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Parental Divorce or Separation and Children's Language Ability: Mediating Roles of Family Support and Temperament

Yuhui Sarah Wang[1*]; **Ming Milano Li**[2]

[1] Centre for Empirical Legal Studies, Faculty of Law, University of Macau, Taipa, Macau

[2] Department of Government and Public Administration, Faculty of Social Sciences, University of Macau, Taipa, Macau

Corresponding author: Yuhui Sarah Wang (yc47258@um.edu.mo)

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Abstract: Parental divorce or separation can significantly impact early childhood development, yet its effects on preschool children's language ability remain underexplored. Given that language plays a foundational role in both cognition and socialization, this study examines the mediating roles of family support and children's temperament (effortful control, negative affectivity) in the relationship between parental separation and language ability. Using data from 9,823 children aged 0-5 in the 2022 National Survey of Children's Health, bootstrapped mediation analyses reveal that parental separation negatively affects language ability both directly and indirectly through reduced family support and changes in children's temperament. These findings underscore the developmental consequences of early family instability and highlight the importance of strengthening family support systems and fostering children's self-regulation as intervention strategies. This study contributes to family stress and coping theory and advances our understanding of how parental separation shapes early childhood development. It also provides practical insights for designing supportive programs that buffer the adverse effects of parental separation on young children's language outcomes.

Keywords: parental divorce or separation, children's language ability, family support, children's temperament, effortful control, negative affectivity

Data Availability Statement : The data used in this study were obtained from the Child & Adolescent Health Measurement Initiative (CAHMI), specifically the 2022 NSCH. These data are publicly available through the Data Resource Center for CAHMI at: https://www.childhealthdata.org/learn-about-the-nsch/topics_questions/2021-nsch-guide-to-topics-and-questions#sqB. The 2022 version of the dataset was utilized, with open access and no restrictions. All data cleaning and analysis procedures adhered to the guidelines provided by CAHMI.

Ethics Committee Approval : This study is based on publicly available data from the 2022 National Survey of Children's Health (NSCH) and does not involve direct interaction with human participants. Therefore, ethical approval and informed consent were not required.

Informed Consent : Not applicable.

Declaration of Interests : The authors declare that they have no competing interests, financial or non-financial, related to the work submitted for publication.

Consent for Publication: Not applicable.

Parental divorce or separation can significantly impact early childhood development, yet its effects on preschool children's language ability remain underexplored. Given that language plays a foundational role in both cognition and socialization, this study examines the mediating roles of family support and children's temperament (effortful control, negative affectivity) in the relationship between parental separation and language ability. Using data from 9,823 children aged 0-5 in the 2022 National Survey of Children's Health, bootstrapped mediation analyses reveal that parental separation negatively affects language ability both directly and indirectly through reduced family support and changes in children's temperament. These findings underscore the developmental consequences of early family instability and highlight the importance of strengthening family support systems and fostering children's self-regulation as intervention strategies. This study contributes to family stress and coping theory and advances our understanding of how parental separation shapes early childhood development. It also provides practical insights for designing supportive programs that buffer the adverse effects of parental separation on young children's language outcomes.

Keywords

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Introduction

Children's language ability plays a crucial role in their overall development, and has a profound impact on many fields, including social interaction (Peeters et al., 2025), academic performance (Lurie et al., 2021), and emotional regulation (Cole et al., 2010). Existing studies show that well-developed language competence in early childhood is one of the most reliable indicators for predicting their future academic achievements and cognitive development (Spiegel et al., 2021). In particular, children's language acquisition delays or speech disorders are often accompanied by an increased risk of learning difficulties, especially in reading and writing, which are the basis for the development of reading and writing skills (Light et al., 2021; Sun & Wallach, 2014). Observational studies have also highlighted that these delays may result in social and behavioral difficulties, which often persist into adulthood and are correlated with academic struggles (Kirtchuk et al., 2022; Meinzen-Derr et al., 2021). According to the Critical Period Hypothesis, from birth to the age of five, the neuroplasticity of brain regions associated with language is at its peak. Therefore, the language input received during this period plays a crucial and decisive role in the formation of neural networks and cognitive development of neural networks (Kuhl, 2010). In view of this, early identification of speech and language barriers, especially for children under the age of five, and implementing targeted interventions are essential to alleviate such challenges and minimize their long-term negative impact on academic performance and mental health.

While fully affirming the importance of promoting children's language development, we must also examine and consider the external environmental factors that affect this development. In today's context of socio-economic transformation and increasingly diverse family structures, parental divorce or separation has become a common phenomenon. Such family disruptions may bring developmental challenges at a critical period of children's growth; existing research has shown that against this background, children show significant vulnerabilities in both language and cognition (Liu et al., 2024; Mei et al., 2022). Specifically, in the case of parental separation, the difficulties faced by children in psychological adjustment are often manifested as marked deficits in vocabulary acquisition and executive functioning (Garriga & Pennoni, 2022). Empirical studies in the past ten years have shown that children from divorced families often lag in terms of language and communication skills, and their language expression and language comprehension ability are weak (Liyu, 2015). In addition, global data sets, including the Organization for Economic Cooperation and Development (OECD) family database, show that the divorce rate has been on the rise in the past few decades - especially in the United States, where the crude divorce rate in many OECD member countries has more than doubled since 1970 (OECD, 2022). A series of recent studies have consistently pointed out that children from divorced families may face higher risks of developmental difficulties (Hu, 2020; Zhang, 2020). However, the impact of parental separation on children's language ability is not a simple linear relationship, nor is it decisive. Scholars suggest that family support after separation (Amato, 2000), children's emotional attachment to their parents (Kelly, 2000), and individual temperament characteristics may all alleviate or aggravate this impact (Eisenberg & Spinrad, 2004).

