with ASD report that caring for them is challenging, demanding, rife with difficulties and pressures, and can affect the mental health of other family members (Bekhet et al., 2012). They also report that caring for

their child with ASD affects their occupational choices and renders them unable to commit to the demands of a typical work environment (Kogan et al., 2008; Montes and Halterman, 2008), as the diagnosed child requires an increased presence of at least one parent. In fact, a commitment to a child with ASD may delay the parents' career building (Estes et al., 2009).

Previous studies have shown that psychological capital (PsyCap), defined as a combination of hope, self-efficacy, optimism and resilience, is a key factor in greater job satisfaction and successful coping in a variety of areas (Luthans and Youssef, 2007; Aminikhah et al., 2016). Since this is a relatively new concept, few studies consider PsyCap in relation to parenting children with ASD. However, these studies indicate that the components of PsyCap are very significant for parents as elements in effective treatment of their children and as important predictors for the use of optimal coping strategies (Hastings et al., 2005; Jones and Prinz, 2005; Lightsey and Sweeney, 2008; Benson, 2010; Weiss et al., 2013).

Based on these findings, I argued that PsyCap makes a significant potential contribution to the mental wellbeing of parents with ASD children and may have a role in maximizing their career options. Therefore, I examined the psychological and occupational reality of parents with children with ASD. Specifically, I evaluated the degree of job satisfaction of parents of children with ASD and the PsyCap of these parents and compared these to the job satisfaction and PsyCap of parents of typically developing (TD) children. I also examined differences related to the age of the two parental populations.

Literature review

Parenting children with ASD

The challenges of raising a child with ASD begins long before the process of formal diagnosis (Woodgate et al., 2008). In the first stages of the baby's development, parents often experience pressure, worry, and stress because of their child's developmental delays or disabilities (Hallahan and Kauffman, 2006). Even after a diagnosis, parents have reported difficulties dealing with the child's diagnosis, with the social stigma in relation to children with ASD, and with the social isolation that is a product of this stigma (Papoudi et al., 2021). In the not-too-distant past, parents blamed themselves for their child's autism or felt others blamed them. Although this notion is less common today, parents still often suffer from guilt, self-blame, and a lack of understanding from community members and extended family (Woodgate et al., 2008; Myers et al., 2009). One study found parents of children with ASD sometimes confronted people who made negative comments about their children in public and even stated that this confrontation made them feel good (Neely-Barnes et al., 2011).

Parents of an autistic child experience significant pressures. Family members must manage the many aspects of providing care, and this is demanding, fraught with difficulties, and can affect the mental health of other family members (Bekhet et al., 2012). Parents of ASD children report high levels of parental stress, low satisfaction in their relationships, and behavior problems with their children, compared to parents whose children do not have a developmental disability (Hoffman et al., 2009). Since the needs of a child diagnosed with ASD are unique, the parent requires many more tools to adapt to the child's needs (AlHorany et al., 2013). The parent also becomes the main channel through which the techniques and training that the child receives are disseminated, in the effort to promote the child's communication and social skills (Brobst et al., 2009; Papoudi et al., 2021). Studies show that parents of children on the autistic spectrum display increased levels of stress and psychological symptoms of depression, relative to both parents of children with normal development and to parents of children with other neurodevelopmental disorders (AlHorany et al., 2013). Risk factors that increase the stress and distress of family members caring for autistic children include the severity of the child's symptoms, the quality of the parents' marriage and the number of children diagnosed as being on the autistic spectrum (Bekhet et al., 2012).

At the same time, parents of children with ASD can have positive experiences; they report finding a positive meaning in life that arises from the challenges of giving birth and raising such a child. In fact, parents have reported that the child's birth and upbringing changed their worldview and encouraged a more positive perception of life in general, as well as appreciation for specific achievements. It is important to note that this view is often established after the first years of their child's diagnosis have passed, when the parents have learned to accept the situation and adapt to it (Bayat, 2007).

Job satisfaction among parents of children with ASD

Job satisfaction is defined as an employee's positive attitude toward the workplace, reflected in his/her desire to remain there (Vroom, 1964). Job satisfaction is an indicator of the general quality of the individual's experiences in his/her role at work; job dissatisfaction can explain unwanted organizational phenomena such as poor performance, employee turnover, intentions to leave and even actual leaving (Clark, 1997). Therefore, job satisfaction depends on the employee and varies from employee to employee, but also depends on the work environment itself (Vroom, 1995). An employee in an organization is an essential element in all that is related to organizational standards, and thus, when the conditions of the work environment suit him/her, the employee can perform his/her work according to the goals of the organization in a high-quality and professional manner (Raziq and Maulabakhsh, 2015; Dziuba et al., 2020). The literature confirms that when employees are satisfied with their work, they are more functional and involved and contribute to the overall success of the organization. Unsatisfied employees tend not to perform well and may contribute to the failure of the organization (Bin and Shmailan, 2015; Loan, 2020).

Parents of children with ASD experience challenges in both work and family life (Houser et al., 2014). Having a child with ASD is associated with a significant increase in the need for personal care for their child, and this situation affects parents' occupational decisions. One study found parents of children with ASD reported that care for their child affected their employment situation seven times more than for parents of typical children (Montes and Halterman, 2008). The work challenges of these parents are related

to their inability to commit to the demands of a typical work environment. In fact, parents of children with ASD are more likely to report reducing work hours or stopping work, depending on their child's condition (Kogan et al., 2008). Hence, the condition of the diagnosed child and the need for increased presence of at least one of the parents may delay the parents' career building (Estes et al., 2009).

Families with children diagnosed with ASD face many stressors, such as the care of the child, employment considerations, accessibility, and complex financial situations (Bekhet et al., 2012). A great amount of flexibility is required for parents to have a stable work environment (Koegel et al., 1992; Davis and Carter, 2008; Estes et al., 2009). However, parents' decision-making regarding employment must consider the timing and location of child care, and these considerations often do not allow flexibility (Houser et al., 2014). Although parents of children with ASD would like to integrate into work as regular employees, colleagues and managers do not understand their complex family situation, and the employment policy is not flexible (Hill et al., 2014). Watt and Wagner (2013) examined the factors of job satisfaction in a sample of parents of children with ASD; they found these parents experienced a great deal of stress, reported mental health symptoms, had lower-paying jobs, and were dissatisfied with the degree of consideration by employers. Employee-employer relationships that offer parents of children with ASD respite and social support may help them find satisfaction in the workplace (Benson, 2006; Watt and Wagner, 2013). The provision of family leave and flexible work arrangements has been associated with higher satisfaction among parents of children with ASD (Gnanasekaran et al., 2016).

PsyCap, its components, and parenting children with ASD

Since World War II, psychology has focused on 'correcting' mental illnesses and dysfunctional behavior, in most cases at the expense of recognizing a person's abilities and functions. The growth of positive psychology encouraged a change in this perception by favoring measuring, developing, and managing people's strengths rather than focusing on their weaknesses (Luthans and Youssef, 2004, 2007). This approach generated the concept of PsyCap, a personal motivational index consisting of four positive qualities: self-efficacy, hope, optimism, and resilience (Luthans et al., 2010; Luthans and Youssef-Morgan, 2017).

The first component, self-efficacy, represents a person's general belief in his/her own ability to complete a wide variety of tasks (Hmieleski and Ensley, 2007; Çavuş and Gökçen, 2015). People with high self-efficacy know how to use their motivation by choosing challenging tasks that motivate them in facing obstacles and achieving their goals (Çavuş and Gökçen, 2015). The second component, hope, refers to a positive motivational state interactively based on goal-directed energy and planning to meet goals (Snyder et al., 1996). The component of hope can be broken down into three separate but complementary components: willpower, goals, and paths to achieve them (Snyder et al., 1996). The third component, optimism, can be defined as a psychological trait that causes a generalized expectation of good and positive results (Keles, 2011). The fourth component, resilience, represents positive coping and adaptation when dealing with adversity or significant risk factors (Masten and Reed, 2002; Youssef and Luthans, 2007). Studies examining demographic sources with the potential to link to or predict PsyCap (length of employment at the workplace, age, gender, etc.) have not revealed a specific source linked to the variable or explained it consistently (Avey, 2014; Aliyev and Tunc, 2015).

PsyCap is a relatively new concept studied mainly in the field of positive organizational behavior; no studies, to the best of my knowledge, have examined its relations to parenting children with ASD. There is some work in this area on the various components of PsyCap, however. First, some studies have looked at self-efficacy. One study found a gender difference among parents of children with ASD in their coping strategies; the level of self-efficacy was found to be the most important variable for mothers, while for fathers, the use of problem solving (hope) was the main strategy (Folkman and Lazarus, 1980; Godoy et al., 2008). In other studies, developing a high sense of self-efficacy was central to the effective treatment of a child with ASD and served as a mediating factor between stressors and a sense of satisfaction with life (Jones and Prinz, 2005; Lightsey and Sweeney, 2008; Weiss et al., 2013).

Second, studies have found optimism is an important predictor of the use of different types of ideal coping strategies in parents of children with ASD (Hastings et al., 2005; Benson, 2010). One study found positive coping mediated the relations between optimistic disposition and depressive symptoms; that is, parents' level of optimism influenced their use of positive coping strategies and this, in turn, reduced depressive symptoms. Conversely, those who were less optimistic tended to use avoidant forms of coping that increased their depressive symptoms (Willis et al., 2016).

Third, studies have found that parents with better resilience better manage the challenges associated with caring for a child with ASD (Luthar et al., 2000). Resilience helps them to recover from complex problems, adapt in a positive way to reality, and even view difficult life situations as an opportunity to improve and strengthen themselves. In fact, although parents of children with ASD have little control over risk factors such as the severity of their children's symptoms or the number of their children diagnosed with autism, there is no question that their resilience is an important protective factor and, as such, should be strengthened. Strengthening parental resilience can bolster other positive indicators such as self-efficacy, self-acceptance, sense of coherence, optimism, resourcefulness, and parental and family functioning (Bekhet et al., 2012).

Fourth, studies have shown that hope is a key factor in the psychological wellbeing of mothers of children with intellectual disabilities, autism, and Down syndrome (Mednick et al., 2007). Monsson (2010) found higher levels of hope were associated with lower levels of depression, anxiety, and chronic grief among parents of autistic children. A high level of hope has many positive qualities, including the ability to find alternative goals when current goals are blocked or unattainable. Hope makes it possible to see the positive aspects of different situations, reframe situations to find meaning in difficult events, and develop effective problem-solving skills (Snyder, 2002). These qualities are especially important for parents of children with ASD whose day-to-day conduct can seem a continuous, unwinnable battle (Monsson, 2010). A study of

mothers of children with ASD and Down syndrome found mothers with a higher level of hope reported less worry. It also found mothers of children with ASD had lower levels of hope and worried more about their child's future than mothers of children with Down syndrome. Finally, mothers whose children were higher functioning reported higher levels of hope and less tendency to worry generally and to worry about the future specifically (Ogston et al., 2011).

