

A Study on the Influence of Father Involvement in Parenting on Young Children's Peer Interaction Ability

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Abstract

To investigate the influence of father involvement in parenting on the peer interaction competence of children aged 3-6 years, this study employed a mixed-methods design combining questionnaire surveys with semi-structured interviews. Forty fathers of preschool children from three public kindergartens in Hangzhou participated in the research. Quantitative data were collected using the Father Parenting Involvement Questionnaire and the Preschool Children's Peer Interaction Competence Questionnaire. These were supplemented by semi-structured interviews with fathers to gather qualitative data. The results indicate that father involvement in urban public kindergartens is generally at an upper-middle level. This involvement is characterized by the highest scores in the responsibility dimension, moderate scores in interaction, and the lowest scores in accessibility. Specifically, emotional accessibility represents the primary weakness in paternal parenting involvement. The peer interaction competence of preschool children is generally well developed, with prosocial behavior scoring the highest and social initiative scoring relatively low. Significant differences were observed across grades: Children in the middle class demonstrated significantly higher peer interaction competence than those in the junior and senior classes. A significant positive correlation was found between father involvement in parenting and children's peer interaction competence, with the accessibility dimension showing the strongest predictive power. Based on these findings, the study proposes targeted educational recommendations at three levels: the individual father, the family system, and kindergarten-home co-education.

Keywords

Father involvement in parenting, Accessibility, Preschool children, Peer interaction competence, Kindergarten-home co-education

Introduction

Peer interaction competence is a core component of preschoolers' socio-emotional development and lays an important foundation for children's later social adjustment and interpersonal adaptation [1]. The ages of 3 to 6 represent a critical developmental window during which family socialization shapes how young children initiate play, cooperate, and resolve conflicts with peers. Within family contexts, father involvement has garnered growing scholarly attention, challenging the long-held assumption that mothers act as the sole primary socialization agents for young children [2]. In contemporary urban China, policy frameworks advocate for equal, shared parenting responsibilities for both parents. Yet, many fathers still struggle to achieve deep-

level engagement, often limited by heavy work-related burdens and lingering traditional gender role norms [3]. Empirical research confirms that high-quality paternal participation benefits children's peer functioning. Responsive, emotionally available father-child relationships build children's inner security and social confidence, encouraging more active exploration within peer groups. However, not all paternal participation yields equivalent developmental gains. Recent multidimensional frameworks distinguish among the interaction, responsibility, and accessibility dimensions of father involvement. Accessibility refers primarily to psychological and emotional availability rather than mere physical co-presence, and it may carry unique

developmental weight for preschool-age children. Existing studies in the Chinese context frequently report overall positive correlations between father involvement and child social outcomes but rarely compare the differential predictive effects across these three sub-dimensions. Furthermore, quantitative large-sample surveys predominate, while small-scale mixed-methods research combining questionnaires and semi-structured father interviews remains relatively scarce.

Against this backdrop, the present study adopts a mixed-methods design. Drawing on a sample of 40 fathers from three urban public kindergartens in Hangzhou, it describes the current status and demographic group differences regarding multidimensional father involvement and preschoolers' peer interaction competence. It further explores the correlational and regression-based relationships among father involvement sub-dimensions, focusing on the unique predictive contribution of accessibility. By integrating quantitative outputs with qualitative interview narratives, this paper proposes practical suggestions targeted at individual fathers, family-system co-parenting, and kindergarten-home co-education. The aim is to enrich localized empirical evidence and provide practical references for fostering young children's peer interaction abilities.

Literature review

Definition of core concepts

(1) Father involvement in parenting

Lamb's well-known tripartite framework lays the conceptual foundation for modern father involvement research, distinguishing three interrelated dimensions: interaction, accessibility, and responsibility [4]. Interaction refers to direct, face-to-face father-child engagement, including caregiving, play, rule-setting, and conversational exchange. Accessibility - the construct highlighted in the present study - describes psychological and physical availability. Fathers are prepared to respond to their children's needs even in the absence of ongoing direct interaction, emphasizing emotional presence rather than mere physical co-presence. Responsibility covers indirect parenting tasks such as developmental decision-making, co-parenting collaboration, role model demonstration, and the proactive acquisition of parenting

knowledge.

This three-dimensional model avoids reducing father involvement solely to time spent with children. Quantitative time input does not guarantee quality engagement; a father may stay in the same room while remaining psychologically unavailable, yielding limited developmental benefits for the child. Drawing on this framework, the current study defines father involvement as fathers' behavioral participation and psychological-emotional investment in children's growth, covering both direct father-child exchanges and indirect supportive parenting practices.

(2) Preschool children's peer-interaction competence

Peer interaction competence reflects preschoolers' overall capacity to build, sustain, and adjust peer relationships within group contexts [5]. It consists of four key dimensions adopted in this research: verbal-nonverbal communication, prosocial behavior, social initiative, and social barriers. Prosocial behavior includes sharing, helping, empathy, and cooperative performance; social initiative captures children's willingness to approach peers voluntarily, initiate games, and express personal viewpoints. Social barriers refer to withdrawal, anxiety, and avoidance responses that hinder positive peer exchanges.

For children aged 3-6 years, the preschool period represents a formative window for developing such skills. At Ages 4-5 years, cooperative play expands rapidly, perspective-taking develops, and peer-related social skills advance most noticeably. Individual differences in peer interaction competence are shaped substantially by family socialization processes, among which paternal parenting practices deserve close scholarly attention.