Family support is widely regarded as a key buffer factor to resist the negative impact of parental separation on children's development (Caksen, 2022; Guidubaldi & Cleminshaw, 1983). In addition, children's temperament is also a key determinant of their coping mechanism, which shapes the way children react to stressors related to parental separation (Lengua, 2006). Differences in temperament affect the degree to which children experience emotional distress or show psychological resilience, which in turn affects their language acquisition process and broader social and emotional development (Dixon Jr & Smith, 2000).

Although existing studies have explored the relationship between parental divorce or separation and children's language ability, there are still significant gaps in the relevant literature on the specific mediation role of family support and children's temperament (Kelly & Emery, 2003). This gap not only covers up the complex interaction mechanism between these mediation factors but also hinders the process of educators and clinicians developing personalized and precise intervention programs. To solve this problem, future research should adopt a more rigorous methodological design, so as to more comprehensively reveal how family support interacts with children's temperament and thus in the context of parental separation, thus affecting their language ability (Gorard, 2013; Park et al., 2004). The progress of such methodologies will help improve the effectiveness of causal inferences and provide a solid theoretical foundation for the formulation of evidence-based intervention strategies.

In response to the gaps in the above research, this study aims to empirically explore how parental divorce or separation affects children's language ability through the two mediation variables of family support and children's temperament (Lansford, 2009). Specifically, this study will examine the extent to which these intermediate variables promote or hinder the language development of children who have experienced parental separation, thus providing theoretical and practical inspiration for potential intervention strategies.

Literature review

Beyond broken homes: family support as a protective factor

Parental divorce or separation has become an important issue across multiple disciplines and has attracted much attention because of its far-reaching impact on children's well-being. In the United States, an average couple divorces every 13 seconds, equivalent to about 277 divorces per hour, causing many children to experience early family breakdown (Sakib, 2021). This family instability has been continuously proven to be closely related to the negative consequences of children's language development, academic performance, and behavioral and psychological well-being (Xerxa et al., 2020). For example, Amato (2000) found that children who grow up in divorced families tend to be weaker in language expression and face greater difficulties in emotional adjustment. Subsequent interdisciplinary studies further confirmed these findings, highlighting the multiple ways in which family breakdown has an adverse impact on children's cognitive and social-emotional domains.

A key factor that can alleviate these negative consequences is family support, which covers the emotional care, attention, and practical assistance provided by parents or extended family members (Bernardi & Radl, 2014). According to the Family Stress and Coping Theory, family support plays a key role in enhancing children's resilience and their ability to adapt to parental separation (Cohen & Wills, 1985). The theory believes that family stressors such as parental divorce or separation may disrupt children's development by weakening emotional support and coping strategies. Empirical studies emphasize that family support is a protective factor that can relieve the psychological pressure of divorce and promote children's emotional and cognitive well-being (Dolan et al., 2020). Therefore, family support acts as a key buffer mechanism, which can offset the harmful effects of parental separation on children's cognitive and socio-emotional functions (Daly et al., 2015).

Although a large number of studies have explored the impact of parental separation on school-age children and adolescents, few studies have focused on young children, whose neural structures are undergoing critical developmental change (Flouri et al., 2015). Early childhood is a sensitive period of language acquisition and emotional regulation; if this stage is disturbed, it will often lead to long-term consequences (Garriga & Pennoni, 2022). Therefore, deeply exploring the impact of parental separation on language acquisition and paying special attention to variations in family support are of great significance.

H1: Parental divorce or separation negatively influences children's language ability.

H2: Parental divorce or separation negatively influences family support.

Fostering resilience: the interplay of family support and children's temperament

Temperament generally refers to patterns of emotional reactivity and self-regulation that are biologically rooted and relatively stable within the individual (Shiner et al., 2012). Although temperament is largely influenced by biological tendencies, existing literature emphasizes that the family environment can profoundly shape the expression and evolution of children's temperament over time (Kiff et al., 2011). In research on early emotional and behavioral regulation, two core dimensions of temperament often examined are effortful control and negative affectivity (Wang et al., 2021).

Based on these theoretical foundations, several empirical studies have pointed out that effortful control involves the individual's ability to regulate impulsive responses and engage in goal-oriented behavior (Finkenauer et al., 2005). In childhood, supportive parenting and emotional response can significantly promote the formation of self-regulation skills (Steele et al., 2019). By providing continuous guidance and stability, family support gives

children strategies to manage emotional arousal, thus enhancing their ability to control impulse responses (Mena et al., 2017).

At the same time, negative affectivity refers to a heightened tendency to experience anxiety, sadness and other negative emotions (Gilboa & Revbelle, 2014). Individuals with higher levels of negative emotions tend to show stronger emotional reactivity, which may increase their susceptibility to cognitive and behavioral distress (Behrens et al., 2023). In contrast, individuals with lower levels of negative emotions usually show higher emotional stability and self-confidence (Dodd & Lester, 2021). Recent analyses show that the emotional support of parents, such as solving problems through discussion and adopting common coping strategies, can effectively alleviate children's negative emotions and promote their emotional stability (Zimmer-Gembeck et al., 2022). By providing consistent emotional reassurance, family support reduces emotional volatility and fosters improved mental health outcomes (Cohodes et al., 2022).

In summary, family support influences children's temperament by providing emotional security, reinforcing self-regulation strategies, and reducing vulnerability to negative affectivity. Based on these studies, this article proposes the following hypotheses:

H3: Family support positively influences children's effortful control.

H4: Family support negatively influences children's negative affectivity.

From emotions to expression: how temperament shapes children's language ability

Language acquisition during infancy and early childhood forms the foundation for later academic success and social integration (Brooker, 2008). Extensive research suggests that children with weaker language skills in early childhood face greater challenges in emotion regulation, social interactions, and school readiness (Eadie et al., 2021). While various environmental and individual factors influence these outcomes, children's temperament has emerged as a particularly salient predictor of language learning and communication development (Reilly & McKean, 2023).

