Implications of Early Family Economic Concerns and Maternal Investment on Reading Development

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ABSTRACT

Reading proficiency is crucial for academic success, with early reading difficulties often predicting future challenges (Rashid, 2018). This study used longitudinal data from the National Institute of Child Health and Human Development Early Child Care and Youth Development to explore how early socioeconomic factors influence third-grade reading achievement through maternal emotional and cognitive investment. We employed structural equation modeling to analyze data on socioeconomic indicators when children were 54 months old: family income-to-needs ratio (FITNR), maternal employment status, and maternal education level. Our focus was on whether maternal emotional and cognitive support at 54 months mediated the link between these factors and third-grade reading outcomes. Maternal cognitive stimulation mediated the relationship between FITNR and reading decoding, as well as maternal education level and reading decoding. Moreover, maternal emotional investment mediated nearly all socioeconomic variables at 54 months, with FITNR showing a trend toward significance. Emotional investment emerged as a stronger mediator than cognitive stimulation in connecting early socioeconomic factors to third-grade reading abilities. These findings underscore the importance of further investigating parental emotional attunement and responsiveness, given the robust impact of maternal investment on child outcomes. More research is needed to elucidate these dynamics comprehensively.

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CHAPTER I: INTRODUCTION

Reading is believed to be the most vital skill acquired throughout a child's schooling. Viewed as a foundational skill for other academic abilities, reading, and reading-related problems are strongly connected to future academic success (Rashid, 2018). Researchers are particularly concerned about the third-grade reading level, as third-grade reading abilities strongly predict high school graduation rates (Sparks, 2011). The term “double jeopardy” describes the association between third-grade reading problems and low high school graduation rates (Hernandez, 2011). Notably, an alarming 23% of third-grade students with below-basic reading abilities fail to earn a high school diploma by age 19 (Hernandez, 2011). Despite its importance, reading achievement has been on the decline for decades (Chall, 1996), and research suggests that children are not engaging with reading in their leisure time at home to refine their higher-level skills (Willms, 2003). Given the robust prediction of academic success and failure, research must focus on strengthening foundational reading proficiencies and supporting early cognitive and academic development in school and at home.

Reading is a skill that moves beyond the classroom environment and is central to emotional/behavioral functioning. For example, children with early reading problems are more likely to display disruptive behavior in the classroom environment, resulting in more suspensions and expulsions that only compound academic challenges, keeping children away from cognitive stimulation, and decreasing the likelihood of earning a high school diploma (i.e., the school to prison pipeline (Christle et al., 2005). In terms of emotional functioning, children with reading difficulties exhibit a heightened propensity for developing diminished self-esteem and increased anxiety (Lawrence, 1985; Grills-Taquechel et al., 2012). Identifying early predictors of third-

grade reading achievement may enhance evidence-based reading interventions and community-based family literacy efforts.

Development of reading

To gain a comprehensive grasp of issues associated with reading difficulties, it is imperative to recognize that reading is an intricate and multifaceted cognitive undertaking that encompasses a spectrum of distinct albeit interconnected processes. These processes include visual perception (Quantz, 1987), orthographic and phonological awareness/processing (Serafini et al., 2008; Hagiliassis et al., 2006), decoding proficiency, comprehension capacity, and metacognitive faculties (Lundberg, 1991). Meta-cognitive faculties include the ability to effectively filter out distractions and extraneous information (Lundberg, 1991). Unfortunately, researchers often reduce reading ability to one overall reading achievement score (Carretti et al., 2008). To combat this simplification, researchers have called for a comprehensive investigation of reading that includes an examination of reading decoding, fluency, and comprehension (Willcutt, 2018).

Relatedly, a developmental framework is needed to understand and/or appreciate the astonishing pathways to proficient reading. For example, children move rapidly from chewing and touching books in infancy to studying the pictures while not understanding the words on the page, to pausing and deliberately decoding the words, and then suddenly transitioning to fluent reading while understanding and remembering what has been read on the page (Siegel, 1993). Early and prevailing reading theories (e.g., Chall, 1996; LaBerge & Samuels, 1974) posit that multiple skills necessary for reading success are learned throughout early and middle childhood, leading to mastery of reading achievement and comprehension, the foundation of learning.

Throughout elementary school, developing the necessary skills (e.g., sustained attention) becomes more coordinated and increasingly automatic due to improved executive functioning, leading to higher reading achievement. While the order in which these skills are acquired is still up for debate, as well as their levels of importance for reading "mastery" (Paris, 2005), a popular and prevailing theory proposed by Chall continues to be one of the bases for reading achievement (Chall, 1996). Chall proposes a cognitive theory of reading development based loosely on Piaget's child development theory.

Chall proposed six stages of reading development. Prereading (Stage 0) encompasses children from birth to age 6 or the time before formal education. In prereading, children living in literate environments begin to interact with letters, books, and words through caregiver reading and other exposures. A cognitively stimulating environment is necessary for the enrichment and curiosity of the child. Caregivers should encourage any interaction with reading. The decoding stage (Stage 1) begins with formal reading education and includes children in 1st and 2nd grade. Children begin to internalize cognitive understanding about reading, such as what the letters are for and how to know when mistakes are made. Children in this same age range are developing and relying on executive functioning to retain and utilize these new skills (Chall, 1996).