Empirical research on father involvement and preschool peer-interaction competence

Existing empirical studies, both international and within the Chinese context, have confirmed meaningful links between paternal parenting quality and young children's peer functioning. High-quality father involvement predicts better prosocial tendencies and peer adaptation among preschoolers, independent of maternal parenting quality [6]. Fathers' distinctive play patterns, such as physically oriented playful interaction, offer children repeated practice in managing competition, emotional

arousal, and conflict negotiation - skills transferable to real-world peer group scenarios [7].

Nevertheless, not all forms of paternal participation produce equal developmental gains. Several studies have pointed out that accessibility (emotional-psychological availability) may exert stronger predictive power for children's socio-emotional outcomes compared with observable interaction frequency or self-reported sense of responsibility. Fathers who fulfill objective caregiving duties but fail to provide timely emotional responses are less capable of fostering children's social confidence.

Demographic factors further shape paternal parenting and children's peer performance. Fathers' educational level and occupational conditions influence actual involvement quality. Higher-educated fathers tend to adopt more reflective, child-centered parenting strategies, while fathers under heavy occupational pressure often struggle to maintain psychological accessibility despite subjective willingness to participate [8]. Research findings regarding child gender differences remain mixed across cultural samples. Many studies report that girls score higher on prosocial dimensions, yet overall peer competence gaps between boys and girls are often non-significant after controlling for family context [9].

Research gaps

Despite accumulated evidence documenting positive correlations between father involvement and peer competence, several notable gaps remain in the existing literature. First, many prior studies rely only on total score analysis of father involvement scales, without comparing the differential predictive weights of the interaction, accessibility, and responsibility sub-dimensions. The unique contribution of emotional accessibility has not been sufficiently examined within Chinese preschool samples. Second, most available evidence comes from large-sample questionnaire surveys. Small-scale, mixed-methods research combining questionnaires and fathers' semi-structured interviews is relatively scarce, limiting a deep understanding of the real-life practical barriers fathers face at home. Third, many investigations adopt single-source data; father-reported child social performance carries ecological validity for home-context observations yet may contain social desirability bias - a methodological limitation that

needs explicit acknowledgment.

This study addresses these gaps via a mixed-methods design. It compares the predictive effects across the three sub-dimensions of father involvement, collects both questionnaire data and paternal interview narratives, and explicitly discusses reporting bias when interpreting results.

Research design

Research purpose

The purposes of this study are threefold.

- (1) To objectively analyze the current status of father involvement in parenting by examining the extent of fathers' engagement in raising young children.
- (2) To explore the influence of father involvement on young children's peer interaction abilities through questionnaire surveys and interviews.
- (3) To provide evidence-based suggestions for promoting father involvement in parenting, derived from the findings of this study. Ultimately, it is hoped that this research will raise awareness among individuals and society regarding the importance of father involvement and offer practical guidance for fostering young children's peer interaction skills.

Research content

The specific research contents are as follows.

- (1) To analyze the current status of father involvement in parenting, describing its overall characteristics and group differences.
- (2) To examine the influence of father involvement in parenting on young children's peer interaction ability.
- (3) To integrate the analysis of the current status with the empirical research results, proposing targeted and actionable educational recommendations at three levels: fathers themselves, the family environment, and kindergarten education.

Research subjects

Using convenience sampling, participants were recruited from three public kindergartens in Hangzhou and consisted of 3-6-year-old preschool children and their fathers. One junior, middle, and senior class was selected from each kindergarten, resulting in 42 distributed questionnaires. Head teachers shared online Questionnaire-Star links in father-focused WeChat groups. The survey

introduction stated the study's objectives, assured anonymity and confidentiality, and required biological fathers to complete the questionnaires independently. Completion by proxies, such as mothers, grandparents, or other relatives, was prohibited.

Strict criteria for invalid questionnaires were applied, including: completion in less than 120 seconds, uniform or identical responses, more than 20.0% of items missing, or demographic inconsistencies suggesting the respondent

was not the father. After removing duplicate submissions and two invalid questionnaires, 40 valid responses remained, yielding an effective response rate of 95.2%. To compensate for the constraints of the small sample size, semi-structured interviews were conducted to provide qualitative data. This approach enabled quantitative-qualitative triangulation and strengthened the interpretability of the results. Participant demographic information is presented in Table 1 and Table 2.

Table 1. Basic information on child subjects.

Variable	Category	Number of people	Percentage (%)
Gender	Male	22	55.0
	Female	18	45.0
Grade	Junior class (3-4 years old)	13	32.5
	Middle class (4-5 years old)	14	35.0
	Senior class (5-6 years old)	13	32.5
Only child	Yes	27	67.5
	No	13	32.5

Table 2. Basic information on father subjects.

Variable	Category	Number of people	Percentage (%)
Educational background	Junior college and below	11	27.5
	Bachelor's degree	22	55.0
	Master's degree and above	7	17.5
Occupation	Government/institution/SOE	14	35.0
	Private enterprise employee	11	27.5
	Professional and technical personnel	8	20.0
	Self-employed/freelancer	7	17.5
Household registration	Urban	29	72.5
	Rural	11	27.5

Research Methods

(1) Questionnaire survey

Questionnaires were employed to collect data on paternal parenting involvement and preschool children's peer interaction competence for subsequent statistical analysis of their relationships.

