Father Involvement and Children's Developmental Outcomes: A Systematic Review of the Literature on Chinese Population over the Past 20 Years

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***Abstract*—In the Chinese context, fathers historically held distant, disciplinary roles in the family. This systematic review examines the influence of Chinese father involvement on the developmental outcomes of pre-puberty children over the past two decades, considering contemporary societal shifts in paternal roles. A comprehensive search of databases including PsycINFO, PubMed, and CNKI was conducted using relevant keywords, resulting in finding a total of 1314 papers. Following the first screening, 158 manuscripts were appraised for eligibility, and 55 articles were included in the analysis subsequently. Active father involvement yielded positive outcomes in behavior, socio-emotional, cognitive, and psychological domains, enhancing social skills, emotional well-being, and cognitive abilities. However, some studies reported negative or inconclusive results due to methodological and cultural differences, necessitating further research. The review also highlights the importance of nurturing positive paternal involvement for child and family well-being in the changing Chinese landscape, emphasizing the need to understand the nuances of fatherhood in this context for policy and interventions.**

***Keywords*—father involvement, child development, paternal role, family study, parenting**

I. Introduction

There is a widespread consensus supporting the idea that fathers play a crucial role in the growth and well-being of their children [1]. Throughout history, the concept of the perfect father has undergone several transformations. Initially, fathers were seen as moral instructors and disciplinarians [2]. They later became primary breadwinners and, subsequently, gender-role models and companions to their children. Presently, there is a growing recognition of the importance of fathers as loving co-parents [3].

This evolution in the perception of fatherhood aligns with shifting societal norms and roles. Models of Father Involvement (FI) gaining recognition were formulated by Lamb and colleagues [4] and consist of three key components: (a) interaction, referring to the time fathers spend directly with their children, (b) accessibility, involving fathers' presence and availability in their children's lives, and (c) responsibility, encompassing fathers' capacity to meet their children's needs and engage in various activities with them. Pleck [5] presented a modified conceptualization of father participation, including three elements: (a) engaging in positive activities, (b) demonstrating warmth and responsiveness, and (c) exercise of control. Additionally, there are two further domains, namely indirect care and process responsibility.

These developments help researchers investigate the role of fathers more comprehensively and gather precise data about their involvement in child development. While all these components are crucial for family well-being and child development, it is essential to recognize that paternal involvement may manifest differently in various family contexts and sociocultural backgrounds [4]. For example, the changing landscape of Chinese society has played a pivotal role in shaping contemporary fatherhood. Over the past two decades, China has witnessed significant socio-economic transformations, alongside the rising prominence of working women [6]. This has led to a gradual shift in the traditional roles of fathers [7]. As a result, the role of Chinese fathers within the family has shifted [8–10], leading to increased paternal involvement in child-rearing [11, 12].

In addition to the changing role of fathers, the structure of Chinese families has also evolved considerably. Rapid economic growth and urbanization have led to many families moving from rural to urban areas [13]. Dual-income families are becoming more common, leading to work-family conflict and increased grandparental involvement in parenting as a strategy to cope with parenting pressures [14]. Data from the 2022 Report on the Development of Children in China's Migrant Population reveals that there are approximately 11.47 million urban migrant toddlers aged 3 to 5 in China [15]. The evolving role of fathers and the shifting dynamics within Chinese families require a new perspective on father-child relationships.

An Expanded Model aims to encompass various aspects and goes beyond traditional linear and static models by recognizing the transactional and reciprocal nature of the father-child connection [16]. This perspective recognizes fathers as essential elements of dynamic systems characterized by interwoven connections among caregivers and children. It elucidates how these relationships evolve and transform over time, influenced by various social and environmental circumstances. Thus, during this period of dramatic change, we were curious to see how it affected fathers and children and whether there were changes uniquely attributable to Chinese fathers.

Research conducted in Western countries over the past twenty years has consistently demonstrated a positive association between increased levels of FI and favorable outcomes for children. These outcomes include a reduction in both externalizing and internalizing behavior problems [17], higher levels of subjective well-being [18], improved

early learning abilities [19], enhanced cognitive functioning [20], and greater socio-emotional competence [21]. Pomerantz and colleagues [22] conducted an in-depth review of the existing literature pertaining to parents' engagement in their children's academic endeavors. They argue that the quality of parents' engagement in their children's education affects their academic success. Based on an extensive examination of 24 longitudinal studies done by Sarkadi and colleagues [23], it was observed that the engagement of fathers had a beneficial impact on several aspects of children's development, including behavioral, social-emotional, cognitive, and psychological outcomes. This characterization guides our systematic review.