The confirmation and fluency stage (Stage 2) occurs around the 2nd and 3rd grades. During this stage, knowledge from the first stage is consolidated and confirmed. The basic decoding skills learned in the first stage have become more automatic, allowing them to engage more deeply and concentrate their attention on comprehending familiar readings. The repetition of familiar readings and the increased automaticity of their cognitive skills lead to higher reading

fluency and speed during stage 2, increasing the child's confidence in their reading abilities and confidence overall.

Reading for learning (Stage 3) is vital for broader academic achievement and encompasses children ages 8 through 14. While knowledge and cognitive abilities are still limited during this stage, the foundational reading skills solidified in the previous stages allow for integrating new knowledge and information. However, academic success is more attainable if reading is limited in complexity during this period. The multiple viewpoints stage (Stage 4) involves increased reading complexity for high school students. Reading at this stage entails dealing with layers of facts and concepts from multiple viewpoints while demonstrating cognitive flexibility to integrate the information. Stage 4 can lead to significant difficulties in academic achievement without successfully acquiring the basic knowledge of previous stages.

Construction and Deconstruction (Stage 5) is the highest level attainable beyond age 18. Skills acquired in stage 5 involve deciding what is and is not necessary to read based on the area of knowledge central to one's interests or concerns. Chall's stages can be employed to assess a child's acquired knowledge and identify areas that still require instruction. Moreover, Chall's stages emphasize the rapid progression and relatively small window of reading development in early childhood compared to the slower progression in later stages (Paris, 2005).

Notably, children typically in the rapid stages 0 to 3 (0-8 years old) of Chall’s development of reading are also in the most expeditious stage of executive functioning development (Best et al., 2011). Longitudinal studies are essential to distinguish whether the increases in correlation strength between executive functions and academic achievement during specific early ages result from other potential factors such as environmental influences.

Socioeconomic Status as a Risk Factor/Social Determinants of Reading Development

Lower socioeconomic status is the most common risk factor linked to inadequate school performance (Sameroff et al., 2021). Children from lower socioeconomic backgrounds exhibit a notably higher incidence of academic achievement challenges (Sameroff et al., 2021). Specifically, the graduation rate for children who have experienced poverty at some stage is 22 percent, compared to a significantly lower 6 percent for those who have never experienced poverty (Hernandez, 2011). Hoover et al. (2020) indicated a robust correlation between family socioeconomic status during a child's 8-9-year-old period and their proficiency in mathematics and language during the seventh grade. However, it is important to note that socioeconomic status indicators alone do not serve as consistent and precise predictors of academic performance in individual cases (Bradley et al., 1988). Recent studies have shown that socioeconomic status alone underestimates the total scope of parental influence (Thomas et al., 2023). This point underscores the existence of other influential/mediating factors beyond economic resources. For example, research conducted by Vasilyeva et al. in 2018 revealed a positive correlation between family income and the level of parental involvement in educational activities with their children, such as shared reading, as well as the presence of resources that support child language development within the home. These factors, in turn, were found to contribute to a child's literacy scores upon entering the first grade. Additional research on early indicators of socioeconomic concerns and potential mediators of the association between early socioeconomic concerns and reading is needed to identify potential treatment targets and enhance community-based family literacy efforts.

Parental Investment: Cognitive stimulation and emotional support

A comprehensive understanding of the connection between socioeconomic status (SES) and caregiver investment demands a nuanced approach with different indicators of socioeconomic status (and not a limited focus on income) and an evaluation of the role of parental commitments that include cognitive and emotional investments. Parental cognitive stimulation refers to academic stimulation, such as caregivers reading with their children, the learning materials available in the home (e.g., blocks developed to enhance fine motor skills), and language stimulation or the encouragement of conversation with their caregivers (Cabrera et al., 2018). Parental emotional investment refers to the parents' feelings of affection and open communication about emotions with their target child (Heckman, 2011).

While on the surface, income may seem to be linked only to material investments (e.g., toys), as ensuring access to tangible resources tends to enhance knowledge about child development and learning (Allen, 2015). However, income may be related to emotional investments by the parents who involve children in stimulating engagements. Moreover, a closer investigation reveals that several SES-related variables might influence both cognitive and emotional investment (Heckman, 2011). Notably, parental education could impact material investments by enhancing the caregivers' capacity to choose appropriate resources. Simultaneously, income likely contributes to activities between caregivers and children within the home, some of which might necessitate resources beyond what is feasible due to financial limitations. Moreover, low SES households are more likely to have caregivers working extended hours, limiting interaction and opportunities for investment with their children (Liang et al., 2023).