PsyCap and job satisfaction

PsyCap, job satisfaction, and organizational commitment have a significant effect on each other (Luthans and Youssef, 2007). Employees' PsyCap significantly impacts the creation of a positive work environment, job satisfaction, happiness at work, and organizational commitment (Luthans and Youssef, 2007). It is linked to job satisfaction and to a resulting improvement in work performance (Luthans and Youssef, 2007; Aminikhah et al., 2016). A study on relations between the components of PsyCap and job satisfaction found a distinct positive relationship between resilience and optimism, two components of PsyCap, and job satisfaction (Kaplan and Biçkes, 2013). Another study found hope, optimism, and resilience promoted commitment to the workplace and a positive level of satisfaction with the workplace. In addition, employees with higher levels of hope may be more satisfied with their job and thus more committed to their workplace (Çetin, 2011).

Study hypotheses

Based on my review of the literature, I formulated the following hypotheses:

1. There will be positive relations between PsyCap and job satisfaction; that is, higher PsyCap will be associated with higher satisfaction.
2. Parents of autistic children will report higher PsyCap than parents of typical children due to the many challenges involved in parenting autistic children and due to their increased need to rely on positive psychological resources. Conversely, parents of children with ASD will be less satisfied with their workplace than parents of typical children due to the difficulties they experience in combining raising a special-needs child with the demands and limitations of their workplace.
3. Studies have shown that parents of children with ASD face significant challenges and difficulties in finding work that allows them leeway with the commitments involved when raising a diagnosed child (e.g., Kogan et al., 2008; Montes and Halterman, 2008). It seems they invest more in raising their children and less in career development and occupational advancement than parents of TD children. I therefore hypothesized that as the age of parents of children with ASD increases, their job satisfaction will decrease, and the job satisfaction of parents of TD children will increase. I also hypothesized that PsyCap is a positive motivational resource of universal significance in terms of age for both groups, and thus, no differences will be found between parents of ASD and parents of TD children (Avey, 2014; Aliyev and Tunc, 2015).

Methods

Participants

An a priori power analysis was conducted using G*Power version 3.1.9.7 (Faul et al., 2007, 2009) to determine the minimum sample size required to test the study hypotheses. For correlation, the bivariate normal model, to achieve 80% power for detecting a medium effect at a significance criterion of $\alpha = 0.05$, the required sample size was $n = 84$. For an independent samples t-test, the required sample size to achieve 80% power for detecting a medium effect at a significance criterion of $\alpha = 0.05$ was $n = 128$. For linear multiple regression of a fixed model, R^2 deviation from zero design with three predictors, the required sample size to achieve 80% power for detecting a medium effect at a significance criterion of $\alpha = 0.05$ was $n = 85$. Thus, the obtained sample size of $n = 141$ was adequate to test the study hypotheses.

The study involved 141 participants, all of them parents and defining themselves as primary caregivers of their children, 127 women and 14 men, all of whom participated voluntarily, with no monetary compensation. Their average age was 42.52 (SD = 6.65), with an age range from 27 to 61. About 88% of the participants were married; 5% were single, and the remainder were divorced. About half ($n = 69$) had a child with ASD (mean age 41.41, SD 5.79), and about half ($n = 72$) had a TD child (mean age 43.65, SD 7.29).

Regarding the demographic characteristics of the sample among the two groups of parents, the average age of the parents in the TD group is 43.64 (SD = 7.28), while among the parents of children with ASD, the average age is 41.40 (SD = 5.79). In the TD parents' group, there are five males and 67 females; almost similarly, among the parents of children with ASD, there are nine males and 60 females. Among the TD parents, there are seven single, 61 married, and four divorced individuals; among the parents of children with ASD, 64 are married and five are divorced. In both parent groups, only two parents reported being unemployed at present, the rest are employed. In both groups, the maximum number of children per family is 5. Among the TD parents, the average number of children is 2.88 (SD = 0.86), and among the parents of children with ASD, the average number of children is 2.46 (SD = 0.91).

Materials

Job satisfaction

Job satisfaction was measured using the Job Satisfaction Questionnaire (Brayfield and Rothe, 1951), designed to evaluate the individual's attitude and expression of feelings toward the workplace. The questionnaire includes 19 items (for example: "Most days I am enthusiastic about my work"), on a scale of 1–5, ranging from "strongly disagree" (1) to "strongly agree" (5). The questionnaire includes 10 reversed items (1, 4, 5, 7, 9, 11, 12, 15, 17,

TABLE 1 Division and reliability of PCQ subscales.

Scales	α	Sample item
Self-efficacy	0.61	I feel confident analyzing a study-related long-term problem to find a solution
Hope	0.72	There are lots of ways around any study-related problem
Optimism	0.44	When things are uncertain for me as a student, I usually expect the best
Resilience	0.59	I can deal with study-related difficulties because I've experienced difficulty before
Overall	0.83	

19). The summed questionnaire score ranges from 19 to 95 points, with a higher score reflecting a greater degree of job satisfaction. The reliability for the original version of this questionnaire was $\alpha = 0.87$; in the present study, $\alpha = 0.904$.

PsyCap

The PsyCap questionnaire (PCQ) used in this study is a modified Hebrew version of the questionnaire composed by Luthans et al. (2007). Its items, generally formulated in a positive way, reflect PsyCap's four psychological capacities with respect to strengths and outcomes. The 12-item version of the questionnaire was validated by Avey et al. (2011). PCQ is comprised of 12 items; the appropriateness of each is evaluated on a five-point Likert scale from "strongly disagree" (1) to "strongly agree" (5). The score range of the PCQ is 12–60, with a higher score indicating a higher level of PsyCap. Table 1 shows the reliability of the PCQ subscales in this study.

Procedure

The data collection process began immediately after receiving ethical approval from the institutional ethics committee. All procedures followed were in accordance with the IRB standards of the institutional committee (protocol number: 2-8/2022). The data were collected using an online Qualtrics questionnaire. To attract parental participation, I posted announcements of the study at schools with classrooms for ASD-diagnosed students diagnosed and on Facebook groups for parents of ASD-diagnosed children. Participants were informed of the objectives and contributions of the study before entering the online survey site and signing the consent form.

Data analysis

Initially, descriptive statistics were calculated to summarize participant attributes, including demographic characteristics and scores on the PsyCap and Job Satisfaction Questionnaires. Subsequently, Pearson correlation analyses were performed to assess the strength and direction of relationships between variables of interest and also to compare the correlational coefficients of two parental groups. Also, to compare the means of PsyCap and job satisfaction between the two groups of parents, independent *t*-tests were conducted. Additionally, multiple regression analyses were utilized to investigate the effects of age, group membership (ASD vs. TD), and their interaction on job satisfaction and PsyCap, considering the potential for confounding variables. Notably, to address concerns regarding the multiplicity of comparisons, Bonferroni correction was applied to adjust significance levels for multiple testing, thereby mitigating the risk of errors.

Results

The first hypothesis assumed positive relations between PsyCap and job satisfaction, with higher levels of PsyCap associated with higher job satisfaction. I used Pearson correlations to examine relations between job satisfaction and PsyCap (overall PsyCap and self-efficacy, hope, optimism, and resilience subscales). Job satisfaction was significantly positively correlated to overall PsyCap in the two parental groups. For the PsyCap subscales, job satisfaction was positively correlated to hope for participants in both groups, and to optimism for participants without a child diagnosed with ASD (see Table 2).

Hypothesis 2 speculated that parents of children diagnosed with ASD would report higher levels of PsyCap than parents of TD children. It also assumed parents of ASD children would report lower job satisfaction than parents of TD children. *T*-test analyses compared the two parental groups in study variables concerning their job satisfaction and PsyCap (overall PsyCap and self-efficacy, hope, optimism, and resilience subscales). Findings did not support this hypothesis; parents of ASD children and parents of TD children did not differ in their PsyCap or job satisfaction levels (see Table 3). Findings also showed resilience was the only PsyCap resource that was higher for parents of ASD children.

Hypothesis 3 tested the interaction between age and job satisfaction and PsyCap. I predicted that as the age of parents with ASD children increased, their job satisfaction would decrease; in contrast, as the age of parents of TD children increased, their job satisfaction would increase. I also predicted that there would be no differences between groups in relations between age and PsyCap. Findings corroborated both predictions. I conducted multiple regression analysis using age, parental group, and the interaction between them as predictors, and job satisfaction or PsyCap as the independent variable. As shown in Table 4, the interaction between age and parental group was significant only when job satisfaction was the dependent variable, and was close to significant when optimism was the dependent variable. As shown earlier in Table 2 (correlational analysis), age was negatively and significantly correlated to job satisfaction for parents of ASD children and positively correlated to age of parents of TD children. Optimism was positively and significantly correlated to age in parents of TD children but was not correlated in parents of ASD children.

Discussion

The objective of this study was to learn about the PsyCap of parents of children with ASD and the degree of their satisfaction

TABLE 2 Means, SDs, and correlations between study variables for the two parental groups.

Variables	*M* (SD)	1	2	3	4	5	6
Child with ASD							
1. Job satisfaction	3.62 (0.68)						
2. PsyCap	4.24 (0.46)	0.28*					
3. Self-efficacy	4.38 (0.57)	0.21	0.70***				
4. Hope	4.18 (0.58)	0.31**	0.86***	0.43***			
5. Optimism	3.91 (0.83)	0.22	0.69***	0.18	0.58***		
6. Resilience	4.39 (0.52)	0.06	0.76***	0.55***	0.50***	0.33**	
7. Age	41.41 (5.79)	−0.29*	0.01	0.16	−0.08	−0.08	0.09
No child with ASD							
1. Job satisfaction	3.79 (0.63)						
2. PsyCap	4.11 (0.56)	0.23*					
3. Self-efficacy	4.27 (0.68)	0.15	0.72***				
4. Hope	4.09 (0.65)	0.25*	0.90***	0.54***			
5. Optimism	4.08 (0.76)	0.34**	0.74***	0.28*	0.66***		
6. Resilience	4.01 (0.67)	0.15	0.83***	0.45***	0.66***	0.56***	
7. Age	43.65 (7.29)	0.30*	0.17	0.08	0.19	0.29*	0.10

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

TABLE 3 Mean differences between parents of ASD children and parents of TD children in study variables.