Our specific focus on children between the ages of 2 and 10 stems from a deliberate choice to examine developmental stages just before the onset of puberty. Adolescence is officially recognized as commencing with the onset of physiologically normal puberty and concluding when an individual embraces adult identity and behavior, typically around the ages of 10 to 19 years, as defined by the World Health Organization [24]. It is worth noting that Chinese children have been observed as early initiators of puberty on a global scale, with a significant advancement in chronological sexual maturation, as indicated by the study conducted by Cheng and Tao [25]. This deliberate selection of the pre-pubertal age range underscores our interest in understanding child development during this critical phase.

In the field of Chinese population research, there's a growing emphasis on FI in child-rearing due to evolving paternal roles over the last two decades. However, prior studies lack comprehensive evaluation. This systematic review aims to address this gap, examining the influence of rapid economic development, population migration, and cultural shifts on children aged 2 to 10 in China. Integrating these factors systematically is essential [26], it also seeks to distinguish these findings from Western cultures, contributing to the understanding of contemporary parenting in the 21st century.

II. Methods

A. Definition of Terms Used

In this systematic review, 'father' encompasses biological fathers and male guardians, including stepfathers and men residing with the child's mother, but excludes adoptive fathers due to data limitations in the primary sources. We employed Lamb and colleagues [27] framework for 'father involvement', which outlines three facets: accessibility, engagement, and responsibility. Due to data constraints in several large studies, co-residence with the mother was utilized as a criterion for accessibility. It is worth noting that solely providing financial aid was not deemed a sufficient indicator of FI.

A wide range of outcome measures were considered, as long as they might impact subjects' health and well-being. The measures pertaining to behavior included behavioral difficulties as reported by parents or teachers. The measures pertaining to social outcomes included assessments conducted by psychologists, which evaluated social skills, problem-solving ability, and adaptive behavior. Additionally, self-reported empathetic concern was also taken into account. The measures pertaining to education were academic achievement (parents-reported or from educational assessments), and age-appropriate assessments of cognitive skills. Psychological outcome measures include self-reported negative affect or psychological discomfort.

B. Eligibility Criteria and Search Strategy

A predetermined set of criteria for inclusion and exclusion of articles was created. The establishment of criteria was undertaken for the purpose of conducting abstract screening. The inclusion criteria for this study are as follows: (1) empirical articles that have an accessible abstract and have been published in peer-reviewed journals; (2) articles that have been published in either English or Chinese, as these are the languages mastered by the authors; (3) articles that have been published between the years 2003 and 2023; (4) articles that focus on children between the ages of 2 and 10; and (5) articles that have key words related to FI or child outcome in either their title or abstract.

A set of criterion of exclusion was created: (1) children or parents not living in natural contexts, such as institutionalized children or incarcerated fathers; (2) fathers who have a diagnosed physical and/or mental illness; (3) studies did not examine FI; (4) articles focusing solely on fathers' roles with children having disabilities, mental challenges, or those left-behind; (5) any article without an available full text; (6) articles aiming to develop, adapt, or validate measures of FI; and (7) studies that presented combined results from both parents without differentiation were excluded.

A systematic data search was performed in PsycINFO, and PubMed using the following search terms: (father involvement OR paternal involvement OR father* OR paternal*) AND child* AND development AND (Chinese OR China) NOT Chinese American NOT British Chinese.

For the purpose of this review, a databased 'CNKI' from China was performed as well using the following Chinese search terms: fu qin can yu (Father involvement) AND er tong (Child) AND fa zhan (Development)

The search was applied to the last 20 years (until May 26, 2023), and resulted in 1,314 records.

C. Study Selection and Data Extraction

The first two authors conducted a screening process on the first 1,314 papers based on the predetermined inclusion criteria. As a result, 1,156 articles were deemed ineligible and were omitted from further analysis. The first two authors separately evaluated the remaining 158 full-texts to determine their eligibility for inclusion. Disagreements were discussed until consensus was reached. In the case of a few publications where the two main reviewers disagreed, the opinion of a third reviewer was sought to foster consensus. 55 articles met all the inclusion criteria (see Fig. 1).

To collect and summarize the data, a categorizing system was created. The classification system was created to identify: (1) general characteristics pertaining to participants, such as city of origin, socioeconomic background, and age range; and (2) domains of FI and child developmental outcomes. The first two authors were in charge of categorizing the retrieved papers.

