



REVIEW

Relationship between Parent-Child Attachment and Problem Behaviors among Chinese Firstborn Children in Family Transitions: A Meta-Analysis

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ABSTRACT

The implementation of China's three-child fertility policy has led to a notable increase in multiple-child families. Notably, firstborn children experience a significant transition from being an only child to a non-only child. This transition is associated with problematic behaviors, affecting their social adjustment, sibling relationships, and family harmony. Although several studies have examined the relationship between parent-child attachment and problem behaviors exhibited by firstborn children during family transitions, the findings have been inconsistent. Hence, a meta-analytic study was undertaken to elucidate the inconsistencies in this relationship and explore the moderating factors that may contribute to these discrepancies. Using a systematic literature retrieval and screening method, 12 effect sizes were derived from the 10 eligible articles, encompassing a sample size of 5319. The meta-analysis demonstrated a low negative association between parent-child secure attachment and problem behaviors exhibited by firstborn children during family transitions. Furthermore, the present study investigates potential moderator factors, such as children's age and geographic region, to gain a more nuanced understanding of the relationship. Consequently, the establishment of parent-child attachment relationships has the potential to mitigate problem behaviors observed in first-born children during family transitions. The implications of these findings indicate that parents can nurture secure attachment bonds with their children by demonstrating sensitive responsiveness, employing positive parenting practices, and fostering emotional availability. These efforts contribute to the cultivation of secure internal working models and positive behavioral manifestations within first-born children, which in turn affect their relationships with siblings.

KEYWORDS

Parent-child attachment; problem behaviors; firstborn children; meta-analysis; moderation effect

Introduction

Based on attachment theory, the pivotal role of internal working models is highlighted in the association between parent-child attachment and child behavior [1]. In light of this theoretical framework, our study aimed to investigate the connection between parent-child attachment and problem behaviors exhibited by firstborn children during family transitions. To accomplish this objective, we employed

meta-analytic techniques to analyze existing studies and data. One perspective arises from the body of literature examining the familial spillover effects of parent-child attachment on parenting. When parents cultivate secure attachment bonds with their children, it provides an avenue for children to witness and internalize patterns of intimacy and secure relationships. Consequently, children may, to some extent, replicate these patterns in their social behaviors, including interactions with peers. Within this realm of investigation,



researchers conceptualize the family unit as a trinity, where the quality of the parent-child bond is intricately linked to a child's behavioral development [2]. We sought to extend this literature by conceptualizing the family unit as quadrilateral or more multilateral, in which parent-child attachment is associated with sibling behavioral manifestations. Additionally, our investigation draws support from the extensive body of research on children's behavioral development, particularly in the context of family transitions. Numerous studies spanning decades have demonstrated the association between children's problem behaviors and future challenges in social adjustment and academic achievement [3]. However, limited knowledge exists regarding the family-related factors associated with problem behaviors displayed by firstborn children during family transitions. Therefore, examining the influence of parent-child attachments on problem behaviors among firstborn children presents a promising avenue to address this research gap.

The attachment theory

The developmental outcomes of qualitative distinctions within early parent-child relationships, such as parent-child secure attachment, have been investigated in connection to children's subsequent social and behavioral adjustment [4,5]. According to Bowlby's Attachment Theory (1969/1982), children have a biologically rooted attachment system that has evolved to ensure their proximity to caregivers in times of threat. In parallel, caregivers possess a caregiving system enabling them to respond to the child's distress with assistance, protection, and consolation [6]. The consistency and attentiveness of caregivers' responses to children's needs play a significant role in shaping individual variations in the quality of children's attachment, which are manifested in children's behavior towards their caregivers [7]. Therefore, children form attachments to their caregivers, which can vary in quality. Responsive and sensitive caregiving is expected to cultivate the child's expectation that social partners are available and responsive and that the child deserves affection from others. In contrast, when attachment figures are perceived as unpredictable, unresponsive, or unavailable, the child is predicted to develop expectations that others are not trustworthy or available and that they are unworthy of love from others. In addition, the establishment of cognitive representations of the self in relationships, as well as a range of behavioral skills and affective responses that reflect and adjust these internal representations in subsequent interactions, develops within the context of early positive interactions between parent and child [6].

Parent-child attachment and problem behaviors among Chinese firstborn children in family transitions

In the Chinese context, the implementation of family planning as a fundamental state policy has played a beneficial role in addressing population and development concerns. However, it has also contributed to population aging. In response to this challenge, the Chinese government introduced a national two-child policy in 2016, which permitted all Chinese families to have two children to address this demographic shift [8]. Adjustments in fertility policies can