Economic disparities within families represent a significant stressor that could impede parents' capacity to address their children's physical, psychological, and academic needs (Granat et al., 2017). Prior studies show multiple mechanisms exist in the intergenerational risk transmission from parental stress to their children's various social and emotional outcomes (Goodman, 2020). Examining whether these more specific explanatory mechanisms may be applied to child outcomes in domains beyond mental disorders is necessary. Moreover, financial difficulties often lead to family stress, impacting the frequency and quality of interactions between parents and their children; such repercussions have been well-documented as a substantial element in child development (Conger & Donnellan, 2007). It is imperative to conduct more comprehensive research to gain a deeper understanding of the intricate dynamics that characterize interactions between children and their caregivers, as various elements within the domestic environment have often displayed a more pronounced association with child outcomes than socioeconomic status (Bradley, Caldwell, & Elardo, 1977).

Theoretical Framework

The Family Investment Model (FIM) represents a conceptual framework with established connections between parents' socioeconomic advantages and their children's physical, emotional, and social well-being (Figure 1). Conger and Donnellan (2007) categorized parental investments into four broad domains: (a) direct and indirect facilitation of learning (e.g., assisting with homework or hiring a tutor for academic support); (b) the availability of educational resources within the household (such as accessible books and toys); (c) the standard of living encompassing housing quality, nutrition, and similar aspects (e.g., a well-maintained, well-illuminated, and clean residence); and (d) residing in an environment conducive to optimal child

development (for instance, a neighborhood in proximity to a high-quality school). In the present investigation, our focus centered on the stimulation of learning and emotional investments in the child.

Most research using the FIM has primarily focused on income as a key factor (e.g., Rijlaarsdam et al., 2013). Educational attainment and employment status, the other two main quantitative indicators of socioeconomic status (SES), are typically treated either as control variables or are combined with income to form a composite SES index (Conger & Donnellan, 2007). However, it has been observed that each component of SES exerts an independent and distinct influence on parenting practices (Duncan & Magnuson, 2003; Sirin, 2005). Recognizing these unique contributions, we chose to analyze these three dimensions of SES separately to isolate and explore their individual roles in the proposed causal mechanisms of parental investments (Conger et al., 2010; Duncan et al., 2017).

In a study utilizing the FIM, Davis-Kean (2005) highlighted that parental education level shapes the household environment and influences how caregivers interact with their children, thereby fostering broader academic achievement. This discovery suggests that economic challenges alone do not inevitably restrict academic development.

Current Study

The current study investigated the associations between early socioeconomic concerns and third-grade reading achievement. Specifically, we investigated the potential roles of three separate indicators of socioeconomic concern when children are 54 months (4 and a half years old): family income-to-needs ratio (FITNR), maternal employment status, and maternal education level and their independent influence on reading achievement, and specifically a more

nuanced look into reading decoding and comprehension. Finally, we examined whether maternal emotional and cognitive investment when the child is 54 months old mediates the relation between early socioeconomic concerns and third-grade reading achievement. To date, this study is the first study to disaggregate three independent components of socioeconomic status and examine both high- and lower-reading abilities (i.e., reading decoding and reading comprehension) simultaneously using a longitudinal design. The longitudinal design allows us to examine early predictors of third-grade reading achievement, a critical and sensitive time in development that has been linked to several adverse outcomes.

We hypothesized that (1) socioeconomic concerns (i.e., income-to-needs ratio (FITNR), maternal employment status, and maternal education level) at 54 months will be related to third-grade reading decoding and comprehension abilities; (2) early socioeconomic concerns at 54 months will be related to maternal cognitive and emotional investment at 54 months; (3) maternal cognitive and emotional investment at 54 months will be related to third-grade reading decoding and comprehension abilities; (4) maternal cognitive and emotional investment at 54 months will mediate the relation between early socioeconomic concerns at 54 months and third-grade reading decoding and comprehension abilities.

CHAPTER II: METHOD

Participants

The current study utilizes the extensive longitudinal dataset NICHD Study of Early Child Care and Youth Development (SECCYD) (United States Department of Health and Human Services. National Institutes of Health. Eunice Kennedy Shriver National Institute of Child Health and Human Development, 2010). Participants were chosen through a selectively random sampling method designed to ensure that the recruited families represented diverse demographics including economic status, educational background, and racial diversity at the study sites. Participants included 1,364 children and their families. Respondents were sampled from a catchment of 6,189 children. Children's development was assessed via trained observers, interviewers, questionnaires, and direct testing. The study included both two-parent and single-parent families following children from birth (1991 birth cohort) to age 15 across 10 different locations in the U.S. Data collection occurred in four phases: Phase I (birth to 3 years), Phase II (54 months to 1st grade), Phase III (2nd to 6th grade), and Phase IV (7th grade to age 15 years). Exclusion criteria comprised (a) mothers under 18 years old at the child's birth, (b) families not planning to remain in the area for at least 3 years, (c) children born with disabilities or hospitalized for more than 7 days postpartum, and (d) mothers with limited proficiency in English.

