

Original article

Temperament and Risk-taking Behaviors in Chinese Young Children: The Mediating Role of Paternal Involvement Across Family Socioeconomic Status

Yiyang Li, Peige Fu, Jun Hao*

College of Teacher Education, Ningbo University, Ningbo 315211, Zhejiang, China

Received: August 11, 2026

Revised: September 4, 2026

Accepted: September 14, 2026

Published: September 22, 2026

Cited as:

Li, Y., Fu, P., Hao, J. (2026).
Temperament and Risk-taking
Behaviors in Chinese Young Children:
The Mediating Role of Paternal
Involvement Across Family
Socioeconomic Status. *Educational
Research Advances*, 1(3), 152-162.
<https://doi.org/10.46690/era.2026.03.02>

Abstract: This study explored how Chinese children's sensation seeking temperament, paternal involvement and family socioeconomic status (SES) jointly influence their risk-taking behaviors, with paternal involvement as a mediator and family SES as a moderator. A mixed-methods approach was used with 206 father-child dyads from Ningbo and Xuchang, combining quantitative measurements and semi-structured interviews. Results showed temperament and paternal involvement directly and positively predicted children's risk-taking behaviors, with paternal involvement playing a partial mediating role. High SES families had higher paternal involvement and lower child risk-taking behaviors; the positive correlations among the three variables were only significant in high SES families. Fathers across SES recognized paternal involvement's importance and risk-taking's duality but differed in developmental focus, risk attitudes and failure perceptions. The study provides new insights into Chinese children's risk-taking behaviors development.

Keywords: Temperament; Risk-taking behaviors; Paternal involvement; Family socioeconomic status

1. Introduction

Children are naturally curious and inclined to explore, with risk-taking being a key way they do so. Risk-taking behaviors is typically defined as engaging in actions that may lead to physical harm when there are alternative options that could potentially reduce the risk of injury (Morronegiello & Sedore, 2005). This definition emphasizes the negative impacts of risk-taking behaviors. From a positive perspective, this study defines it as actions taken after weighing the pros and cons of success and failure, as well as the appropriateness of one's own abilities, in situations with uncertain outcomes (Little, 2015). Through risk-taking, children can better familiarize themselves with and master their surroundings, and develop autonomous abilities (Sandseter & Kennair, 2011). Those who have experienced negative consequences of risk-taking behaviors become more sensitive to environmental risks, better able to judge their own abilities and thus better at protecting themselves (Brown, 2005).

Literature indicates children's and family characteristics significantly influence children's risk-taking behaviors (Hansen Sandseter, 2007; Little et al., 2011). Temperament, a stable psychological trait in children and their earliest personality difference, plays a key role in behavioral patterns, emotional responses, etc. (Rothbart & Posner, 2004) and is significantly linked to their risk-taking behaviors (Morronegiello & Sedore, 2005; Yu Meihui, 2020). Extensive research highlights fathers' unique role in children's risk-taking behaviors development. Lamb (1995) notes fathers' parenting distinct from mothers', involves introducing children to the external world and reality. Studies find men are more positive and accepting of children's risky play than women (Cevher-Kalburan & Ivrendi, 2016; Sandseter, 2014). The activation relationship theory emphasizes parent-child bonds, especially father-child, and aims to regulate such behavior during children's environmental exploration (Paquette et al., 2022). Family socioeconomic status (SES) may be another key family factor affecting children's risk-taking behaviors. Studies have found that families with different SES differ in terms of parenting attitudes, parenting styles, and growth resources provided to children (Ali et al., 2023). Children from families with lower family SES have more significant external behavioral problems (Zhang Wei et al., 2007) and exhibit more risk-taking behaviors (Hao & Hsueh, 2018).

Although the independent effects of children's temperament, paternal involvement and family SES on children's risk-taking behaviors have been verified, how these three factors jointly influence remains unclear. Therefore, this study establishes a model to explore the impacts of these three factors on children's risk-taking behaviors, with children's

temperament as the independent variable, paternal involvement as the mediating factor, and to investigate the role of different family SES in this relationship.

1.1 Children's Sensation Seeking Temperament, Paternal Involvement and Risk-Taking Behaviors

Temperament is characterized by innate, stable traits, which are exhibited through unique expressive behavior in the context of the individual's environment. The temperament of children is associated with varying levels of sensation-seeking (Morrongiello, 2010), a personality trait characterized by a drive for novel, exciting sensations and experiences, often expressed through risk-taking behaviors (Zuckerman, 1994). In this study, children's temperament is operationalized as sensation-seeking temperament, manifested in the degree of sensation seeking. High sense-seekers tend to exhibit an aggressive, stimulus-seeking temperament, whereas low sense-seekers tend to exhibit a more stable temperament. Evidence indicates that sensation-seeking temperament significantly predicts children's risk-taking behaviors (Morrongiello & Sedore, 2005). Children with higher sensation-seeking temperament tend to engage in positive risk-taking behaviors, whereas those with lower levels typically exhibit negative risk-taking behaviors (Hansen & Breivik, 2001).

Paternal involvement is a multifaceted construct encompassing not only fathers' physical engagement in children's development but also their psychological and emotional investment. It includes both direct, positive interactions with children and indirect contributions that support children's physical and mental well-being (Hawkins, 2002). Evidence indicates that paternal involvement promotes children's social skills (Chen, 2021) and learning qualities (Wang, 2021), while significantly enhancing their motivation, frequency, and risk identification ability regarding positive risk-taking behaviors (Lu, 2015). Conversely, insufficient paternal involvement elevates children's risk of engaging in dangerous behaviors (Idemudia et al., 2016).