prompt shifts in family structures, resulting in a role transition for an only child upon the birth of a sibling. Consequently, children experiencing this shift (from being the only child to a non-only child) between their mother's second pregnancy and the birth of the second child are sometimes identified as firstborn children undergoing a family transition [9]. In 1946, Freud posited that one of the most distressing early experiences for children was the transition from being an only child to a non-only child [10]. Upon the arrival of a second child, parental attention that previously might have been devoted to the only child becomes divided and distributed [11]. Consequently, the first-born child's negative and disruptive conduct towards the sibling during the family transition is frequently interpreted as sibling envy, a behavior that previous research has consistently deemed harmful and detrimental to the child's overall well-being and development [12-14]. Simultaneously, the acceptance of the second child by the firstborn and their behavioral performance significantly impact the parent's inclination towards having another child [15]. Hence, an investigation into the effect of the crucial parent-child attachment relationship, which helped establish early self-representation of behavioral skills and affective responses, on firstborn children's problem behaviors during the role transition phase and the proposal of appropriate tactics to mitigate such challenges can aid the firstborn in handling the discomfort of this period constructively. This, in turn, can enhance the firstborn child's acceptance of their sibling, ultimately increasing the parent's inclination towards having a second child.

The problem behaviors of children, which include issues with emotion, conduct, hyperactivity, and peer relationships, are seen as being at higher risk of further adjustment issues [16,17]. Researchers' interest in comprehending how family factors affect the manifestation of problem behaviors in children as well as the pathway mechanisms between the relationships, both in Chinese and international contexts [18-20], has recently increased. This is because children's behavior patterns and character are believed to be shaped significantly by their domestic setting [21]. Generally, parent-child secure attachment is negatively related to problem behaviors among firstborn children in family transitions [22,23]. This can be attributed to the pivotal role played by the central mechanism of internal working models in the relationship between parent-child attachment and child behavior. Children's attachment to caregivers influences the formation of internal working models, which encompass the acquisition of cognitive representations of expected behaviors and complementary self-representations [1]. Specifically, children's initial internal working models will be broadly integrated into future relationships with others. Securely internal working models may be involved in scripts, expectations, and attributions of pro-social behaviors that include kindness, cooperation, empathy, and sharing [24]. For instance, Children who have secure parent-child attachments are more inclined to anticipate positive responses from their siblings and attribute their siblings' behaviors as well-intentioned. Conversely, children's insecure internal working model may involve scripts, expectations, and attributions of problem behaviors [24].

However, upon reviewing related research findings, it becomes apparent that there are disparities in the outcomes concerning the impacts. This suggests that further research is required to achieve a more comprehensive understanding of the relationship. For instance, parent-child secure attachment has been found to exhibit an inverse correlation with problem behaviors in preschoolers who are firstborns and experiencing family transitions [25], whereas other research discovered positive effects in school-age children [26]. As the evidence above suggests, there still needs to be a more comprehensive understanding of the association between parent-child secure attachment and problem behaviors in Chinese firstborn children undergoing family transitions. Consequently, addressing research gaps is imperative to obtain a complete understanding of this relationship.

The current study

Empirical studies may yield inconsistent results due to sampling and other conditions. To derive a comprehensive conclusion, the meta-analysis involves aggregating a vast quantity of analytical outcomes from diverse empirical samples addressing the same research problem through statistical analysis [27,28]. Hence, it may be necessary to conduct a meta-analysis to establish the nature and extent of the link between parent-child secure attachment and problem behaviors in Chinese firstborn children experiencing family transitions. Based on the theoretical framework of attachment theory and relevant empirical evidence, this meta-analysis proposes a hypothesis (H) that suggests a negative correlation between parent-child secure attachment and problem behaviors in Chinese firstborn children undergoing family transitions.

Method

Glass introduced the term “meta-analysis” in 1976 at the annual conference of the American Educational Research Association [28]. The meta-analysis is a research method that integrates the results of numerous analyses of distinct empirical evidence connected to specific topics in order to reach broad conclusions [29]. The limitations related to conventional empirical research, such as limited sample sizes, low representativeness, and a lack of generalizability in the findings, are addressed by the meta-analysis method [30]. Thus, the meta-analysis may provide a more appropriate study route for comprehending the relationships between parent-child secure attachment and problem behaviors among Chinese firstborn children in family transitions.

Literature search

The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA 2020) standards take into account the strategies used to identify, select, evaluate, and synthesize research. The literature search for this study was conducted in strict adherence to the PRISMA standards [31].

English databases, such as Web of Science, Scopus, ProQuest, EBSCO, and Google Scholar, and Chinese

databases, such as CNKI, VIP, Wanfang, and Baidu Scholar, were searched to collect related local and overseas research. This study was restricted to literature published between 2016 and the present. The search time was December 2022. That is because since January 2016, when the Population and Family Planning Law of the People’s Republic of China was revised to encourage every couple to have two children, there has been a shift in family structures in China, with more multiple-child families emerging and the end of the one-child policy that had been in place for over 30 years. Parent-child secure attachment and problem behaviors of first-born child were included as two keyword categories for the search, along with any alternate terms or synonyms. In this study, we used the Boolean operator AND to combine search terms across categories, while the operator OR was employed to link terms within each category [32]. For instance, parent-child secure attachment is one category, which includes maternal attachment, paternal attachment, parental attachment, and parent-child relationship; behavioral problem of firstborn child is another category term, which includes problem behavior of first-born child, conduct problem of first-born child. During the initial phase of literature identification, we identified a total of 132 articles pertaining to the topic of parent-child secure attachment and problem behaviors in Chinese firstborn children during family transitions. Among these articles, 124 were published in Chinese, while 8 were published in English.