Measures

Reading Decoding and Comprehension

Children were administered two reading subtests from the Woodcock-Johnson Psychoeducational Battery-Revised while enrolled in the third grade. The comprehensive

Woodcock-Johnson-Revised test battery has been standardized based on a diverse sample spanning 24 months (about 2 years) to 95 years. The Letter-Word Identification subtest assesses rudimentary decoding skills, such as identifying isolated letters and words. The Passage Comprehension subtest required students to orally supply the missing word removed from sentences or a very brief paragraph. This subtest measures reading comprehension. Raw Letter-Word Identification and Passage Comprehension scores were transformed into W scores using the Woodcock-Johnson software (McGrew et al., 1991). *W* scores characterize a child's proficiency level on a scale where a score of 500 reflects the skill level expected of a third-grade student. The reliability within the entire battery of subscales ranged from .94 to .98 in terms of internal consistency, while test-retest reliability was in the range of .80 to .87. The Letter-Word Identification and Passage Comprehension subtests are significantly correlated with other measures of reading ability (McGrew, Werder, & Woodcock, 1991). The test-retest reliability of the Letter-Word Identification subtest was in the range of .87 to .96, while Passage Comprehension was in the range of .80 to .95 (Weatherly, 1992). Higher scores denote skill levels akin to older children, while lower scores correspond to skill levels for younger children. It was also observed in previous investigations involving the current sample that these subtests had a robust association with factors thought to impact academic achievement (e.g., the quality of parental care; NICHD Early Childcare Research Network, 2005).

Family Economic Conditions

Family Economic Conditions were assessed in three ways: family income-to-needs ratio (FITNR), maternal employment status, and maternal education level. The income-to-needs ratio was computed by dividing the pretax total family income by the poverty threshold obtained from

the U.S. Census Bureau in corresponding years when the children were 54 months. Given the significant lack of data provided for other caregivers, we used the maternal employment status and education levels in the proposed study. Maternal education was measured at 54 months of age using the following coding: less than a high school graduate=raw number of years of education; high school graduate completion of the General Educational Development(GED) test=12; AA degree, some college or vocational school=14; Bachelor's degree=16; Master's degree or some graduate work=18; Law degree=19; Doctoral-level degree (i.e. EdD, MD, PhD, etc.,)=21. Employment status was recorded for mothers when their children were 54 months old and coded using the following rubric: employed=0, unemployed=1.

Caregiver Investment in Cognitive Stimulation and Emotional Support

The Home Observation for Measurement of the Environment (HOME; Bradley & Caldwell, 1984) was administered during home visits at 54 months. The HOME measures the quality and quantity of stimulation and support available to a child in the home environment. The focus is on the child in the environment as a recipient of inputs from objects, events, and transactions occurring in connection with the family surroundings. HOME scores were based on both observer reports and parent-report (in cases when the observers were unable to observe a particular behavior or home characteristic). The Home Observation for Measurement of the Environment (HOME) at 54 months (Cronbach's alpha exceeded .82; Burchinal et al., 2004; Caldwell & Bradley, 1984) provided a measure of the overall quality of the home environment.

For the current study, we utilized the following subscales: at 54 months cognitive stimulation was measured by Academic Stimulation subscale (5 items; e.g., "c*hild is encouraged to learn spatial relationship*"; α =.48), Learning Materials subscale (11 items; e.g., "*toys which*

require fine motor skills"; α = .57), and the Language Stimulation subscale (7 items; e.g., "*child is encouraged to learn the alphabet*"; α = .36). The caregiver cognitive stimulation total score is based on an average of the z-scores for the Learning Materials, Language Stimulation, and Academic Stimulation subscales (NICHD, 2005; Hart, 2023). We used the Total score of the subscale measuring emotional support and responsivity (e.g., “mother's voice conveys positive feelings about their child”) to define observed maternal emotional investment. There was adequate internal reliability (∝= .78–.87) for HOME scores at 54 months. This measure, validated through correlations with family social status and maternal IQ, has also shown excellent reliability, with α = .93 (Bradley & Caldwell, 1984). Higher scores are indicative of more observed maternal investment in cognitive and emotional stimulation.

Data Analytic Plan

Regarding missing data, the practice of listwise deletion, which entails discarding cases with missing values entirely, is recognized as a biased method for managing missing data, especially in the context of extensive longitudinal data suitable for multiple imputations (Allison, 2003). In the current study, the imputation of missing values was performed using the full information maximum likelihood (FIML) procedure (Allison, 2003), which entails imputing missing values based on observed data patterns and associations across all participants in the sample (Schafer & Graham, 2002).

A longitudinal research design was employed to explore the impact of socioeconomic factors, including the income-to-needs ratio (FITNR), maternal employment status, and maternal education level at 54 months, on their respective child’s third-grade reading decoding and comprehension abilities. Additionally, the study investigated the influence of early

socioeconomic concerns at 54 months on maternal cognitive and emotional investment, as well as the relationships between maternal investment and reading abilities. The hypotheses were examined using a structural equation model, which elucidated predictive associations simultaneously between variables across different time points while accounting for earlier effects and elucidating temporal changes in variable effects.

