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ARTICLE

Pilot Study of a School-Based Parenting Intervention: Prevention of Emotional and Behavioral Problems among Chinese Children

Jin Peng, Jiabei He* and Na Li*

School of Humanities and Social Sciences, Xi'an Jiaotong University, Xi'an, 710000, China

*Corresponding Authors: Jiabei He. Email: 18398264813@163.com; Na Li. Email: 13484510566@163.com

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ABSTRACT: Background: Parenting exerts a profound influence on children's mental health and behavioral development. Despite the high prevalence of children's emotional and behavioral problems (CEBP) in China, evidence-based parenting interventions remain scarcely investigated as preventive public health strategies. This pilot study evaluated a school-based intervention for preventing CEBP. **Methods:** We employed a quasi-experimental design with propensity score matching (PSM) to select 28 families (intervention: n = 13; control: n = 15) from two matched urban primary schools. Quantitative data from seven validated scales were analyzed using *t*-tests and ANCOVA. Qualitative insights were derived from 10 semi-structured interviews via thematic analysis. **Results:** Compared to the control group, the intervention group demonstrated significantly greater improvements in CEBP (p = 0.020, Cohen's d = 0.92), parental adjustment (p = 0.031, Cohen's d = 0.80), parenting confidence (p = 0.003, Cohen's d = 1.04), and parent-child relationships (p = 0.001, Cohen's d = 1.46). Non-significant effects were observed for parenting style, parental relationship, and parenting conflict ($p > 0.05$). Qualitative analysis corroborated these findings and further identified contributing factors for non-significant outcomes, including challenges with measurement adaptability and inconsistent co-parenting practices. **Conclusions:** This pilot study suggests that an authoritative parenting style may be effective and culturally adaptable in China. Positive parenting interventions appear to mitigate CEBP by reducing risk factors and enhancing protective factors. However, improving parental relationships and parenting conflict may require targeted strategies. Given the pilot nature of this PSM-matched study (n = 28), the findings should be interpreted as exploratory and used primarily for intervention refinement.

KEYWORDS: Parenting intervention; children; school-based; China; emotional and behavioral problems

1 Introduction

Children's emotional and behavioral problems (CEBP) encompass emotional, behavioral, cognitive, and social issues that impair children's physical and mental health, as well as their social functioning during development [1]. This pervasive global concern imposes substantial personal and societal costs [2]. According to the *19th International Association for Child and Adolescent Psychiatry and Allied Professions (2010) report*, at least 30 million children and adolescents aged 0–17 years in China experience emotional and behavioral problems [3]. According to the *Mental Health in China (2023) report*, the rates of depression detection among high school, middle school, and primary school students were approximately 40%, 30%, and 10% respectively [4]. CEBP emerging in early childhood predicts difficulties extending into adolescence and adulthood, with profound short- and long-term consequences for the child, family, and society [5–7]. Thus, devoting attention and preventive efforts to children's health and developmental issues at an earlier stage

holds significant societal benefits [8]. As the family is a primary determinant of children's well-being, adverse family environments can hinder psychological and behavioral development [2]. Conversely, safe, nurturing, and positive parent-child interactions provide a critical foundation for healthy development [9,10]. Among the many driving factors of CEBP, parenting style represents a key protective element [10,11].

Parenting style is defined as a constellation of parental attitudes that collectively establish the emotional context in which behaviors are expressed [12]. Within this context, the parent-child relationship exerts a stronger influence on development than specific parental behaviors [13]. According to attachment theory, the quality of early caregiver-child attachment shapes children's internal working models of self and others, influencing their expectations of future relationships [14]. Positive parenting can enhance attachment security, mitigate early disruptions, and prevent socioemotional and psychological difficulties [15–17]. According to social learning theory, children acquire behavioral expectations by observing interactions with caregivers [18]. Parental encouragement, support, and collaborative negotiation foster positive socioemotional bonds and prosocial behavior while reducing the risk of CEBP [11,19,20]. Research from China has confirmed that responsive, appropriate parenting strengthens socioemotional bonds, promotes prosocial behavior, and lowers CEBP incidence [21–23].

Authoritative parenting (including high responsiveness and high demandingness) is considered the optimal parenting style for children's psychosocial development and academic performance, regardless of race, culture, family structure, and socioeconomic status [24]. Chinese and Western studies have demonstrated that adopting an authoritative parenting style is associated with positive outcomes for parent-child relationships, parents' psychological adjustment, and children's emotional and behavioral development [25–27]. Researchers also generally regard responsiveness, warmth, support, respect, and clear expectations as positive parenting attributes [28,29], whereas control, rejection, inconsistency, neglect, indulgence, and punishment are considered negative attributes [25,30,31]. Substantial cross-cultural empirical evidence has demonstrated that positive parenting can promote children's mental health and behavioral adaptation, whereas negative parenting can lead to adverse behavioral outcomes [26,28,32,33]. In China, a higher socioeconomic status is associated with a greater use of authoritative parenting, which has a positive influence on children's social behavior, psychological well-being, and academic outcomes [34,35].

While parenting interventions are prevalent in Western societies, significantly improving family interactions and addressing CEBP through skill-building [10,36,37], those meeting the "gold standard" criteria for CEBP prevention share core features [38]. These include a focus on family interaction dynamics [39], structured programs grounded in social learning theory [9,40], action-oriented behavioral parent training [39], problem-solving frameworks [41], and delivery by professionals or trained facilitators via individual/group formats (typically 8–12 weekly sessions) [42]. These features underpin the efficacy of interventions in reducing CEBP by enhancing family functioning and parenting practices [43].

In China, several parenting interventions have targeted CEBP [44–46]. Recent meta-analyses confirm the beneficial impacts of these approaches [42,47], with one suggesting that behavioral approaches (e.g., modifying child behavior through differential attention) may outperform relational approaches (e.g., improving parent-child relationship quality) [47]. Nevertheless, Chinese research in this area faces limitations. First, such studies emerged later than in Western countries, yielding few established models and limited empirical support [48]. Current interventions primarily test the feasibility of Western models in China [45,49] or target specific child behaviors [50,51]. Second, research disproportionately focuses on treatment and urban families, neglecting prevention and low-income populations. Most studies involve children with developmental disorders in urban settings [42,44,47]. However, CEBP prevention—emphasized as cost-effective and child-centered by UNICEF (2021–2025) and recent research [3,52–54]—is critical in China,

where lower socioeconomic status predicts passive parenting strategies that heighten CEBP risk [34,55]. Preventive interventions are crucial for mitigating the detrimental effects of poverty and advancing health equity, particularly in rural and low-income areas [8,33]. Third, while some Western interventions show efficacy in China, cultural differences in parenting preferences must be addressed [45,47,56]. Given Confucian emphases on knowledge acquisition, norm adherence, and discipline acceptance, Chinese parents often prioritize academic performance over socioemotional needs. This priority can lead to reduced emotional support, increased behavioral control, and a greater tendency toward authoritarian styles [57,58]. Consequently, Chinese parents typically emphasize the mastery of academic skills but may overlook the importance of emotional understanding [57]. Divergent social goals and cultural traditions necessitate culturally adapted interventions that reflect Chinese parenting characteristics [27]. Researchers must critically evaluate cultural adaptability and explore interventions suited to Chinese families [42].