Eligibility criteria for literature selection

To ensure the accuracy of effect size calculations through a meta-analysis approach and align with the study objectives, the following inclusion criteria were formulated: (1) the studies must be empirical, (2) the articles must be written in either English or Chinese, (3) the research designs must examine the relationship between parent-child secure attachment and problem behaviors, (4) the publications must specifically focus on the Chinese firstborn children’s problem behaviors during family transitions, (5) the first-born children in family transition were defined as children who experience the transition between the mother’s second pregnancy and the birth of the second child (from only child to non-only child), (6) the age range for the first-born children should be between 2 and 18 years, (7) the scales used for children’s problem behaviors measurement at least include one of the following scales: Child Behavior Checklist (CBCL), Parental Expectations and Perceptions of Children’s Sibling Relationships Questionnaire (PEPC—SRQ), Personal Distress (PD), and Strengths and Difficulties Questionnaire (SDQ), (8) the studies must provide sufficient information to calculate effect sizes, such as correlation coefficients and sample sizes, (9) the articles must utilize a full or dimensional measure of both parent-child secure attachment and the problem behaviors of the first-born children, (10) for longitudinal studies, the first time measurement (T1) of parent-child attachment and the final time measurement of children’s problem behaviors were selected, and (11) to ensure the quality of the included literature, we only included peer-reviewed articles and master’s or doctoral dissertations.

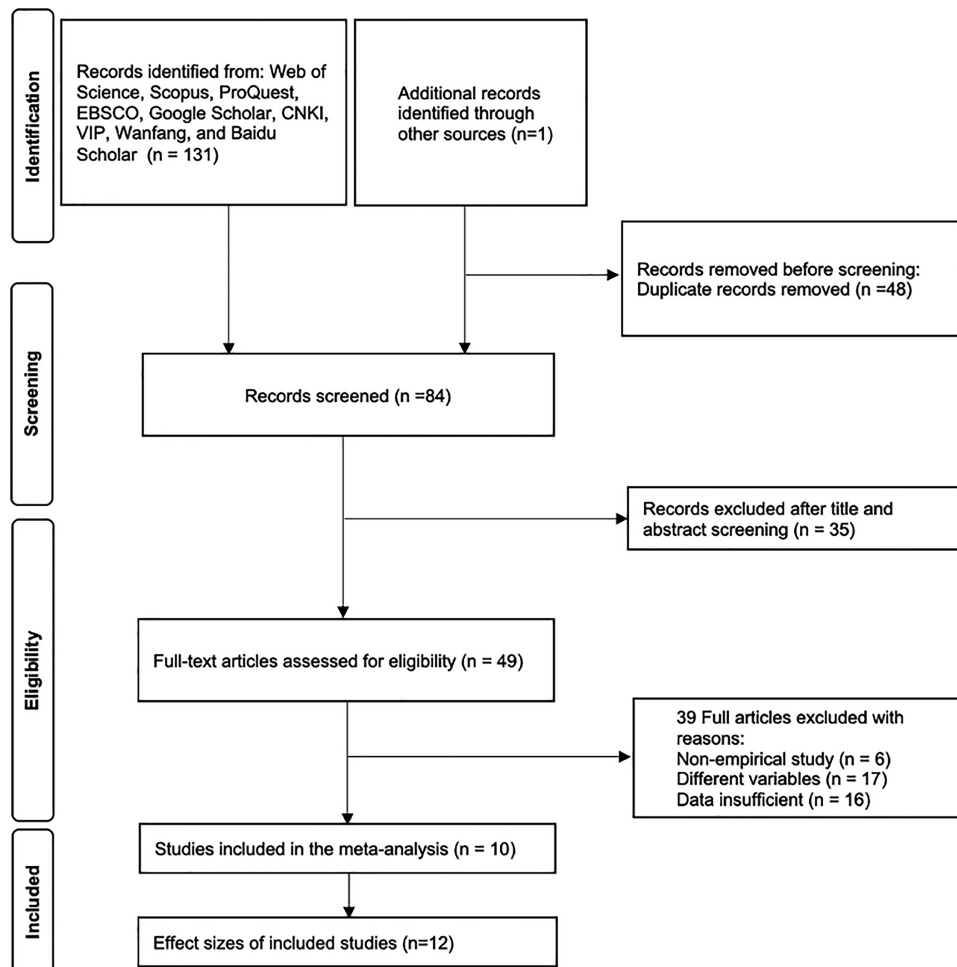


FIGURE 1. Literature search and inclusion diagram.

Search results

Fig. 1 displays the PRISMA flow [31], depicting the article selection process, including literature identification, screening, eligibility, and inclusion as implemented in this study.