All statistical analyses were conducted using the Mplus software (Muthén & Muthén, 2017). The model included main effects of socioeconomic variables at 54 months, predicting maternal cognitive and emotional investment at the same time point. Subsequently, the study evaluated whether maternal cognitive and emotional investment at 54 months mediates the relationship between socioeconomic factors and third-grade reading abilities while also examining direct effects from each socioeconomic variable at 54 months on reading abilities. The indirect and total effects were estimated using the Model Indirect command in Mplus. The bootstrapping procedure (10,000 bootstrapped samples) was used to estimate the 95% confidence intervals of the estimates. Child gender (1=male, 0=female) was incorporated to control for the influence of gender in the analyses.

CHAPTER III: RESULTS

Primary Analyses

Regarding the sociodemographic profile of the study participants (see Table 1), the distribution of child gender revealed a relatively even sample of males (n=705, 49.9%) and females (n=659, 45.7%), with 79 cases (5.5%) where gender data were missing. Regarding racial background, the majority of participants identified as White (n=1097, 76.0%), followed by Black (n=176, 12.2%), Asian (n=22, 1.5%), and Other (n=64, 4.4%).

Maternal education levels varied across participants with a significant proportion of mothers attaining some college education without obtaining a degree (n=455, 31.5%) or had completed high school or obtained a GED (n=287, 19.9%). Data were missing on material education for 79 cases (5.5%). Maternal employment status was 52.7 % employed (n=761) and 20.6% unemployed (n=297). Data on maternal employment were missing for 385 cases (26.7%). As proposed, the imputation of missing values was performed using the full information maximum likelihood (FIML) procedure (Allison, 2003).

Means, standard deviations, and correlations are reported in Table 2. Nearly all target variables showed significant correlations, supporting the existing literature. Results from the path model are presented in Table 3. All total effects between independent variables and outcome variables yielded significant results, suggesting further examination of direct and indirect pathways (see Table 3). The proposed mediational model examined maternal cognitive and emotional investment at 54 months simultaneously as mediators of the relation between early socioeconomic concerns at 54 months and third-grade reading decoding and comprehension abilities (see Figure 2). This model demonstrated good model fit: CFI = 1.0, TLI = 1.0, SRMR =

0.009. Covariate analysis revealed that gender was not significantly related to third grade reading decoding and comprehension outcomes. All socioeconomic variables at 54 months were positively associated with maternal emotional investment at 54 months: employment status (B = .279, SE=.085, p=.001), income-to-needs ratio (B = .046, SE = .017, p = .006), and maternal education level (B = .087, SE=.022, p < .001). Income-to-needs ratio (B = .031, SE=.011, p < .01) and maternal education level (B = .107, SE=.015, p < .001) but not maternal employment status (B = .102, SE=.058, p=.076) at 54 months were positively associated with maternal cognitive stimulation at 54 months.

Both maternal cognitive stimulation (B = 4.210, SE=.909, p < .001) and emotional investment (B = 1.586, SE=0.507, p=.01) at 54 months were positively associated with third grade reading decoding. None of the socioeconomic variables measured at 54 months were found to have a direct effect on reading decoding.

Lastly, maternal cognitive stimulation (B = 4.172, SE=.712, p < .001) and emotional investment (B = 1.129, SE=0.377, p=.01) at 54 months were positively associated with third-grade reading comprehension levels. Similarly, none of the socioeconomic variables measured at 54 months were found to have a direct effect on reading comprehension abilities in the third grade.

Indirect Effects

While no direct effects were found between the socioeconomic variables and reading outcomes, significant indirect effects were found. There was an indirect effect of the relation between family income to needs ratio and reading decoding through maternal cognitive stimulation (β =.130, SE=.057, p=.021, CI [.036, .325]). A similar indirect effect was found for

the relation between maternal education level and reading decoding through maternal cognitive stimulation (β =.452, *SE*=.115, *p*=.000, CI [.202, .810]). Individuals reporting higher family income to needs and maternal education were observed engaging in more cognitive stimulation in the household, which was positively associated with third-grade foundational reading skills. Maternal cognitive stimulation did not yield a significant indirect effect on the association between maternal employment at 54 months and third-grade reading decoding.

Additionally, there was an indirect effect of maternal cognitive stimulation on the association between family income to needs ratio and reading comprehension (β = .129, *SE*=.053, *p*=.015, CI [.040, .309]), as well as maternal education level and reading comprehension (β = . 447, *SE*=.009, *p*=.000, CI [.248, .766]), such that individuals reporting higher family income to needs and maternal education were also more likely to be observed providing more cognitive stimulation, which is highly, positively associated with third-grade reading comprehension performance. Similarly to decoding, maternal cognitive stimulation did not yield a significant indirect effect on the association between maternal employment at 54 months and third-grade reading comprehension abilities.