As discussed previously, temperament encompasses several dimensions, among which effortful control and negative affectivity play key roles. Children with higher effortful control tend to focus more efficiently on learning tasks, insist on target-oriented behavior, and regulate their impulses, all these abilities are crucial to language development (Fensie et al., 2024). Empirical evidence shows that sensitive and supportive parenting can enhance self-regulation, thus promoting children's investment in the language learning environment (Horm et al., 2024). By contrast, children who show high negative emotional characteristics often find it difficult to regulate their emotions, which hinders the strong development of their language skills (Ginsburg et al., 2007).

Building on these observations, this study proposes the following hypotheses:

H5: Effortful control positively influences children's language ability.

H6: Negative affectivity negatively influences children's language ability.

Moreover, given the interrelated effects of family support, effortful control, and negative affectivity, we further hypothesize:

H7: Family support, effortful control, and negative affectivity jointly mediate the relationship between parental divorce or separation and children's language ability.

The above seven hypotheses are illustrated in Figure 1.

Figure 3. intuitively shows the mediation paths of parents' separation through family support, effortful control and negative affectivity, thus affecting children's language ability. This figure shows the non-standardized coefficient (bp value) and significance level (p value) of each path. Among the displayed paths, the dotted line represents the indirect effect, while solid line represents the direct effect. Larger standardized coefficients signify stronger path influences on children's language outcomes. These results highlight the important role of family support in alleviating the negative impact of parental separation on language development and reveal the mediating roles of effortful control and negative affectivity.

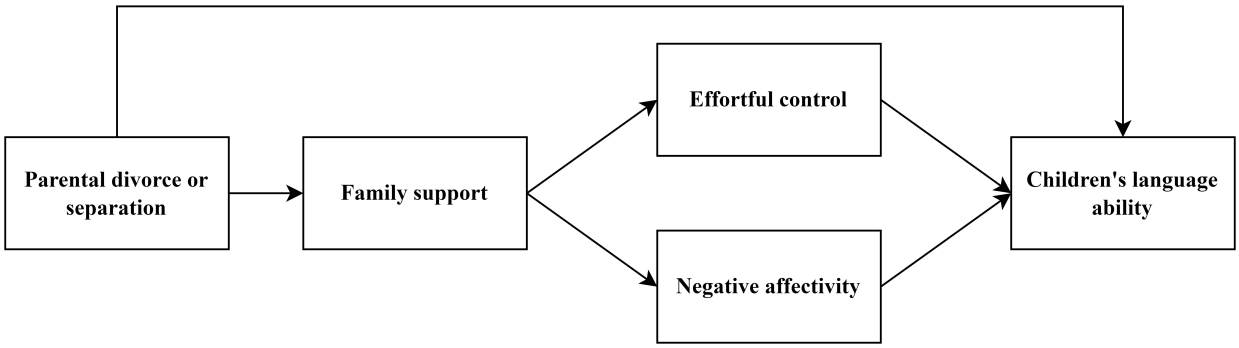

Fig.1 Hypothesized mediation model

Methods

This study utilizes data from the 2022 National Survey of Children's Health (NSCH), a nationally representative survey conducted by the U.S. Department of Health and Human Services in collaboration with the Health Resources and Services Administration, the Maternal and Child Health Bureau, and the U.S. Census Bureau. The NSCH collected 54,103 completed surveys from U.S. households with children aged 0-17 years, using multi-stage sampling with online and mail-in questionnaires. All procedures were approved by the Research Ethics Review Board of the National Center for Health Statistics.

As shown in Figure 2, a total of 2,097 participants were excluded due to missing data on parental divorce or separation, followed by 721 participants removed due to missing data on family support. Additionally, a large number of cases (involving 40,971 participants) were excluded due to the lack of negative affectivity data, and the final remaining sample included 10,314 children. Further exclusions included 56 participants due to the lack of effortful control data, 23 participants due to the lack of children's language ability data, and 412 participants due to other missing information. The final sample comprised 9,823 children aged 0-5 years, accounting for 18.2% of the total dataset. Given the rigorous sampling and weighting adjustments of the NSCH, the samples selected in this study is considered sufficiently representative. As the dataset is publicly available and de-identified, no additional ethical approval was required.