We discovered 132 articles published about parent-child secure attachment and problem behaviors among Chinese firstborn children in family transitions in the first identification phase, including 124 Chinese articles and 8 English articles. After removing 48 duplicate records, a total of 84 records were initially identified and entered the second phase of screening. In this phase, eligibility was assessed by two independent researchers who reviewed the titles and abstracts of each article. Upon confirmation of an article's relevance to the study's focus on parent-child secure attachment and problem behaviors among Chinese firstborn children in family transitions, the article was retained and subjected to full-text review in the subsequent phase. Following the identification and screening phases, a total of 49 full-text articles were recorded. These articles were then subjected to further screening during the eligibility phase, with a focus on empirical studies examining the relationship between parent-child secure attachment and problem behaviors among Chinese firstborn children in family transitions. Articles were required to report adequate data, including sample size and correlation coefficients, to be

included in the study. As a result, 39 articles were excluded from the analysis for reasons including not being quantitative empirical studies, variables not being consistent with the definition of variables in this meta-analysis, and not reporting the complete data used to calculate effect sizes. This exclusion process resulted in a final set of eligible studies consisting of 10 studies and 12 effect sizes.

Coding procedure

Following a thorough discussion between the two independent coders, the coding inconsistencies were resolved through a precise procedure. Firstly, the two coders established a comprehensive coding framework. Subsequently, coders individually carried out the coding process and compared findings. Finally, any discrepancies were discussed and settled through mutual discussion and consensus. The high similarity between the coding matrices of the two coders attested to a high level of consistency in the coding outcomes. The encoding results are shown in Table 1.

Analytic strategies

The Comprehensive Meta-Analysis Version 3 (CMA 3.0) software was utilized to conduct a meta-analysis study, with the primary analysis involving several key components. These components encompassed the derivation of

TABLE 1

Encoding results of included studies

Author	Year	Country	N	Age	Region
Wang	2019	China	156	Preschoolers	Central
Wu	2020	China	150	Preschoolers	Central
Zhao	2018	China	444	School-age children	West
Du	2020	China	181	Preschoolers	Central
Huang	2017	China	576	School-age children	West
Yang	2020	China	882	Preschoolers	West
Yang	2021	China	882	Preschoolers	West
Han	2020	China	1365	Preschoolers	East
Liu	2020	China	150	Preschoolers	East
Liu	2021	China	141	preschoolers	Central
Liu	2021	China	196	Preschoolers	Central
Liu	2021	China	196	Preschoolers	Central

descriptive statistics, the investigation of publication bias, testing for heterogeneity and model selection, the calculation of effect sizes, and the exploration of moderator effects. Through the adoption of these analytical methods, the study achieved a comprehensive and rigorous investigation of the relevant research literature.

Descriptive statistics

Descriptive statistics were performed for each independent sample included in the meta-analysis, encompassing several key parameters. These included the total sample size (N), the number of independent samples (k), the minimum and maximum sample sizes, as well as the correlation coefficients. By deriving these parameters, the study was able to gain a comprehensive understanding of the characteristics of the individual samples and their contribution to the meta-analytic results.

Publication bias analysis

Publication bias was identified as the most frequent source of error in the meta-analysis, characterized by a tendency for positive results to be favored by publication [33]. We used funnel plots to evaluate the validity of the meta-analysis, with small sample size results plotted at the bottom and large sample size results at the top. An asymmetric, inverted funnel shape would indicate the absence of bias, whereas an inclined and asymmetric funnel plot would suggest the presence of bias. The use of funnel plots provided a robust method for evaluating publication bias in the meta-analysis [34].

The graphical representation of publication bias was further substantiated by using the fail-safe ratio (N_{fs}), which quantifies the number of unpublished studies required to nullify the significance of the effect size. Specifically, N_{fs} was compared to $5k + 10$ (where k represents the number of effect sizes), with N_{fs} exceeding this threshold, indicating a reduced impact of publication bias on the combined

research results [35]. Additionally, Egger's regression was employed as an alternative approach to assessing publication bias in the meta-analysis.

Model selection and effect size calculation

The fixed-effect model and the random-effects model embody fundamentally distinct assumptions regarding the data. In the fixed-effect model, we assume the existence of a single true effect size underlying all studies in the analysis, attributing any discrepancies in observed effects solely to sampling error. In contrast, the random-effects model accommodates varying true effect sizes, allowing for the possibility of both a shared effect size across all studies and differing effect sizes from study to study. The effect sizes observed in conducted studies represent a random sample from a specific distribution in random-effects meta-analysis. The fixed-effect model is appropriate when there are two conditions met: firstly, when there is strong evidence supporting the functional equivalence of all the studies, and secondly, when our objective is to calculate the common effect size, limited to the specific population encompassed in the analysis without generalization [36]. Due to variations in real conditions across different studies included in the current meta-analysis research, such as sample age, sample region, study design, and measurement tools, the applicability of the fixed-effect model is undermined in the current study. It is highly probable that the true mean differs between studies, making the adoption of a random-effects model more plausible. In the subsequent meta-analysis, a heterogeneity test was conducted to further validate the selection of the model.