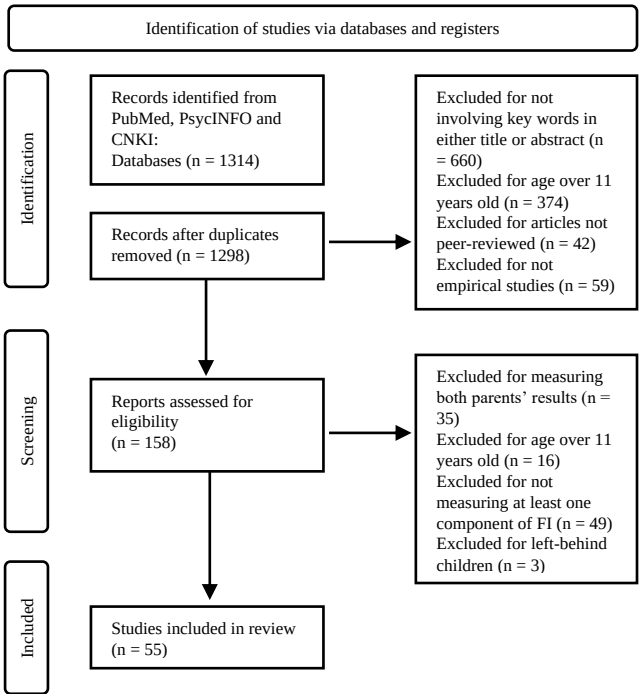

Fig. 1. PRISMA flow diagram of study selection.

III. Results

The findings are presented using the Preferred Reporting Items for Systematic Reviews and Meta-Analyses [28]. The initial screening yielded a total of 158 results, 35 were removed because there were no results for fathers only (n = 35), or children's mean aged over 11 years old (n = 16), or no measurements on FI (n = 49). The final full-text review yielded a total of 55 articles meeting inclusion criteria.

Of the 55 articles reviewed, 22 studies sampled lower or lower to middle class family, and a smaller number of studies (n = 12) sampled middle or middle to upper class. For the remainder of the articles (n = 21), there was no reporting on socio-economic status.

Regarding the children's age brackets analyzed in the included studies, they spanned a diverse range. The majority of the evaluated children ((n = 48) were aged between 2–5 years (i.e., preschool), the remaining children in the study (n = 7) were generally aged between 6–10 years (i.e., first grade to third grade). In terms of the domain of FI, 12 studies examined all of the three dimensions of involvement (i.e., interaction, responsibility, accessibility). 20 studies were measuring one dimension of FI (i.e., interaction or accessibility). The other studies (n = 23) examined various combinations of the two dimensions of FI.

A. Types of FI Measurement

Before considering the association between FI and child developmental outcomes, it is noteworthy to talk about the different measurements were used in those included studies, as they indicated negligible disparities on the influence of FI on child development.

A variety of questionnaires have been used to investigate FI. The Father Involvement Questionnaire [29] was implemented by 10 studies. The questionnaire consists of 56 questions divided into 3 dimensions (i.e., interaction, accessibility, and responsibility), in which interaction consists of five sub-dimensions: daily-life caring, academic support, emotional expression, rule teaching, and recreational activities; accessibility consists of two sub-dimensions: spatial accessibility and psychological accessibility; and responsibility consists of five sub-dimensions: role modelling, paternity growth, information accessibility, parenting support, and developmental planning.

A small proportion of studies (n = 7) examine the frequency of FI in extracurricular activities. Two studies [30, 31] were adapted from the Parental Involvement in Early Childhood Parenting Questionnaire used by Dr. Iruka [32], which investigated the frequency of FI in a variety of educational activities (large muscle, small muscle, self-care, language, cognitive, social, and artistic creativity). Additionally, there are four studies that focus on intrahousehold extracurricular educational activities, such as the home-literacy environment [33, 34], language-related practices [35], home-based numeracy activities [36], and paternal scaffolding [37]. Finally, one study employed questionnaires and observations to investigate the quality and frequency of father-child play [38].

With regard to children's developmental outcomes, the studies included so far have analyzed behavioral development, cognitive development, socio-emotional development, and psychological development, and in the following article will categorize them according to the different developmental outcomes mentioned above and synthesize their findings. For a general summary of studies characteristics, see Appendix A.