Variables	ASD	Non-ASD	*t*	Cohen's *d*
	M (SD)			
Job satisfaction	3.62 (0.68)	3.79 (0.63)	$t_{(139)} = 1.499, p = 0.136$	0.252
PsyCap	4.24 (0.46)	4.11 (0.56)	$t_{(137)} = -1.532, p = 0.128$	−0.260
Self-efficacy	4.38 (0.57)	4.27 (0.68)	$t_{(137)} = -1.041, p = 0.300$	−0.177
Hope	4.18 (0.58)	4.09 (0.65)	$t_{(137)} = -0.945, p = 0.346$	−0.160
Optimism	3.91 (0.83)	4.08 (0.76)	$t_{(137)} = 1.243, p = 0.216$	0.213
Resilience	4.39 (0.52)	4.01 (0.67)	$t_{(137)} = -3.699, p < 0.001$	−0.626

with their workplace. The first research hypothesis was that there would be positive relations between PsyCap and job satisfaction. The findings confirmed this for both parental groups (parents of ASD children, parents of TD children). These results support previous studies emphasizing the contribution of PsyCap to a positive work environment, improved performance, and increased employee organizational commitment—elements that contribute to a sense of satisfaction with the workplace (Luthans and Youssef, 2007; Aminikhah et al., 2016).

The research findings strengthen previous findings on relations between the components of PsyCap and job satisfaction. This study, like previous ones, indicates positive relations between hope and job satisfaction in the two groups of parents and to positive relations between optimism and job satisfaction in parents of TD children. The findings suggest employees who have higher levels of hope are more likely to be satisfied with their jobs and therefore more committed to the workplace (Çetin, 2011).

The second hypothesis argued parents of ASD children would report higher PsyCap but would be characterized by lower satisfaction with their workplace than parents of TD children. The findings did not corroborate this hypothesis, as no differences were found between the two groups of parents in PsyCap and job satisfaction. In fact, resilience was the only component of PsyCap for which there were differences between the groups; parents of children with ASD had higher levels of resilience than parents of TD children.

As mentioned, PsyCap is a relatively new variable and has not been well studied in the context of parents of children with PsyCap. My findings suggest PsyCap has universal importance for all parents and the type of parenting—for special-needs or TD children—does not necessarily affect the degree of global PsyCap

TABLE 4 Multiple regression analysis using age, group, and their interactions as predictors, and job satisfaction or PsyCap as the dependent variable.

Variables	*B*	SE.B.	*β*	*t*	*p*-value
Satisfaction; $F_{(3,127)} = 4.98$, $p = 0.003$, $R^2 = 8.4\%$					
Age	0.025	0.011	0.257	2.350	0.020
Group	2.343	0.730	1.810	3.211	0.002
Interaction	−0.060	0.017	−1.941	−3.490	<0.001
PsyCap; $F_{(3,125)} = 1.37$, $p = 0.254$, $R^2 = 3.2\%$					
Age	0.013	0.009	0.173	1.510	0.134
Group	0.661	0.608	0.637	1.086	0.279
Interaction	−0.012	0.014	−0.500	−0.863	0.390
Self-efficacy; $F_{(3,125)} = 0.90$, $p = 0.446$, $R^2 = 2.1\%$					
Age	0.008	0.011	0.080	0.693	0.489
Group	−0.238	0.754	−0.187	−0.316	0.753
Interaction	0.009	0.018	0.283	0.483	0.630
Hope; $F_{(3,125)} = 1.20$, $p = 0.312$, $R^2 = 2.8\%$					
Age	0.018	0.011	0.188	1.640	0.104
Group	1.195	0.734	0.957	1.629	0.106
Interaction	−0.026	0.017	−0.880	−1.516	0.132
Optimism; $F_{(3,125)} = 2.29$, $p = 0.082$, $R^2 = 5.3\%$					
Age	0.031	0.014	0.253	2.187	0.031
Group	1.637	0.946	1.015	1.731	0.086
Interaction	−0.042	0.022	−1.110	−1.915	0.058
Resilience; $F_{(3,125)} = 4.55$, $p = 0.005$, $R^2 = 9.8\%$					
Age	0.009	0.011	0.099	0.898	0.371
Group	0.446	0.718	0.352	0.621	0.536
Interaction	−0.001	0.017	−0.037	−0.066	0.947

a parent will develop. My findings lead me to think all parents make use of the elements of PsyCap to deal with and care for their children, solve problems, and deal with complex situations, without noticeable differences between parents of special needs and TD children (Folkman and Lazarus, 1980; Godoy et al., 2008; Willis et al., 2016). However, my findings also indicate that parents of children with ASD rely more on resilience than parents of TD children. This corresponds with previous studies where high levels of resilience helped parents of children with ASD recover from complex situations and better manage the challenges associated with caring for their children; resilience also promoted self-acceptance and better parental functioning (Luthar et al., 2000; Bekhet et al., 2012).

Job satisfaction often depends on the individual employee and on the work environment itself (Vroom, 1995). My findings emphasize the individuality of persons in their sense of satisfaction with the workplace; I cannot link increased or decreased satisfaction at any given moment to either parental group studied. Similarly, previous studies indicated some parents of children with ASD find the workplace to be a respite from complex family challenges and a place of social support (Benson, 2006). My research population may have experienced employee-employer relations that allowed family vacations, flexible work arrangements, and time for respite and social support, helping those parents to feel generally satisfied with their workplace (Watt and Wagner, 2013; Gnanasekaran et al., 2016).

The third research hypothesis anticipated that with increased age, parents of children with ASD would report decreased job satisfaction and parents of TD children would report increased job satisfaction. I did not hypothesize differences between parental groups in relations between age and PsyCap (Avey, 2014; Aliyev and Tunc, 2015). The research hypotheses were fully corroborated. As in previous studies, my findings highlighted the challenges of parents of children with ASD in the workplace over time (Houser et al., 2014). More specifically, their satisfaction with the workplace decreases, while the satisfaction of parents of TD children increases.

The literature indicates that parenting a child with ASD involves continuous and often unpredictable demands, which can significantly impact parents' emotional and physical resources (Hastings and Taunt, 2002). This ongoing stress can lead to

a depletion of energy, which is critical for maintaining job satisfaction and motivation at work (Schaufeli and Bakker, 2004). These findings, in conjunction with the present study, suggest a child with ASD requires a more intensive parental presence and causes a higher degree of parental stress, thus affecting parents' ability to take advantage of career opportunities and advance professionally (Montes and Halterman, 2008; Estes et al., 2009). More specifically, the challenges of balancing work and family life, resulting in lower job satisfaction may be particularly difficult to achieve for parents of children with ASD due to the unique and demanding care needs of their children, which can limit their availability and engagement in professional development opportunities (Dykens et al., 2014).

The many stressors of parents of children with ASD make it difficult for these parents to commit to the demands of a typical work environment (Kogan et al., 2008; Bekhet et al., 2012; Watt and Wagner, 2013). A great deal of flexibility may be required for them to have a stable workplace (Koegel et al., 1992; Davis and Carter, 2008; Estes et al., 2009). This raises the question of whether parents of children with ASD must choose between investing their time and energy in raising their child or investing time and energy in career development and professional advancement. Perhaps these parents would like to integrate into the workplace as regular employees, but the issues preventing them from doing so become barriers that lead to stress and dissatisfaction (Hill et al., 2014). The occupational compromises they must make over the years translate into decreasing satisfaction with the workplace. In contrast, parents of TD children can invest their time and energy in occupational advancement, training, and continuing education; therefore, as time passes, their working conditions improve and their sense of satisfaction grows.

The findings confirmed my hypothesis on PsyCap; there were no differences between the parental groups in relations between age and PsyCap (i.e., no interaction was found). This finding is consistent with previous studies that did not find a demographic factor associated with or able to explain the level of PsyCap. It seems to be a positive personality-based motivational variable that is situational and subject to change and development; there is no relationship between age and the extent to which a person is characterized by this variable (Avey, 2014; Aliyev and Tunc, 2015).

Implications of the findings for practice

The study expands the understanding of how parents of children with ASD cope at the occupational level as compared to parents of TD children. I did not find differences in the degree of job satisfaction of parents of ASD children and parents of TD children. However, age seemed to have an influence on job satisfaction over time, with the latter reporting more satisfaction with increased age. PsyCap was a significant predictor of job satisfaction for both groups of parents, regardless of parental age. The findings add new information to the literature, especially as PsyCap in general and the relations of PsyCap to job satisfaction in particular have not been examined among parents of children with ASD.

On the practical level, as PsyCap is subject to change and development, the findings are of great importance. They point to the importance of preserving and developing the PsyCap of parents of children with ASD, so that they can feel satisfied with their work now and in the future. The study indicates that as the age of parents increases, the job satisfaction of parents of children with ASD decreases. Organizations and companies who employ parents of children with special needs in general and ASD in particular should take this into account and discuss with their employees their changing needs in order to maximize their job satisfaction over the years and give them room for training and professional development under flexible conditions so that they can advance in their work.

The implications of this study's findings extend beyond the occupational sphere, offering significant insights for policy-makers in education. Recognizing the unique challenges faced by parents of children with ASD, educational institutions can play a pivotal role in supporting these families. In light of the critical role of PsyCap in enhancing job satisfaction for parents of children with ASD, targeted interventions aimed at developing PsyCap elements—hope, self-efficacy, resilience, and optimism—are recommended. Educational policymakers and practitioners should consider implementing specialized training programs for these parents. Such programs could include resilience-building workshops, optimism training sessions, and strategies for enhancing self-efficacy, tailored specifically to the unique challenges faced by parents of children with ASD. Additionally, fostering a supportive educational environment that acknowledges and addresses these parents' unique needs can further augment their PsyCap, thereby improving their job satisfaction and overall wellbeing. By investing in the development of PsyCap among these parents, educational institutions can play a pivotal role in not just the educational success of children with ASD but also in the occupational and psychological wellbeing of their parents.

Limitations and future work

The study examined the research variables at one point in time; future studies may expand the data collection and examine alterations in the research variables over time. In addition, the study used quantitative data collected by questionnaires; a mixed-methods study could add qualitative information, for example, by using interviews. This type of information can help us understand the reasoning behind parental responses and the lived reality of parents of children with ASD, how they perceive and describe the challenges in their workplace and how their age affects the degree of satisfaction they feel in the workplace. An integrated investigation would also deepen the understanding of the contribution of positive psychological resources, primarily PsyCap, to day-to-day coping in the upbringing of a special-needs child, as well as the contribution to experiences in the workplace.

Another limitation of this study is the relatively low number of male participants compared to female participants. Although both groups of parents, those with TD children and those with children with ASD, included men who identified as the primary caregivers of their children, the overall male representation remains small. This imbalance might limit the generalizability of the findings across genders, especially considering the potential differences in job satisfaction and caregiving roles between mothers and

fathers. Future studies could benefit from a more balanced gender distribution among participants to explore any nuanced differences in the experiences of male and female primary caregivers.