As the distribution of the correlation coefficient r was skewed and the study's variance was dependent on the correlation, it was necessary to transform r into Zr using Fisher's Z . This transformation allowed the distribution of Zr to approximate a normal distribution [37]. For the

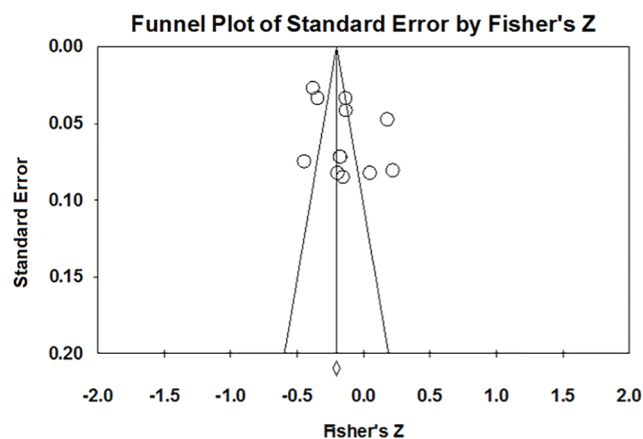


FIGURE 2. Funnel plot of the relationship between parent-child secure attachment and problem behaviors.

analysis of the overall effect size, the correlation coefficient r was selected and converted into Zr using the following calculation formula based on Fisher's transformation [38]:

$$Zr = 0.5 * \ln\left(\frac{1+r}{1-r}\right) \tag{1}$$

Heterogeneity testing

The study utilized significance tests of Q statistics to examine the heterogeneity of effect sizes. The Q statistic, which measures the overall variation test, was used to assess heterogeneity, with effect sizes relying on a chi-square distribution with a significance level of $p < 0.10$. Moreover, the I^2 index is utilized to quantify heterogeneity. The I^2 statistic quantifies the proportion of total variation across studies attributed to heterogeneity rather than chance. The I^2 index was calculated by dividing the inter-group difference by the sum of the inter-group and intra-group differences, with values of 25%, 50%, and 75% indicating low, moderate, and high heterogeneity, respectively [39]. Nevertheless, I^2 provides a general estimation of the overall dispersion rather than a precise measure of the extent of variation in effect sizes. Therefore, Kendall's τ^2 was employed to estimate the between-study variance of the effect sizes accurately [39,40]. If significant heterogeneity is detected, a subgroup analysis of potential moderating variables is required.

Sensitivity and moderator analyses

To investigate potential causes of heterogeneity, sensitivity and moderator analyses were conducted. In the sensitivity analysis, the impact of a single large study on the pooled estimates was examined by including and excluding it.

Moderator analyses were conducted to identify potential sources of heterogeneity among the significant relationships between parent-child secure attachment and problem behaviors among Chinese firstborn children in family transitions. Categorical moderators, such as the age period subgroup (e.g., preschoolers and school-age children) and region subgroup (e.g., east, central, and west), were examined using subgroup analyses, while meta-regression was conducted for continuous moderators (e.g., publication ages) [36]. The moderating effect analyses allowed for a more nuanced understanding of the factors that may contribute to the observed relationships between parent-child secure attachment and problem behaviors.

Results

Publication bias analyses

Fig. 2 displays the effect sizes of the associations between parent-child secure attachment and problem behaviors among firstborn Chinese children in the familial transitions analyzed in this study toward the top of the symmetrical funnel plot. The absence of publication bias in the meta-analysis is evident from the funnel plots. Furthermore, the fail-safe ratio N_{fs} and Egger's linear regression were comprehensively evaluated to support the graphical findings concerning publication bias.

Based on the analytical findings of the fail-safe ratio N_{fs} , a total of 379 studies with invalid results would be required to nullify the effect size. Notably, the N_{fs} values exceeded the $5k + 10$ criterion, indicating that the current results were highly robust and that the likelihood of publication bias was negligible. Additionally, Egger's linear regression test demonstrated non-significant asymmetry ($intercept = 0.144$, $p > 0.05$), indicating a lack of publication bias. Consequently, the results obtained from the funnel plot, the fail-safe ratio N_{fs} , and Egger's regression suggest that the effect estimate derived from this meta-analysis is highly unlikely to have been influenced by publication bias.

The combined effect sizes analyses

This meta-analysis comprises 10 articles that report on 12 separate studies, as presented in Table 2. The selected articles were published between 2017 and 2021. Of these, the investigation into the correlation between parent-child secure attachment and behavioral issues among firstborn Chinese children in familial transitions had a total sample size of 5319 participants. The sample size of children ranged from 141 to 1365 in the included studies, with the age ranging from 2 to 15 years.