Two self-report scales were adapted for this study. The Father Involvement Scale measured three core dimensions: interaction, accessibility, and responsibility, using a 5-point Likert scale (1=never to 5=always), with all items positively scored. Items were revised and reduced from the original instrument to a final set of 26 items (see Appendix). The adapted scale demonstrated strong psychometric properties: Cronbach's $\alpha=0.956$, split-half reliability=0.915, KMO=0.921, and Bartlett's test of sphericity $p<0.001$. Inter-dimension and dimension-total score correlations confirmed acceptable

construct validity.

The Peer Interaction Competence Scale was completed by fathers to assess their children across four dimensions: prosocial behavior, social barriers, verbal-nonverbal ability, and social initiative. Responses followed a 5-point Likert format (1=completely inconsistent to 5=completely consistent), with several items reverse-coded. After revision, the final version comprised 15 items, also provided in the Appendix.

(2) Semi-structured interview

Semi-structured interviews supplemented the questionnaire data by exploring fathers' perceptions of their parenting influence on their children's peer behaviors, daily father-child interactions, and real-world parenting patterns. Interviews were conducted using a combination of offline, face-to-face talks and online video calls to accommodate participants' geographic distribution and

time constraints, thereby supporting sample diversity. A unified interview outline ensured consistency and validity across all interview sessions in the Appendix.

Results

Descriptive analysis of the overall status of father involvement in parenting and young children's peer interaction ability

(1) Descriptive analysis of father involvement in parenting

This study conducted descriptive statistics on the parenting involvement questionnaire data of 40 fathers, and the results are shown in the following Table 3. The overall mean of father involvement was 3.80 (maximum =5), representing a moderately high level. Among the three dimensions, responsibility yielded the highest score ($M=4.01$), demonstrating that urban fathers generally recognize their parenting obligations and complete routine caregiving, role modeling, and co-parenting tasks.

Interaction ranked second ($M=3.76$), showing regular father-child contact with remaining potential to deepen interaction quality. Accessibility obtained the lowest score ($M=3.63$), identifying emotional responsiveness, sustained attention, and reflective parenting as the primary weakness in paternal engagement.

Fathers scored well on practical duties including role modeling, sick-childcare, co-parenting coordination, health monitoring, and play companionship. In contrast, low scores appeared for proactive behaviors such as parenting knowledge acquisition, seeking advice, reflecting on parenting practices, and maintaining remote emotional contact.

These findings suggest that while fathers reliably fulfill reactive parenting responsibilities, they lack initiative, reflective practice and sustained emotional engagement. Their parenting remains transitioning from situation-driven to growth-oriented involvement.

Table 3. Scores of each dimension of father involvement in parenting.

Dimension	Number of items	Mean (M)	Std. deviation (SD)
Responsibility	10	4.01	0.59
Interaction	10	3.76	0.68
Accessibility	6	3.63	0.71

(2) Descriptive analysis of the overall status of young children's peer interaction ability

In order to fully understand the development level of

young children's peer interaction ability, this study conducted statistical analysis on the children's interaction ability questionnaire, as shown in Table 4.

Table 4. Scores of each dimension of young children's peer interaction ability.

Dimension	Number of items	Mean (M)	Standard deviation (SD)
Prosocial behavior	4	4.32	0.49
Verbal and non-verbal communication ability	4	4.18	0.53
Social initiative	4	4.05	0.61
Social barriers (reverse-scored)	3	2.81	0.72

As can be seen from Table 4, the total average score of young children's peer interaction ability was 4.18, with the overall development at a good level. Among them, the prosocial behavior score was the highest, indicating that children generally possess positive social qualities such as politeness, sharing, cooperation, and caring for others, which is closely related to the daily social education in kindergartens and family guidance. The verbal and non-verbal communication ability was second, indicating that children's development in communication, expression, understanding others' intentions, and other aspects is relatively stable. The social initiative score was

relatively low, reflecting that children are still relatively lacking in actively initiating interactions, actively making friends with peers, and actively expressing their ideas, which is the main shortcoming in children's current social development. The social barriers score was low, indicating that children's overall social emotional state is relatively healthy, and problems such as social withdrawal and anxiety are not prominent.

Group difference analysis of father involvement in parenting and young children's peer interaction ability

(1) Gender difference analysis of children

In order to explore whether there are differences in father

parenting involvement and peer interaction ability among children of different genders, this study used independent samples t-test for analysis, and the results are shown in Tables 5 and 6 below.

Table 5. Comparison of father involvement in parenting among children of different genders.

Group	N	Mean±SD	t	p
Boys	22	96.48±14.80	0.690	0.495
Girls	18	92.68±19.37	/	/

As can be seen from Table 5, the difference test of father involvement in parenting among children of different genders showed that children's gender differences were

not significant in the total score and each sub-item. This indicates that children's gender did not have an obvious impact on fathers' parenting involvement level, reflecting the equal and active parenting concepts of contemporary urban fathers.

As can be seen from Table 6, girls scored significantly higher than boys in the prosocial behavior dimension ($p<0.05$), indicating that girls perform more prominently in caring for, comforting, and helping peers. In social initiative, verbal ability, and total score, girls scored slightly higher than boys, but the difference did not reach a significant level.

Table 6. Comparison of peer interaction ability among children of different genders.