The *Family Education Promotion Law of the People's Republic of China* [59] emphasizes the vital role of family-school collaboration in promoting children's emotional and behavioral development. Schools offer strategic settings for accessible, low-stigma parenting interventions [46]. The growth of family-school cooperation in China, along with the establishment of "parent schools", creates opportunities for school-based programs. Designing and evaluating culturally aligned, parent-centered, school-based interventions to prevent CEBP thus holds significant theoretical and practical relevance, particularly for low-income parents.

This pilot study aimed to evaluate the efficacy of a school-based parenting intervention—developed by integrating authoritative parenting principles with Chinese familial contexts—in preventing children's emotional and behavioral problems (CEBP). We hypothesized that: (1) The intervention group would demonstrate significantly greater reductions in CEBP severity compared to controls; (2) Intervention participants would show improved parenting style, parental adjustment, parenting confidence, and parent-child relationship quality. Exploratory analyses examined the effects on parental relationships and parenting conflict, although these were not primary targets given the intervention's focus on parent-child interaction dynamics. A mixed-methods design tested these hypotheses while identifying implementation barriers.

2 Methods

2.1 Experimental Design

We adopted a quasi-experimental design (two groups × two periods) within a mixed-methods approach that integrates quantitative and qualitative analyses. Quantitative data were collected by school personnel through a questionnaire comprising seven scales. Subsequently, researchers conducted semi-structured interviews to gather feedback from participants in the intervention group, given the small sample size of questionnaire responses [60]. Thematic analysis [61] was used to qualitatively assess changes in the intervention group and reveal the effectiveness of the intervention and directions for improvement.

The school-based parenting intervention in this study was implemented within the primary school setting. Researchers identified two comparable public primary schools (designated School A and School B for anonymity). At School A, 15 families were recruited and selected to participate in the intervention group. These families participated in family interviews and completed the family background and pre-test questionnaires. This data collection served three primary purposes: (1) to understand the basic information and needs of the intervention group participants; (2) to obtain necessary information for conducting propensity score matching (PSM); and (3) to establish baseline measurements for the intervention group. PSM was employed to create balanced groups with similar distributions of observed covariates [62].

The control group was selected using PSM from a larger pool of second-grade families (n = 223) at School B. These families also completed the family background questionnaire used for the PSM procedure.

Successfully matched families did not participate in the intervention but completed both pre- and post-test questionnaires concurrently with the intervention group. Cross-school matching not only improves comparability between the intervention and control groups and eliminates confounding factors in the experimental results [63], but also prevents spillover effects from parent communication within schools [64,65]. This approach ensures that the assessment of the intervention effect has high internal validity.

This study was approved by the Shaanxi Education Science Research Institute (Approval No.: SGH20Y1016; Date: 15 January 2021), which conducted a full ethics review as part of the project authorization process. This procedure is equivalent to that of the Institutional Review Board in the United States. All procedures exclusively involved adult parents; no minors participated directly in interventions or data collection. Written informed consent was obtained from each participant prior to enrollment, documenting the study's purposes, procedures, and rights. Regional education authorities supervised implementation in compliance with data confidentiality regulations.

2.2 Participants

To implement family-school co-education, a county education bureau and the author jointly developed this school-based parenting program to enhance parenting quality. Two public primary schools (School A and School B) were selected based on comparable demographics, including location, student enrollment, second-grade cohort size, teacher-student ratio, and teacher qualifications (Appendix A). Intervention group participants were recruited from families (n = 352) of second-grade students in School A. Inclusion criteria required: (a) Children aged 7–9 years; (b) No diagnosed behavioral/psychological problems; (c) Primary caregiver parents; (d) Parents without diagnosed psychological/behavioral illness; (e) ≥1 parent able to attend all sessions; (f) Parental literacy for curriculum tasks. Fifteen families were selected from a pool of 18 recruits to form the intervention group. The study experienced limited attrition, with two families withdrawing due to time constraints. The final sample (n = 13 children, aged 7–8 years) aligned with the recommended group sizes for parenting interventions [66] (Table A1).

The control group was drawn from second-grade families (n = 223) in School B. We excluded children with health problems, non-parental households, or divorced/separated parents. Propensity score matching (PSM) created 1:1 pair-matched families from Schools B and A.

Propensity scores were calculated using eight family background variables [67] (n = 212), including the child's age, gender, family structure, number of children, parental employment, household income, and parental education (both the father's and mother's). Using logistic regression and nearest-neighbor matching (caliper = 0.25 SD [68]), we obtained a balanced sample of 30 families (School A = 15, School B = 15) prior to attrition. The matching procedure was successful, with no significant differences in baseline characteristics between two groups (see Appendix B) (Table A2).

Post-matching, two intervention-group families withdrew before the baseline assessment due to scheduling conflicts (confirmed through follow-up contact). Baseline comparisons revealed no significant differences among the remaining groups, confirming that attrition did not affect group comparability or introduce systematic bias. Sample screening is detailed in Fig. 1, and group characteristics are presented in Table 1.