The Parent-Child Activation Relationship Theory posits that children's biological tendencies toward risk-taking may be attenuated or amplified as a function of the current environment (Paquette et al., 2022). Relative to mother-child activation relationships, only father-child over-activation relationships significantly predict children's risk-taking behaviors. Prior research further indicates bidirectional influences between children's temperament and paternal parenting styles. To align with children's needs, fathers adjust their parenting behaviors accordingly (Liu et al., 2023). This suggests children's temperament may impact children's risk-taking behaviors development via its influence on paternal involvement.

1.2 The Influence of Family SES on Children's Sensation Seeking Temperament, Paternal Involvement and Risk-taking Behaviors

Family SES encompasses a family's comprehensive status across economic resources, social status, and educational attainment. Children's risk-taking behaviors vary by family SES: those from high SES families demonstrate stronger risk assessment skills and engage in fewer risk-taking behavior (Hao & Hsueh, 2018), whereas low SES families' children exhibit more such behavior (Jia & Zhu, 2021).

Furthermore, children's sensation seeking temperament and paternal involvement vary significantly by family SES. Prior research indicates that parental educational attainment is a key predictor of children's temperamental characteristics (Feng, 2009). Parents with higher educational attainment typically provide richer familial cultural and educational resources and more effectively engage in parent-child educational interactions, thereby fostering children's temperamental development (Wu, 2021). From the perspective of paternal involvement, fathers' educational attainment, occupation, and monthly income collectively shape their overall paternal involvement (Xu, 2021). Early research indicates that fathers from high SES families exhibit greater paternal involvement (Carlson & Magnuson, 2011), whereas those from low SES families show lower levels of involvement and tend to engage in negative parenting practices (McLoyd, 1998). This suggests that family SES not only directly predicts children's risk-taking behaviors but may also exert indirect effects on such behaviors via children's sensation seeking temperament and paternal involvement. Existing research has not comprehensively examined the potential moderating roles of family SES in the associations among those three factors.

1.3 The Present Study

To date, most researchers have mainly explored the impact on children's risk-taking behaviors from a single factor such as children themselves or their families, and there is a lack the dual factors. Research on children's risk-taking behaviors in China only emerged in recent years, and no research exists on the associations between children's sensation seeking temperament, paternal involvement, and family SES, and their risk-taking behaviors. Thus, additional research on Chinese children samples is warranted.

This study seeks to examine the relationships among sensation seeking temperament, paternal involvement, and risk-taking behaviors in Chinese children, as well as the influence of family SES on these three factors and their interrelationships. To address these objectives, three hypotheses are proposed.

H1: Children's sensation seeking temperament and paternal involvement exert a direct influence on their risk-taking behaviors.

H2: Paternal involvement mediates the relationship between children's sensation seeking temperament and their risk-taking behaviors.

H3: Significant differences exist in children's sensation seeking temperament, paternal involvement, children's risk-taking behaviors, and their interrelationships across families with different SES.

2. Methodology

2.1 Participants

This study examined the impact of children's sensation seeking temperament and their paternal involvement on their risk-taking behaviors. Participants in the study were mainly from an urban area in Ningbo, Zhejiang Province, and a township in Xuchang, Henan Province. There were 100 children and their fathers in Ningbo and 106 children and their fathers in a township in Xuchang that were recruited as the participants of this study. Specific information about the participants is shown in Table 1.

Table 1. List of Basic Information

Variant	Level	Number	Proportion
region	Urban	100	48.5%
	Township	106	51.5%
sex	Male	111	53.9%
	Female	95	46.1%
Father's education	High school, junior college and below	97	47.1%
	College or higher	30	14.6%
	Undergraduate	71	34.5%
	Master's degree or above	8	3.9%
Mother's education	High school, junior college and below	93	45.1%
	College or higher	32	15.5%
	Undergraduate	70	34.0%
	Master's degree or above	11	5.3%
Father's monthly income	Less than \$4,000	30	14.6%
	\$4000- \$6000	47	22.8%
	\$6000- \$8000	30	14.6%
	\$8000- \$10000	24	11.7%
	More than \$10,000	75	36.4%
Only child	Yes	59	28.6%
	No	147	71.4%
Family structure	Mother and children	3	1.5%
	Mother, father and children	63	30.6%
	Mother, elder and children	25	12.1%
	Parents, elder and children	109	52.9%
	others	6	2.9%
SES	High	103	50%
	Low	103	50%

2.2 Measures

2.2.1 Early Childhood Sensation Seeking Temperament Questionnaire

The sensation seeking temperament of children was measured using the Children's Stimulus-Seeking Temperament Inventory (Morrongiello et al., 2010). This inventory consists of 27 questions, each with two response options (1 point for 'high' stimulus-seeking and 0 points for 'low' stimulus-seeking). The total score indicates the level of 'stimulus-seeking' temperament. The total score indicates the level of 'stimulus-seeking' temperament in the children. The internal consistency coefficient of the revised Chinese version was 0.84 (Hao, 2020).

2.2.2 Paternal Involvement Questionnaire

Paternal involvement was measured using the Father Parenting Input Questionnaire (Wu et al., 2015). The 56-item questionnaire is categorised into three dimensions: interactivity, accessibility, and responsibility. Items were scored on a 5-point scale ranging from 0 to 4 (never, occasionally, sometimes, often, and always), with all items scored positively. The internal consistency coefficients of all dimensions were between 0.83 and 0.93, indicating good reliability of the scale.

2.2.3 Youth Version of Balloon Analogue Risk Task

The risk-taking behaviors of children was measured using a balloon-hitting risk simulation mini game (Lejuez et al., 2007), as illustrated in Figure 1. A total of 15 balloons were used in the test, conducted using computer software. The

larger the balloon, the higher the score, but the balloon could explode at any time during the process. The number of times the balloon was pumped without bursting was then averaged to indicate the children's level of risk-taking behaviors. The children received small gifts corresponding to their scores, spending an average of 5 minutes on the task. The reliability of this measure was good, with an internal consistency coefficient of 0.78, which was significantly correlated with the participants' risk-taking behaviors in a real environment.