B. Subgroup-Specific Effects of FI

A majority of the studies (87%) for inclusion found a positive association between higher levels of FI and enhanced child developmental outcomes. This relationship was consistent across various developmental domains, including behavioral, socio-emotional, cognitive and psychological development. While the overarching narrative emphasizes a positive association between FI and child developmental outcomes, it's essential to delve deeper into specific developmental domains to gain a nuanced understanding of these relationships. Therefore, to further elucidate these findings, we will delve into subgroup explorations next.

1) Behavioral effects

The results on the correlation between FI and child development outcomes in various studies were complex and mixed. This systematic review included 13 studies examining different behavioral outcomes (see Table B1).

Liu's [39] study showed a decrease in child conduct problems with increased father responsibility and interaction. Regarding internalizing behaviors, Wang [40] found positive outcomes with increased father responsibility, while Hou [41] found no significant associations with both internalizing and externalizing behaviors.

Aggressive behavior outcomes also varied. Several studies reported no effect of father's presence and responsibility [40–42]. While Yu [43] noted a decrease in aggressive behaviors with indirect father support. Other studies supported this, showing reduced aggression through father-child activities like rule teaching [44] and play [38].

Differences were also seen in children's reading interests. Zhu [45] found a positive correlation, while Fan [46] found no effect. Similar disparities existed in motor skills development reporting a positive association [47], in contrast to Ma and colleagues' study, which found no significant impact of FI on general behavioral development, including motor skills [42]. Lastly, a review of self-care and responsibility acts in children, father interaction had a positive impact, but father's responsibility did not show a significant influence [48].

2) Socio-emotional effects

Out of 55 articles, 30 studies focused on FI's impact on child socio-emotional outcomes (see Table B2). 19 primarily examined social development, while 11 delved into emotional competence and regulation (ER).

Studies on the correlation between FI and children's social skills generally found a positive connection, as seen in 15 studies. Four of these studies emphasized the uniformly positive impact of all FI domains on children's social skills [49–52]. Articles assessing positive social skills covered aspects like social competence, school readiness, prosocial behaviors, and social initiative behaviors. Additionally, two studies indicated that overall interaction positively influenced socio-emotional development [53, 54].

However, this consensus was not universal. Two studies found no significant relationship between various domains of FI, such as accessibility and responsibility, and children's social competence [55, 56]. Similarly, Hou [41] reported no effect of interaction and responsibility on in-school social competence. A study found no correlation between the level of paternal involvement in activities and children's socio-emotional development [42].

Mixed results also emerged in the context of school readiness. While individual studies have noted a positive association, with Sun [57] attributing this to interaction and Sun [58] relating it to fathers' responsibility, a consensus is not universally agreed upon. Notably, conflicting viewpoints exist regarding the influence of interaction on school readiness, as illustrated by divergent findings across studies [58, 59]. This highlights a landscape of both agreement and discrepancy in the research.

Furthermore, these studies indicate that different dimensions of FI can have varying impacts on the same child's developmental outcomes. Daily caregiving and rule teaching were positively associated with prosocial behaviors, while emotional communication didn't positively influence on that [48, 58]. Furthermore, studies consistently reported a positive relationship between father accessibility and improved prosocial behaviors in children, highlighting the potential benefits of increased father-child interaction time [60–62].

Research on the effects of different FI domains on children's emotional competence also presents a multifaceted picture. Zhang [63] found a positive impact from father's responsibility and accessibility, with no influence from interaction. In contrast, Li [64] upheld the positive roles of responsibility and interaction but dismissed the impact of father's accessibility on children's moral-emotional understanding.

Delving further, Fan [65] delineated a complex interplay of factors influencing different aspects of children's emotional development. The study affirmed the beneficial impact of both physical and psychological accessibility on emotional awareness and control. Yu's study [43] also noted a positive effect of indirect support from fathers on emotional control ability. However, it reserved the positive acknowledgment for psychological accessibility when it came to enhancing children's ability to use emotion [65].

Research scrutinizing the correlation between FI and children's ER predominantly showcases a positive influence. Liang [66] outlined the nuanced influences of FI on children's ER strategies, with physical accessibility positively associated with beneficial ER strategies and deterrence of negative ones. Increased responsibility and healthy father-child interaction were linked to positive ER outcomes, supported by several studies (e.g., [67–69]).

Delving deeper, Li [70] emphasized the substantial role fathers' emotional expressions play in shaping children's ER outcomes. Neutral emotional demeanor from fathers fostered positive ER outcomes, while positive or passive emotional expressions had no apparent effect. Negative expressions were found to adversely affect children's ER.