Dimension	Boys (n=22), M±SD	Girls (n=18), M±SD	t	p
Social initiative	3.92±0.63	4.21±0.57	-1.523	0.136
Verbal ability	4.05±0.55	4.34±0.48	-1.789	0.082
Prosocial behavior	4.18±0.51	4.49±0.43	-2.105	0.042*
Social barriers	2.95±0.74	2.64±0.69	1.372	0.178
Total score	4.02±0.61	4.31±0.48	-1.727	0.092

Note: * $p<0.05$.

(2) Grade difference analysis of children

In order to examine the differences in father involvement in parenting and the development of peer interaction ability among children of different ages, this study conducted one-way analysis of variance (ANOVA) with junior class, middle class, and senior class as groups, and the results are shown in Tables 7 and 8.

Table 7. Comparison of father involvement in parenting among children of different grades.

Group	N	Mean±SD	F	p
Junior class	13	92.40±17.18	0.964	0.391
Middle class	14	91.00±19.55	/	/
Senior class	13	98.78±14.19	/	/

As can be seen from Table 7, there is no significant difference in father involvement in parenting among children of different grades. The results of the comparison indicate that the parenting involvement levels of fathers whose children are in each grade are broadly comparable. In other words, children across the various grades do not differ meaningfully in the extent to which their fathers participate in parenting. These findings suggest that grade level does not serve as a distinguishing factor in paternal engagement, and the involvement of fathers appears to remain relatively stable and consistent across the different grade groups examined in this study.

Table 8. Comparison of peer interaction ability among children of different grades.

Dimension	Junior class (n=13)	Middle class (n=14)	Senior class (n=13)	F	p
Social initiative	3.87±0.62	4.31±0.58	3.96±0.60	2.783	0.075
Verbal ability	4.02±0.54	4.39±0.51	4.13±0.52	2.196	0.126
Prosocial behavior	4.15±0.50	4.51±0.47	4.29±0.49	2.472	0.098
Social barriers	2.98±0.73	2.62±0.70	2.84±0.71	0.873	0.426
Total score	4.01±0.53	4.38±0.46	4.06±0.51	3.215	0.052

As can be seen from Table 8, the total score of peer interaction ability of middle-class children was marginally significantly higher than that of junior and

senior class children ($p=0.052$), indicating that the middle class stage is the critical period for the development of young children's peer interaction ability.

At this stage, children's cooperative games increase, rule awareness strengthens, language expression becomes more stable, and the social level shows a rapid upward trend. Junior-class children are still in the kindergarten adaptation stage, with relatively insufficient social experience. Although senior-class children are older, affected by the tasks of transition to primary school, their social ability development tends to stabilize. At the same

time, there is no significant difference in the parenting involvement level among fathers of children of different grades.

(3) Father educational background difference analysis

To test whether father involvement in parenting and young children's peer interaction ability differ across educational backgrounds, this study performed a one-way ANOVA, and the results are presented in Table 9.

Table 9. Comparison of father involvement in parenting among fathers with different educational backgrounds.

Dimension	Junior college and below (n=11)	Bachelor's degree (n=22)	Master's degree and above (n=7)	F	p
Interaction	3.35±0.71	3.87±0.65	4.02±0.62	3.892	0.029*
Responsibility	3.68±0.60	4.09±0.57	4.21±0.55	3.517	0.040*
Accessibility	3.21±0.73	3.72±0.69	3.91±0.67	3.645	0.036*
Total score	3.41±0.67	3.90±0.63	4.05±0.61	4.268	0.021*

Note: * $p < 0.05$.

As can be seen from Table 9, the total score and the scores of each dimension of father involvement in parenting showed an upward trend with the improvement of educational background, and the differences were significant ($p < 0.05$). Fathers with bachelor's and master's degrees or above performed significantly higher than fathers with junior college and below in interaction, responsibility, and accessibility. This indicates that fathers with higher educational levels have more outstanding parenting concepts and abilities, with higher initiative, quality, and stability of parenting involvement. As can be seen from Table 10, the total score of young children's peer interaction ability showed an upward

trend with the improvement of fathers' educational background, and the differences between groups were significant ($p < 0.05$). Post-hoc comparisons showed that the scores of young children's peer interaction ability under the parenting of fathers with bachelor's and master's degrees or above were significantly higher than those of the group with junior college and below. The difference between the bachelor's group and the master's degree and above group was not obvious. This indicates that the higher the fathers' educational level, the more scientific growth support they can provide for children, thereby positively affecting the development of children's peer interaction ability.

Table 10. Comparison of peer interaction ability of children under fathers with different educational backgrounds.

Group	N	Mean±SD	F	p
Junior college and below	11	3.81±0.52	3.517	0.040*
Bachelor's degree	22	4.12±0.47	/	/
Master's degree and above	7	4.28±0.50	/	/

Note: * $p < 0.05$.

(4) Father occupation difference analysis

In order to explore the differences in parenting involvement of fathers of different occupational types and the differences in their children's peer interaction ability, this study conducted statistical analysis by occupation group, and the results are shown in Table 11. Fathers with stable occupations (institutions, SOEs, professional and technical personnel) scored significantly higher than self-employed/freelancers in the

total score of parenting involvement and the accessibility dimension ($p < 0.05$). This indicates that fathers with regular working hours and relatively stable income can provide children with more stable companionship and emotional support. While fathers with flexible working hours and higher pressure are relatively insufficient in parenting involvement, indicating that occupational stability and time arrangement may be important factors affecting father involvement in parenting.

Table 11. Comparison of father involvement in parenting among fathers of different occupational types.