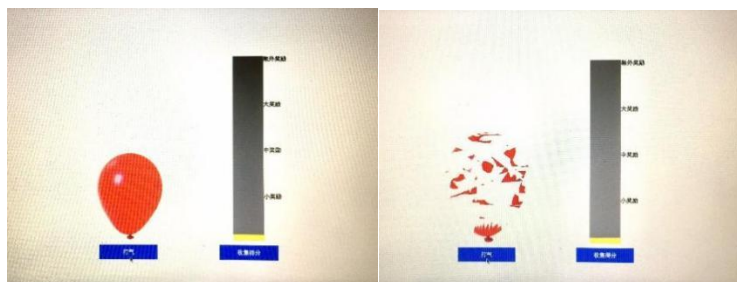


Figure 1. Youth version of balloon analogue risk task.

2.2.4 Semi Structured Interviews

The questionnaire method can only reveal the relationships between the variables in the model. Therefore, it is difficult to explain the reasons for the formation of these relationships. To compensate for this shortcoming, an interview method was used to better understand fathers' attitudes and practices regarding parenting and coping with the risk-taking behaviors of children. This method aimed to explain the relationships among the three research variables in the model, as well as the effects of family SES on these relationships. For this study, 12 fathers of children from high SES and 8 fathers of children from low SES were selected for semi structured interviews. The interviews were derived from self-edited interview outlines and audio-recorded in their entirety with the consent of the interviewees.

2.3 Procedures

The fathers of the children were first invited to play a risky simulation game of balloon playing, and after the children completed the game, the fathers of the children were asked to complete a simple questionnaire, which included basic information about the children's location, gender, whether they were an only child, the parents' education level, the father's monthly income level, the structure of the family, and the family SES, as well as the children's level of sensation seeking temperament and the paternal involvement. After the fathers of children completed the questionnaire, 12 and 8 fathers of children were further invited for semi structured interviews in high and low family SES respectively. The interviews were conducted mainly according to the flow of author's questions, subjects' answers, and random follow-up questions based on the interviewee's answers, one interview per father of children. After the interviews, the authors transcribed, organized, and extracted valid content from the recordings.

2.4 Data Analysis

This study used SPSS 26.0 to analyze the correlation between young children's sensation seeking temperament, paternal involvement and children's risk-taking behaviors. The PROCESS 3.5 plug-in for SPSS 26.0 was used to test the mediating effect. The stability of the model's mediating effects will be tested using the bias-corrected percentile bootstrap method with 2,000 replications.

Thematic analysis was employed to analyze the interview data (Braun & Clarke, 2006). All textual data were coded according to the date of the interview and the interviewee. For example, "20230413T1" represents the content of the interview with the father of the first children on April 13, 2023. In the case of an interview with a household of high SES, it would be coded as "20230413T1-H". Interviews with households of low SES would be coded as "20230413T1-L".

3. Results

3.1 Preliminary Analyses

In terms of mean values, children's sensation seeking temperament scores ($M = 0.46$, $SD = 0.16$) were all below the median and at the lower intermediate level, had small standard deviations. The mean score for overall paternal involvement ($M = 2.64$, $SD = 0.62$) indicated that the level of paternal involvement was in the upper middle range. The accessibility dimension was highest ($M = 2.88$, $SD = 0.67$), followed by the responsibility dimension ($M = 2.67$, $SD = 0.64$). The interactivity dimension was lowest ($M = 2.57$, $SD = 0.62$). Children's risk-taking behaviors scores ($M = 25.12$, $SD = 19.56$), were below the median at the lower middle of the range and had a large standard deviation.

Across family SES, mean scores were higher for sensation seeking temperament ($M = 0.47$, $SD = 0.15$) and paternal involvement ($M = 2.75$, $SD = 0.56$) for children from high SES families ($M = 0.44$, $SD = 0.17$) than for those of low SES family ($M = 2.56$, $SD = 0.65$). Additionally, mean scores for risk-taking behaviors were higher for children of low family SES ($M = 28.53$, $SD = 21.66$) than for those of high family SES ($M = 21.71$, $SD = 16.61$).

Secondly, there was a significant positive pairwise correlation between children's sensation seeking temperament, paternal involvement and risk-taking behaviors ($r = 0.17, p = 0.014$; $r = 0.15, p = 0.031$; $r = 0.15, p = 0.028$).

3.2 The Mediating Effect of Paternal Involvement

As shown in Table 2, the direct effect size of children's sensation seeking temperament on their risk-taking behaviors was 18.18 (90% CI [4.447, 31.912], $p < 0.05$), and the mediating effect size of paternal involvement was 2.33 (90% CI [-0.181, 5.609], $p < 0.05$). These results revealed a significant direct effect of children's sensation seeking temperament on their risk-taking behaviors, but a non-significant mediating effect of paternal involvement.

Table 2. Breakdown table of total effects, direct effects, and indirect effects.

path	Effect	90%CI	Proportion of effects
Direct effects $ST \rightarrow RB$	18.18	[4.45,31.91]	88.63%
Indirect effects $ST \rightarrow PI \rightarrow RB$	2.33	[-0.18,5.61]	11.37%
Total effects	20.51	[6.86,34.16]	

Note: *ST* Sensation seeking temperament; *RB* Risk-taking behaviors; *PI* Paternal involvement. The same below.