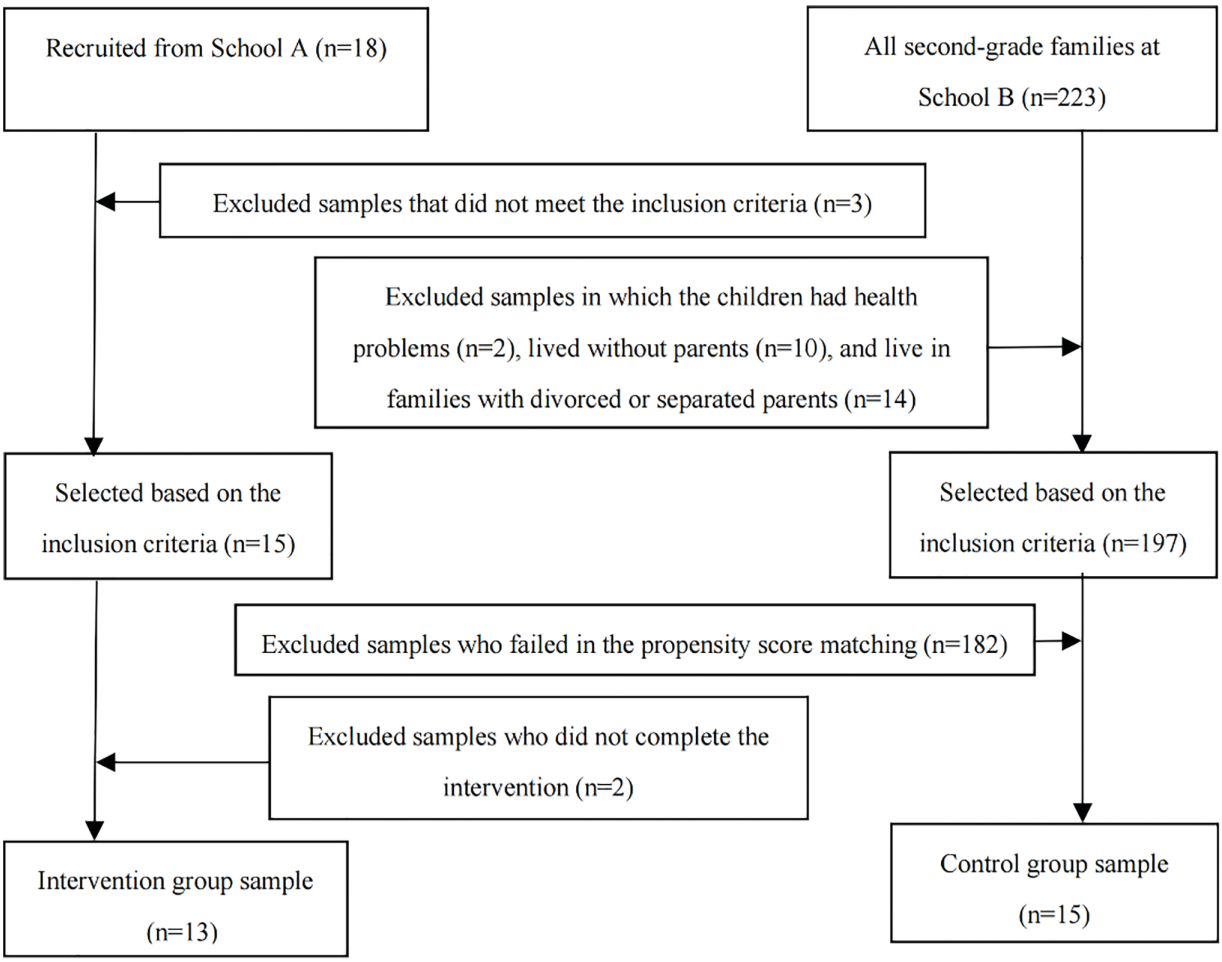

Figure 1: Sample screening flowchart

Table 1: Characteristics of the intervention and control groups after the PSM

Characteristics	Variable	Intervention (n = 13)	Control (n = 15)	*p*-Value
		M (SD)/n (%)	M (SD)/n (%)	
Child's age		7.31 (0.48)	7.33 (0.49)	0.89[a]
Child's gender	Male	9 (69.23%)	10 (66.67%)	0.60[b]
	Female	4 (30.77%)	5 (33.33%)	
Parents' gender	Father	2 (13.3%)	1 (6.7%)	0.44[b]
	Mother	13 (86.7%)	14 (93.3%)	
Family structure	Core family	3 (23.08%)	2 (13.33%)	0.43[b]
	Stem family	10 (76.92%)	13 (86.67%)	
Number of children		1.54 (0.66)	1.53 (0.52)	0.98[a]
Health status of children	Good	15 (100.00%)	15 (100.00%)	
Working parents	Double-worker	9 (69.23%)	12 (80.00%)	0.41[b]
	Single-worker	4 (30.77%)	3 (20.00%)	

(Continued)

Table 1 (continued)

Characteristics	Variable	Intervention (n = 13)	Control (n = 15)	*p*-Value
		M (SD)/n (%)	M (SD)/n (%)	
Income (per capita)	Below ¥5000	4 (30.77%)	4 (26.67%)	>0.99[b]
	¥5000–¥9000	3 (23.08%)	3 (20.00%)	
	Over ¥9000	6 (46.15%)	8 (53.33%)	
Father's education	Less than high school	2 (15.38%)	3(20.00%)	>0.99[b]
	High school	3 (23.08%)	3 (20.00%)	
	College and above	8 (61.54%)	9 (60.00%)	
Mother's education	Less than high school	1 (7.69%)	1 (6.67%)	>0.99[b]
	High school	4 (30.77%)	4 (26.67%)	
	College and above	8 (61.54%)	10 (66.67%)	

Note: SD, standard deviation; [a]Two-sample *t*-test; [b]Pearson chi-square test.

2.3 Measures

The intervention outcomes were evaluated based on quantitative data collected using a standardized questionnaire that contained seven scales measuring CEBP, parental adjustment, parenting confidence, parent-child relationships, parenting style, parental relationship, and parenting conflict. All the scales were administered in their Chinese versions, an English PhD expert performed meticulous translation checks to ensure the participants' full understanding of the questionnaire items. Before distributing the questionnaire, feedback was solicited from a pilot sample of 20 participants, leading to further refinements in the language and wording of the scales.

2.3.1 CEBP

The Strengths and Difficulties Questionnaire (SDQ) [69] is a 25-item scale assessing CEBP. It measures parents' perceptions of positive and negative behaviors in children aged 3–16. Each subscale score ranges from 0 to 10, with higher scores indicating a greater number of problems. The total difficulties score (0–40) is calculated by summing the scores of all subscales except for prosocial behavior, which is used to generate the strengths score. The SDQ can distinguish low- and high-risk samples. The severity degrees are as follows: emotional symptoms (0–3: normal, 4: borderline, 5–10: abnormal), conduct problems (0–2: normal, 3: borderline, 4–10: abnormal), hyperactivity (0–5: normal, 6: borderline, 7–10: abnormal), peer problems (0–2: normal, 3: borderline, 4–10: abnormal), prosocial behavior (6–10: normal, 5: borderline, 0–4: abnormal), and difficulties (0–13: normal, 14–16: borderline, 17–40: abnormal). The total difficulties score has adequate internal reliability ($\alpha = 0.76$) [69] and test-retest reliability ($r = 0.85$) [68]. This measure has been psychometrically tested in Chinese populations ($\alpha = 0.64$–0.74) [70]. For this sample, the Cronbach's alpha value of 0.73 indicated satisfactory internal consistency.

2.3.2 Parental Adjustment

The 42-item Depression Anxiety Stress Scale (DASS) [71] was used to assess the degree of parental depression, anxiety, and stress. Responses are rated on a four-point Likert scale (0 = not at all for me; 3 = very much for me). The three subscale scores are summed to derive the parental adjustment score. Higher scores

indicate greater levels of parental depression (0–9 normal, 10–13 mild, 14–20 moderate, >27 severe), anxiety (0–7 normal, 8–9 mild, 10–14 moderate, >15 severe), and stress (0–14 normal, 15–18 mild, 19–25 moderate, >26 severe). The scale has high reliability for the depression (α = 0.91), anxiety (α = 0.84), and stress (α = 0.90) subscales, as well as good discriminant and concurrent validity. It has been validated in mainland Chinese samples, showing adequate internal consistency (ranging from 0.76 to 0.79), adequate composite reliability (ranging from 0.72 to 0.80), and good discriminant and concurrent validity [72]. For this sample, the internal consistency of this scale was strong (α = 0.96).

2.3.3 Parenting Confidence

The 16-item Parenting Sense of Competence Scale (PSOC) [73] was used to assess parents' confidence and satisfaction with their parenting practices. The scale consists of two subscales: satisfaction and efficacy. Responses are rated on a six-point Likert scale (1 = strongly agree; 6 = strongly disagree), with some items of the efficacy subscale reverse-scored. Normative scores on the scale differ slightly by children's age and gender. Specifically, mothers' scores are 62.48–64.19 (total), 37.4–38.76 (satisfaction), and 24.79–25.69 (efficacy), and fathers' scores are 64.61–65.91 (total), 39.20–40.47 (satisfaction), and 24.95–25.77 (efficacy) [74]. The total score (16 items), satisfaction factor (9 items), and efficacy factor (7 items) demonstrate a satisfactory level of internal consistency (α = 0.79, 0.75, and 0.76, respectively) [74]. The scale has shown strong reliability in Chinese cultural contexts, with adequate internal consistency (ranging from 0.70 to 0.79) [75,76]. For this sample, the Cronbach's alpha value of 0.73 indicated satisfactory internal consistency.