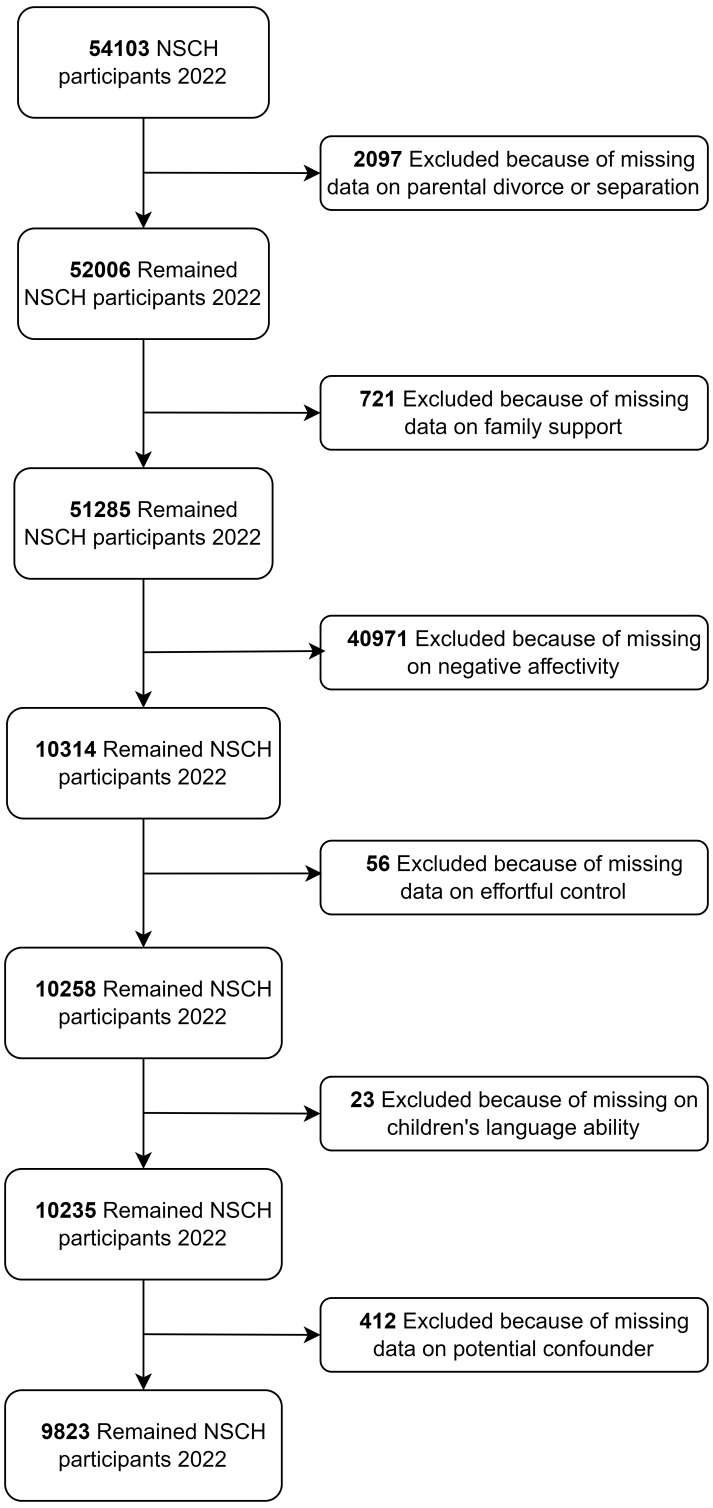

Fig.2 Participant selection flowchart

Measurement

The core variables, including the measure of parental divorce or separation, family support, children's language ability, and children's temperament, along with other covariates, were extracted from the 2022 NSCH dataset.

Children's language ability. Children's language ability was evaluated using 11 binary indicators, with responses coded as 1 ("yes") or 2 ("no"). Participants need to indicate whether the child could complete a specific task, including saying at least one word (such as "hi" or "dog"), combining two words (such as"car go"), constructing

three-word sentences (such as "Mommy come now"), and asking simple questions (such as "who," "what," "when," "where"). More advanced language skills were evaluated by the following indicators asking complex questions (such as "why" or "how"), telling a structured story, understanding the meaning of the word "no," following verbal instructions without gestures (such as "Wash your hands"), pointing to objects in a book when prompted, executing two-step instructions (such as "Get your shoes and put them in the basket"), and understanding positional words (such as "in," "on," "under"). Responses across these 11 items were averaged to create a composite index representing children's overall language ability.

Family support. Family support was measured using four items adapted from the question, "When your family faces problems, how often are you likely to do each of the following?" These include: (1) Talk together about what to do; (2) Work together to solve our problems; (3) Know we have strengths to draw on; and (4) Stay hopeful even in difficult times. Responses were recorded on a four-point scale ranging from 1 ("all of the time") to 4 ("none of the time"). To facilitate interpretation, the scale was reverse-coded, so that higher scores reflected lower levels of perceived family support, and the Cronbach's alpha was 0.9025.

Children's temperament. Children's temperament was assessed through two dimensions: effortful control and negative affectivity. Effortful control reflects a child's ability to maintain attention and persist in goal-directed tasks. Participants responded to three items: "Is easily distracted?", "Keeps working at something until he or she is finished?", and "Follows instructions when paying attention." Negative affectivity measures emotional reactivity and self-regulation, using four items: "Becomes angry or anxious when transitioning between activities?", "Shows concern when others are hurt or unhappy?", "Calms down quickly when excited?", and "Loses control of their temper when things do not go their way?". Responses to all items were recorded on a five-point scale, ranging from 1 ("always") to 5 ("never"). Negatively worded items were reverse-coded, ensuring that higher scores indicated poorer outcomes, with higher effortful control scores representing weaker attentional regulation and task persistence, and higher negative affectivity scores reflecting increased emotional reactivity and difficulties in self-regulation.

Parental divorce or separation. The independent variable, parental divorce or separation, was derived from participants' responses to the question: "To the best of your knowledge, has this child ever experienced parental or guardian divorce or separation?" Responses were dichotomized, with "yes" coded as 1 and "no" coded as 2, indicating whether the child had experienced parental separation.

Explanatory covariates. The selection of control variables in this study is guided by causal inference theory (Pearl , 2009) and supplemented by the support of empirical literature (Donnelly & Kidd, 2021; Zuk et al., 2025). This method aims to effectively reduce confounding and improve the robustness of the estimated associations. The selection of these variables strictly follows the principle of "good controls" proposed by Rubin (2009) and Cinelli et al. (2024), which emphasizes the effectiveness of causal models at the statistical level.

Control variables were classified into three main groups: demographic characteristics (caregiver's place of birth, child's race, and Hispanic status); parental and caregiver characteristics (caregiver's physical and mental health, caregiver's sex and employment status, mother's age at the child's birth); and family characteristics (household income level and sources, total number of family members). These control variables were extracted from the NSCH data set, which has passed strict ethical review and been weighted. The analyses confirmed that the estimates were consistent across different model specifications and sample ranges, thus further verifying the robustness and causal interpretability of the findings in this study.