TABLE 2

k	Sample			N	Heterogeneity test			
	Min	Max	Q-value		df(Q)	p-value	I ²	τ ²
12	141	1365	5319	180.050	11	0.000	93.891	0.038

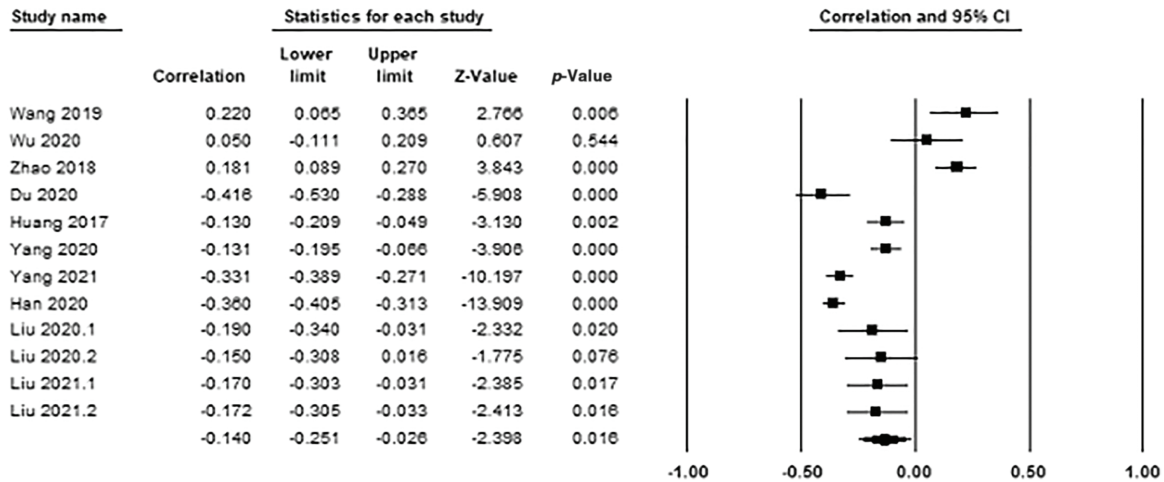


FIGURE 3. Forest plot of effect sizes (r) synthesis: Parent-child secure attachment and problem behaviors.

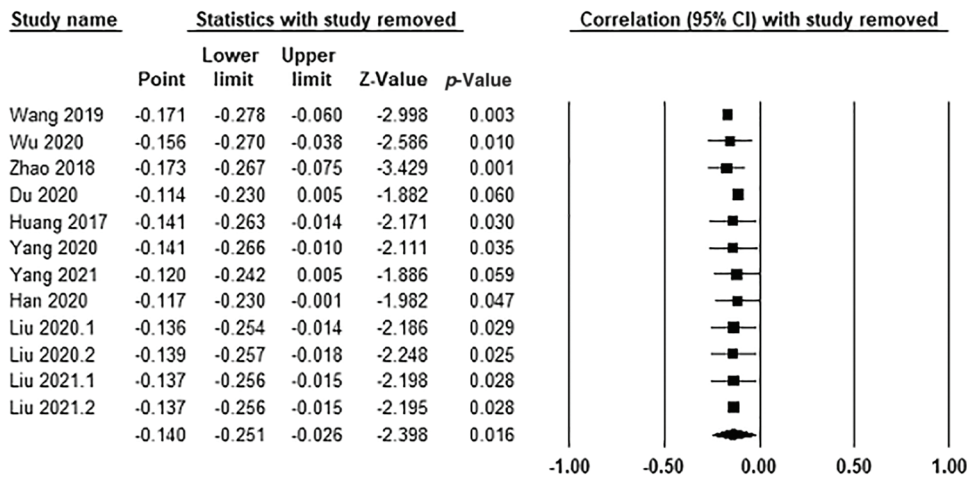


FIGURE 4. Results of a sensitivity analysis.

We extracted 12 effect sizes (r) to analyze the combined effects of parent-child secure attachment on problem behaviors. The data were subjected to an analysis of combined effects using random-effects models because the model allows for more generalized inferences concerning the mean of the effect size distribution [41,42]. Fig. 3, the forest plot, illustrates the range of these effect sizes, which varied from -0.416 to 0.220. The aggregated effect size was calculated as -0.140.

The overall effect sizes were found to be statistically significant ($p < 0.05$). To gauge the strength of the combined effect, we employed the standard measure of effect size suggested by Cohen [43], whereby an effect size of $0.1 \leq r < 0.3$ indicates a small effect. The results reveal that the overall effect size of $r = -0.140$ (95% CI = [-0.251, -0.026], $p < 0.05$) suggests a small, negative relationship between parent-child secure attachment and problem behaviors among Chinese firstborn children in family transitions. These results lend support to the research hypothesis.

Heterogeneity test

Table 2 presents the outcomes of the heterogeneity assessment, revealing significant heterogeneity among the

studies based on the Q statistics results, with $p < 0.05$, the I^2 values exceeding 75% indicate significant study heterogeneity, and $\tau^2 = 0.038$ [39].

Sensitivity and moderator analyses

To ensure statistical fidelity, a sensitivity analysis was conducted using CMA software. This involved systematically removing one study while retaining the others in a random-effects model. The results of the sensitivity analysis are shown in Fig. 4, which indicates that the significance of the findings remained unchanged despite the systematic removal of individual studies.