Therefore, this study further adopted Judd & Kenny's mediation effect test to examine the mediating role of paternal involvement. As shown in Table 3, the regression coefficient of children's sensation seeking temperament on their risk-taking behaviors was 0.17 ($p < 0.05$), and that of children's sensation seeking temperament on paternal involvement was 0.15 ($p < 0.05$). After controlling for children's sensation seeking temperament, the regression coefficient of paternal involvement on their risk-taking behaviors was 0.13, marginally significant, ($p < 0.1$). Per Judd & Kenny's complete mediation criterion, the regression coefficient of children's sensation seeking temperament on their risk-taking behaviors remained 0.15 ($p < 0.05$) after adding paternal involvement. Thus, paternal involvement played a partial mediating role between children's sensation seeking temperament and their risk-taking behaviors. The mediating effect model was illustrated in Figure 2.

Table 3. Regression model analysis results.

Variables	Dependent variables	<i>R</i>	<i>R</i> ²	F	<i>β</i>	<i>SE</i>	<i>t</i>	
ST	RB	0.17	0.03	6.17*	<i>c</i>	0.17	8.26	2.48*
ST	PI	0.15	0.02	4.91*	<i>a</i>	0.15	0.26	2.22*
PI	RB	0.21	0.05	4.79	<i>b</i>	0.13	2.22	1.83 ⁺
ST					<i>c'</i>	0.15	8.31	2.19*

Note: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$, ⁺ $p < 0.10$.

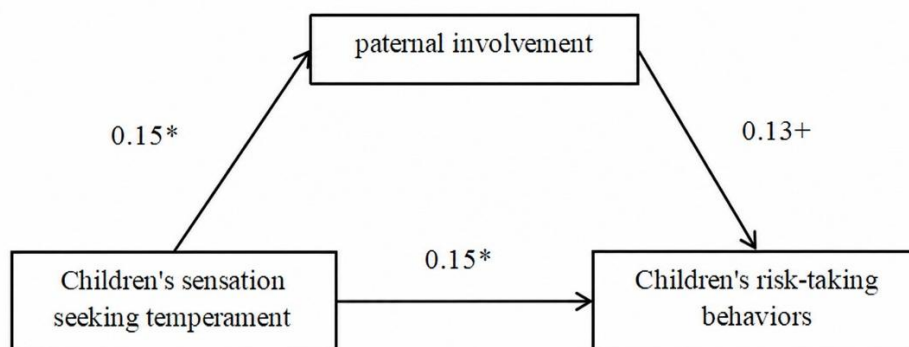


Figure 2. Mediating effects of paternal involvement between children's sensation seeking temperament and risk-taking behaviors.

3.3 The impact of family SES

To understand how the three variables relate to different family SES, the study conducted a Pearson correlation analysis for each variable in households with high and low SES, as shown in Table 4. Among families with a high SES, both children's sensation seeking temperament ($p = 0.008$) and paternal involvement ($p = 0.007$) were significantly and positively correlated with risk-taking behaviors. Among families with a low SES, however, neither children's sensation seeking temperament ($p = 0.137$) nor paternal involvement ($p = 0.196$) was significantly correlated with risk-taking behaviors.

Table 4. The relationship between three variables in different SES of families.

Variables	SES	r/p	ST	PI
RB	High	r	0.26	0.27
		p	0.008**	0.007**
	Low	r	0.15	0.13
		p	0.137	0.196
PI	High	r	0.12	
		p	0.223	
	Low	r	0.16	
		p	0.118	

Note: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$, + $p < 0.01$.

To investigate how high and low family SES affects various factors, this study divided family SES into two groups: high and low. An independent samples t-test was conducted, and the results are shown in Table 5. Significant differences were found in paternal involvement ($p = 0.024$) and children's risk-taking behaviors ($p = 0.012$) for family SES. This indicated that high and low family SES affected paternal involvement and children's risk-taking behaviors. The mean for paternal involvement was higher for families with a high SES than low, indicating that fathers with a high SES were more involved than low. Regarding the mean risk-taking behaviors of children, the results were high < low, indicating that high family SES had lower levels of risk-taking behaviors than low.

Table 5. The impact of family SES on three variables.

variables	SES	M	s	t	p
ST	High	0.47	0.15	1.41	0.158
	Low	0.44	0.17		
PI	High	2.75	0.56	2.27*	0.024
	Low	2.56	0.65		
RB	High	21.71	16.61	-2.54*	0.012
	Low	28.53	21.66		

Note: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$, + $p < 0.10$.

This study employed multi-cluster analysis to investigate the stability of the models. While keeping the basic parameters, factor loadings, error variances, and structural covariances constant, two models were developed: one with free estimation of paths across family SES (unconstrained structural paths), and the other with equal path coefficients for high and low family SES (constrained structural paths). The results showed no significant difference between the two models [$\chi^2(3) = 1.128, p = 0.770$]. At the same time, all fit indicators for both models met the fitness criteria (see Table 6). These results indicated that the two models have cross-family socioeconomic status stability, i.e., there was no significant difference in the cross-family SES comparison between the two models.

Table 6. Comparison of constrained and unconstrained structural pathway models for cross family SES.

	χ^2	df	CFI	RMSEA	SRMR	AIC	ECVI
unconstrained structural paths	14.41	6	1.00	0.00	0.00	24.00	0.12
constrained structural paths	13.28	3	1.00	0.00	0.03	19.13	0.09

3.4 Results of Interviews with Fathers from Different Family SES

Based on the results of the thematic analyses, commonalities and differences were identified between fathers with high and low family SES.