Additionally, the study did not categorize children with ASD by the severity of their disorder, which could have provided more detailed insights into the differences between parents of ASD children and those of TD children. Furthermore, the research neglected to incorporate implicit stress indicators, impeding our insight into stress trends within this specific group. As many parents of special needs children face substantial stress, it would be prudent to incorporate this factor in subsequent studies.

Data availability statement

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

Ethics statement

All procedures followed were in accordance with the Ethical Standards of Standards IRB of the Institutional Committee. The studies were conducted in accordance with the local legislation and institutional requirements. The participants provided their written informed consent to participate in this study.

Author contributions

BH-L: Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Writing – original draft, Writing – review & editing.

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Emphasizing symbolic capital: its superior influence on the association between family socioeconomic status and adolescent subjective well-being uncovered by a large-scale multivariate network analysis

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Background: Family socioeconomic status (FSES) serves as a significant determinant for subjective well-being. However, extant research has provided conflicting evidence on the correlation between FSES and adolescent students' subjective well-being (SSWB).

Methods: Data were collected from 12,058 adolescent students (16 years of age) by the Programme for International Student Assessment (PISA) 2018. Multivariate canonical correlation and Mantel test were utilized to investigate the specific connection between FSES and SSWB. Furthermore, a Gaussian EBICglasso graph-theoretical model was used to capture the topological properties of the FSES-SSWB network and reveal the interplay among multifarious components of FSES and SSWB.

Results: FSES was positively correlated with SSWB. In the FSES-SSWB network, parental educational attainment and occupation status demonstrated the highest centrality values, thereby contributing significantly to the relationship between FSES and SSWB. However, family wealth, along with educational and cultural resources, displayed lower centrality values, signifying their weaker roles in this relationship.

Conclusion: Our findings suggest that symbolic capital, rather than family affluence, exerts a dominant influence on adolescent SSWB. In other words, SSWB may not be detrimentally influenced by a deficiency in monetary resources. However, it is more susceptible to being unfavorably impacted by inferior parental educational attainment and occupational standing.

KEYWORDS

students' subjective well-being, family socioeconomic status, adolescent students, symbolic capital, network analysis

1 Introduction

Feelings of subjective well-being (SWB) are especially sensitive in adolescence, which is a developmental period characterized by a variety of biological, cognitive, and social changes (Christie and Viner, 2005; Hanson and Chen, 2007). Consequently, numerous efforts have been made to explore ways to enhance SWB and guide the multifaceted development of adolescents (Park, 2004; Bowers et al., 2015; Kansky et al., 2016). For instance, the United Nations Educational, Scientific, and Cultural Organization (UNESCO) has prioritized the promotion of well-being among children and adolescents in its education strategy (UNESCO, 2016). Despite this, there is cumulative evidence that SWB in young students has been consistently declining worldwide (Marquez, 2021). A recent study revealed a steady decline in the SWB of American youth since 2012 (Twenge et al., 2018). Furthermore, similar issues are emerging in European regions, with one-third of 15-year-old students living in Organization for Economic Co-operation and Development (OECD) member countries reporting low life satisfaction (OECD, 2019). This phenomenon has been observed in Asia as well, with South Korean adolescent students experiencing low SWB (Yoo and Choi, 2016). In summary, a decline in SWB among students during adolescence is prevalent across different cultures. One promising theoretical explanation attributes this global decline in SWB to the socioeconomic disadvantages faced by students during adolescence, particularly in terms of family socioeconomic status (Bradley and Corwyn, 2002). Several lines of empirical evidence support this claim by demonstrating a strong link between higher socioeconomic status and enhanced SWB among adults (Lelkes, 2006; Sacks et al., 2012; Huang et al., 2017). Despite this evidence, little is known about whether this linkage could be generalized to adolescent students.

Numerous studies have consistently demonstrated that students' subjective well-being (SSWB) serves as a robust predictor of students' academic performance and mental health (Bortes et al., 2021; Tsouloupas and Voulgaridou, 2021; Cárdenas et al., 2022; Blasco-Belled et al., 2024). As previously stated, unexpected declines in SSWB place students at risk of experiencing poor performance, low self-esteem and psychological issues (Hair et al., 2015; Peverill et al., 2021; Szcześniak et al., 2021). Meanwhile, the existing studies illustrated that the subjective well-being among adolescents was not optimistic, with evidence showing that 4 out of every 100,000 of them died from suicide at home or even school per year (UNICEF, 2021). Hence, researchers are proactively exploring the risk factors contributing to lower SSWB, with particular emphasis on the impact of students' FSES on SSWB (Knies, 2012; Main, 2014; Manzoor et al., 2015; Yang et al., 2022). Typically, a student's FSES is gauged by amalgamating their family's wealth and cultural resources, along with their parents' educational and occupational status (Wong et al., 2022). Recent studies indicate a positive association between family socioeconomic status (FSES) and students' subjective well-being (SSWB), with higher FSES corresponding to increased SSWB (Wang S. et al., 2022; Wang Y. et al., 2022). However, inconsistencies exist within this area of research. For instance, an empirical study by Kim and Chung (2021) revealed no significant correlation between FSES and SSWB in adolescents (Kim and Chung, 2021). Furthermore, a separate study identified FSES as a negatively correlated factor with SSWB in adolescents ($r = -0.270$, Jurecska et al., 2012). Accordingly, the relationship between FSES and SSWB warrants systematic investigation and clearer elucidation to enhance our understanding and potentially improve SSWB.

One potential factor contributing to these inconsistent observations is the oversimplification of FSES and SSWB measurements. As previously mentioned, FSES and SSWB encompass a multitude of components, each measured heterogeneously, including wealth resources, as well as parental education level and occupation. To address these measurement-derived variations in traditional correlational models, the multivariate statistics could be a promising approach to examine these associations. Canonical correlation analysis (CCA) is a suite of multivariate statistical techniques utilized to ascertain linear relationships between variables from two distinct sets (Uurtio et al., 2018). Therefore, the utilization of CCA contributes to integrating all components of FSES and SSWB, thereby elucidating the relationship between FSES and SSWB in this study. Nonetheless, an inherent limitation of CCA is its inability to account for the intricate interplay among all elements within each set. Therefore, to compensate for this limitation, we employed network analysis following the CCA analysis. Network analysis offers a methodological approach to simultaneously depict the structure and interplay of multiple variables (Borsboom and Cramer, 2013). The unique configuration of the network enables the comprehension of intricate interrelationships among variables that traditional statistical methods cannot reveal (Jones et al., 2021). In this context, using CCA in conjunction with network analysis to delve into the intrinsic interplay between FSES and SSWB could provide primary evidence to elucidate this association in greater detail.

In the current study, we utilized CCA to elucidate the multivariate linear association between FSES and SSWB in a large-scale sample ($n = 12{,}058$) obtained from the Programme for International Student Assessment (PISA) 2018. This analysis separately modeled all the components of both FSES (e.g., family affluence, parental educational level, and parental occupation status) and SSWB (e.g., students' self-efficacy, emotional experience, and sense of belonging). Subsequently, we performed a Mantel test to analyze the network-based correlation among these components. To further probe how these components interacted, we conducted a large-scale multivariate network analysis and constructed a Gaussian EBICglasso graph-theoretical model to capture the topological properties of the FSES-SSWB network. In summary, the aim of the present study was to explore the precise association between FSES and SSWB and attempt to shed light on the underlying mechanism of the FSES-SSWB relationship to promote better SSWB.

2 Materials and methods

2.1 Data and participants

In the current study, we analyzed data from PISA 2018. The Organization for Economic Co-operation and Development (OECD) organizes this international project for adolescent students every 3 years. We used the PISA 2018 dataset in the present study because it not only offered a comprehensive framework for assessing global SSWB but also provided extensive details on FSES. This study has been formally approved by the Institutional Review Board of College of Education Science in Sichuan Normal University (IRB-20230906022).

TABLE 1 Description of students' subjective well-being variables.

Variable	Description
Growth mindset (GRM)	Students' beliefs that their abilities and intelligence can develop over time.
Meaning of Life (MLI)	Students' beliefs that their life have satisfactory significance and aspirations.
Self-efficacy (RES)	Students' beliefs regarding their pride in achievements, their capacity to navigate complex circumstances, their competency in multitasking, and their faith in their own resilience.
Fear of failure (FFA)	Whether students worry about others' opinions of them when they fail, whether they worry about their own abilities, and whether they doubt their future plans.
Attitudes toward competition (COM)	Whether students enjoy working in situations that involve competition from other people, whether it is important to outperform others in the task, or whether they work harder on the task compared to other people's level of competition.
Learning goals (LGO)	Whether students' goal is to learn to master as much of the class material as possible and to understand the content thoroughly.
Master work motivation (WMA)	Whether students are satisfied with working hard and improving their grades, whether they are sticking to tasks presented or endeavoring to master areas of potential weakness.
Student competition (COMPER)	Whether students at their school seem to value competition, whether they enjoy competing with each other, whether they feel they are always being used to compete with others.
Student cooperation (COO)/ (COOPP)	Whether students advocate collaboration, whether they collaborate with each other, whether they feel that collaboration is important, and whether they feel they are encouraged to collaborate with others.
Help others (HEO)	Students' perceptions about their reactions to bullying, their attitudes toward protecting their peers, their views on bullying, and their willingness to stand up for bullied students.
Positive feelings (AFP)	This index measures the frequency of students encountering positive emotions, encompassing happiness, liveliness, pride, joy, and cheerfulness.
Negative feelings (AFN)	This index measures the frequency of students experiencing negative emotions, including scared, miserable, afraid, and sad.
Life satisfaction (SAT)	Students' holistic assessment of their lives.
Sense of belonging (BEL)	Students' feelings about school relationships and integration, including their ease in making friends, their perception of being liked by others, their discomfort, feeling of alienation, and sense of loneliness at school.
Exposure to bullying (BUL)	Whether students have been bullied, threatened, excluded, or ridiculed by other students.

2.2 Measures

2.2.1 Students' subjective well-being

Subjective well-being (SWB) refers to individuals' affective experiences and cognitive assessments concerning their lives, based on the events that occur within them (Lucas and Diener, 2008; Jebb et al., 2018). Generally, SWB encompasses five elements: positive emotion, engagement, relationships, meaning, and accomplishment (Seligman, 2011). By refining the general concepts of SWB and the engagement, perseverance, optimism, connectedness, and happiness model (EPOCH) of adolescent well-being, students' subjective well-being (SSWB) emphasizes adolescent students' cognitive and emotional evaluation of their school life and experiences, including self-perception, emotional experiences, interpersonal relationships, feeling of belonging, and school atmosphere (Kern et al., 2016). Based on Diener's definition of subjective well-being and the dimensions of the EPOCH model, we incorporated 15 items into the subjective well-being questionnaire. Higher scores indicate stronger SSWB (see Table 1). The sample mean SSWB total score was 46.07 (SD = 7.35).