2.3.4 Parent-Child Relationships

The Parenting Scale of the Parenting and Family Adjustment Scales (PAFAS) [77] includes a five-item parent-child relationship scale. The scale assesses the quality of the parent-child relationship through items such as "I chat/talk with my child", "I enjoy giving my child hugs, kisses, and cuddles", "I am proud of my child", "I enjoy spending time with my child", and "I have a good relationship with my child". Participants rate their responses on a four-point Likert scale (0 = not good; 3 = very good), with higher scores indicating a better parent-child relationship. The PAFAS has established validity in Chinese populations, demonstrating satisfactory internal reliability (α = 0.74) [78]. For this sample, the internal consistency of the scale was strong (α = 0.84).

2.3.5 Parenting Style

The Parenting Style Scale [79] is a 30-item questionnaire designed to assess coercive parenting and inadequate parenting behaviors. It consists of three subscales: laxness, over-reactivity, and verbosity. Responses are rated on a seven-point Likert scale (1 = ideal; 7 = least ideal), with reverse scoring applied to some items. Among non-clinic families, the mean scores for each subscale and the total score are as follows: laxness, 2.4 (standard deviation [SD] = 0.8); over-reactivity, 2.4 (SD = 0.7); verbosity, 3.1 (SD = 1.0); and total score, 2.6 (SD = 0.6). The scale demonstrates satisfactory internal consistency for both the total score (α = 0.84) and all three subscales (laxness: α = 0.83, over-reactivity: α = 0.82, verbosity: α = 0.79). Test-retest reliability is also good (α = 0.63). The scale has been validated in Vietnam and Hong Kong, China, showing adequate internal consistency (Vietnam: 0.70–0.85, Hong Kong: 0.64–0.78) [80]. For this sample, the internal consistency of the scale was strong (α = 0.83).

2.3.6 Parental Relationship

The five-item Relationship Quality Index scale [81] is used to assess the quality and satisfaction of the parental relationship. The scale consists of two subscales: quality (rated on a 7-point Likert scale: 1 = strongly disagree; 7 = strongly agree) and satisfaction (rated on a 10-point Likert scale: 1 = unhappy; 10 = very happy). The scores of the two subscales are summed to produce the parental relationship score, with higher scores indicating a higher quality and satisfaction in the relationship. Scores of 29 or less are indicative of relationship distress. The measure has demonstrated adequate internal consistency, with inter-item correlations ranging from 0.68 to 0.86. It has also been tested in Chinese populations, with internal consistency coefficients of 0.938 for husbands and 0.947 for wives [82]. For this sample, the internal consistency of this scale was strong (α = 0.93).

2.3.7 Parenting Conflict

The 16-item Parenting Problem Checklist scale [83] is used to assess whether parents experience conflicts in parent-child relations and demonstrate an inability to work as a team. The scale consists of two subscales (problem and extent), which indicate the frequency and intensity of parental conflict, respectively. Responses for the problem subscale are rated as "Yes" or "No", and those for the extent subscale are rated on a 7-point Likert scale (1 = never; 7 = always). For clinical purposes, scores above 5 on the problem subscale are considered to be within the clinical range, indicating the need for intervention. The scale exhibits moderately high internal consistency (α = 0.70) and high test-retest reliability (r = 0.90). We total the number of areas of disagreement the family has experienced in the last month, resulting in a score ranging from 0 to 16. For non-clinical Australian families, the mean is 2.59 (SD = 2.41), while for clinic families, the mean score is 5.71 (SD = 3.92). The scale has been validated in Hong Kong, China, with reliability estimates from 0.75 to 0.93 [78]. For this sample, internal consistency was strong for the problem (α = 0.86) and extent (α = 0.92) scales.

2.4 Intervention and Procedure

The school-based parenting intervention aimed to help parents adopt authoritative parenting concepts and develop new interaction strategies to improve parent-child relationships and guide children's behavior. Our curriculum framework integrated attachment theory and social learning theory through two dimensions (positive interaction and firm guidance) and four components (relationship bonding, emotional support, behavior training, and behavior management). The positive interaction dimension emphasized emotional bonding while teaching practical skills for emotional expression and parent-child engagement, countering the emotional restraint typical in traditional Confucian parenting. The firm guidance dimension focused on identifying the underlying logic and needs of children's behaviors, offering non-coercive practical skills to build positive habits and manage challenging behaviors. This explicitly targeted parent-child conflicts during socialization, particularly academic conflicts frequently experienced by Chinese parents.

The curriculum content encompassed concept introduction (such as positive and negative parenting styles), skill training (such as descriptive praise, non-violent communication, and natural and logical consequences), and case-based practice (e.g., tutoring homework, family dinner, and addressing mobile phone addiction). Moreover, we used participant co-design approaches and post-session assignments to capture practical feedback on parenting skills in real-life situations. To ensure effective delivery, we monitored the intervention process through attendance rates, in-class participation rates (measured by active questioning), and post-session feedback (as indicated by questionnaire completion) (Appendix C). The intervention was designed and implemented by a team of professional social workers, including two university professors (the first and third authors) and one PhD candidate (the second author). All team members received

comprehensive training in the fundamental theories of child and family studies, as well as social work group facilitation skills (Table A3).

The curriculum consisted of seven sessions involving four modules (three positive parenting courses, one parents co-design course, two parenting practice courses, and one final course) (Table 2). Participants visited Y school for seven group sessions once per week for 1–2 h (the last four sessions moved online due to COVID-19 stay-home orders). Following the intervention, 10 participants participated in semi-structured interviews to discuss their experiences with applying skills. One-to-one semi-structured interviews were conducted via video conference by the first author, with the second author documenting the interviews. Each 60-minute session required prior informed consent and permission to audio-record. Interview topics explored intervention objectives, parenting skill application, family changes, and program experiences (Appendix D). All procedures concluded in February 2022 (Table A4).

Table 2: Intervention sessions

Session	Intervention topic	Main contents
Session 1	Recognize authoritative parenting style	Communicate the main parenting goals of the family Explain how parental responses affect children's emotions Analyze the effects of parental demands on children's behavior List basic positive parenting requirements and precautions
Session 2	Relationship bonding and emotional support	Discuss how parent-child relationships affect child development Identify the types of companionship and communication children need Demonstrate positive feedback skills for children's behavior Practice and summarize positive parenting skills
Session 3	Behavior training and management	Explain the logic behind a child's good or inappropriate behavior Teach strategies for fostering children's socially desirable behaviors Select appropriate consequences for misbehavior Practice positive parenting skills and summarize
Session 4	Interim summary and co-design	Analyze case studies of Chinese parenting practices Exchange practical experiences and problems Evaluate the difficulty levels of various parenting skills Review and update family parenting goals
Sessions 5 and 6	New skills and co-design	Demonstrate daily implementation tips and pitfalls to avoid Develop new positive parenting strategies for emerging needs Exchange practical experience and problem-solving strategies
Session 7	Results and future	Summarize the lessons and parents' practical cases Provide recommendations and establish future expectations

2.5 Statistical Analysis

The quantitative data were analyzed using a *t*-test, chi-square test, and ANCOVA. The samples were found to be normally distributed and independent. Independent sample *t*-tests and chi-square tests were

used to test the balance of the variables between the intervention and control groups. Paired-sample *t*-tests and ANCOVAs were used to test the within- and between-group differences between the intervention and control groups. Effect sizes (Cohen's d) were interpreted as small (0.2), medium (0.5), and large (0.8), per convention. In addition, we conducted the non-parametric Mann–Whitney–Wilcoxon test to verify the robustness of the results. The quantitative data were analyzed using SPSS 26 (IBM Corp., Armonk, NY, USA).