The heterogeneity tests conducted in the present study reveal a significant level of heterogeneity in all the included studies pertaining to the association between parent-child secure attachment and problem behaviors among Chinese firstborn children undergoing family transitions. A range of moderating variables could potentially influence this heterogeneity. These factors were considered in the moderating analysis to examine the potential moderating effect of sample characteristics such as age and region. This allowed for an investigation into whether these research factors may account for heterogeneity in the relationship. Table 3 displays the results of between-level Q moderator

TABLE 3

Moderating effect results

Moderator		Q_B			k	N	r	95% CI
		Q_B value	df	p				
Age	Preschool children	55.287	1	0.000	10	4299	-0.177	-0.280~-0.069
	School-age children				2	1020	0.025	-0.275~0.321
Region	East	8.660	2	0.013	3	1656	-0.250	-0.395~-0.093
	Central				5	879	-0.104	-0.310~-0.111
	West				4	2784	-0.107	-0.297~-0.090

analyses conducted for categorical moderators, namely participants' age (e.g., preschool children and school-age children) and region (e.g., east, central, and west areas of China).

The results of the moderating analyses indicate that children's age (i.e., preschool or school-age) and region (i.e., east, central, and west regions of China) significantly moderate the association between parent-child secure attachment and problem behaviors among Chinese firstborn children experiencing family transitions. Notably, a marked discrepancy in the strength of this relationship was observed between the two age groups. Specifically, a considerably stronger negative correlation was observed among preschool-age children ($r = -0.177$), while a weaker positive correlation was found among school-age children ($r = 0.025$).

Additionally, the meta-regression analysis of continuous moderators, such as publication year, revealed no significant (Estimate = -0.079 , SE = 0.045 , $Z = -1.77$ and $p = 0.077$) change in the relationship between parent-child secure attachment and child problem behavior over time.

Discussion

This study employed a meta-analytic method to investigate the relationship between parent-child secure attachment and problem behaviors among Chinese firstborn children undergoing family transitions. A comprehensive quantitative analysis of the 10 included articles was conducted, resulting in a total sample size of 5319 and 12 effect sizes (r) extraction. Publication bias was assessed using a funnel plot, the fail-safe ratio N_{fs} test, and Egger's linear regression, which collectively suggested no risk of publication bias in the study. A random-effects model was utilized to estimate overall effect sizes. Finally, an exploration of subgroup analyses was conducted utilizing the moderators of participant age and region, which provided an explanation for the observed heterogeneity.

The combined effects

Consistent with the attachment theory-based hypothesis [9], the findings of this study reveal a small, negative effect ($r = -0.140$) of parent-child secure attachment on problem behaviors of Chinese firstborn children in family transitions. These results are consistent with previous research conducted in Chinese and other cultural contexts [11,25,44].

Based on attachment theory, the initial relationship between a parent and child shapes an internal working model that determines how an individual perceives themselves in relation to other interactive figures, such as siblings and peers. Subsequently, the behaviors displayed in later relationships are believed to be influenced by this model [6]. The activation of the working model is presumed to be significant in situations where maintaining an attachment bond in further relationships is essential, such as interactions with siblings and peers. Consequently, in these situations, children with secure attachments are expected to exhibit more adaptive behaviors than their insecurely attached counterparts [4]. The present study's results offer further support for attachment theory within the family system context. Specifically, first-born children with secure attachments demonstrate more significant adaptive behaviors in early interactions with their parents and subsequently exhibit fewer problematic behaviors when transitioning to interactions with younger siblings within the family structure transition period.

The moderating effects

The present study revealed significant variations in the moderating influence of children's age on the association between parent-child secure attachment and the firstborn child's problematic behaviors during family transitions. Specifically, the correlation was positively and weakly associated among the sample of school-aged children, whereas it was negatively and relatively strongly associated among preschool-aged children. These findings of correlation degree are consistent with prior research [25,26], suggesting that as children mature and navigate increasingly complex social environments, behaviors may become less susceptible to familial characteristics, such as parent-child secure attachment. Consequently, studies that sampled school-aged children demonstrated a weaker association between parent-child secure attachment and problematic behaviors in contrast to studies that sampled preschool-aged children. Furthermore, attachment theory aligns with the current study's results [6], which indicate that parent-child secure attachment has a more substantial adverse influence on the problematic behaviors of firstborn children during the family transition period among preschool-aged children in sample studies. Specifically, this finding provides further support for attachment theory, which proposes that the

child's secure internal working model acts as the central mechanism that establishes the connection between parent-child attachment and child behavior [1]. During the preschool years, children's interactions with parents have a notably greater impact on shaping their internal working patterns concerning safe and unsafe scripts, expectations, and attributions, compared to the school-age years [24]. Namely, preschoolers who lack secure attachment display fewer prosocial behaviors and more problematic behaviors.