3.4.1 Commonalities between high and low socioeconomic status of families

First, families of all SES agreed that paternal involvement is important, but fathers actually spent little time parenting. For example, during the interview, a father from a low SES family said, "I don't think I communicate much with my child because I'm not home much. I can't help him with many things. For example, last week, his mother sent him to kindergarten, and she noticed an injury on his left eye. I didn't know about it. His mother asked the teacher about it, and the teacher said the injury happened at school on Monday. The injury was already there, but the child was fine at home before. Finally, the teacher told us that the child bumped his head at school." (20230322T1-L); A father from a high SES family

also said, *"I may be busier now. It's his mom who accompanies him more. I accompany him in all aspects, but less."* (20231021T11-H); Thus, it could be seen that fathers were less involved in parenting due to work, and in most families, it was the mother or grandparents who were involved in child rearing. Additionally, most fathers, regardless of their family's SES, were aware of their unique role in their children's upbringing. During the interviews, one father said, *"I think that if fathers are more involved, it makes children braver and more in touch with society."* (20230420T6-L); *"All aspects of the father's behavior and demeanor have a greater impact on his son. For example, when I'm out talking to clients, if he goes with me, he can see how I interact with people. That's something he can pick up on very quickly."* (20231021T10-H). Regardless of their family's SES, fathers spent less time parenting. However, they all saw their role as irreplaceable in their children's development.

Second, both groups of fathers recognized the two-sided nature of risk-taking behaviors in children and allowed them to take risks within certain limits. Some of the father's views on risk-taking behaviors emerged during the interviews: *"I think risk-taking behavior is complementary. Risk-taking has both advantages and disadvantages. The advantage is that risk-taking can exercise the child's courage. However, if children try riskier things, they are exercising their wild nature. It's not good to discipline them."* (20230420T6-L). *"This is divided into two aspects: there are advantages and disadvantages. The favorable aspect is to let him try something new and constantly break through. The harmful aspect is when he goes after exciting things. This may cause him to grow up to be more extreme. He wants to try everything, and this is not good. Our thinking is to do things a little more stably."* (20231021T10-H). The vast majority of parents recognized the dual nature of risky behavior, had a balanced view of risk, and could make sound judgments when their children took risks. Additionally, fathers of all SES allowed their children to take risks to a certain extent. For example, two fathers said the following: *"I feel that she has her own thoughts now. If she thinks something is dangerous, she won't do it. But if she's curious and wants to try it, she will, and that's human nature." I think it's beneficial to take risks like swinging. When it's higher, she'll be scared at first, but she'll slowly get used to it and find the fun in it. That's also a kind of growth. As long as it doesn't cause her any harm, I won't object"* (20230322T1-L). Another father said, *"If it's something that I think will cause harm to his person, then I definitely won't allow it, but if it doesn't cause harm, then I'll encourage and accompany him through it"* (20230322T1-L); *"If I think it will harm him, I won't allow it. But if it won't, I'll encourage and accompany him through it"* (20231021T10-H). Many fathers encouraged their children to take risks and viewed risk-taking behaviors positively in children as long as it did not cause them harm.

Lastly, both groups of fathers recognized the importance of self-assessment for children. During the interview, the researcher learned about the father's views on his children's attempts to try new things. The father said, *"I have cacti planted in my house. She is very curious and wants to touch them. After she accidentally got stabbed by a cactus thorn, she remembered it and won't touch them again because she knows it will hurt. This is the kind of growth one gets after experiencing failure and frustration, which is also a kind of learning"* (20230322T1-L). The father also said, *"It's better to tell him that this thing and that thing are not allowed than to let him try it on his own. It's really not allowed."* (20231021T9-H). Regardless of their family SES, this showed that fathers were willing to let their children learn from their failures and grow.

3.4.2 Differences in SES between High and Low Families

First, the results of the interviews revealed that parents with high and low SES placed different emphases on early childhood development. Parents with a high SES paid more attention to their children's physical and mental development, as well as cultivating interests and habits. For example, one father said, *"For this little one, I want him to do more physical exercise because I don't think culture is too important at his age. I think physical fitness is more important because learning is relaxing at this stage. There is no pressure to learn, and it may influence his future growth. This time period may also have a big impact on his growth."* (20231021T12-H). Meanwhile, fathers of low SES placed more emphasis on their children's academic performance. For example, one father said, *"First, I think it's important to cultivate cultural knowledge. Learning is the most important. Then, we can see what hobbies he has and cultivate them."* (20230420T6-L). Thus, it was clear that parents with high and low SES focused on different aspects of their children's early childhood development. The former focused on their children's physical and mental health, while the latter focused on their children's intellectual development.

Second, parents of different SES had different attitudes and practices regarding their children's risk-taking behaviors. Parents of a higher SES encouraged risk-taking and respected their children's self-will. For example, one of the fathers interviewed said, *"Even in the shopping mall, if he wants to play that climbing game, we encourage him to try these things. Not only in school but also outdoors, we encourage based on the child's will. For example, when he is timid, we encourage him, but the final decision is in his hands"* (20231021T10-H). On the other hand, fathers of low SES were extremely protective, though they saw adventure as beneficial. One father said, *"I can be very protective of my child. I have thought about this, and I will encourage my child to take risks to a certain extent. But when you really come across it, you may feel a little scared of the idea of encouraging her. You will end up throwing it out for a while because you still think about protecting her in the long run"* (20230420T8-L). It could be seen that parents with high and low SES had different attitudes and practices toward children's risk-taking behaviors. The former had a positive attitude and encouraged risk-taking, giving the choice to the child. The latter recognized the positive significance of risk-taking but ultimately approached it with admonition and protection.

Finally, fathers from high and low family SES had different perceptions of failure and frustration in children. Fathers from higher family SES viewed failure and injury as opportunities for growth for their children. One father in the interview

said, *"I think failure and injury are growth spurts and learning processes for him as well"* (20231021T12-H). In contrast, parents of low family SES perceived failure and injury as hurtful to their children. One father talked about how a child would be discouraged by failure and feel defeated. He said, *"Then he'll watch from the sidelines, and he'll do it all over again. I think failure and injury are hurtful to a child's growth"* (20230420T7-L). It was clear from the above that fathers with high and low family SES had different perceptions when their young children faced failures and setbacks. The former believed that failures and setbacks were learning opportunities and that they could make a difference, while the latter believed that setbacks would negatively affect their children and make them feel like failures.