Dimension	Government/Institution/SOE (n=14) M±SD	Private enterprise employee (n=11) M±SD	Professional and technical Personnel (n=8) M±SD	Self- employed/Freelancer (n=7) M±SD	F	p
Interaction	3.95±0.66	3.68±0.69	3.89±0.67	3.37±0.70	2.315	0.092
Responsibility	4.15±0.58	3.98±0.60	4.09±0.59	3.62±0.61	2.573	0.069
Accessibility	3.82±0.70	3.59±0.72	3.75±0.71	3.18±0.74	2.781	0.055*
Total score	4.01±0.64	3.75±0.66	3.94±0.65	3.39±0.68	3.126	0.037*

Note: *p<0.05.

Correlation analysis between father involvement in parenting and young children's peer interaction ability

In order to reveal the internal relationship between father

involvement in parenting and young children's peer interaction ability, this study used Pearson correlation analysis, and the results are shown in Table 12.

Table 12. Correlation matrix between father involvement in parenting and young children's peer interaction ability.

Variable	Total father involvement	Interaction	Responsibility	Accessibility
Total peer interaction	0.581**	0.497**	0.528**	0.612**
Social initiative	0.517**	0.432**	0.475**	0.553**
Verbal ability	0.552**	0.468**	0.501**	0.587**
Prosocial behavior	0.593**	0.512**	0.546**	0.621**
Social barriers	-0.328*	-0.276*	-0.301*	-0.357**

Note: **p<0.01, *p<0.05.

As can be seen from Table 12, the total score and each dimension of father involvement in parenting were significantly positively correlated with the total score and each dimension of young children's peer interaction ability (p<0.01). This indicates that the higher the level of father involvement, the stronger the children's peer interaction ability. Among them, the accessibility dimension had the highest correlation with children's interaction ability, indicating that fathers' emotional availability, psychological support, and timely response are key factors in promoting children's social development. At the same time, father involvement was significantly negatively correlated with children's social barriers, indicating that under higher levels of father involvement, children are less likely to develop

maladaptive behaviors such as social anxiety and withdrawal.

Regression analysis of father involvement in parenting and young children's peer interaction ability

Based on the significant correlation identified between father involvement in parenting and young children's peer interaction ability in prior correlational analysis, this study proceeded to conduct simple linear regression to examine the predictive relationship between the two constructs. In this regression model, young children's peer interaction ability was defined as the dependent variable, while the total score of father involvement in parenting was treated as the independent variable to test its predictive effect. The detailed statistical results of this simple linear regression model are displayed in Table 13.

Table 13. Simple linear regression analysis of father involvement in parenting and young children's peer interaction ability.

Dependent variable	Independent variable	β	t	F	R ²	ΔR ²
Peer interaction ability	Total father involvement	0.581	6.327**	19.683**	0.337	32.0%

Note: **p<0.01.

As can be seen from Table 13, the father involvement in parenting variable with significant positive predictive power for "peer interaction ability" was the total score of

father involvement in parenting, and its predictive power for "peer interaction ability" was 32.0%. The regression model as a whole was significant (F=19.683, p<0.01),

and the regression coefficient of the total score of father involvement in parenting was $\beta=0.581$ ($p<0.01$). This indicates that the higher the level of father involvement in parenting, the stronger the children's peer social interaction ability, and there is a stable positive influence relationship between the two.

To further distinguish the independent predictive effects of the three sub-dimensions of father involvement

(accessibility, interaction, and responsibility) on young children's peer interaction ability, a multiple stepwise linear regression analysis was conducted. This analysis was based on the results of the preliminary simple correlation analysis. The three sub-dimensions were entered as simultaneous independent variables, with the total score of peer interaction ability serving as the dependent variable. The results are shown in Table 14.

Table 14. Multiple stepwise regression analysis of the three dimensions of father involvement in parenting on young children's peer interaction ability.

Dependent variable	Independent variable	β	t	F	R^2	ΔR^2	VIF
Total peer interaction ability	Accessibility	0.417	4.722**	16.351**	0.386	0.361	1.821
	Interaction	0.143	1.265	/	/	/	2.013
	Responsibility	0.185	1.611	/	/	/	1.947

Note: ** $p<0.01$; all VIF values are below 2.1, indicating no multicollinearity problem.

As can be seen from the multiple stepwise regression results, after controlling for the effects of the other two dimensions, only the accessibility dimension could significantly positively predict young children's peer interaction ability ($\beta=0.417$, $p<0.01$). The predictive effects of the interaction and responsibility dimensions were not significant. The adjusted R^2 of the model was 0.361, indicating that the three dimensions together can explain 36.1% of the variation in young children's peer interaction ability. This result further confirms the conclusions of the correlation analysis. Compared with actual interaction behaviors and fulfilling parenting responsibilities, fathers' psychological and emotional accessibility is the most core predictive factor in promoting the development of young children's peer interaction ability.

Discussion

The present study found that father involvement among sampled urban Hangzhou fathers reached an upper-middle level, characterized by the highest scores in responsibility, moderate scores in interaction, and the lowest scores in accessibility. While most fathers fulfil concrete caregiving, role-modelling, and co-parenting obligations, many remain confined to situation-driven, reactive parenting and lack proactive reflection and sustained emotional responsiveness. This pattern aligns with prior work noting that a high subjective sense of parental responsibility does not automatically translate

into psychological or emotional availability within Chinese urban families [10]. Even when fathers complete practical childcare tasks, limited psychological engagement may restrict the developmental benefits children can obtain from paternal participation.