2.2.2 Family socioeconomic status

Family socioeconomic status (FSES) is a multifaceted conceptual construct encompassing various indicators, including income, education, and occupation, which reflect the tangible and intangible resources available to family members (Bradley and Corwyn, 2002). Typically, the measurement of a student's FSES involves synthesizing various indicators, including their family's wealth and cultural resources, along with their parents' educational and occupational status (Wong et al., 2022). In the current study, we utilized the FSES questionnaire which comprised a total of seven items based on the components. These items comprised two dimensions: education and occupation of parents, and familial resources, including wealth, educational and cultural resources. The sample mean FSES total score was 138.83 (SD = 41.59). Further details regarding this questionnaire can be found in Table 2.

2.3 Data analysis

2.3.1 Canonical correlation analysis (CCA)

Our study aimed to elucidate the association between FSES and SSWB, both of which were multivariate datasets. A simplistic approach seeking a univariate linear correlation and covariance between FSES and SSWB was insufficient for this study. Therefore, we employed CCA, which we felt was the best method to explore the association between FSES and SSWB. CCA is a technique that describes the linear relationship between two random variables and performs dimensionality reduction on multivariate data by maximizing the projection of variance within the same category (Hardoon et al., 2004). This study's variables consist of two datasets: the FSES dataset ([A], X) and the SSWB dataset ([B], Y). These datasets had a sample size of n and a dimension of m, resulting in sample matrices of

TABLE 2 Description of family socioeconomic status variables.

Variable	Description
Mother's education attainment (MIS)	Mother's the highest degree or educational level
Father's education attainment (FIS)	Father's the highest degree or educational level
Mother's occupational status (BMM)	Mother's main job
Father's occupational status (BFM)	Father's main job
Wealth resources (WEL)	The wealth resources variable includes information about the number of bedrooms and other material items.
Educational resources (EDU)	The educational resources include information such as whether there is a room of one's own to study, whether educational software is installed at home and the number of E-book readers.
Cultural resources (CUL)	The cultural resources include information on classic literature, books of poetry, works of art, books on art, music, or design in students' home.

$X = n_a \times m$ and $Y = n_b \times m$. Therefore, CCA could identify the underlying linear relationships between the two datasets by maximizing the projection of corresponding sample matrices X and Y onto projection vectors. To achieve convergence, we employed the traditional eigenvalue decomposition optimization method. This method involves taking the derivative of the projection vectors using the Lagrange theorem, optimizing the Lagrange multipliers, and obtaining the linear coefficients based on the square root of the maximum eigenvalue (Thompson, 1984).

We used IBM SPSS 27.0.1 to perform CCA on the FSES dataset (A) as the independent variable and the SSWB dataset (B) as the dependent variable in our study. First, we identified multiple pairs of linear combinations (U_i, V_i) from the two variable sets and analyzed the correlation coefficient $p(U_i, V_i)$ between them. Then, we selected the canonical correlation variables with the highest correlation coefficient. The utilization of the combination's canonical correlation coefficient could signify the correlation between the two variable sets. Finally, we revealed the specific information of the canonical variables through the application of canonical loadings.

2.3.2 Network analysis

With the rapid development of graph-theoretical statistics, large-scale network analysis has enabled integrated examinations of the interplay of multivariates (Epskamp et al., 2018). A network comprises nodes and edges, where nodes denote variables and edges symbolize their connections or interactions. After the network is constructed, analyzing it with various measures and techniques facilitates the provision of quantitative centrality indicators for each node, drawing upon the unique configuration of the network, enabling the comprehension of intricate interrelationships among variables that traditional statistical methods cannot reveal (Jones et al., 2021). Consequently, to determine the underlying patterns of the relationship between FSES and SSWB, we conducted a large-scale network analysis utilizing the R program (R Development Core Team, 2014). Within the network model, each variable from FSES and SSWB was conceptualized as a node, with the relationship between two nodes depicted as an edge (Epskamp et al., 2012). Least Absolute Shrinkage and Selection Operator (LASSO) and Extended Bayesian Information Criteria (EBIC) methodologies were employed to reduce edges within the network and select pertinent tuning parameters, thereby rendering the network more sparse and facilitating interpretation (Epskamp et al., 2012). We utilized the R packages *qgraph* (Epskamp et al., 2018) and *bootnet* (Epskamp et al., 2018) to visualize the network model, where green edges signified positive relations and red edges indicated negative associations.

2.3.3 Estimation of network centrality

To further elucidate the mechanism of the relationship within the FSES-SSWB network model, we quantified the significance of each node by computing the node's expected influence (EI) using the R package *qgraph* (Epskamp et al., 2012). Computation of EI has been deemed more suitable for networks comprising both positive and negative edges, as opposed to the traditional centrality index (i.e., node strength) in previous research (Robinaugh et al., 2016). The higher the node's expected influence, the more significant the variable was in the network model. The bridge expected influence was computed to discern bridge variables, utilizing the bridge function within the R package *networktools* (Jones, 2017). Nodes possessing higher bridge expected influence values exhibited enhanced capability in connecting one community to others, in contrast to bridges with lower expected influence values (Jones et al., 2021). To emphasize key variables, we focused our analysis on the top five variables with the highest EI values. All analyses related to R were performed using R version 4.2.3.

2.3.4 Estimation of network stability

We confirmed the robustness of the results using the case-drop bootstrap procedure in the R package *bootnet* (Epskamp et al., 2018). This procedure continuously removes cases from the original sample and recalculates the centrality index (i.e., expected influence) of the nodes in the network. If the centrality indices of the nodes exhibit minimal variation after the exclusion of a subset from the dataset, the network structure is deemed stable. Correlation stability coefficients (CS-C) value signified the highest proportion of cases that could be eliminated from the sample. Generally, the CS-C value should be no less than 0.25 and ideally above 0.50 (Epskamp et al., 2018). Subsequently, we deemed the difference between two strength indices as significant if the 1,000 bootstrap 95% nonparametric confidence intervals (CIs) did not encompass "0" (Epskamp et al., 2018). This test utilized 95% CIs to ascertain whether there is a significant difference in the weight of two edges or the strength of two nodes.

3 Results

3.1 Distribution characteristics of FSESE and SSWB

This study included a total of 12,058 Chinese students, with 5,775 females and 6,283 males. All participants were 16 years old. To estimate the distribution of actual total scores for SSWB, we used a k-s

nonparametric distribution test. SSWB displayed a statistically significant negative skew (Figure 1A). By using this test, we further demonstrated that FSES presents a pyramid-shaped pattern with three peaks (Figure 1B). Collectively, these results highlighted the low level of SWB among adolescents. FSES scores were distributed across high, middle, and low levels.

3.2 Multivariate correlations between FSES and SSWB

This study conducted a CCA to examine the specific relationship between FSES and SSWB and further analyzed the extracted components of the canonical correlation variables from the CCA. Results identified a significant positive correlation between the FSES and SSWB datasets, and four pairs of significant canonical correlation variables. As shown in Table 3, significant positive correlations existed between the four pairs of canonical correlation variables: U_1V_1 ($r=0.27$, $p<0.05$), U_2V_2 ($r=0.17$, $p<0.05$), U_3V_3 ($r=0.086$, $p<0.05$), and U_4V_4 ($r=0.066$, $p<0.05$). Notably, U_1V_1 demonstrated the strongest correlation, with the other pairs showing weaker degrees of correlation (Supplementary material). Hence, this study restricted its interpretation of the overall relationship to this pair of canonical correlation variables (U_1V_1).

Based on the canonical loadings, we identified the key components of the first pair of canonical correlation variables (U_1, V_1) (Tables 4, 5). In the U_1 dataset, which represented FSES, mother's educational level (MIS, $p<0.05$), father's educational level (FIS, $p<0.05$), mother's occupation status (BMM, $p<0.05$), and father's occupation status (BFM, $p<0.05$) exhibited the highest canonical loadings. Correspondingly, in the linear combination of variables in the student subjective well-being (SSWB) dataset, V_1, self-efficacy (RES, $p<0.05$), learning goals (LGO, $p<0.05$), helping others (HEO, $p<0.05$), and student cooperation (COOPP, $p<0.05$) exhibited the highest canonical loading, indicating their maximal contribution to V_1 (Figure 2). These results demonstrated that these variables are primary representatives of U_1 and V_1, and that they play a critical role in establishing the significant positive correlation observed in the CCA. Coupled with this evidence, we also observed a direct positive correlation between parents' educational level/occupation status and students' self-efficacy, learning goal orientation, and interpersonal interactions in school, highlighting their pivotal role in shaping SSWB.

3.3 Network-based interactions between FSES and SSWB

The foregoing CCA results provided robust evidence of a meaningful association between the two sets of variables: FSES and SSWB. To gain a comprehensive understanding of the complex interplay between FSES and SSWB, this study utilized network analysis to further investigate network-based interactions. Mantel test results revealed a statistically significant positive correlation ($r=0.86$, $p<0.05$, see Figure 3) between the two networks composed of all elements of FSES and SSWB.

3.4 FSES-SSWB network structure and centrality

Building on the above foundation, we integrated FSES and SSWB into an FSES-SSWB network to further clarify the intricate interplay among these elements (Figure 4). Out of 231 possible edges, 85 (37%)

TABLE 3 Canonical correlation coefficients.

Canonical variable	Canonical correlation	Wilks statistic	*p* value
U_1V_1	0.270	0.888	0.000
U_2V_2	0.166	0.958	0.000
U_3V_3	0.086	0.985	0.000
U_4V_4	0.066	0.992	0.000
U_5V_5	0.040	0.996	0.047
U_6V_6	0.037	0.998	0.122
U_7V_7	0.027	0.999	0.387

U_i denotes different linear combinations of all variables of FSES, and V_i represents different linear combinations of all variables of SSWB.