4. Discussion

Appropriate exposure of children to age-appropriate risky situations constitutes a critical developmental process for them to learn about and explore the world (Sandseter et al., 2021). However, against the backdrop of a continuous rise in accidental injuries among children in China, safety has garnered significant attention in parental caregiving, with many parents tending to forgo opportunities for children's unstructured free play and adventurous exploration in the name of safety (Liu et al., 2023).

To date, few empirical studies have explored the joint effects of children's individual factors and family factors on their risk-taking behaviors within the Chinese context. By constructing a theoretical model, the present study is the first to systematically examine the mechanisms through which children's sensation seeking temperament, paternal involvement, and family SES exert their influences on risk-taking behaviors among children in China.

The results confirmed that children's sensation seeking temperament and paternal involvement exert direct effects on risk-taking behaviors among Chinese children, and further verified the mediating role of paternal involvement in the relationship between children's sensation seeking temperament and their risk-taking behaviors. These findings indicate that children's sensation seeking temperament not only has a direct impact on their risk-taking behaviors but may also indirectly influence such behavior by shaping paternal involvement. Additionally, the study revealed significant disparities in paternal involvement and children's risk-taking behaviors across families of varying SES in China.

4.1 Children's Sensation Seeking Temperament, Paternal Involvement and Children's Risk-taking Behaviors are interrelated

The sensation seeking temperament of Chinese children, paternal involvement and children's risk-taking behaviors are pairwise correlated. Among them, children's sensation seeking temperament is significantly positively correlated with risk-taking behaviors and can directly predict those behaviors. Children with high sensation seeking temperament are more inclined to choose high-intensity and high-stimulation activities, and they exhibit more risk-taking behaviors (Li, 2022). This suggests that identifying high sensation seekers in early childhood and providing appropriate guidance can help balance their desire to explore with safety risks and prevent accidents.

There is also a significant positive correlation between paternal involvement and children's risk-taking behaviors, among which the "accessibility" and "responsibility" dimensions have more prominent impacts. Fathers' timely responses can enhance children's sense of security, making them more daring to attempt challenges; fathers' behaviors of planning long-term development for their children and setting examples of taking risks can improve children's ability to judge risks.

There is a significant positive correlation between children's sensation seeking temperament and paternal involvement. That is, children with a high sensation-seeking temperament can more actively express their needs, prompting fathers to invest more energy in parenting; conversely, paternal involvement will also strengthen children's sensation-seeking tendencies, forming a two-way promoting relationship. This is consistent with the conclusion of previous study (Liu et al., 2023) that children's temperamental characteristics will affect parents' parenting styles, and parents' responses will in turn react on children's behavioral tendencies.

4.2 Paternal Involvement Mediates the Children's Sensation Seeking Temperament and Risk-taking Behaviors

This study confirms that paternal involvement plays a partial mediating role in the relationship between children's sensation-seeking temperament and their risk-taking behaviors. This can be explained by the "Activation Relationship Theory" (Paquette et al., 2020): fathers are more inclined to activate children's desire to explore through risky games, and children's high sensation-seeking temperament will strengthen such interactions.

Children with a high sensation-seeking temperament not only directly exhibit more adventurous behavior, but also indirectly enhance their adventurous tendencies by prompting fathers to adopt more positive parenting styles (such as encouraging exploration and providing support). Compared to mothers, fathers have a higher ability to engage in adventurous behavior; they tend to enjoy challenging adventurous things and encourage their children to engage in adventurous activities or outdoor games. Moreover, a children's temperament affects the father's parenting style: for children with a high sensation seeking temperament, fathers are more inclined to encourage them to take risks and show greater support for their adventurous behaviors. For Children with a low sensation seeking temperament, fathers adopt a more conservative parenting style. Different parenting styles of fathers, in turn, influence the father's temperament, resulting in a bidirectional interaction.

4.3 Impact of Family SES on The Three Variables and Their Relationships

This study found that family SES has a significant impact on father involvement and children's risk-taking behaviors. Fathers in high SES families have a higher level of involvement, which is consistent with previous research results (Meng, 2022). Fathers in high SES families tend to engage more in homework support, parent-child communication, and spending time with their children (Li et al., 2020). Children in low SES families engage in more risk-taking behaviors, which may be related to the environmental advantages of town and rural areas. Children in kindergartens with greater access to outdoor spaces may have more opportunities to engage in outdoor play and adventurous activities (Liu et al., 2023). In contrast, children in high SES families are mostly from urban areas, where the range of activities is smaller, and the excessive supervision by parents in high SES families may limit children's opportunities for adventure (Hao et al., 2025).

There is a significant positive correlation between the sensation seeking temperament of children from high SES families, paternal involvement and their risk-taking behaviors. This indicates that in families with sufficient resources, these three factors may form a positive cycle where fathers' encouragement of exploration and guidance help children develop a liking for taking risks and promote their beneficial risky behaviors (StGeorge & Freeman, 2017), consistent with previous research findings (Aquino et al., 2020). However, there is no significant correlation in low SES families. This may be because the parenting styles of low SES families tend to be "permissive" or "overprotective," which weakens the impact of temperament and parenting on risk-taking behaviors (Yang, 2018). For example, some fathers from low SES families are neglectful of discipline due to busy work (McLoyd, 1998), and their children's risk-taking behaviors may be more influenced by the environment rather than temperament or father's parenting.

In addition, based on the supplementary results of the interview content analysis, it can be known that there are three commonalities and three differences each in children's sensation seeking temperament, paternal involvement and children's risk-taking behaviors with respect to the variable of high and low family SES. It is worth mentioning that, in terms of commonalities, regardless of the family SES, Chinese fathers generally recognize the dual nature of risk-taking behaviors. They allow children to take risks within a certain range and emphasize the importance of children's self-assessment.