Interestingly, maternal emotional investment demonstrated an indirect effect on the association between nearly all socioeconomic variables at 54 months, excluding income to needs ratio, which is trending toward significance (β = . 051, *SE*=.027, *p*=.054, CI [.005, .151]), and third-grade reading decoding and comprehension. These effects were stronger than those found when examining cognitive stimulation as a mediator of the relationship between early socioeconomic variables and third-grade reading abilities. Indirect effects are reported in Table 3.

CHAPTER IV: DISCUSSION

Reading decoding and comprehension are essential skills that form the foundation of literacy (Hoover & Tunmer, 2020). Together, reading decoding and comprehension empower children to engage critically with various forms of written material, promoting literacy, intellectual growth, empathy, and a broader understanding of the world. The current study attempted to understand the associations among early socioeconomic concerns, early maternal cognitive investment, emotional investment, and third-grade decoding and comprehension skills. Interestingly, maternal cognitive and emotional investment at 54 months (about 4 and a half years) fully mediated the relationship between most early family socioeconomic variables and third-grade reading outcomes.

The model tested in the current study, the Family Investment Model (FIM), is a framework that emphasizes the importance of family involvement in children's education and general early development (Vasilyeva et al., 2018). It posits that families play a crucial role in shaping children's academic achievement and overall well-being by investing their time, resources, and support, potentially even more than economic resources as hypothesized by the current study. The model suggests that when families actively participate in their children's educational development through activities, providing educational resources, actively engaging in school events, and offering emotional support, children are hypothesized to be more likely to succeed across several domains regardless of socioeconomic concerns that might be present (Conger et al., 2021). The results of the current study predominately supported the FIM using a longitudinal design.

Socioeconomic Concerns and Reading

Notably, the FIM distinguishes three unique aspects of early socioeconomic concern: monetary resources, parent employment status, and parent level of education. We found familial income-to-needs ratio (FITNR) and maternal education level specifically to be associated with third-grade reading outcomes (decoding and comprehension abilities); however, maternal employment status was not related to reading outcomes. By disaggregating these three dimensions of SES to isolate and examine their unique roles in the hypothesized causal processes of child outcomes, we were able to uncover critical relationships for future research, prevention, and intervention. The current study suggests support for the notion that employment status during her child's early development is unrelated to their child's reading outcomes. At the same time, maternal education level and family income may play a more critical role. While maternal employment status may indirectly influence family income and access to resources, it does not appear to be directly associated with children's reading achievement in the current study.

Importantly, none of the socioeconomic variables measured at 54 months show a direct effect on third-grade reading comprehension and decoding, suggesting that the relationship between socioeconomic variables and reading comprehension is fully mediated by different means of maternal investment (cognitive and emotional) at 54 months. The lack of direct relation between socioeconomic variables measured at 54 months and third-grade reading skills suggests that factors such as familial income, maternal education level, and employment status do not independently predict reading outcomes in third-grade. Instead, the influence of early socioeconomic variables on reading skills appears to be fully mediated by maternal cognitive stimulation and emotional investment. This implies that the positive effects of socioeconomic

advantage on reading operate through the pathways of maternal engagement in cognitively stimulating activities and emotional support during early childhood, supporting the Family Investment Model.

Socioeconomic Concerns and Maternal Investment

The results again support the FIM regarding the relationship between early socioeconomic variables and maternal investment at 54 months. All early socioeconomic variables were associated with maternal emotional investment (support and responsivity) at 54 months. Socioeconomic variables are hypothesized to significantly impact maternal emotional responsivity and support during early childhood, highlighting the importance of addressing socioeconomic disparities to encourage positive parent-child interactions and child development outcomes. Concerning the relationship between income-to-needs ratio and maternal emotional investment, significant financial stress may affect parental emotional well-being and responsiveness (Ward et al., 2020). Financial stress and hardship might lead to parental anxiety, depression, or fatigue, impacting their ability to provide emotionally responsive caregiving, therefore influencing the quality of investment in their children (Conger et al., 2000). Additionally, higher income increases access to resources such as books, toys, and educational materials. Families with higher socioeconomic resources may have more funds available to create enriching environments that support children's emotional development (Kalil et al., 2020).

As for maternal education levels as an early socioeconomic factor, higher maternal education levels often correlate with greater knowledge about child development and effective parenting practices (Bornstein et al., 2022), this theory states that mothers with higher education

levels may be better equipped to understand and respond to their child's emotional needs, fostering a supportive environment with high responsivity.

Regarding the relationship between cognitive stimulation and early socioeconomic variables, maternal cognitive stimulation was associated with the familial income-to-needs ratio and maternal education level but not maternal employment status. In the current study, higher family income relative to the poverty threshold is linked with greater cognitive stimulation mothers provide to their children at 54 months of age. Families with a higher income-to-needs ratio may have more financial resources to afford educational materials, books, and activities that stimulate cognitive development. Additionally, they may have more time available to engage in enriching activities with their children, such as reading, engaging in educational games, and exploring the environment and broader community. Higher-educated mothers may also place a greater emphasis on fostering their child's cognitive development and may be more aware of the importance of early learning experiences.