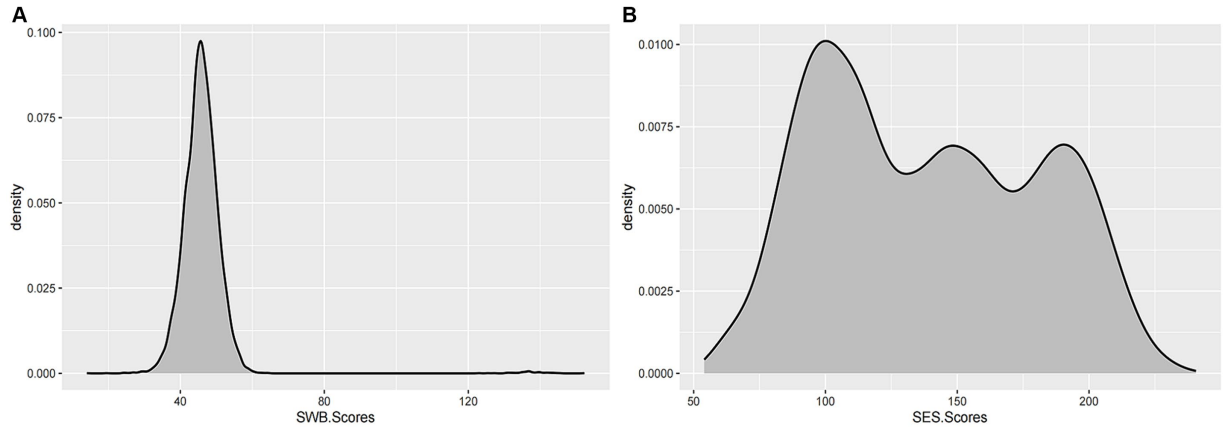

FIGURE 1
The distribution of SSWB **(A)** and FSES **(B)** for this dataset. The *x*-axis represents the total score for students' subjective well-being and family socioeconomic status, while the *y*-axis represents the density of their scores. The gray area in the legend denotes the distribution of scores.

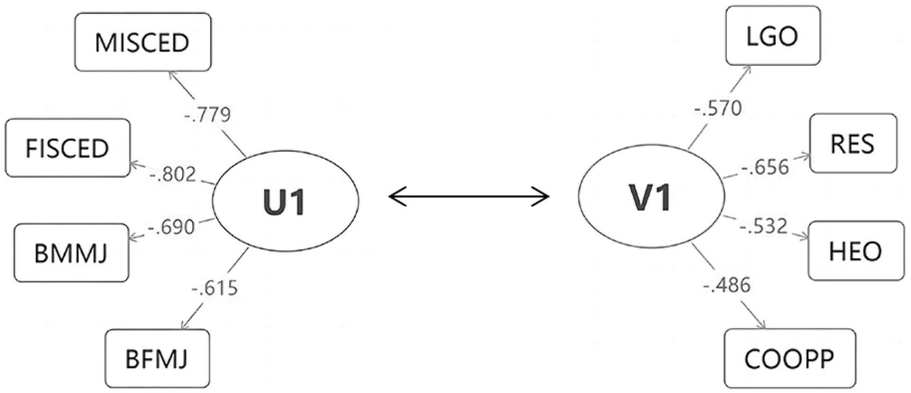

FIGURE 2
Analysis path for the results of CCA. The variables in the rectangle with the highest canonical loading among the first pair of canonical correlation variables (U_1V_1).

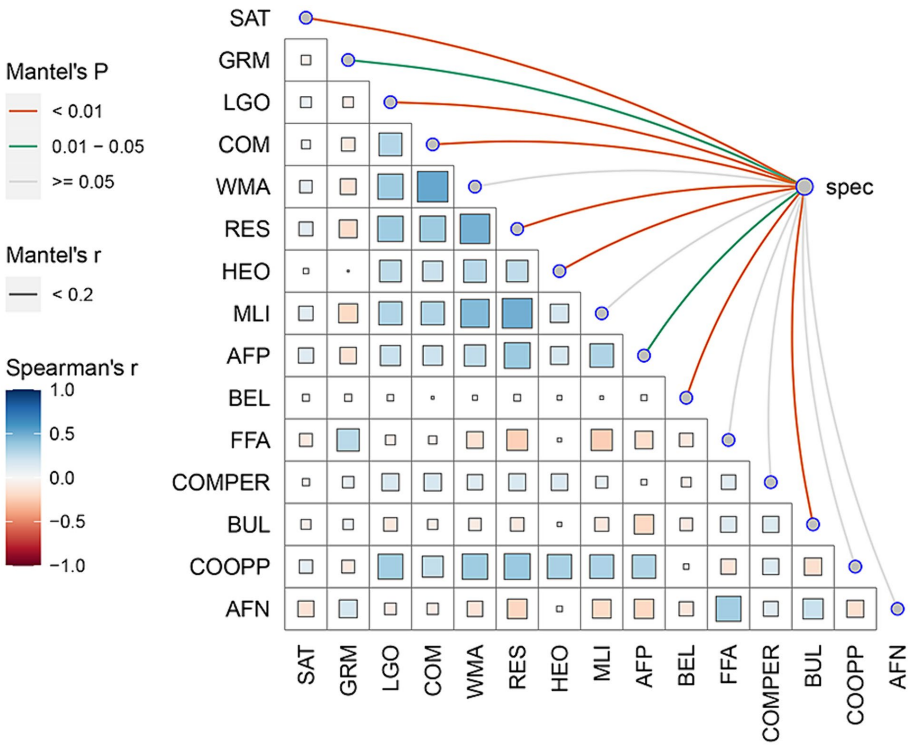

FIGURE 3
Heatmap of correlation coefficients between all variables of both FSES and SSWB. The heatmap colors represent the magnitude of the correlation coefficients. Darker colors correspond to higher correlation coefficients, indicating stronger correlations between the variables. The color scale is shown on the left side of the heatmap to indicate the range of correlation coefficients and their corresponding colors.

were nonzero, indicating that the FSES-SSWB network is sparse. These results add greater theoretical validity to the network and enhance the overall interpretability and meaningfulness of the findings. In this model, we discerned the 10 most prominent edges within the FSES and SSWB communities, encompassing four edges within the FSES community and six edges within the SSWB community. The edge between FIS and MIS was strongest, followed by edges MIS-BMM, FIS-BFM, BFM-FIS, SAT-GRM, COM-WMA, MLI-RES, AFN-FFA, FFA-GRM, and HEO-COO. The within-module connectivity of FSES and SSWB was stronger than their among-module connectivity.

Figure 5 displays the expected node influences within the entire network structure. The highest expected influence value was associated with MIS, followed by FIS, WMA, and RES. These results suggested that, in terms of variance explained, MIS, FIS, WMA, and RES exert the most influence within the entire FSES-SSWB network model. This finding aligns with the results from the above CCA, indicating the paramount importance of these variables in

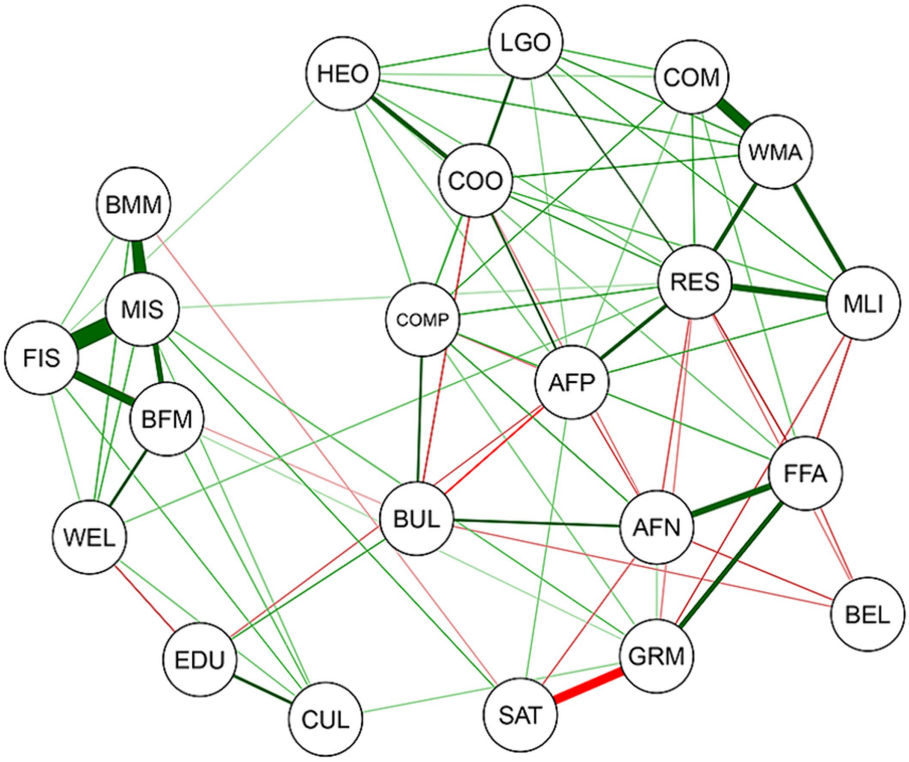

FIGURE 4
Network of SSWB and FSES. Nodes denote the variables of both FSES and SSWB. The green lines represent positive correlations. The edge thickness represents the strength of the association between nodes. GRM, growth mindset; MLI, meaning of life; RES, self-efficacy; FFA, fear of failure; COM, attitudes toward competition; LGO, learning goals; WMA, master's work motivation; COMPER, student competition; COO, student cooperation; HEO, help others; AFP, positive feelings; AFN, negative feelings; SAT, life satisfaction; BEL, sense of belonging; BUL, exposure to bullying; FIS, father's education attainment; MIS, mother's education attainment; BFM, father's occupational status; BMM, mother's occupational status; WEL, wealth resources; EDU, educational resources; and CUL, cultural resources.

establishing close connections within this network. Conversely, the impact of other FSES variables, such as wealth resources (WEL), cultural resources (CUL), and educational resources (EUD), was relatively marginal within the network.

The bridge centrality within the entire network structure is depicted in Figure 6. The variables demonstrating the highest expected influence values were students' cooperation (COO), occupational status of mother (BMM), occupational status of father (BFM), mother's education attainment (MIS) and father's education attainment (FIS). These results suggest that the academic achievement and occupational status of parents have a more significant influence than material resources within FSES indicators. Specifically, these data suggest they play a crucial role in regulating and bridging collaboration or interpersonal relationships among students within schools, thereby significantly impacting SSWB.

3.5 Network stability

In terms of the stability of network analysis, the expected influence exhibited excellent stability (i.e., CS-coefficient = 0.75). This suggested that even if 75% of the sample were to be dropped, it would not result in significant alterations to the network structure (Figure 7).