3) Cognitive effects

In this comprehensive review, we reviewed studies investigating the cognitive effects (see Table B3) of various aspects of FI on children (n = 25), categorizing the outcomes into three primary groups: implicit cognitive ability (e.g., attention shift, creativity), effects related to academic achievement (e.g., learning quality, language development, math performance), and outcomes related to personal well-being (e.g., self-control, delay of gratification).

Starting with implicit cognitive ability, a study found a positive correlation between the number of father-involved activities and children's attention shift ability [42]. However, these activities did not affect short-term memory, and the mere presence of a father had no discernible effects.

In exploring the relationship between FI and children's creativity, a trend emerged. Several studies generally supported a positive impact of FI on children's creativity [30, 71, 72]. Li [30] noted higher creativity levels when fathers significantly engaged in activities that enhanced fine muscle coordination, cognitive stimulation, and social activities. However, a separate study using the same questionnaire found a positive impact only in terms of the frequency of involvement in cognitive and social activities on the sub-dimension of creativity under children's quality of learning [31].

Regarding learning quality, Li [72] found no overarching impact of father-child interaction. However, a sub-domain analysis revealed a positive influence from rule teaching, particularly benefiting preschool children. Sun [58] highlighted a positive correlation between father's responsibility and children's learning capacity, a finding further supported by Li [50] in the context of all FI domains. Notably, a study reported a null effect concerning interaction, deviating from this trend [53].

Wang [40] argued that increased father-child interactions could reduce the risk of children encountering learning difficulties. However, this perspective faced opposition from

Hou [41], who found no effect of either responsibility or interaction dimensions of FI on children's learning difficulty.

Similar complexities occur in the field of language learning. In terms of language development, studies indicated a positive correlation between language-related practices and children's English proficiency [35, 53]. However, this positive correlation did not extend to vocabulary acquisition, as confirmed by several recent studies [33, 73, 74]. One study stood as an exception, establishing a positive relationship between home literacy practices and enhancements in both receptive and expressive vocabulary [34].

Regarding mathematical competence, one study found a positive correlation between father-child interaction and children's math performance [37], others discovered that home numeracy activities had no impact on children's symbolic and non-symbolic mathematical skills [36].

Turning to cognitive outcomes related to personal well-being, Guo [75] outlined a generally positive impact of father-child interaction on self-regulation, including self-control, self-advocacy, and self-reliance. The presence of the father as a role model fostered increased self-control and self-reliance in children. Stressing the importance of a father's physical and psychological accessibility, the study highlighted its significance in nurturing children's self-reliance, a sentiment echoed [61], which documented a positive association between father-child time and children's self-control. A collection of research spanning over a decade further supports this, showing a positive effect of paternal responsibility on children's self-control [43, 76–78].

Delving deeper into the influence of father-child interaction, Sun [77] found a positive relationship between emotional communication and child self-control, although daily caregiving did not exhibit a similar correlation. This research also highlighted the child's ability for delayed gratification, a trait positively influenced by father-child interaction, as supported by Li [79], but found no influence stemming from the father's responsibility aspect.

4) Psychological effects

Out of 55 studies, 8 focused on psychological aspects (see Table B4), with the majority centered on the impact of FI on children's anxiety, as five out of eight explored this domain.

A consensus among three studies showed that increased levels of both responsibility and interaction in FI tend to reduce children's anxiety [39, 80, 81]. Liu [39] also studied the influence of FI on impulsivity-hyperactivity and psychosomatic disorders, finding that having the father as a role model positively affected the hyperactivity index and impulsivity-hyperactivity. While interaction positively influenced the hyperactivity index, it didn't significantly affect psychosomatic disorders and impulsivity-hyperactivity.

Two studies consistently found that both interaction and responsibility aspects of FI were instrumental in reducing children's tendencies towards aggression and withdrawal [37, 43]. A higher degree of responsibility was inversely correlated with withdrawal and depression, showcasing its protective role in children's psychological well-being. Supporting this, He [69] demonstrated that enriched father-child interaction is crucial in lowering the prevalence of loneliness in children.

Wei [81] highlighted that while indirect support could mitigate social anxiety, it had no impact on Generalized Anxiety Disorder (GAD), Obsessive-Compulsive Disorder (OCD), or separation anxiety. There was an overall positive influence in reducing social anxiety through interaction; however, it was accompanied by increased anxiety provoked by high levels of rule teaching.