5. Implications and Limitations

This study examines children's risk-taking behaviors from the perspective of the interaction between children as individuals and their family environment, which is the first attempt in the Chinese context. In addition, it also confirms that the development of children's risk-taking behaviors is not isolated, but the result of the combined effect of individual temperament and family environment. This finding provides a new perspective for understanding the development of risk-taking behaviors in Chinese children. Future research can focus on the bidirectional relationship between child development and paternal involvement.

However, this study still has some limitations. First of all, this study only selected two cities in central and eastern China, which inevitably led to a small sample size, and this also resulted in the phenomenon that some research results showed marginal significance. Future studies can further expand the sample from different regions. Secondly, this study adopted a cross-sectional design, but children's sensation seeking temperament and risk-taking behaviors will change as they grow older. Future studies can try to adopt a longitudinal design to explore the relationship among the three more deeply, so as to obtain more valuable research conclusions.

Conflicts of interest

The authors declare no conflict of interest.

Data Availability Statement

The dataset generated and analyzed during the current study is available from the corresponding author upon request.

Open Access

This article is distributed under the terms and conditions of the Creative Commons Attribution (CC BY-NC-ND) license, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

References

- Ali, N., Ullah, A., Khan, A. M., Khan, Y., Ali, S., Khan, A., Bakhtawar, Khan, A., Din, M. U., Ullah, R., Khan, U. N., Aziz, T., & Ahmad, M. (2023). Academic performance of children in relation to gender, parenting styles, and socioeconomic status: What attributes are important. *PloS one*, 18(11), e0286823. <https://doi.org/10.1371/journal.pone.0286823>
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative research in psychology*, 3(2), 77-101. <https://doi.org/10.1191/1478088706qp063oa>
- Brown, S. L. (2005). Relationships between risk - taking behavior and subsequent risk perceptions. *British Journal of Psychology*, 96(2), 155-164. <https://doi.org/10.1348/000712605x36703>

- Cevher-Kalburan, N., & Ivrendi, A. (2016). Risky play and parenting styles. *Journal of Child and Family Studies*, 25, 355-366. <https://doi.org/10.1007/s10826-015-0236-1>
- Chen, Y. (2021). *Research on the influence of Father's Involvement in Parenting on Children's Peer Communication Ability* [Master's Dissertation, Central China normal university]. China National Knowledge Infrastructure. <https://doi.org/10.27159/d.cnki.ghzs.2021.002480>
- Feng, J. J. (2008). *A study on attachment, temperament characteristics and maternal attachment of 2-3 year old children* [Master's Dissertation, Shaanxi Normal University].
- Hansen Sandseter, E. B. (2007). Categorising risky play—how can we identify risk-taking in children's play? *European Early Childhood Education Research Journal*, 15(2), 237–252. <https://doi.org/10.1080/13502930701321733>
- Hansen, E. B., & Breivik, G. (2001). Sensation seeking as a predictor of positive and negative risk behavior among adolescents. *Personality and individual differences*, 30(4), 627-640. [https://doi.org/10.1016/s0191-8869\(00\)00061-1](https://doi.org/10.1016/s0191-8869(00)00061-1)
- Hao, J. (2020). *A Comparative Study of Young Children's Risk-Taking Behavior in China and US: A Multiple-Group Path Analysis* [Doctoral dissertation, The University of Memphis].
- Hao, J., & Hsueh, Y. (2018). Chinese preschoolers' risk-taking behaviors: a tripartite relation. *International Journal of Child Care and Education Policy*, 12(1), Article 10. <https://doi.org/10.1186/s40723-018-0049-y>
- Hao, J., Xue, Y., & Yue, Y. P. (2025). The influence of temperament and family parenting environment on risky play among Chinese and American young children: Parental supervision as a mediator from a sociocultural perspective. *Studies in Preschool Education*, (3), 56-70. <https://doi.org/10.13861/j.cnki.sece.2025.03.001>
- Hawkins, A. J., Bradford, K. P., Palkovitz, R., Christiansen, S. L., Day, R. D., & Call, V. R. (2002). The inventory of father involvement: A pilot study of a new measure of father involvement. *The journal of men's studies*, 10(2), 183-196. <https://doi.org/10.3149/jms.1002.183>
- Idemudia, E., Moamogwe, K., & Maepa, M. (2016). Father involvement and demographic factors influencing anti-social behaviours of adolescent learners in south africa. *Journal of Psychology: Interdisciplinary and Applied*, 7(2), 61-67. <https://doi.org/10.1080/09764224.2016.11907845>
- Lamb, M. E. (1995). The changing roles of fathers. In J. L. Shapiro, M. J. Diamond, & M. Greenberg (Eds.), *Becoming a father: Contemporary, social, developmental, and clinical perspectives* (pp. 18-35). Springer Publishing Company.
- Lejuez, C. W., Aklin, W., Daughters, S., Zvolensky, M., Kahler, C., & Gwadz, M. (2007). Reliability and validity of the youth version of the Balloon Analogue Risk Task (BART-Y) in the assessment of risk-taking behavior among inner-city adolescents. *Journal of Clinical Child and Adolescent Psychology, Division 53*, 36(1), 106-111. <https://doi.org/10.1080/15374410709336573>
- Li et al. (2020). Family socioeconomic status and home-based parental involvement: A mediation analysis of parental attitudes and expectations. *Children and Youth Services Review*, 116, 105111. <https://doi.org/10.1016/j.childyouth.2020.105111>
- Li, J. X. (2022). *The impact of sensation seeking on risk-taking behavior in adolescents: Adjust the a mediation* [Master's Dissertation, Northwest Normal University]. <https://doi.org/10.27410/d.cnki.gxbfu.2022.000928>
- Li, K., & Wang, Y. J. (2020). Current situation and promotion strategies of young children's risky play. *Studies in Preschool Education*, (12), 82-85. <https://doi.org/10.13861/j.cnki.sece.2020.12.009>
- Little, H. (2015). Mothers' beliefs about risk and risk-taking in children's outdoor play. *Journal of Adventure Education & Outdoor Learning*, 15(1), 24-39. <https://doi.org/10.1080/14729679.2013.842178>
- Little, H., Wyver, S., & Gibson, F. (2011). The influence of play context and adult attitudes on young children's physical risk-taking during outdoor play. *European Early Childhood Education Research Journal*, 19(1), 113-131. <https://doi.org/10.1080/1350293X.2011.548959>
- Liu, J., Wyver, S., Chutiyami, M., & Little, H. (2023). Children's access to outdoors in early childhood education and care centres in China during the COVID pandemic. *Journal of Outdoor and Environmental Education*, 26(3), 403 - 419. <https://doi.org/10.1007/s42322-023-00139-z>
- Liu, W., Guo, X., Zhang, J., & Hu, W. (2023). The Relationship between 3~4-Year-Old Children's Temperament and Parenting Style: A Two Wave Longitudinal Study. *Journal of Psychological Science*, 46(03), 578-585. <https://doi.org/10.16719/j.cnki.1671-6981.20230309>
- Lu, J. Y. (2015). *A study on the Relationship between sensory seeking, risk-taking Behavior and Paternal parenting Styles in Adolescents* [Master's Dissertation]. Guangxi Normal University.
- McLoyd V. C. (1998). Socioeconomic disadvantage and child development. *American Psychologist*, 53(2), 185-204. <https://doi.org/10.1037//0003-066x.53.2.185>
- Meng, A. Q. (2022). *The relationship between family socioeconomic status and mathematics achievement: Parents education participation and the role of math anxiety* [Master's Dissertation]. Hebei Normal University. <https://doi.org/10.27110/d.cnki.ghsfu.2022.000906>
- Morrongiello, B. A., & Sedore, L. (2005). The influence of child attributes and social-situational context on school-age children's risk taking behaviors that can lead to injury. *Journal of Applied Developmental Psychology*, 26(3), 347-361. <https://doi.org/10.1016/j.appdev.2005.02.003>