Preschoolers in this sample demonstrated generally sound peer interaction competence. Children showed strong prosocial behaviour. However, social initiative stood out as the main developmental weakness. Qualitative interview excerpts suggested that overprotective remarks from grandparents may partly inhibit children's willingness to initiate peer contact. Most children exhibited low social barrier scores, indicating few severe withdrawal- or anxiety-related social problems. This pattern is consistent with cross-cultural preschool research showing that prosocial capacities develop earlier than active social initiation skills among young children [11].

Regarding demographic correlates, girls scored significantly higher on prosocial behaviour, consistent with documented gender-related differences in early empathy development, whereas overall peer interaction competence showed no substantial gender gap [12]. Middle-class (4-5-year-old) children displayed marginally superior peer interaction competence, supporting the view that ages 4-5 constitute a critical developmental window for preschool peer skills. Fathers' educational background positively predicted all dimensions of paternal involvement: Higher-educated

fathers tended to adopt more reflective, child-centred parenting practices [13]. In addition, occupational stability mattered: Fathers holding regular-hour, stable jobs achieved higher involvement and accessibility compared with self-employed or freelance fathers, whose parenting input was constrained by heavy work pressure and irregular schedules [14]. Work-family strain can erode fathers' psychological availability even when they hold positive parenting intentions, independent of their subjective willingness to engage with children [15].

Correlation and regression analyses confirm positive associations between father involvement and children's peer interaction competence. Notably, accessibility emerged as the sole statistically significant independent predictor after controlling for the interaction and responsibility dimensions. This reinforces the core argument that emotional and psychological presence outweighs mere physical companionship time. High-accessibility father-child bonds build children's inner security and social confidence. Fathers also offer unique social learning models through their play, negotiation, and conflict management styles. In turn, greater paternal emotional availability reduces children's social withdrawal-type barriers. These results echo international studies highlighting the primacy of emotional availability over the quantity of time spent with children.

Conclusion

Drawing on questionnaire and interview data from 40 father-child dyads in Hangzhou public kindergartens, this mixed-methods study yields the following key findings and practical takeaways. The sampled urban fathers demonstrate upper-middle levels of parenting involvement: their responsibility scores are the highest, interaction is moderate, and accessibility is the lowest. Many fathers complete practical childcare tasks but lack proactive reflection and sustained emotional engagement. The preschoolers exhibit adequate peer interaction competence, with strong prosocial behaviour but limited social initiative. Girls score higher in prosocial behaviour, and middle-class children demonstrate relatively better peer skills. Fathers with higher educational attainment and stable occupations report greater involvement.

Crucially, paternal emotional accessibility acts as the strongest independent predictor of children's peer interaction competence, proving more important than mere companionship time.

In practice, fathers should prioritize emotional responsiveness and high-quality parent-child interaction. Families require collaborative co-parenting and reduced over-protective grandparental interference. Kindergartens should deliver targeted social-emotional training and provide accessible, differentiated support for fathers.

This study is limited by its small, local sample, cross-sectional design, reliance on exclusive father self-report data (which is prone to social desirability bias), and the omission of potential family moderators. Future research should adopt larger, more diverse samples, longitudinal tracking, multi-informant assessments, and intervention studies to further clarify the relevant influencing mechanisms.

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Conflicts of Interest

The authors declare no conflict of interest.

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Appendices

Part 1 Background information survey

I. Basic Information of the Child:

1. Gender: Male ☐ Female ☐
2. Grade: Senior class ☐ Middle class ☐ Junior class ☐
3. Only child: Yes ☐ No ☐

II. Basic Information of the Father: (please tick “√” in the brackets according to the actual situation)

1. Your educational level (the father’s educational level):

- A. Junior high school and below
- B. Senior high school/technical secondary school
- C. Junior college/university
- D. Master’s degree and above

2. Your occupation (the father’s occupation):

- A. Government/institution/SOE employee
- B. Private enterprise employee
- C. Professional and technical personnel (doctor, teacher, lawyer, etc.)
- D. Self-employed
- E. Freelancer

F. Other (please specify)

3. Your monthly income (the father’s monthly income):

- A. RMB 3,000 and below
- B. RMB 3,001-6,000
- C. RMB 6,001-9,000
- D. RMB 9,001-12,000
- E. RMB 12,001 and above

4. Your household registration (the father’s household registration):

- A. Urban household registration
- B. Rural household registration

Part 2 Father parenting involvement questionnaire

Next, please evaluate the frequency of your engagement in the following activities over the past 12 months. For each statement, choose the response that most accurately reflects your real-life situation from the five response options: Never, Occasionally, Uncertain, Often, Always. Please place a check mark “√” in the cell corresponding to your selected option for each item.

Table A1. Father parenting involvement questionnaire.

No.	Item	Never	Occasionally	Uncertain	Often	Always
1	I correct my child’s wrong behaviors.					
2	I can go out with my child.					
3	I set an example by my own actions and serve as a role model for my child.					
4	To educate my child well, I read relevant books, newspapers, or magazines.					
5	I seek others’ advice on “how to be a good father.”					
6	I take time to chat with my child.					
7	I help my child choose extracurricular interest classes.					
8	In front of my child, I pay attention to my manners.					
9	When I am not with my child, I proactively contact him/her (by phone call, text message, etc.).					
10	I visit off-campus educational places with my child (such as science museums, libraries, zoos, etc.).					
11	I talk with my child about things that happen in his/her life.					
12	I talk with my child about things he/she is interested in.					
13	When my child needs to see a doctor, I take him/her there.					
14	I express emotions to my child through body language (such as hugging, patting the shoulder, touching the head, etc.).					
15	I play with my child at home.					
16	When my child needs it, I accompany him/her to go out.					