The results displayed discrepancies in the area of foreign language anxiety, with one study observing a positive outcome from home literacy practices [34], while Sun [35] found no effect. Additionally, Wu [82] underscored the important role of a father's responsibility in fostering a child's sense of significance, self-esteem, self-efficacy, and positive body image. While interaction generally replicated these positive outcomes, it did not significantly influence self-esteem.

IV. Discussion

A. Summary of Key Findings

In this comprehensive review, a wide-ranging exploration of the impact of FI on child development unfolds, encompassing various dimensions including behavioral, socio-emotional, cognitive, and psychological aspects. The synthesis of a substantial body of research paints a complex and multifaceted portrait of the vital role fathers play in shaping the developmental trajectories of their children.

Notably, an overwhelming 89% consensus highlights the positive impact of FI. These findings were consistent with previous reviews on both Western and Chinese populations. These positive associations are evident in the reduced child conduct problems, improved internalizing behaviors, and decreased aggressive tendencies linked to heightened levels of father responsibility and interaction [23]. Furthermore, the research highlights the prominent advantages derived from engaged and responsive father figures, particularly in terms of enhancing children's social competence [55], fostering positive psychological outcomes [64], and reducing anxiety levels [52].

Yet, amid this prevailing consensus, the review also underscores the complexity of the relationship between FI and child development. Notably, there are instances of null or negative associations, indicating that the effects of FI are not universally consistent. This complexity is further evident when exploring specific dimensions of FI. For certain consistent measurements, particularly those related to language predictions, the results in this review articles are predominantly null, especially concerning academic achievement and language outcomes. This discrepancy may, in part, be attributable to the inherently lower levels of FI, as evidenced in Feng's study [73], where fathers exhibited reduced involvement across various dimensions. Another review [83] on Chinese population also corroborated these findings—the influence of FI on children's academic achievement remains a contentious issue, with null effects emerging when paternal involvement in parenting falls below the level of maternal involvement in education.

Our research also yielded some adverse findings. For instance, Wei's experiment [81] discovered that increased FI actually heightened children's anxiety levels, and Wang's study [40] produced similar results in the context of internalizing behaviors. These outcomes are not unexpected, given the inconsistent relationships observed in previous studies between FI and child behavioral and emotional problems (e.g., [84, 85]). To explain these results, one study investigated the moderating roles of paternal practices and father-child relationships in the correlation between FI and child adjustment [56]. They found that elevated FI, when combined with consistent parenting, exhibited an association with decrease in children's behavioral and emotional problems. Conversely, increased levels of FI, were related with increased levels of child behavioral and emotional difficulties when combined with inconsistency or strained father-child interactions. These findings underscore the significance of paternal consistency and the quality of the father-child relationship in shaping the impact of FI on children's behavioral and emotional development. This insight offers clarity on the conflicting outcomes observed in prior research regarding the relationship between FI and child behavioral and psychological outcomes.

In conclusion, while several studies affirm a beneficial correlation between increased FI and improved child developmental outcomes, there exists a substantial body of work presenting a nuanced or even contrarian view, outlining negligible or adverse effects. This diversity in findings illustrates the complex dynamics of FI in child development, indicating variations across different contexts and signaling a rich avenue for further nuanced research.

B. FI in Chinese Context

Studies of Chinese FI, reveal the influence of unique socio-cultural and policy factors. Intergenerational parenting is common in China, where grandparents often participate in child upbringing, potentially reducing fathers' involvement [71]. A study confirmed this, showing fathers' involvement is intermediate compared to other caregivers like grandparents and mothers [30]. Notably, the average involvement score of other caregivers, such as grandparents and mothers, surpasses that of fathers. This highlights the prevalent belief among many fathers perceive mothers, grandparents, and schools as primarily responsible for childcare and education.

Chinese FI exhibits distinctive characteristics in parenting practices. Most reviewed articles focus on variations in FI dimensions. Fathers are highly engaged in providing indirect support but less involved in disciplinary roles. The traditional role of "breadwinner" is deeply ingrained, leading them to contribute to early childhood education primarily through material means. In a systematic review of cross-cultural comparative FI, authors similarly noted that Chinese fathers, influenced by traditional collective culture, often assume the role of family providers and face greater financial pressure [86].