The qualitative data were examined using thematic analysis, which is "a method for identifying, analyzing, and reporting themes in data" and is a valuable and reliable qualitative research method [61]. Two principal investigators (the first and second authors) independently conducted line-by-line coding of transcribed interviews, generating 126 initial codes through semantic coding of explicit behavioral descriptions (e.g., "praised after packing up the schoolbag") and latent coding of relational dynamics (e.g., "child shared his secrets"). Through three consensus discussions, the codes were grouped into 21 subthemes, with an 86% agreement rate. Discrepancies were resolved through a collective re-examination of the raw data, with the third researcher (the third author) verifying inconsistent themes. Through thematic integration, five themes were identified to reflect the core concepts across the interviews. The three researchers reached a consensus on the final themes, ensuring the credibility of the thematic analysis process.

3 Results

3.1 Quantitative Results

3.1.1 Pre- and Post-Test Results

Table 3 presents the pre-test results of the two groups. There were no significant differences in the scores of any of the variables (subscales not presented in the table). The results of the Mann–Whitney–Wilcoxon test confirmed the robustness of the results.

Table 3: Results of the independent *t*-test before the intervention-mean (SD)

Outcome	Intervention (n = 13)	Control (n = 15)	*t*-Value	*p*-Value
CEBP	10.7 (3.1)	10.7 (4.4)	0.02	0.986
Parental adjustment	20.5 (21.4)	17.6 (11.2)	0.45	0.655
Parenting confidence	64.4 (9.9)	63.6 (6.2)	0.26	0.801
Parent-child relationships	12.2 (2.9)	11.9 (2.7)	0.28	0.780
Parenting style	3.6 (0.4)	3.7 (0.3)	0.66	0.513
Parental relationship	38.6 (4.7)	36.1 (9.4)	0.92	0.367
Parenting conflict (problem)	3.3 (3.0)	2.8 (3.8)	0.39	0.704
Parenting conflict (extent)	34.0 (12.1)	30.0 (20.5)	0.62	0.543

Table 4 shows the post-intervention differences between the intervention and control groups. Compared with the control group, the intervention group exhibited significant positive changes in CEBP (p = 0.043, ES = 0.81), parenting confidence (p = 0.014, ES = 0.99), and parent-child relationships (p = 0.013, ES = 0.99), indicating a large effect size. In addition, the emotional symptoms subscale of CEBP (p = 0.047, ES = 0.79), the anxiety subscale of the DASS (p = 0.034, ES = 0.83), and the satisfaction subscale of parenting confidence (p = 0.019, ES = 0.95) showed significant differences, with medium to large effect sizes. Notably, the significance of CEBP (p = 0.043), the emotional symptoms subscale (p = 0.047), and the prosocial behavior subscale (p = 0.057) were close to 0.05, suggesting that the changes in CEBP require further validation. The

results of the Mann-Whitney-Wilcoxon test confirmed the robustness of the results, except for the anxiety subscale score (p = 0.058).

Table 4: Results of the independent t-test after the intervention—mean (SD)

Outcome	Intervention (n = 13)	Control (n = 15)	Difference (95% CI)	p-Value	ES
CEBP	10.1 (4.9)	13.9 (4.5)	−3.8 (−7.4 to −0.1)	0.043*	0.81
Emotional symptoms	2.2 (1.4)	3.5 (2.0)	−1.3 (−2.7 to −0.02)	0.047*	0.79
Conduct problems	1.6 (0.9)	2.1 (1.4)	−4.5 (−1.4 to 0.5)	0.321	0.38
Hyperactivity	3.9 (2.1)	4.9 (2.1)	−1.0 (−2.6 to 0.6)	0.209	0.49
Peer relationship	2.5 (1.9)	3.4 (1.5)	−0.9 (−2.3 to 0.4)	0.162	0.55
Prosocial behavior	8.5 (1.7)	7.0 (2.1)	1.5 (−0.04 to 3.0)	0.057	0.76
Parental adjustment	14.2 (13.5)	23.9 (14.4)	−9.7 (−20.7 to 1.1)	0.077	0.70
Stress	7.3 (6.5)	11.0 (5.5)	−3.7 (−8.3 to 1.0)	0.115	0.62
Anxiety	3.8 (3.8)	7.8 (5.7)	−4.0 (−7.7 to −0.3)	0.034*	0.83
Depression	3.1 (4.4)	5.1 (5.4)	−2.1 (−5.9 to 1.8)	0.285	0.41
Parenting confidence	66.5 (9.0)	59.5 (4.9)	7.0 (1.6 to 12.6)	0.014*	0.99
Satisfaction	34.9 (5.0)	30.1 (4.9)	4.8 (0.9 to 8.6)	0.019*	0.95
Efficacy	31.7 (6.4)	29.3 (4.6)	2.4 (−1.9 to 6.7)	0.270	0.43
Parent-child relationships	13.0 (2.1)	10.1 (3.5)	2.9 (0.7 to 5.1)	0.013*	0.99
Parenting style	3.6 (0.6)	3.7 (0.3)	−0.1 (−0.5 to 0.3)	0.626	0.19
Parental relationship	37.7 (6.0)	33.6 (8.6)	4.1 (−1.7 to 9.9)	0.162	0.55
Parenting conflict (problem)	2.2 (2.5)	2.5 (4.0)	−0.3 (−2.9 to 2.3)	0.808	0.10
Parenting conflict (extent)	30.8 (10.7)	33.3 (23.5)	−2.5 (−16.6 to 11.6)	0.715	0.13

Note: ES, effect size (Cohen's d). *p < 0.05, insignificant results not shown.

3.1.2 CEBP

The children in the intervention group showed a non-significant decrease in the CEBP score (Diff. = −0.6). The children in the control group demonstrated significant negative changes in the CEBP score (t = 2.62, p = 0.02), with a significant increase in the conduct problems (t = 2.86, p = 0.013) and hyperactivity subscale scores (t = 2.33, p = 0.035). The ANCOVA results indicated a significant effect of the intervention on the CEBP (F = 6.21, p = 0.02, ES = 0.92), with a large effect size. These results suggested that the children in the intervention group did not experience negative changes in emotion and behavior compared with those in the control group (see Table 5). The robustness test confirmed the same significant difference in the total scores for CEBP (p = 0.037).

Table 5: Within- and between-group means of the outcomes-mean (SD)

Outcome	Intervention (n = 13)			Control (n = 15)			ANCOVA		
	Pre	Post	Diff.[a]	Pre	Post	Diff.[a]	F	*p*-Value[b]	ES
CEBP	10.7 (3.1)	10.1 (4.9)	−0.6 (3.4)	10.7 (4.4)	13.9 (4.5)	3.2* (4.7)	6.21	0.020*	0.92
Parental adjustment	20.5 (21.4)	14.2 (13.5)	−6.3 (11.1)	17.6 (11.2)	23.9 (14.4)	6.3 (19.1)	5.2	0.031*	0.80
Parenting confidence	64.4 (9.9)	66.5 (9.0)	2.1 (5.8)	63.6 (6.2)	59.5 (4.9)	−4.1* (6.2)	11.23	0.003**	1.04
Parent-child relationships	12.2 (2.9)	13.0 (2.1)	0.8 (1.4)	11.9 (2.7)	10.1 (3.5)	−1.8** (2.0)	15.64	0.001**	1.46
Parenting style	3.64 (0.4)	3.62 (0.6)	−0.02 (0.4)	3.73 (0.3)	3.71 (0.3)	−0.02 (0.4)	0.02	0.901	0.00
Parental relationship	38.6 (4.7)	37.7 (6.0)	−0.9 (5.9)	36.1 (9.4)	33.6 (8.6)	−2.5 (9.8)	1.31	0.264	0.19
Parenting conflict (problem)	3.3 (3.0)	2.2 (2.5)	−1.1 (2.0)	2.8 (3.8)	2.5 (4.0)	−0.3 (3.2)	0.46	0.505	0.30
Parenting conflict (extent)	34.0 (12.1)	30.8 (10.8)	−3.2 (9.3)	30.0 (20.5)	33.3 (23.5)	3.3 (17.9)	1.02	0.321	0.45

Note: Diff:, Post-Pre; ES, Effect size (Cohen's d). *$p < 0.05$, **$p < 0.01$. [a]Paired-sample *t*-test; [b]One-way ANCOVA. Subscale scores of the variables are not presented in the table.