No.	Item	Never	Occasionally	Uncertain	Often	Always
17	In front of my child, I pay attention to my speech.					
18	I ask other people (family members, nanny, etc.) about my child's situation.					
19	I pick up and drop off my child.					
20	When my child is unwell, I take care of him/her.					
21	To educate my child well, I watch relevant TV programs.					
22	I pay attention to which activities my child often participates in.					
23	I cooperate with my spouse in raising my child.					
24	I cooperate with grandparents in raising my child.					
25	I pay attention to my child's physical development and health.					
26	I reflect on my own parenting methods.					

Table A2. Young children's peer interaction ability questionnaire.

No.	Item	Completely inconsistent	Relatively inconsistent	Uncertain	Relatively consistent	Completely consistent
1	Takes the initiative to introduce himself/herself to new companions					
2	Can make a correct evaluation of his/her own appearance and talents					
3	Never expresses his/her own opinions					
4	Is willing to help others					
5	Can organize a group of children to do activities together, put forward suggestions in the activities, and become the leader					
6	Can explain his/her own behaviors in accurate and concise language and defend himself/herself					
7	Can quickly understand peers' intentions					
8	Perceives peers' emotional changes and is considerate					
9	Can care for unhappy or hurt children, and sympathize with others' unfavorable situations (such as illness, disability)					
10	Gets familiar with people quickly upon meeting					
11	Has a sense of humor					
12	Can fully state his/her own name, gender, parents' names, work units, and home address					
13	Uses polite language					
14	Feels uncomfortable when with other children					
15	Has close relationships with 1-2 peers, cares about them, and misses them when they are not around					

Interview outline (Father)

Interview purpose:

Interview date:

Interviewee:

Interview content:

1. Do you think you have done well in participating in your child's upbringing? What is the reason?
2. Do you know about maternal parenting self-efficacy? Do you think your partner is confident in raising the child? How does this affect your participation in the child's upbringing?
3. How do you and the child's mother divide the work in the family?
4. What aspects of yourself do you think affect your child's peer interaction ability? Please give examples (e.g., educational level, occupation, personality, or others).
5. What aspects of your family do you think affect your child's peer interaction ability? Please give examples (e.g., family monthly income, family atmosphere, other family members' involvement in parenting, or others).
6. In your opinion, how can children's peer interaction ability be improved in family education?
7. If the kindergarten carries out family education activities in this regard, would you participate? If you participate, what content would you like to learn more about?

Transcript of father interviews

Speaker 1: Do you think you have done well in participating in your child's upbringing?

Speaker 2: Fairly well.

Speaker 1: Why is that? Could you briefly talk about it?

Speaker 2: Hmm, there's no particular reason. Parents should set an example by their own actions - parents should do it first for the child to see. Yeah, that's it.

Speaker 1: What aspects of yourself do you think affect your child's peer interaction ability, such as your occupation, personality, or others?

Speaker 2: There's no influence. I do Korean anti-aging (business), so I often take the child out to learn and participate in activities. Oh, okay. The child also often plays with other children.

Speaker 1: Okay, so it's your... probably your work, your occupation, that affects the child, such as

participating in more activities and socializing. Right? Yes. Okay.

Speaker 1: In your opinion, how can children's peer interaction ability be improved in family education?

Speaker 2: It's that both parents should be emotionally stable, allow the child to make more mistakes, criticize less, and encourage more.

Speaker 1: If the kindergarten carries out family education activities in this regard, would you participate?

Speaker 2: I'll participate if I have time.

Speaker 1: Okay, okay. Thank you.

Speaker 1: I'd like to ask whether you think you have done well in participating in your child's education and upbringing?

Speaker 2: Fairly well, I guess.

Speaker 1: Then how do you and the child's mother divide the work in the family?

Speaker 2: One is more serious, the other is less serious.

Speaker 1: Then what behaviors of your own do you think affect your child's peer interaction ability? For example, your occupation or your personality.

Speaker 2: Personality, I guess.

Speaker 1: Oh, could you be more specific about how it affects the child?

Speaker 2: Sometimes work is busy, and I don't have patience.

Speaker 1: Oh. What aspects of your family do you think affect your child's peer interaction ability? For example, the family atmosphere, or other family members' parenting styles, etc.

Speaker 2: Hmm, everything is fine.

Speaker 1: Could you be more specific?

Speaker 2: Well, it's all fine.

Speaker 1: Then in your opinion, how can children's peer interaction ability be improved in family education?

Speaker 2: Just communicate with him actively, be patient, and explain things to him.

Speaker 1: Mm-hmm. If the kindergarten carries out family education activities in this regard, would you choose to participate?

Speaker 2: Yes.

Speaker 1: If you participate, what content would you prefer the kindergarten to carry out?

Speaker 2: For example, they share some knowledge in

the kindergarten, some activities.

Speaker 1: Okay, okay. Thank you very much for participating in our interview. Thank you. Yeah, okay, okay.

Speaker 1: Do you think you have done well in participating in your child's upbringing?