Statistical analysis

This data analysis process integrates Python 3.11 and Stata 18.0 through an interoperability framework. First, we used descriptive statistics to preliminarily describe the distribution characteristics of all research variables. Subsequently, we used Stata 18.0 to systematically carry out model estimation and inference and automate the workflow through Python scripts.

In terms of mediation effect analysis, we adopted the modern methodology framework proposed by Hayes (2017) and Zhao et al. (2010), and its calculation implementation strictly followed the standardized operating procedures proposed by Zhao et al. (2024). We rigorously tested the mediation effect through an advanced bootstrap program, which carried out 9,823 resamples and calculated the bias-corrected 95% confidence intervals to ensure the robustness of the estimated results.

To solve the doubts about the comparability of the measurement scales in the recent methodology literature, we have introduced the percentage coefficient (b_p) as a supplementary indicator in addition to the traditional β coefficient. This dual-indicator analysis strategy has the following advantages: (1) by mapping the size of the effect to the standardized interval of 0-1, it improves the interpretability of the results; (2) by standardizing the measurement unit, the comparability between different variables is improved. When both dependent and independent variables are converted by percentage (0-1 scaling), the b_p coefficient is mathematically equivalent to the non-standardized B coefficient, while retaining the unique advantages of standardized indicators.

The superiority of b_p indicators in analysis has been empirically verified in recent methodological innovation research (Li et al., 2025), especially in solving the coefficient interpretability paradox pointed out by King (1986) and Blalock (1979), and has shown promising results in improving coefficient interpretability. All statistical analysis programs are implemented through version-controlled Python scripts and Stata macro commands, thus ensuring the full reproducibility of the calculation process.

Results

Preliminary analyses

The final sample contained 9,823 children aged 0 to 5, accounting for 18.2% of the total data set. The sample was broadly representative in terms of demographic characteristics, with boys accounting for 50.9% and girls accounting for 49.1%. In terms of the characteristics of caregivers, 85.5% were born in the United States, 68.7% were women, and 68.4% worked full-time. In terms of family structure, 42.7% of children lived in three-member families, while 29.1% lived in families of two. The distribution of household income based on the federal poverty line (FPL) shows that 10.3% of household had incomes below 100% of FPL, 15.0% were between 100% and 199%, 29.7% is between 200% and 399%, and 44.9% is between or above 400%. In terms of key research variables, 10.8% of children had experienced parental divorce or separation, 84.5% had strong family support, 66.4% showed high effortful control, and 25.7% show high negative emotional tendencies. In terms of language ability, 96.4% of children are classified as having good language ability, while 3.6% of children have poor language ability (see Table 1).

In view of the strict sampling method and weight adjustment mechanism adopted by the NSCH, the selected samples can be considered broadly representative. As the dataset is publicly available and de-identified, no additional ethical approval was required.

Table 1. Frequency and proportion table of samples

Characteristic	N (%)
N	9823
Caregiver's mental health	
1 Excellent	2640 (26.9%)
2 Very good	3927 (40.0%)
3 Good	2507 (25.5%)
4 Fair	674 (6.9%)
5 Poor	73 (0.7%)
Caregiver's physical health	
1 Excellent	2561 (26.1%)
2 Very good	4326 (44.1%)
3 Good	2464 (25.1%)
4 Fair	423 (4.3%)
5 Poor	48 (0.5%)
Caregiver born in the U.S.	
Yes	8403 (85.5%)
No	1420 (14.5%)
Caregiver sex	
Male	3071 (31.3%)
Female	6752 (68.7%)
Caregiver's employment	
Employed full-time	32861 (68.4%)
Employed part-time	5859 (12.2%)
Employed without pay	572 (1.2%)
Not employed but looking for work	1963 (4.1%)
Mother's age at birth	

Characteristic	N (%)
18-24	1154 (11.7%)
25-30	3170 (32.3%)
31-35	3462 (35.2%)
36-40	1705 (17.4%)
41-45	332 (3.4%)
Breastfeeding	
Yes	8186 (83.3%)
No	1637 (16.7%)
Selected child's sex	
Male	4997 (50.9%)
Female	4826 (49.1%)
Selected child's ethnicity and race	
Hispanic	1413 (14.4%)
Non-Hispanic white	6539 (66.6%)
Non-Hispanic black	453 (4.6%)
Non-Hispanic Asian	551 (5.6%)
Non-Hispanic multiracial (reference)	867 (8.8%)
Number of family members in 2022	
1 Member	447 (4.6%)
2 Members	2863 (29.1%)
3 Members	4192 (42.7%)
4 Members	1644 (16.7%)
5 Members	677 (6.9%)
Household income as a percentage of the federal poverty level (FPL)	
0-99% FPL	1010 (10.3%)
100-199% FPL	1477 (15.0%)
200-399% FPL	2921 (29.7%)
400% FPL or greater	4415 (44.9%)

Characteristic	N (%)
Parental divorce or separation	1062 (10.8%)
Yes	8761 (89.2%)
No	8305 (84.5%)
Family support	1518 (15.5%)
Yes (good support)	2527 (25.7%)
No (low support)	7296 (74.3%)
Negative affectivity	
Yes (high)	
No (low)	
Effortful control	
Yes (high)	6519 (66.4%)
No (low)	3304 (33.6%)
Children's language ability	
Yes (good ability)	9472 (96.4%)
No (poor ability)	351 (3.6%)

Main regression analysis

This study assumes that parental divorce or separation will have a negative predictive effect on children's language ability (H1). To verify this hypothesis, this study conducted a multivariate regression analysis using bootstrapping (sample size N = 9,823). As shown in Table 2, the direct effect of parental divorce or separation on children's language ability is negative, but it does not reach a statistically significant level (b_p = -.002, β = -.019, p = .631); this shows that the relationship between the two may not work through direct effects, but it can be explained through the indirect path. However, the separation of parents significantly reduces the level of family support (b_p = -.054, β = -.653, p < .001), which supports H2 and suggests that divorce or separation will reduce the various emotional and practical resources available to children, which may in turn affect developmental outcomes.