4 Discussion

In the present study, we examined a large-scale adolescent sample to probe the relationship between FSES and SSWB, utilizing CCA and network analysis. The findings of this study collectively revealed a statistically significant positive correlation between FSES and SSWB, as well as the unique importance of symbolic capital (parental educational achievement and occupation status) in shaping SSWB. Furthermore, graph-theoretical analysis indicated that symbolic capital, represented by parental educational attainment and occupational status, exerts a greater influence on SSWB than economic and material resources. This contradicts the common argument that "money can buy well-being" (Kahneman and Deaton, 2010; Killingsworth et al., 2023). Specifically, the lack of financial resources does not necessarily result in a reduction in SWB among adolescent students. Conversely, a lower level of parental educational attainment and occupational status may likely lead to a decreased level of SWB among students. This might suggest that possessing high symbolic capital (i.e., parental educational attainment and occupational status) can potentially enhance SSWB, rather than mere financial wealth.

The results from the CCA indicated a positive linear correlation between students' FSES and their SWB. In the CCA, we identified four pairs of significant canonical correlation variables, in which U_1V_1 (with U referring to FSES set and V referring to SSWB set) demonstrated the strongest correlation. Specifically, parental

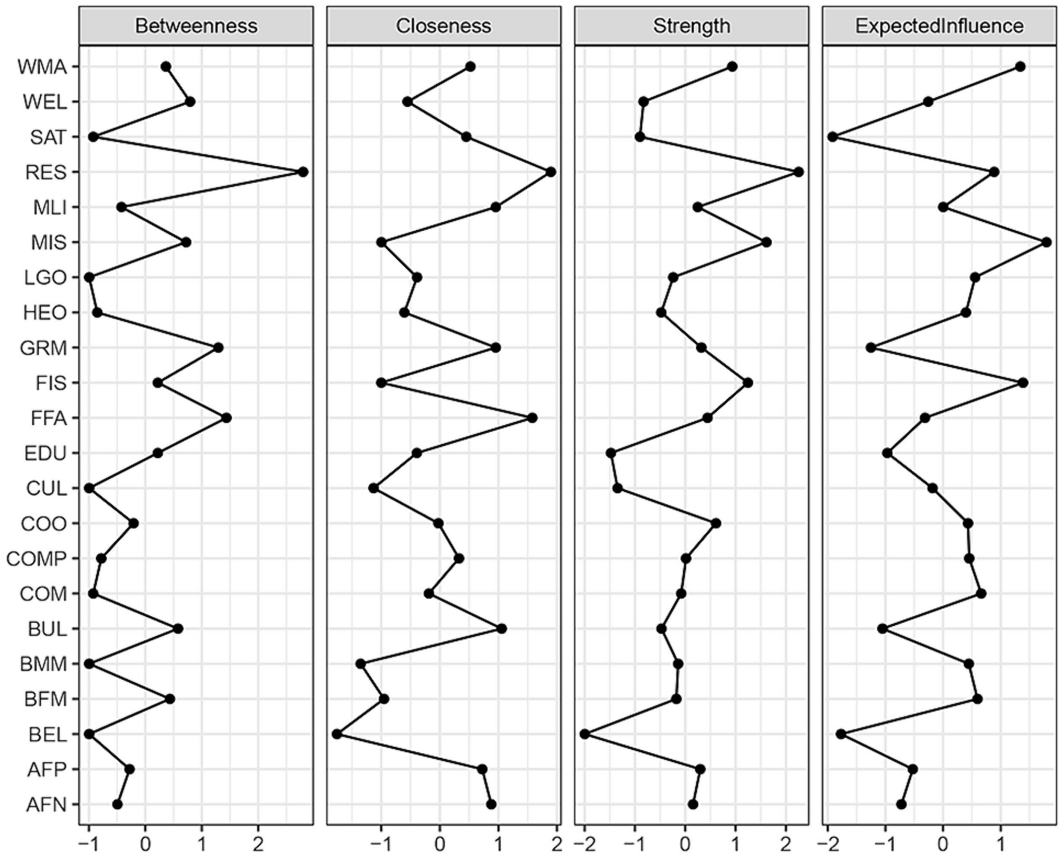

FIGURE 5
Node centrality in the network.

educational level and occupational status exhibited the highest canonical loadings in the U_1 dataset, providing preliminary evidence for the significant impact of parents' education and occupational status on the FSES-SSWB relationship. Considering the network-based interactions among the variables, we utilized a Mantel test to further investigate the FSES-SSWB correlation, thereby complementing the linear relationship established by the CCA. Mantel test results further confirmed a significant positive correlation between FSES and SSWB. Consequently, the current study provides robust evidence affirming the significant positive correlation between FSES and SSWB, supported by research that identifies FSES as a contributor to SSWB (Twenge and Campbell, 2002; Manzoor et al., 2015; Chen et al., 2016; Addae, 2020; Saunders and Brown, 2020; Treviño et al., 2021). However, this contradicts previous research suggesting a negligible or possibly inverse relationship between FSES and SSWB (Luthar, 2003; Yoo and Choi, 2016; Kim and Chung, 2021; Marquez, 2021; Wu et al., 2022). The discrepancy among studies could partly be attributed to the use of different measures for FSES and SSWB. Previous studies that used a single measure to model the FSES-SSWB relationship might have overlooked the complex interactions between the multivariate FSES and SSWB. Therefore, our study addresses the limitations of partial variable designs by employing multivariate analysis, enabling a more comprehensive and nuanced analysis. In summary, both multivariate linear and network-based analyses consistently demonstrate a significant positive correlation between FSES and SSWB.

To further understand the underlying mechanisms of the FSES-SSWB relationship, we incorporated all variables into the FSES-SSWB network. This allowed us to deconstruct the network's topological architecture, identify the central variables of this network model, and pinpoint the highly central nodes bridging FSES and SSWB. The expected influence centrality of nodes contributed to pinpoint specific variables that rendered significant contribution to the comprehensive FSES-SSWB network. Results indicated that the centrality value was highest for parental educational attainment, classified according to the International Standard Classification of Education (ISCED) (OECD et al., 2015). This finding implies that parental educational attainment plays a pivotal role in bridging the entire FSES-SSWB network. As posited in the intergenerational transfer of socioeconomic resources model, parental educational attainment is often a key driver of the impact of other FSES factors on offspring's SWB (Davis-Kean et al., 2021). Compared to other FSES factors, parents' educational level plays a unique role, enabling parents to seek, identify, synthesize, and evaluate information about their children's well-being (Davis-Kean et al., 2019), which subsequently leads to a high level of SSWB. For instance, existing literature denotes that highly educated parents are more likely to be equipped to handle stressful life situations (Reiss et al., 2019), more timely cope children's problems to reduce the risk of their mental health problem (Horoz et al., 2022; Xiang et al., 2024), help their children develop a positive self-image (Shifrer and Pals, 2021), and earmark a larger share of their budget for family trips, school supplies, and recreational activities (Kaushal et al., 2011). These

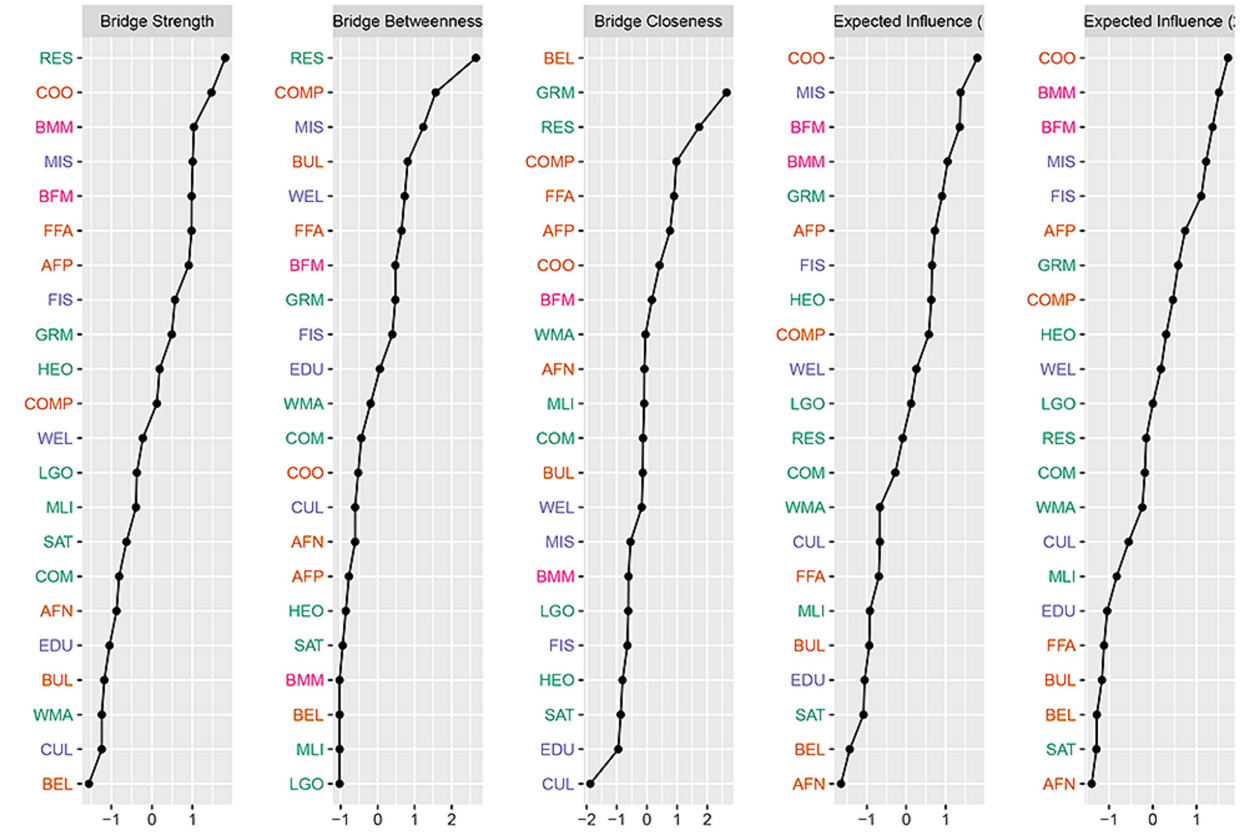

FIGURE 6
Bridge expected influence of students' subjective well-being and family socioeconomic status.

factors, in turn, contribute to increased SSWB and positive developmental outcomes for adolescents (Davis-Kean et al., 2019). Summarily, the results reveal that parents' educational level, considered as a form of symbolic capital (Bourdieu, 2002), occupies a more central position in the FSES-SSWB network. This suggests that symbolic capital, which bestows prestige and social status, may hold more sway over SSWB than material possessions or objective economic resources.