- Morrongiello, B. A., Sandomierski, M., & Valla, J. (2010). Early identification of children at risk of unintentional injury: A sensation seeking scale for children 2-5 years of age. *Accident Analysis & Prevention*, 42(4), 1332-1337. <https://doi.org/10.1016/j.aap.2010.02.014>
- Paquette et al. (2022). Father-child and mother-child relationships as predictors of injury-risk behaviors in toddlers. *Adversity and Resilience Science*, 4, 47-56. <https://doi.org/10.1007/s42844-022-00068-8>
- Rothbart, M. K., Ellis, L. K., & Posner, M. I. (2004). Temperament and self-regulation. In R. F. Baumeister & K. D. Vohs (Eds.), *Handbook of self-regulation: research, theory, and applications* (pp. 357-370). Guilford Press.
- Sandseter, E. B. H. (2014). Early childhood education and care practitioners' perceptions of children's risky play; examining the influence of personality and gender. *Early Child Development and Care*, 184(3), 434-449. <https://doi.org/10.1080/03004430.2013.794797>
- Sandseter, E. B. H., & Kennair, L. E. O. (2011). Children's risky play from an evolutionary perspective: The anti-phobic effects of thrilling experiences. *Evolutionary psychology*, 9(2), 257-284. <https://doi.org/10.1177/147470491100900212>
- Sandseter, E. B. H., Kleppe, R., & Sando, O. J. (2021). The prevalence of risky play in young children's indoor and outdoor free play. *Early Childhood Education Journal*, 49(2), 303-312. <https://doi.org/10.1007/s10643-020-01074-0>
- Wang, X. B. (2021). *A study on the relationship between father involvement in parenting and learning quality of 3-6 year old children: Mental toughness of intermediary role* [Master's Dissertation]. Hebei Normal University. <https://doi.org/10.27110/d.cnki.ghsfu.2021.001196>
- Wu et al. (2015). Preparation of paternal involvement questionnaire and its reliability and validity test. *Chinese journal of clinical psychology*, 23(02), 576-579. <https://doi.org/10.16128/j.cnki.1005-3611.2015.04.002>
- Wu, X. Y. (2021). *Influence of temperament of small class children on kindergarten adaptation* [Master's Dissertation, East China Normal University].
- Xu, Y. J. (2021). *The effect of maternal gatekeeping behavior on young children's emotional competence: the mediating role of father involvement in parenting* [Master's Dissertation]. Central China Normal University. <https://doi.org/10.27159/d.cnki.ghzsu.2021.000820>
- Yang, X. Y. (2018). *A study on the relationship between parents' attitudes toward young children's risky play and their family parenting styles: A case study of Wuhan City* [Master's Dissertation]. Central China Normal University.
- Yu, M. H. (2019). *A study of the relationship between temperament and problem behavior in 3-6 years old* [Master's Dissertation], Anshan Normal University. <https://doi.org/10.27825/d.cnki.gassf.2019.000029>
- Zhang et al. (2007). Low socio-economic status and child development. *Journal of South China Normal University (Social Science Edition)*, (6), 104-112.
- Zuckerman, M. (1994). *Behavioral expressions and biosocial bases of sensation seeking*. New York: Cambridge University Press.
- Zuckerman, M. (2007). The sensation seeking scale V (SSS-V): Still reliable and valid. *Personality and individual differences*, 43(5), 1303-1305. <https://doi.org/10.1016/j.paid.2007.03.021>