Financial pressure intensifies with population mobility as individuals migrate from rural to urban areas, affecting migrant children's development. These challenges include economic difficulties, an unequal investment in migrant children's education, a tendency to reduce family involvement in education, resulting in limited child development. Additionally, there's a lack of community and kindergarten support for migrant children's education, exacerbating these issues [87].

Researchers have identified a strong connection between the overall FI scores and psychological resilience in migrant children [76]. Regrettably, only a few articles address the differences between migrant and local populations, these disparities may serve as confounding variables that independently or in conjunction with FI influence child development.

Child development often results from bidirectional relationships, where a child's behavior and development can influence their father's involvement, and vice versa [88]. Neglecting to consider external factors that may shape a child's behavior and experiences can lead to mixed results, making it unclear whether FI causes certain outcomes or if the relationship is reversed.

C. Limitation

The primary limitation observed across the studies pertains to generalizability. In alignment with the research question and the specific objectives of this review, we restricted our inclusion criteria to children aged between 2 and 10, which may not apply to the adolescent stage. Additionally, the majority of the included studies were conducted in developed regions (comprising 64% of the included studies). Given the substantial variations in socioeconomic, cultural, and healthcare contexts between developed and less developed areas, it is essential to acknowledge the potential challenges in extrapolating results from one context to another. This overlooks the impact of socioeconomic factors on FI within various family contexts.

The second constraint pertains to the aspect of measuring. The measurement of FI has been subject to criticism for multiple reasons. Firstly, it is often criticized for its simplicity, lack of consistency in instruments, and over-reliance on self-reporting, introducing potential bias and missing the interactive nature of father-child interactions [26]. Second, the validation testing of these instruments often relies heavily on mothers, which may introduce bias and limit the accuracy of the measurements [89]. Therefore, it is recommended to prioritize the incorporation of self-reported data with qualitative approaches, such as observations, in the examination of father-child interactions. Furthermore, many studies used cross-sectional designs, which limited the ability to draw causal conclusions. Using a multi-informant approach can offer more comprehensive insights compared to single data sources.

V. Conclusion and Future Direction

This comprehensive review delves into FI's impact on child development across behavioral, socio-emotional, cognitive, and psychological dimensions. It finds a strong consensus (89%) supporting positive effects, such as reduced child conduct issues, improved internalizing behaviors, and lower aggression. Engaged fathers enhance children's social competence and psychological well-being.

However, the review highlights the nuanced and sometimes contradictory nature of FI's relationship with child development. Null or negative associations exist, influenced by contextual factors like variations in child measurements and paternal involvement levels. Chinese socio-cultural and policy influences add complexity, with intergenerational parenting and traditional roles shaping paternal involvement.

While research has begun exploring parental and gender perceptions of fathers, there's limited understanding of how cultural contexts and social expectations shape fathers' roles. To illustrate, Dubowitz [90] underscores the importance of understanding cultural influences on men's motivations in fatherhood, as well as their frustrations and needs. It has been proposed that parenting resources specifically tailored for fathers of children in care are essential, given the unique challenges they face [91]. Furthermore, many men from migrant families often grapple with social marginalization and personal issues, necessitating the provision of services and interventions on par with those available to mothers [92].

In contrast to Western countries, China is in the early stages of policy and educational practices for parental involvement [65]. For instance, Switzerland implemented the Paternity Law in the mid-20th century, which rigorously outlines a framework for paternal leave and paid childcare leave. Since 2000, this leave period for fathers has been extended from one month to two months, thereby fully guaranteeing fathers' dedicated parenting time. Learning from successful Western experiences can enhance China's educational system and policies, promoting parental participation in early childhood education, benefiting children's physical and mental development.

In conclusion, this review navigates the intricate terrain of FI and child development, revealing a tapestry of findings that emphasize the importance of context, cultural factors, and policy considerations. While complexities persist, the consensus on the significance of FI remains resolute, offering a roadmap for future research and policy development in the realm of fatherhood and child development.

Appendix A Information on the Study Characteristics and Measurements

	n	Article ID [a]
Domains of FI		
Interaction	19	#30–31, #33–38, #47–48, #53–54, #57, #59–61, #67, #70, #74
Availability	1	#93
Mixed	23	#39–46, #55–56, #58, #62, #67, #73, #76–82, #94–95
All	12	#30, #49–52, #63–66, #68, #71, #75
Outcome measurements		
Behavioral	6	#38, #45–47, #31, #69
Socio-emotional	20	#49, #51–52, #54–57, #59–60, #62–68, #70, #77–79
Cognitive	10	#30–31, #33–34, #36–37, #71–72, #76, #95
Psychological	2	#81–82
Mixed	17	#34–35, #39–44, #48, #53, #58, #61, #64, #69, #73–74, #80

Note: [a] Article numbers are corresponding to references list.