Interestingly, again, maternal employment status was not found to be significantly associated with maternal cognitive stimulation at 54 months. This suggests that whether the mother is employed outside the home does not directly impact the level of cognitive stimulation provided to the child at this age. While maternal employment status may influence family income and time available with their child, it appears that other factors, such as income level and maternal education, have a more substantial influence on maternal engagement in cognitively stimulating activities with their children. One hypothesis is that the child could be provided with additional cognitive stimulation in other settings, such as high-quality daycare.

Overall, these findings underscore the critical role of maternal involvement and caregiving practices in shaping children's reading abilities over time. They also highlight the importance of early interventions that promote parental engagement, literacy-rich environments, and socio-emotional support for children from diverse socioeconomic backgrounds to bridge the gap, given the crucial indirect effects found.

Study Limitations and Future Directions

The data utilized for this study was derived from the NICHD Study of Early Child Care and Youth Development Phases 1 and 3. Data collection occurred between 1991 and 1994 and between 2000 and 2004. A limitation of using historical data is that the potential shifts in societal norms and expectations, demographics, and behaviors regarding child-rearing over time can undermine the representativeness of older data, making it less reflective of current realities. However, historical data can provide valuable insights into past trends and patterns and inform the basis of research today.

Additionally, a notable lack of representation from diverse socioeconomic backgrounds could skew findings and fail to capture the nuances of various experiences and perspectives when examining early socioeconomic concerns. The lack of diverse representation may hinder the generalizability of the results to broader populations. Future research should examine greater socioeconomic diversity, potentially revealing unique insights into the Family Investment Model.

Moreover, the current study initially proposed broadly examining parental socioeconomic concerns and investment. After acquiring the data set, we found the reports of secondary caregiver information to be substantially limited, leading to only examining maternal investment

specifically. Future research should examine the influence of multiple caregivers' investment on child outcomes.

The current study's results indicate the need for more research to examine parental and child attunement and influencing factors, given the robust association between maternal investment and child outcomes. Future research should consider comparing whether the differences in the size of the indirect effects of maternal cognitive and emotional investment are statistically significant. Understanding the unique contribution of each type of maternal investment could inform and improve existing interventions and indicate if more emphasis should be placed on maternal cognitive stimulation or emotional support.

Clinically, identifying the differential impacts of cognitive and emotional investment can lead to more tailored interventions. For instance, if cognitive investment is found to have a stronger influence on child outcomes, programs could emphasize activities that enhance cognitive stimulation, such as interactive learning sessions promoting reading and problem-solving exercises between mother and child. Conversely, if emotional investment is more impactful, support could focus on strengthening emotional bonds through activities that promote emotional security and attunement, such as consistent emotional responsiveness and empathy-building practices.

From a research perspective, this line of inquiry could uncover new dimensions of the parent-child dynamic that are crucial for child development. It can prompt the development of more nuanced theoretical models that capture the complexity of maternal influence on child outcomes when socioeconomic concerns are present. Furthermore, by using advanced statistical

methods like multigroup modeling frameworks, researchers potential gender differences in these pathways could be uncovered to inform intervention.

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Appendix

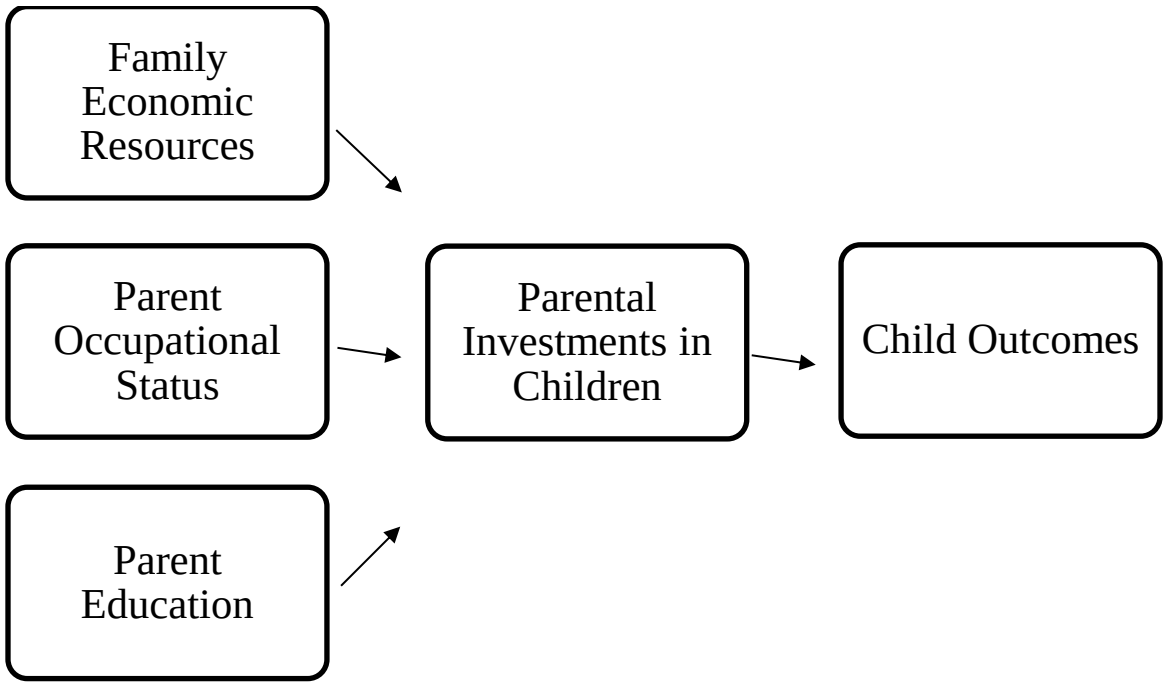

Figure 1. Family Investment Model (FIM).