3.1.3 Parental Adjustment

The parents in the intervention group exhibited a statistically significant decrease in the stress subscale (t = −3.05, $p = 0.01$). The parents in the control group showed an increase in the parental adjustment scale (Diff. = 6.3), although this change was not statistically significant. The ANCOVA results indicated a significant effect of the intervention on the parental adjustment scale (F = 5.2, $p = 0.031$, ES = 0.8) as well as on the stress (F = 4.29, $p = 0.049$) and anxiety subscales (F = 7.41, $p = 0.012$). These results suggested that the parents in the intervention group had fewer psychological and emotional problems than those in the control group (see Table 5). The robustness test showed a consistent, significant difference in the anxiety subscale ($p = 0.037$), but not in the total score of parental adjustment ($p = 0.058$).

3.1.4 Parenting Confidence and Parent-Child Relationships

The parents in the intervention group showed an increase in parenting confidence (Diff. = 2.1) and parent-child relationships (Diff. = 0.8), but these increases were not statistically significant. The parents in the control group experienced significant negative changes in the total score of parenting confidence ($t = −2.58$, $p = 0.022$), the efficacy subscale ($t = −2.34$, $p = 0.035$), and the parent-child relationships ($t = −3.47$, $p = 0.004$). Furthermore, the ANCOVA results revealed significant differences in the parenting confidence (F = 11.23, $p = 0.003$, ES = 1.04), the satisfaction subscale (F = 8.16, $p = 0.009$), and the parent-child relationships (F = 15.64, $p = 0.001$, ES = 1.46) between the intervention and control groups. These results indicated that parenting confidence and parent-child relationships did not deteriorate in the intervention group as they did

in the control group (see Table 5). The robustness test yielded the same significant results for the total scores of parenting confidence ($p = 0.015$) and parent-child relationships ($p = 0.002$).

3.1.5 Parenting Style

The parents in the intervention group showed a non-significant decrease in parenting style (Diff. = −0.02, $p > 0.05$) (see Table 5). There was no significant difference in any parenting style scale between the intervention and control groups, and the robustness test confirmed these results ($p > 0.05$).

3.1.6 Parental Relationship and Parenting Conflict

The parents in the intervention group showed non-significant decreases in the parental relationship (Diff. = −0.9) and the parenting conflict (problem) (Diff. = −1.1), as well as the parenting conflict (extent) (Diff. = −3.2). In the control group, the parents exhibited non-significant decreases in the parental relationship (Diff. = −2.5) and the parenting conflict (Diff. = −0.3), but a non-significant increase in the intensity of the parenting conflict (extent) (Diff. = 3.3) (see Table 5). These findings were further supported by the robustness test, which yielded consistent results.

3.2 Qualitative Findings

Five themes related to the effectiveness of the intervention were identified from the 10 semi-structured interviews: (1) perceptions of parenting behaviors, (2) awareness of children's good behavior and misbehavior, (3) practice of positive parenting skills, (4) growth of parents and children, and (5) suggestions for programs and interventions. These themes are elaborated upon in the following sections, supported by direct quotations from the interview data.

3.2.1 Perceptions of Parenting Behaviors

All interview participants (n = 10) reported that the core principles of positive parenting—including egalitarian communication, emotional warmth, mutual respect, and affirmative language—reshaped their caregiving approaches. Influenced by traditional Chinese parenting norms from their upbringing, participants initially adopted negative parenting styles unconsciously. Practices such as criticism, yelling, punishment, and nagging led only to temporary child compliance and strained parent-child relationships. Recognizing the harmful effects of these negative behaviors motivated participants to change. They shifted from coercive control towards collaborative parenting strategies, improving their parent-child relationships.

> *P1 said, "I didn't reflect on myself before and was very strict, always yelling at my children and asking them to follow my rules. I realize that I need to change and adjust my education mode. . . ".*
>
> *P7 said, "At first, I was confused and didn't know why my child was like this, but now I feel that it is my problem. I felt it was not effective to spend time with my child before, and I didn't know my child's interests. . . ".*

3.2.2 Awareness of Children's Good Behavior and Misbehavior

Most participants (n = 9) reported that understanding behavioral logic and coping strategies enabled them to respond more effectively to their children's needs. They became better attuned to the underlying growth needs often signaled by misbehavior. Consequently, they actively created opportunities for demonstration, practice, and positive feedback, fostering a supportive environment. This heightened awareness boosted their parenting confidence and helped them manage their emotions calmly. Consistent, empathetic

responses built trust, improving communication and mutual understanding, highlighting the importance of equipping parents to address children's underlying needs.

> *P3 said, "I need to know what she needs and the purpose of doing so. Consider a good solution before tackling this problem. . . more patience and effective communication. . . I feel a greater understanding of her".*
>
> *P9 said, "I can also think before doing things, not speak loudly, and give my child a chance to respond when I talk to him. . . Our relationship has improved. . .".*

3.2.3 Practice of Positive Parenting Skills

All participants (n = 10) successfully applied relationship skills (e.g., company, communication, and praise), resulting in positive child responsiveness. Most participants (n = 6) employed behavioral skills (e.g., behavior guidance, natural consequences). Improved relationships and better management of misbehavior motivated them to continue using positive skills. However, practicing skills like logical consequences and rule-setting proved challenging; two parents requested more targeted guidance. Future interventions should address these specific challenges. Despite the difficulties, the overall experience was positive, with significant improvements in interaction noted. Participants effectively translated knowledge into experience, highlighting the critical role of empathy, emotional control, and positive reinforcement in creating a nurturing family environment.

> *P2 said, "On a rainy and cold morning, I accompanied my child to the outside class. Because it was not far away, we used to walk. But after going out, my child said he didn't want to walk and wanted to take a taxi. I said, 'We can get there in 5 minutes, but if we take a taxi, it could be late on rainy days.' He didn't listen and insisted on taking a taxi. He may have wanted to seek the right to decide things by himself, so I didn't stop him and let him decide for himself. As a result, we were late. But I didn't blame him later, leaving him to think for himself. After the second day of departure, my child told me he wanted to walk. It also makes me feel that I need to control my mentality in the future and leave the opportunity for my children to try and make mistakes".*
>
> *P3 said, "I often find better words when he writes and tell him, 'This word is perfect, you see, the strokes are very neat, and the shape of the whole word is also very beautiful. I know you can write well.' After listening to it, he was very happy and wrote his homework well all day".*

3.2.4 Growth of Parents and Children

All participants (n = 10) reported significant improvements in mental well-being, including reduced anxiety and better emotional control during challenges. They also became more aware of negative parenting styles and the importance of avoiding them. Most participants (n = 7) reported increased parenting confidence and reduced stress following improvements in their parent-child relationships. Notably, child behaviors demonstrated significant improvement: reduced procrastination (n = 7), improved habits (n = 5), and fewer tantrums (n = 2). Children also demonstrated greater communicative engagement (n = 6), sharing their thoughts and interests more openly. Parenting has emerged as a two-way interaction that promotes mutual growth through continuous communication, interaction, and feedback. Applying equal, kind and firm parenting styles significantly benefited most participants, boosting parental confidence and supporting children's independence and emotional regulation.