Appendix B

Note: [a] Article numbers are corresponding to references list.
[b] A, accessibility; I, interaction; R, responsibility.

Table B1. Associations between FI and child behavioral outcomes.

Article [a]	FI [b]	Outcomes	Positive	Negative	Null
#38	I	Aggression		1	
#39	R, I	Conduct problems		1	
		Reading interest behaviors		1	
#40	R, I	Internalizing		1	
		Externalizing			1
#41	R, I	Conduct problems			1
#42	A	Aggression			1
		Motor skills			1
#43	R	Aggression		1	
#44	I	Aggression		1	
#45	R, I	Reading interest behaviors	1		
#46	R, I	Reading interest behaviors		1	
#47	I	Motor skills	1		
#48	I	Self-care skills	1		
#93	A, R	Conduct problems		1	
		Learning difficulties		1	
#94	R	Responsibility acts			1
	I		1		

Table B2. Associations between FI and child socio-emotional outcomes.

Article [a]	FI [b]	Outcomes	Positive	Negative	Null
#40	R, I	Social competence	1		
#41	R, I	Social competence			1
#42	A, I	Social withdrawal			1
		Emotion competence	1		
#43	I	Social development	1		
	R	Prosocial behavior			1
#44	I	Prosocial behavior	1		
#48	I	Social skills			1
#49	A, R, I	Prosocial behaviors	1		
#51	A, R, I	Social skills	1		
#52	R, I	Social development	1		
#53	I	Socio-emotional development			1
#54	I		1		
#55, 56	R, I	Social competence	1		
#57	I	School readiness	1		
		ER	1		
#58	I	Socio-emotional development		1	
		School readiness			1
#59	I	School readiness			1
		ER	1		
#60	I	Social development	1		
#61	I	Prosocial behavior	1		
#62	A		1		
	I				1
#63	R	Emotion competence	1		
	I				1
#64	R, I	Moral-emotional understanding	1		
	A				1
#65	A, R, I	Emotion competence	1		
#66-68	R, I	ER	1		
#69	I	Social competence	1		
#70	I	ER	1		
#72	A, R, I	Social skills	1		
#74	I	Social mastery motivation			1
#80	R, I	Social competence	1		

Table B3. Associations between FI and child cognitive outcomes.

Article [a]	FI [b]	Outcomes	Positive	Negative	Null
#30	I	Creativity	1		
#31	I	Creativity			1
#33	I	Language development			1
#34	I	Language development	1		
#35	I	Language development	1		
#36	I	Symbolic and non-symbolic skills			1
#37	I	Math performance	1		
#40	I	Learning difficulty		1	
#41	R, I	Learning difficulty			1
#42	A	Attention shift			1
	I		1		
	A, I	Short-term memory			1
#43	R	Self-control	1		
	A	Creativity	1		
#50	A, R, I	Self-control	1		
		Learning ability	1		
#53	I	Language development	1		
		Approach-to-learning			1
#58	R	Learning ability	1		
#61	I	Self-control	1		
#64	R, I	Approach-to-learning	1		
#71	A, R, I	Creativity	1		
#73	R, I	Language development			1
#75	R, I	Self-control	1		
#76	R	Self-control	1		
#74	I	Language development			1
		Quality of learning	1		
#77	R, I	Self-control			1
		Delay of gratification	1		
#78	R, I	Self- control	1		
#79	R	Delay of gratification			1
	I		1		
#95	R, I	Approach-to-learning	1		

Table B4. Associations between FI and child psychological outcomes.

Article [a]	FI [b]	Outcomes	Positive	Negative	Null
#34	I	Anxiety		1	
#35	I	Anxiety			1
#39	R, I	Anxiety		1	
#43	R	Depression		1	
		Impulsivity-hyperactivity			1
#69	I	Loneliness		1	
#80	R, I	Anxiety		1	
#81	I	Anxiety	1		
#82	I	Self-esteem			1
	R	Social anxiety		1	
	R	GAD			1

Conflict of Interest

The authors declare no conflict of interest.

Author Contributions

Xizi Wang conducted the research; Xizi Wang and Cheng Chi reviewed the paper; Xizi Wang wrote the paper; both authors had approved the final version.

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