Speaker 2: Average, just passable.

Speaker 1: Could you be more specific?

Speaker 2: Well, there's only one child now. In today's society, there are too many institutions that sell anxiety about education issues. As for what actually lands in practice - this kind of education - there's no saying...

Speaker 1: Then I'd like to know, you and the child's mother.

Speaker 2: Let me put it this way: I think many education issues need to be de-anxiousized. Many people say children should have this ability and that ability. Actually, in the process of children's growth, many abilities grow slowly; they don't grow the way adults demand. From preschool to primary school, many people are anxious now, all because preschool institutions sell anxiety. Some children learn abilities slowly because their own abilities haven't developed yet. If adults observe carefully and can find the problem, that's already quite capable; it's even harder to correctly figure out a way to solve it. So sometimes we think, rather than anxiously forcing children to learn this and that, it's better to give children a little time, let them train more, and have more happiness. But how to put it - you are an adult and he is a child; there will be some anxiety, more or less.

Speaker 1: Right - you see other children around have all done very well, but your own child may still have some shortcomings. May I ask how you and the child's mother divide the work in the family?

Speaker 2: Not good in this regard. There's no very specific division of labor. It's just that if my wife can't do it, I'll take over.

Speaker 1: Oh, okay. Then what aspects of yourself do you think may affect the child's peer interaction ability? For example, your occupation or personality.

Speaker 2: Occupation and personality - neither has any influence. My occupation is also a decent one, and my personality is fine. So actually, if you want to say these affect the child, I think half of it is society's fault.

Speaker 1: Mm. Then what aspects of your family do you think may affect the child's peer interaction ability? For example, does the family atmosphere have an influence?

Speaker 2: The family atmosphere has an influence; it will have more or less an influence. Sometimes when anxious, there will be quarrels, which definitely affects the child, and that's unavoidable. There's also anxiety about educational concepts, the child's own procrastination habits, and so on, which often exist. And now "happy education" is advocated; I originally quite agreed with it, but now I don't think so anymore. Due to the change in the world situation, I have somewhat disenchanted with Western education, concepts, and viewpoints.

Speaker 1: Then in your opinion, are there any better methods in family education, or what methods does your family use to improve the child's peer interaction ability?

Speaker 2: Oh, there's no special method. Because our child doesn't have any big problems in interaction, we've never paid attention to this.

Speaker 1: Oh, so the child is the outgoing, lively type?

Speaker 2: Yes. Lively and outgoing children don't have this problem. He can naturally blend into a group of people from the beginning. I tell you, some children are incompatible, and some children are easier to integrate with others. From external observation, this kind of child is more willing to compromise; only when they can compromise can they play together. Some children may be heavily spoiled at home, with everything done by the family. If others don't give way to them, they can't play. At first they may be able to play, but later they can't continue. That's the logic.

Speaker 1: May I ask whether your child is an only child or has siblings?

Speaker 2: An only child.

Speaker 1: Oh, okay. Then if the kindergarten carries out family education activities in this regard, would you participate?

Speaker 2: I'm the one who goes to all of them.

Speaker 1: Oh, you're very active. Thank you for being willing to accept our interview. Okay, okay, thank you. Yeah, okay, bye.

Speaker 1: Do you think you have done well in participating in your child's upbringing?

Speaker 2: How do you define “well” or “not well”?

Speaker 1: For example, whether you spend more time accompanying the child, or how well you do in the child’s education.

Speaker 2: Average.

Speaker 1: Okay. May I ask how you and the child’s mother divide the work in the family?

Speaker 2: How to put it in the family?

Speaker 1: I mean, how you divide the work regarding the child’s education and upbringing.

Speaker 2: The division regarding the child? Well, his mother tutors him in reading, drawing, and such things, and I’m responsible for the rest.

Speaker 1: Okay. Then what aspects of yourself do you think affect your child’s peer interaction ability? For example, your occupation, personality, or other aspects.

Speaker 2: Say it again; I didn’t hear clearly.

Speaker 1: Oh, what aspects of yourself do you think may affect your child’s peer interaction ability?

Speaker 2: Peer interaction means how he gets along with other children, right, yes. What aspects of mine do I think will affect his interaction with peers? Hmm, maybe communication.

Speaker 1: Then, for example, does your occupation or personality have an influence on the child?

Speaker 2: I don’t think occupation has much influence, but personality definitely does.

Speaker 1: Okay. Then what aspects of your family do you think will affect his peer interaction ability? For example, the family atmosphere, or the influence of other family members on the child - is there any?

Speaker 2: The family definitely has influence. For example, grandparents may often remind him, “Pay attention to safety, don’t play with others,” or if he is occasionally bullied or gets bumped and hurt, the elders may say, “Don’t play with that child anymore.” This will affect his interaction with other children. And as parents, we think it doesn’t matter; small bumps and frictions between children are very normal. Right?

Speaker 1: Mm, I understand.

Speaker 1: Okay, then in your opinion, how can children’s peer interaction ability be improved in family education?

Speaker 2: In family education, give him confidence,

instill more confidence in him, and let him bravely express himself.

Speaker 1: Mm. Then if the kindergarten carries out family education activities in this regard, would you participate?

Speaker 2: No.

Speaker 1: Oh, may I ask why?

Speaker 2: I don’t want to go.

Speaker 1: Mm, okay, okay. Thank you. Thank you very much for participating in our interview. Mm, okay, goodbye. Goodbye.