When examining the relationship between family support and children's temperament, the results showed that higher levels of family support were significantly positively correlated with the stronger effortful control (b_p = -.125, β = -.167, p < .001), thus supporting the hypothesis H3. This shows that children with stronger family support tend to develop better self-regulation skills, enabling them to better maintain attention and persist in completing tasks. In addition, higher levels of family support were also significantly associated with lower level of negative affectivity (b_p = .133, β = .133, p < .001), thus supporting the hypothesis H4. This result shows that

sufficient family support helps to reduce the emotional distress experienced by children, such as anxiety and sadness.

In terms of children's temperament as a predictor of language ability, effortful control shows a significant positive impact on children's language ability (b_p = .233, β = .160, p < .001), thus supporting the hypothesis H5. This shows that children with strong self-regulation are more likely to develop solid language skills because they can concentrate on learning and actively participate in effective communication. Conversely, negative affectivity was significantly and negatively associated with language ability (b_p = -.087, β = -.080, p < .001), thus supporting the hypothesis H6. This finding suggests that children who frequently experience emotional distress may face certain difficulties in cognitive and language development due to difficulties in concentrating and verbal interaction.

In addition, several control variables are also significantly correlated with the key variables of this study. The mental health status of the caretaker is not only a powerful predictor of family support (b_p = .286, β = .857, p < .001) and effortful control (b_p = -.092, β = -.369, p < .001), and with lower levels of negative affectivity (b_p = .077, β = .231, p < .001). In addition, there is a significant positive correlation between the age of the mother at childbirth and family support (b_p = .050, β = .022, p < .001) and effortful control (b_p = .029, β = .017, p < .001). At the same time, mother's age at birth was negatively associated with negative affectivity (b_p = -.021, β = -.009, p < .01) and children's language ability (b_p = -.027, β = -.010, p < .001). This result shows that the older age of the mother usually indicates more family support and the child's relatively strong self-regulation ability. But at the same time, this may also be accompanied by children's high emotional reactivity and slightly lower language ability.

In summary, the findings of this study suggest that although the divorce or separation of parents cannot directly predict the decline in children's language ability, its impact is likely to be indirectly realized through changes in family support status and the evolution of children's temperament characteristics. The next section will further explore the mediation mechanism hidden behind these related relationships.

Table 2. Regression coefficient and direct effect of mediation models

	Family support		**Effortful control**		**Negative affectivity**		**Children's language ability**	
	b_p	β	b_p	β	b_p	β	b_p	β
Parental divorce or separation	-.054***	-.653***	.013*	.207*	-.005	-.058	-.002	-.019
Caregiver born in the U.S. (1 = outside the US)	.011	.130	.002	.032	-.000	.002	-.013**	-.137**
Caregiver's physical health	.030**	.092**	-.088***	-.352***	.031***	.092***	-.007	-.018
Caregiver's mental health	.286***	.857***	-.092***	-.369***	.077***	.231***	.012	.034
Selected child's race (reference "Multiracial")								

	Family support		Effortful control		Negative affectivity		Children's language ability	
Hispanic	-.016*	-.198*	-.001	-.020	.002	.028	-.012**	-.135**
Non-Hispanic white	-.006	-.076	.000	.000	.000	.005	.002	.021
Non-Hispanic black	-.010	-.118	-.005	-.079	-.008	-.095	-.034***	-.374***
Non-Hispanic Asian	.014	.169	-.014	-.227	.017*	.203	-.009	-.099
Selected child's sex (1 = Female)	-.006	-.066	.038***	.613***	-.036***	-.433***	.010***	.108***
Mother's age at birth	.050***	.022***	.029***	.017***	-.021**	-.009**	-.026***	-.010***
Breastfeeding	-.009*	-.113*	-.014***	-.229**	.004	.052	-.012**	-.129***
Household income as a percentage of the federal poverty level	-.020**	-.001**	.029***	.001***	-.008	-.000	.022***	.001***
Caregiver sex (1 = Female)	-.008*	-.097*	.015***	.242***	-.009**	-.103**	-.002	-.021
Number of family members in 2022	.012	.037	.010	.039	.022**	.067***	.009	.024
Caregiver's employment (reference "Not employed and not looking for work")								
Employed full-time	.031***	.367***	.011*	.186*	-.014**	-.163**	.013***	.145***
Employed part-time	.030***	.363***	.003	.056	-.007	-.090	.008	.090
Employed without pay	.007	.079	.006	.091	-.001	-.015	.005	.049
Not employed but looking for work	.031**	.372**	-.002	-.038	-.001	-.019	.002	.017
Family support			-.125***	-.167***	.133***	.133***	.013	.012
Negative affectivity							-.087***	-.080***
Effortful control							.233***	.160***
N	9823		9823		9823		9823	
R-squared	.158		.137		.100		.189	

	Family support	Effortful control	Negative affectivity	Children's language ability
Adj R-squared	.156	.135	.099	.188

*p < .05, **p < .01, ***p < .001

Mediation analysis

To further explore the intrinsic mechanism of the relationship between parental divorce or separation and children's language ability, this study carried out a mediation effect analysis to evaluate the possible mediation role of family support, effortful control and negative affectivity. The study used a bootstrapping procedure with 9,823 resampling to estimate the indirect effect and its confidence interval.