To shed light on how the FSES-SSWB network is connected, we examined the bridge centrality within this network to enhance our comprehension of the underlying mechanisms responsible for their interaction. Within the FSES-SSWB network, the nodes with the highest five bridge centralities were "parental educational attainment," "parents' occupation status," and "student cooperation." The classification of parents' occupation status was based on the International Standard Classification of Occupations (ISCO 08) (OIT, 2012). The term "student cooperation" refers to students' perception of the cooperative atmosphere among their peers, reflecting their interpersonal relationships at school. The findings suggest that parents' educational level and occupational status have stronger associations with components of SSWB, particularly student cooperation, than other FSES indicators, thereby establishing a connection between FSES and SSWB. As previous youth development research has indicated, adolescence is a crucial developmental period where peer relationships become a priority (Zhou et al., 2023). Peer relationships become more prominent during adolescence as they place greater importance on the expectations and acceptance of their peers (Xu et al., 2022). Adolescents' focus on cooperation and interpersonal relationships typically increases during this period (Lee et al., 2022). Furthermore, cooperative interactions with peers or active peer relationships can lead to improved psychological health and SSWB (Szcześniak et al., 2022). According to Bourdieu's Theory of Symbolic Domination, parents' educational level and occupational status constitute a form of symbolic capital, associated with prestige and social status (Boghian, 2013). Consequently, individuals often prioritize the pursuit, perception, and even reverence of social status over the acquisition of material resources like money or income (Wang et al., 2023). Moreover, schools may favor parents who possess rich social and cultural experiences, often associated with intellectuals and social elites (Kim et al., 2023). Therefore, students from families with higher parental education and occupational status levels may receive more attention from teachers and establish better teacher–student relationships (Lareau, 1987; Tan et al., 2020), which could ultimately enhance their SWB (Baker et al., 2008; Fang et al., 2023). These previous findings suggest that parents' educational level and occupational status are more influential than tangible possessions in shaping and bridging the relationship between FSES and SSWB.

In contrast, a hierarchical structure exists in adolescent social ecology. Adolescents can categorize or rank themselves or their peers based on sociodemographic status, power, or prestige (Rubin et al., 2006; Pattiselanno et al., 2015; Grapsas et al., 2021; Tuominen and Tikkanen, 2023). Adolescents may be more sensitive to, and influenced by, parental educational attainment and occupational

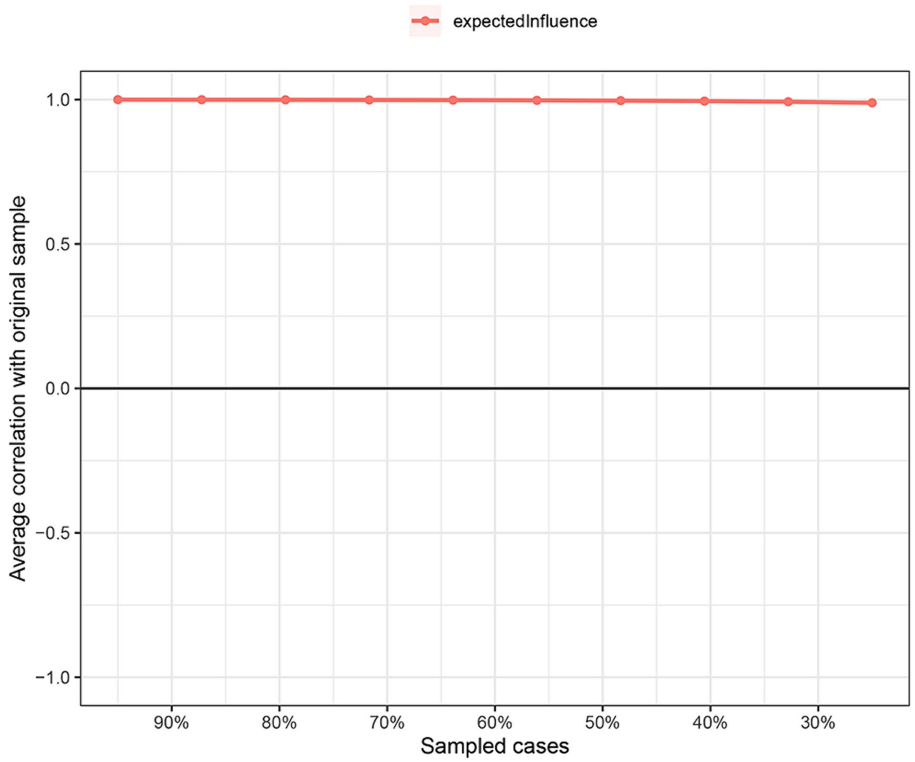

FIGURE 7
Stability of centrality indices by case dropping subset bootstrap. The *x*-axis represents the percentage of cases using the original sample. The *y*-axis displays the mean correlation between the original network's centrality index and the re-estimated network's index.

TABLE 4 Canonical loadings of U_1.

	Variable	Canonical loadings
U_1	GRM	−0.313
	LGO	−0.570
	COM	−0.368
	WMA	−0.364
	RES	−0.656
	HEO	−0.532
	MLI	−0.247
	AFP	−0.230
	BEL	−0.450
	FFA	0.071
	COM	−0.345
	BUL	0.349
	COO	−0.486
	AFN	0.013

TABLE 5 Canonical loadings of V_1.

	Variable	Canonical loadings
V_1	WEL	−0.566
	EDU	0.473
	CUL	−0.179
	MIS	−0.779
	FIS	−0.802
	BMM	−0.690
	BFM	−0.615

status, as these factors reflect position and prestige. As indicated by previous studies, parents with a low income but high educational attainment or occupational status have a stronger influence on their children's SWB compared to low-income parents with less education (Chen et al., 2002; Davis-Kean, 2005; Tighe and Davis-Kean, 2019). In conclusion, we deduce that parents' educational level and occupational status are more likely to predict and influence SSWB compared to material wealth.

To sum up, the current study highlights the pivotal role of symbolic capital in the network of FSES and SSWB, which has several implications for parent, youth organization and school. First, for parents, the finding encourages parents to actively pursue educational opportunities, not just for their own occupational advancement, but also for the indirect benefits on their children (Zhang, 2021). Furthermore, as we discussed above, such symbolic capital may function as the ability to seek, identify, synthesize, and evaluate information about their children's well-being. Therefore, parents should proactively engage in their children's educational activities, both in terms of quantity and quality, which may potentially mitigate the adverse effects of lower FSES on adolescent development and SSWB (Doi et al., 2020; Li and Guo, 2023). Second, as limited by

financial resources, those parents with low FSES may not be able to afford the cost of further education. Therefore, youth organizations should pay more attention to the pivotal role of parental educational attainment and offer educational resources in collaboration with the government, which may yield more substantial benefits than those focusing solely on economic resources (Ge, 2020; Zhang, 2021; Jin, 2022). Third, such symbolic capital is also associated with prestige and social status, leading to decreased SSWB for adolescent students with lower FSES, due to school's differential and unequal treatment (Montoro et al., 2021). Therefore, it is important for schools to strive to avoid disclosing the information regarding students' FSES and develop related policies. Furthermore, caregivers in the school (e.g., teachers) should also give fair attention to all students, irrespective of their FSES, to mitigate the adverse impacts of low FSES on their self-esteem, and foster positive, caring, and supportive environments and promote mutual assistance among students in learning and life (Tan et al., 2020).

5 Limitations and future directions

Despite novel findings in the current study, several limitations warrant caution. First, because the sample for this study was exclusively drawn from China, future research may explore the relationship between FSES and SSWB in a cross-cultural context. Second, using cross-sectional data cannot establish a causal inference for the interplay between FSES and SSWB. Future research could utilize longitudinal studies to better establish the causal relationship between FSES and SSWB. Third, FSES data distribution in this study was relatively skewed. However, this skewed distribution aligns with the real-world situation of wealth distribution in China, which follows a pyramid shape (Piketty et al., 2019). Therefore, future studies should include more balanced data samples from multiple cultures and regions to provide a more complete picture of the interrelationship between FSES and SSWB. Last, we narrowed the scope of this study to the adolescents aged 16, limited by the sample collection of PISA. Hence, examining the relationship between FSES and SSWB across adolescents of all ages could strengthen the reliability and generalizability of the findings among adolescent students.

6 Conclusion

The current study sheds light on the complicated network-based association between FSES and SSWB. The findings underscored that parents' academic achievement and occupational status are more important than material wealth (e.g., money) for SWB among adolescents. In other words, material abundance does not necessarily mean a high level of SWB; however, if parents have a low level of education attainment and occupation status, SSWB is more likely to be lower. Furthermore, students' peer relationships also play a key role in their SWB. Overall, this study provides evidence of a positive correlation between FSES and adolescents' SWB in school, primarily attributed to superior parental educational attainment and occupational status, rather than material wealth per se.

Data availability statement

Publicly available datasets were analyzed in this study. This data can be found here: https://osf.io/FRQ7Z at: DOI: 10.17605/OSF.IO/FRQ7Z.

Author contributions

YW: Formal analysis, Writing – original draft, Writing – review & editing. WL: Formal analysis, Writing – original draft, Writing – review & editing. XL: Writing – review & editing, Validation. QZ: Writing – review & editing, Validation. DL: Writing – review & editing, Conceptualization, Funding acquisition. ZC: Writing – review & editing, Conceptualization, Funding acquisition.

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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.2024.1335595/full#supplementary-material

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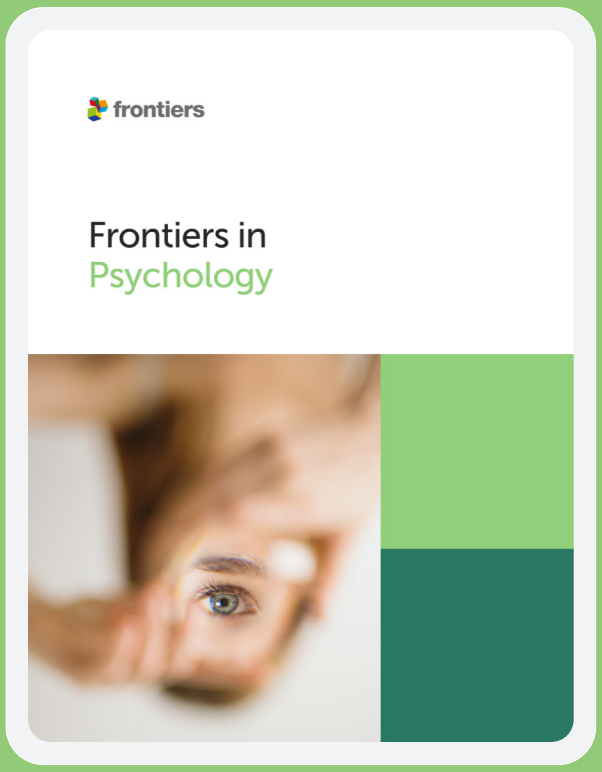

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