P7 said, "The biggest gain is the change in mentality, the acceptance of the use of strategies when they are not satisfactory, not anxious. I try to adjust and control my emotions, say fewer negative words, and discuss some things with my children".

P10 said, "He used to rely on adults, always looking for attention... Now, he has a sense of control over his life, solves problems independently, and loses his temper less".

3.2.5 Suggestions for Programs and Interventions

Given the intervention's short-term nature, refinements are needed. Some participants (n = 4) requested more detailed guidance, particularly on coordinating different methods. In addition, most participants (n = 8) highlighted a lack of support from their partners (usually fathers) or grandparents. Fathers' frequent absence from the intervention and parenting contributed to parental conflict and maternal burden. In intergenerational families, conflicting educational ideas with grandparents hindered cooperation. Therefore, promoting co-involvement and intergenerational collaboration is crucial in reducing barriers to intervention. The discussion elaborates on specific suggestions for future intervention design and content to better meet the needs of families.

P4 said, "My education level is low, and there is a lot of content in the course, but the time is short. I was unable to study this thoroughly".

P6 said, "There is no consensus with him (father), and he is unwilling to study. I don't know how to deal with the conflicts between our educational ideas".

P7 said, "It's still difficult for me to implement some rules at home by myself. The help of the father and grandparents is also vital. I don't know how to mobilize them to accept new knowledge and ideas".

4 Discussion and Implications

4.1 Discussion

This pilot study represents one of the limited school-based parenting intervention trials conducted in mainland China. Such interventions remain relatively scarce compared to Western counterparts or clinic/community-based programs in China [44–48]. The quantitative results indicated that the positive parenting intervention significantly improved CEBP, parenting confidence, parent-child relationships, and parental adjustment. However, no significant effects emerged for parenting style, parental relationships, or parenting conflict. Qualitative findings further revealed improvements in CEBP, parental confidence, parent-child relationships, parenting stress, and parental perceptions and behaviors.

These findings align with a recent meta-analysis demonstrating that positive parenting programs prevent childhood socioemotional-behavioral problems by enhancing parental confidence, adjustment capacity, and parent-child relationships [84]. Neither this study nor the meta-analysis detected significant intervention effects on parental relationships or reductions in parenting conflict. Although consistent with prior research, the small sample size may constrain generalizability. To bolster reliability and mitigate within-school spillover effects, we employed a quasi-experimental PSM design across two schools [63].

The intervention and post-test coincided with COVID-19 lockdowns, imposing sustained familial stressors. Final sessions transitioned online due to lockdown restrictions. Protocol adaptations (e.g., real-time chat, interactive modules) ensured the fidelity of the online intervention. This shift maintained attendance and enhanced engagement, with fathers notably utilizing chat functions to voice concerns (see Appendix C), demonstrating online delivery's potential to enhance accessibility. One systematic review further confirms

that online parent interventions during the COVID-19 pandemic achieve comparable efficacy to in-person delivery while maintaining high acceptability [85].

Empirical evidence from China and Singapore indicates that social distancing measures significantly increased parenting stress, disrupted parent-child interactions, and exacerbated CEBP, particularly anxiety, irritability, and hyperactivity [86–88]. Intervention group participants further reported pandemic-related distress in their post-class feedback, such as disrupted daily routines, remote-learning challenges, and adverse parenting practices. The control group showed significant negative changes in CEBP, parenting confidence, and parent-child relationships. Conversely, quantitative and qualitative evidence indicated meaningful improvements in parental stress reduction, parent-child relationships, and parenting confidence within the intervention group, despite non-significant changes in CEBP. This finding aligns with evidence that universal prevention programs primarily reduce risk factors for disruptive behavior (e.g., harsh parenting) while enhancing developmental outcomes [39].

Qualitative data provided critical insights for program refinement. Although quantitative measures did not capture changes in parenting style, qualitative findings report documented behavioral improvements. This discrepancy may stem from the intervention's brief duration, which is insufficient to alter established practices. Owing to Confucian cultural influences on parenting practices, short-term interventions (<6 months) often fail to facilitate new skill implementation [42]. Universal interventions additionally face floor effects, where no significant problems at baseline limit measurable reduction potential [39].

Measurement limitations may also explain null findings for parenting style. The Parenting Style scale primarily assesses coercive and inadequate behaviors rather than comprehensive practices. In collectivist cultures like China, self-reports are vulnerable to social desirability bias [89], and school authority pressures may have inflated parenting self-assessments, undermining validity. Thus, this instrument lacks sensitivity for detecting short-term changes in community samples.

Future studies should employ measurement tools validated for ordinary Chinese, such as the Parenting and Family Adjustment Scale [44,78]. Culturally grounded measure development remains imperative, as Western constructs may incompletely capture China's unique parenting dimensions [27]. Finally, multi-informant data (e.g., from both parents and teachers) could capture comprehensive perspectives. Consequently, extending the intervention duration while adopting sensitive assessment tools would better reveal the effects of parenting style.

Parental co-involvement is crucial for enhancing relational dynamics and mitigating parenting conflict. Although quantitative results were non-significant, deteriorating parental relationships in controls and qualitative reports underscore the necessity of dyadic engagement in conflict resolution. Despite the active recruitment of both parents, co-attendance proved challenging. The parents in the intervention group (usually mothers) reported limited spousal and grandparental support when implementing parenting skills, which exacerbated intergenerational conflicts and marital strain.

Family system theory [90] posits that families function through interdependent subsystems, where spousal cooperation underpins systemic stability, and alterations in one subsystem cascade through others. Consequently, interventions targeting individual parents struggle to sustain behavioral change [91]. Extensive evidence confirms the critical role of paternal involvement in establishing co-parenting relationships, influencing caregiver mental health, parental and parent-child relationship quality, intergenerational transmission patterns, and balancing extra-familial stressors [92,93]. Despite their developmental significance, Chinese fathers' traditional provider role (vs. caregiving expectations) [94] and rigid paternal identity norms systematically impede participation [93–95]. Global evidence confirms that paternal warmth, equity,

and non-violence enhance family well-being [96]. Additionally, frequent grandparental involvement—substantially exceeding Western levels—and resultant intergenerational conflict intensify implementation barriers [56,97].

Thus, promoting collaborative parenting and strengthening father involvement are essential for addressing these challenges in China. Evidence confirms that grandparent-inclusive interventions enhance caregiver mental health and reduce child behavior problems via structured relational components [98,99]. Key strategies to promote father engagement include (1) adopting strength-based paternal frameworks, (2) customizing content and delivery for fathers, and (3) training practitioners in father-inclusive methods [100]. Researchers should further explore consensus-building mechanisms adapted to China's sociocultural context.