Table 3. Indirect effects of mediation models

Path	b_p	Unstandardized β	95% CI	*p*
PDS→FS→CLA	-.00069	-.00768	[-.00154, .00010]	.0872
PDS→NA→CLA	.00043	.00463	[-.00045, .00137]	.3416
PDS→EC→CLA	.00300*	0.03316*	[.00038, .00570]	.0272
PDS→FS→NA→CLA	.00063***	.00691***	[.00040, .00089]	.0000
PDS→FS→EC→CLA	.00158***	.01742***	[.00113, .00210]	.0000

Note: PDS = Parental divorce or separation; FS = Family support; CLA = Children's language ability; NA = Negative affectivity; EC = Effortful control.

*p < .05, **p < .01, ***p < .001

As shown in Table 3, the most significant mediation pathway identified in this study was PDS→FS→EC→CLA (b_p = .002, β = .017, p < .001). Given that a lower family support score represents a higher level of family support, these results show that parental divorce or separation will lead to a decrease in family support, thereby weakening children's effortful control and ultimately impairing their language ability. The statistical significance of this pathway highlights the key role of self-regulation ability in the process of language acquisition and cognitive development.

In addition, another significant indirect pathway PDS → FS → NA → CLA (b_p = .001, β = .007, p < .001) reveals the impact of the decline in family support levels on the enhancement of negative affectivity, and this enhancement of negative affectivity leads to the decline of language ability. This result emphasizes the importance of emotional regulation in language development and reminds us that children with insufficient family support may face stronger emotional distress, which may negatively affect on their construction of solid language skills.

Notably, the mediation pathway PDS → NA → CLA (b_p = .000, β = .005, p = .342) does not reach a statistically significant level, which shows that negative affectivity itself does not significantly mediate the relationship

between parental divorce or separation and children's language ability. However, the indirect effect path PDS → EC → CLA (b_p = .003, β = .033, p < .05) is significant, which reminds us that under the background of parental divorce or separation, children's effortful control ability plays an independent role in shaping their language development.

In summary, these studies emphasize the need to develop intervention strategies, which should be aimed at improving the level of family support and focusing on cultivating self-regulation skills for children who have experienced parental divorce or separation. To show the above mediation effect more intuitively, this study presents the corresponding structural model in Figure 3.

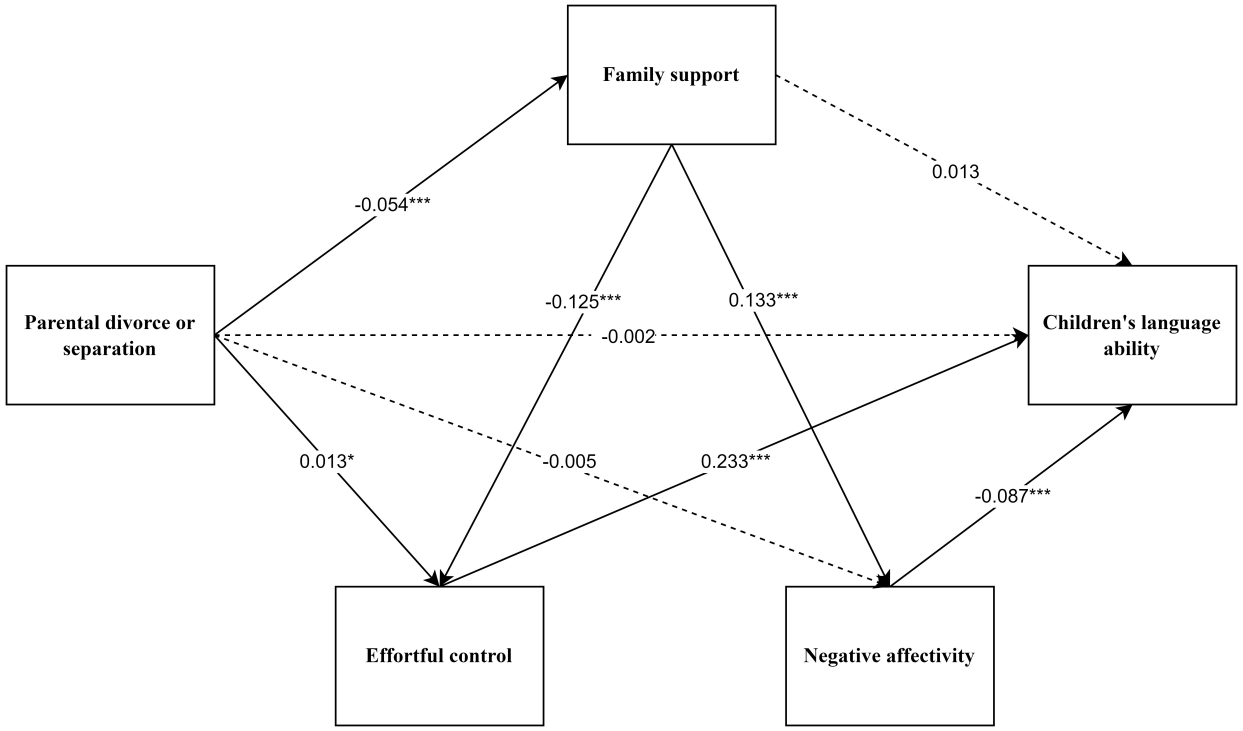

Fig. 3 Mediation pathways in the model

Figure 3 intuitively shows the mediation paths of parents' separation through family support, effortful control and negative affectivity, thus affecting children's language ability. This figure shows the non-standardized coefficient (bp value) and significance level (p value) of each path. Among the displayed paths, the dotted line represents the indirect effect, while solid line represents the direct effect. Larger standardized coefficients signify stronger path influences on children's language outcomes. These results highlight the important role of family support in alleviating the negative impact of parental separation on language development and reveal the mediating roles of effortful control and negative affectivity.