However, the direction of the correlation effect is inconsistent with previous studies [4,45]. Specifically, our results indicate a positive correlation between parent-child secure attachment and problem behaviors in school-age firstborn children during the family transition period. This may be attributed to the unique circumstances surrounding first-born children during a period of familial structural transition and China's historical one-child fertility policy. Following three decades of China's one-child policy, families are experiencing structural changes such as conceiving or having a second child, in which the parents are mostly the only children in their families of origin. Parents encounter difficulties conveying genuine experiences about sibling intimacy with their school-age children as they grow up [46]. School-age children are typically older than preschoolers and may spend more time alone with their parents, receiving greater unshared attention and affection. Consequently, such children may have already developed a secure and stable attachment to their parents. However, they may lack the requisite experience of sibling intimacy from parental guidance because their parents are also only-child. As a result, when a younger sibling arrives or has recently arrived, these school-age children may display different problematic behaviors as the previously established stable family dynamic undergoes changes [26]. Specifically, when a school-age child forms a stronger attachment to their parents during a family transition period, it tends to manifest in the emergence of more problem behaviors when the long-established family dynamics are disrupted by the arrival of a younger sibling.

Furthermore, the children's region was found to impact the relationship, with the strongest negative association observed in eastern China, followed by western and central China, respectively. The process and mechanism of the parent-child relationship in the eastern region of China is largely influenced by Western concepts due to its relatively high level of economic development and degree of social openness [47], which differs from the traditional Chinese parent-child relationship. Previous studies have consistently revealed a negative association between high control parenting and secure attachment in the parent-child relationship [48,49]. However, high control and direct instructions given by parents predict children's obedience, unobtrusive behaviors, and fewer problem behaviors to maintain social harmony in traditional Chinese culture and collectivist society [50]. Thus, in Chinese collectivism and traditional culture, highly controlling parents are associated with close and secure parent-child relationships, as well as less problematic behaviors. However, our findings suggest the opposite, especially in the economically developed and socially open eastern regions. The present-day Chinese

society, marked by economic globalization and social openness, is witnessing a certain level of influence from western cultural practices, particularly in the eastern region, where democratic and affectionate parenting styles and close parent-child relationships are becoming increasingly prevalent, thereby impacting traditional strict and high-control approaches to parenting and parent-child relationships [51]. Therefore, the region moderates this relationship, showing that first-born children in developed and open eastern regions who experience more secure and stable parent-child relationships exhibit fewer problematic behaviors during the family transition period.

The findings from the moderator analysis further indicated that the association between parent-child secure attachment and children's problem behavior remained stable across time, with no significant changes observed. The most plausible explanation lies in the limited timespan covered by the included studies, which ranged from 2017 to 2021. This narrow timespan potentially contributed to the absence of a significant change in the relationship between parent-child secure attachment and child problem behavior. Considering the timeline of the fertility policy implementation in China, it is noteworthy that the official adoption of the two-child fertility policy began in 2016 [8]. As a result, the research sample population predominantly comprised first-born children from (potential) multi-child families. It is not difficult to understand that the first study was carried out around 2017.

Limitations and Implications

Limitations

This study has several limitations that need to be acknowledged. Firstly, the moderator analyses did not account for other variables due to the limited literature, such as study design, measure tools, family socioeconomic status, the children's gender, and parenting support, which may have influenced the strength of the relationship. For instance, a recent study conducted in Chinese settings has shown that grandparents' involvement and support in childrearing may enhance parent-child relationships, directly or indirectly benefiting children's behavioral development, especially in multiple-child Chinese families [52]. Therefore, while moderating factors may explain the observed results, their explanatory role cannot be definitively established in the current study. Further investigation is necessary to address these issues, as accumulating evidence may shed light on these complex dynamics. In addition, the generalizability of our findings to other contexts may be limited, as the literature included in our study was exclusively in Chinese, given the exclusion criteria for English-language publications.

Theoretical and practical implications

Notwithstanding the limitations above, the present study endeavors to investigate the potential influence of parent-child attachment on problem behaviors exhibited by their firstborn child during familial transitions within Chinese cultural settings, thereby offering valuable insights into

effective family support and parenting strategies. The current findings of the research corroborate the tenets of attachment theory, thereby substantiating the theory's validity and significance within both Chinese and international settings. During parent-child interactions, children tend to acquire behavior patterns from their parents, and secure attachment between parents and children leads to more comfortable interaction and communication. The influence of the environment and parental guidance also contributes to the development of adaptive behaviors in children [53]. As a result, individuals who have established a positive attachment relationship with their parents tend to undergo a positive social learning process that facilitates the formation of a positive self and other representations [6]. Parents who are sensitive and responsive to their child's needs and emotions are more likely to establish a secure attachment, which involves understanding and responding appropriately to a child's cues, including facial expressions, vocalizations, and body language. Moreover, using positive and consistent parenting, such as encouragement and positive reinforcement, can also help establish secure attachment. Finally, emotional availability refers to a parent's ability to be emotionally present, responsive, and empathetic to their child's emotions and behaviors [54–56]. The utilization of the parenting practices may serve as valuable contributions to establishing secure parent-child attachment, ultimately reducing the problematic behavior exhibited by firstborn children during their transition from being an only child to a non-only child. The effects of secure attachment between parent and child have been shown to be particularly pronounced among preschool-aged firstborn children, as evidenced by the results of the moderating effect. Therefore, parents need to prioritize the implementation of parenting strategies when interacting with their firstborn preschool children.

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