4.2 Limitations and Implications

Several limitations warrant acknowledgment. First, the small county-based sample limits generalizability to broader Chinese populations. Future studies should verify the effects using larger, more diverse samples. Second, the absence of an RCT design limits causal inference, although the PSM-enhanced quasi-experimental design partially mitigates this limitation. Future work should prioritize RCTs. Finally, the lack of follow-up assessments prevents longitudinal evaluation. While this study focused on immediate validation and program optimization, future research should extend observation periods to capture the evolution of parenting style and the long-term impacts on the family, given the gradual nature of behavioral change. The objective of this study was to explore the effectiveness and feasibility of positive parenting intervention within a specific context. Future research efforts should further investigate this area to establish a strong evidentiary foundation.

These findings carry significant theoretical and practical implications. Results indicate that authoritative parenting frameworks are adaptable to Chinese families; however, participant heterogeneity in education and ability may challenge the efficacy of group interventions. Complex strategies (e.g., natural/logical consequences) demand precise situational sensitivity, suggesting future programs should incorporate: (1) extended duration, (2) tiered skill-building modules, (3) multimedia instructional supports (e.g., detailed manuals, instructional videos), (4) integrated case services, and (5) differentiated intervention groups based on participant characteristics. Moreover, supplementary modules addressing parental relationships and intergenerational conflict resolution may facilitate paternal participation and address distinctive parenting risks in China, particularly intergenerational caregiving challenges. The study further confirms the strategic value of school-based interventions with co-design components, where schools provide critical infrastructure for parenting programs [46] by enabling curriculum standardization tailored to primary school parents, ensuring robust participation through institutional channels, and sustaining support networks via school-linked parent communities. Significantly, the integration of group and case models proves effective for service delivery. Group formats create supportive environments that enable the non-judgmental sharing of concerns, peer interactions foster perspective transformation through the exchange of experiences, and case services provide individualized solutions for family-specific needs [2]. Practitioner flexibility remains essential, where collaboration with parents through formal interviews, course interactions, and feedback mechanisms enhances program responsiveness to local contexts while preserving core elements [10,101]. Consequently, future research should prioritize school-based settings, diversify intervention methods, and expand participatory co-design to identify optimal implementation pathways for effective interventions.

5 Conclusions

This pilot study evaluated a school-based parenting intervention in China to inform the development of future programs. The findings suggest that interventions grounded in daily familial interactions effectively

may mitigate children's emotional and behavioral problems (CEBP), confirming preliminary evidence for the cultural adaptability of authoritative parenting within Chinese families. Positive parenting interventions demonstrate the potential to improve parenting practices, parental adjustment, and parenting confidence, enhance parent-child relationships, and prevent CEBP. However, the sustainable improvement of parental relationships and parenting conflict resolution may require supplementary strategies that engage partners (typically fathers) and grandparents. Future research should investigate dynamic interrelationships among intervention duration, delivery modalities, content adaptation, and target populations in China to identify optimal models for societal benefit.

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Availability of Data and Materials: The data that support the findings of this study are available from the corresponding author, Jiabei He, upon reasonable request.

Ethics Approval: This study was approved by the Shaanxi Education Science Research Institute (Approval No.: SGH20Y1016; Date: 15 January 2021), an independent provincial body under the Education Department of Shaanxi Provincial Government with no institutional affiliation to the authors' university (Xi'an Jiaotong University). The institute conducted a full ethics review as part of the project authorization process. This procedure is equivalent to that of the Institutional Review Board in the United States. All procedures exclusively involved adult parents; no minors participated directly in interventions or data collection. Before the intervention, the participants voluntarily enrolled in the study, and informed consent was obtained from each participant. Written informed consent was obtained from each participant before any data collection took place. These steps ensured that all the participants were fully informed about the study's purpose, procedures, potential risks and benefits, and their rights as participants. In July 2021, administrators of the regional education authority, including the director and the presidents of the two schools, conducted a thorough review and approval of the study's measures to ensure the protection of human subjects.

Conflicts of Interest: The authors declare no conflicts of interest to report regarding the present study.

Appendix A

Table A1: School characteristics

Characteristics	School A (Intervention group)	School B (Control group)
Location	Urban setting	Urban setting
Student enrollment	2004	1059
Number of second-grade students	352	245
Teacher/student ratio	1:20	1:18

(Continued)

Table A1 (continued)

Characteristics	School A (Intervention group)	School B (Control group)
Percentage of teachers with a college education or higher	100%	100%
Percentage of teachers with a middle-level certificate or higher	40%	38%

Appendix B

Table A2: Propensity score matched sample characteristics (pre-attrition)

Characteristics	Variable	Intervention Group (n = 15)	Control Group (n = 15)	x^2 or t	p-Value
		Mean (SD)/n (%)	Mean (SD)/n (%)		
Child's age		7.27 (0.46)	7.33 (0.49)	$t = 0.39$	0.70[a]
Child's gender	Male	11 (73.33)	10 (66.67)	$x^2 = 0.16$	0.50[b]
	Female	4 (26.67)	5 (33.33)		
Family structure	Core family	5 (33.33)	3 (20.00)	$x^2 = 1.68$	0.20[b]
	Stem family	10 (66.67)	12 (80.00)		
Number of children		1.47 (0.64)	1.53 (0.52)	$t = 0.31$	0.76[a]
Work of parents	Double-worker	11 (73.33)	12 (80.00)	$x^2 = 0.19$	0.50[b]
	Single-worker	4 (26.67)	3 (20.00)		
Income (per capita)	Below ¥5000	4 (26.67)	4 (26.67)	$x^2 = 0.21$	>0.99[b]
	¥5000–¥9000	4 (26.67)	3 (20.00)		
	Over ¥9000	7 (46.67)	8 (53.33)		
Father's education	Less than high school	2 (13.33)	3 (13.33)	$x^2 = 0.34$	>0.99[b]
	High school	4 (26.67)	3 (20.00)		
	College and above	9 (60.00)	9 (66.67)		
Mother's education	Less than high school	1 (6.67)	1 (6.67)	$x^2 = 0.16$	>0.99[b]
	High school	5 (33.33)	4 (26.67)		
	College and above	9 (60.00)	10 (66.67)		

Note: [a]Two-sample t-test; [b]Pearson chi-square test.

Appendix C

Table A3: Participation rate

Session	Attendance rate	In-class participation rate	Post-class feedback rate
1	13/13	4/13	13/13
2	13/13	7/13	7/13
3	13/13	5/13	8/13
4	12/13	8/13	8/13
5	13/13	6/13	9/13
6	13/13	11/13	9/13
7	13/13	13/13	10/13

Appendix D

Table A4: Interview schedule

ID	Date	Time	Interview topics
1	2022-1-17	15:00–16:00	1. Objectives for the intervention
2	2022-1-19	9:00–10:00	e.g., Why did you decide to participate in the intervention?
3	2022-1-19	15:00–16:00	Has the intervention met your expectations?
4	2022-1-21	9:00–10:00	2. Application of parenting skills
5	2022-1-21	15:00–16:00	e.g., Which skills have you applied in the family?
6	2022-1-21	19:00–20:00	How effective have these skills been in your experience?
7	2022-1-24	9:00–10:00	3. Changes in the family
8	2022-1-24	15:00–16:00	e.g., Have you noticed any changes in yourself, your children, or
9	2022-1-26	9:00–10:00	other family members since the intervention began?
10	2022-1-26	15:00–16:00	4. Satisfaction with the intervention
			e.g., How satisfied are you with the intervention experience?
			What suggestions, challenges or issues do you have?

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