Discussion

The present study examined the relationship between parental divorce or separation and language ability of children aged 0 to 5, with a specific focus on the mediating role of family support and children's temperament. The results confirm that parental separation does have negative effects that are associated with lower children's language ability. At the same time, the study also emphasizes the mediating roles of family support and effortful control, which play a key role in shaping this relationship.

First, parental separation often leads to less family support for children, which is a key transmission route for the negative impact of family instability. After parents are divorced or separated, the unstable state of the family environment will have a profound impact on children's language ability and cognitive development (Nusinovici et al., 2018). Although the decrease in family support may be the main mechanism in the causal chain connecting parental separation and language ability deficiency, the results of this study show that this influence mainly plays an indirect role by shaping children's emotional and cognitive regulation ability, rather than directly producing causal effects (Ogbaselase et al., 2022).

Specifically, there is a significant positive correlation between a higher level of family support (low numerical value in data presentation) and stronger effortful control ability. Furthermore, strong effortful control is closely related to the improvement of children's language acquisition ability. The findings of this study coincide with the results of previous studies. In early childhood, strong emotional and cognitive self-regulation ability helps to promote better developmental outcomes in language and cognition (Cuartas et al., 2022).

In addition, higher levels of family support are associated with lower levels of negative affectivity; while levels of negative affectivity, in turn, are negatively correlated with children's language ability. This shows that family support helps alleviate children's emotional distress, thus promoting more effective language acquisition. However, the indirect path that connects parents' divorce or separation and children's language ability through the mediation variable of negative affectivity does not reach a statistically significant level, which reminds us that emotional distress itself is not the only mediating factor in this relationship.

Furthermore, the direct effect of family support on children's language ability has not reached a statistically significant level. This result further confirms the following view: the impact of family support is mainly realized through its regulatory effect on effortful control and negative affectivity, rather than acting as a direct predictor of language ability. The above research findings suggest that we should regard family support as an indirect development resource; how it affects children's development depends on how it promotes children's emotional and cognitive growth, not just on whether it exists (Gao et al., 2021). Future research should further explore how different dimensions of family support, such as emotional warmth, and autonomous support, shape children's language ability through psychological mechanisms related to temperament.

In addition, this study highlights the dual role of family support in the process of language development. By reducing negative affectivity levels and enhancing effortful control, a supportive family environment can indirectly promote children's language acquisition and cognitive investment. These findings emphasize that when considering family support, we should not only pay attention to the quantity it provides, but also to its quality level; because the different parenting behaviors adopted by parents often lead to completely different development outcomes (Cooke et al., 2022).

This study confirms that effortful control plays a mediating role in the relationship between parents' divorce or separation and children's language ability. Strong effortful control ability enables children to better cope with the psychological burden brought by their parents' separation, thus promoting their language development (Dong et al., 2024; Rueda, 2012). Although high negative affectivity will consume children's emotional resources and inhibit their language ability, its mediation effect in this relationship does not reach a statistically significant level. This shows that emotional distress alone is not enough to fully explain the relationship between parental divorce or separation and children's language ability.

In addition, this study expands the Family Stress and Coping Theory (McCubbin et al., 1980) and further clarifies the specific mechanism of family support affecting children's language ability (Patterson, 2002). As a source of family stress, parents' divorce or separation directly affects children's language development by shaping the social and emotional support, and coping resources available to them (Anderson, 2014). The results of this study provide empirical support for this theoretical framework and emphasize that in the divorced family environment, emotional support and positive temperament are crucial to promote children's optimal language development (Thompson et al., 2010).

Another important contribution of this study is that it focuses on the language development of preschool children (0-5 years old), especially in the specific context of parental divorce or separation. Although most of the existing studies mainly focus on adolescents and school-age children, there are relatively few relevant studies on how early family changes shape children's language development (Pagerols et al., 2022; Qu et al., 2024; Zakhour et al., 2023). By filling this gap, this study provides a developmentally informed analysis of how parental divorce or separation affects children's language ability during this critical early stage of early development, thus further highlighting the need for timely intervention and support for affected children.

Limitations

Although this research has made certain contributions, there are also some limitations. First, because the data are cross-sectional, a causal relationship cannot be established. Although the results of the study provide important insights into the relationship between parental divorce or separation, family support and children's language ability, longitudinal research still needs to be carried out to track the changes of these dynamics over time and establish causal direction (Galbraith et al., 2017). Secondly, this study relies on the self-reported measures of family support and children's temperament, which may introduce reporting bias (Brutus et al., 2013). Third, although the research results show that family support indirectly affects language ability through effortful control and negative affectivity, the exact mechanism behind these transmission paths still needs to be further explored. In addition, in view of the potential two-way influence, longitudinal research and experimental designs can help clarify whether family support promotes language development by enhancing cognitive regulation ability, or children's own language ability in turn shapes parents' family support strategies. Cross-cultural research would help to improve the universality of research results, especially by examining the diversified upbringing norms and the family structure after separation, how to shape family support and its impact on children's language acquisition.

Future research should overcome the above limitations by adopting longitudinal research methods, incorporating multiple informants, and examining cross-cultural differences. In addition, an in-depth exploration of the qualitative dimension of family support, such as distinguishing between supportive participation and intrusive control, will help us have a deeper understanding of the role of family support in children's language development.

Conclusion

This study explores the impact of parental divorce or separation on the language ability of children aged 0 to 5, and focuses on the mediating role of family support, effortful control, and negative affectivity. Research results show that parental divorce or separation has a significant impact on children's language development. At the same time, although family support and children's temperament characteristics (effortful control and negative

affectivity) are indirect factors, they play a key role in shaping this influence. These findings provide practical insights for parents and educators, especially in formulating strategies to promote the language development of children from divorced families.

Abbreviation

NSCH: National Survey of Children's Health

CAHMI: Child & Adolescent Health Measurement Initiative

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