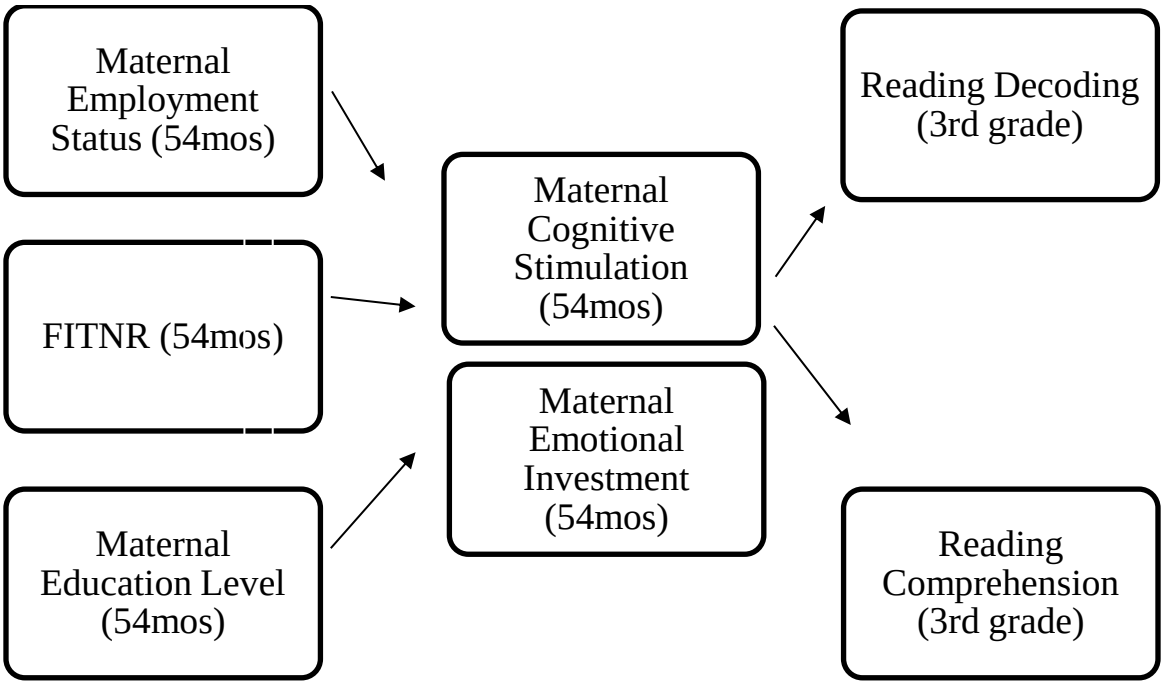

Figure 2. Current Study's Adaptation of the Family Investment Model (FIM).

Table 1. Sociodemographic characteristics of sample.

Characteristic	n	%
Child Gender		
Female	659	45.7
Male	705	49.9
Missing	79	5.5
Race		
Asian	22	1.5
Black	176	12.2
White	1097	76.0
Other	64	4.4
Missing	79	5.5
Maternal Education		
7	3	.2
8	13	.9
9	20	1.4
10	42	2.9
11	61	4.2
High School or GED	287	19.9
Some College; No Degree	455	31.5
Bachelor's Degree	284	19.7
Some graduate; Master's	161	11.2
Law Degree	14	1.0
Doctoral Degree	23	1.6
Missing	79	5.5
Maternal Employment		
Mother Not Employed	297	20.6
Mother Employed	761	52.7
Missing	385	26.7

Table 2. Means, Standard deviations, and bivariate correlations among study variables.

Variables	*M*	*SD*	1	2	3	4	5	6	7
1. FITNR	3.590	3.173	–						
2. Employ	-	-	.054	–					
3. Education	13.49	27.442	.485**	.122**	–				
4. CS	6.627	.856	.293**	.107**	.424**	–			
5. EM	5.23	1.294	.215**	.135**	.270**	.330**	–		
6. Decode	493.86	19.730	.235**	.065*	.337**	.316**	.229**	–	
7. Comp	495.29	14.528	.254**	.039	.336**	.373**	.237**	.789*	–

Note. FITNR = Family Income to Needs Ratio; Employ = Maternal Employment; Education = Maternal Education; CS = Cognitive Stimulation; EM = Emotional Responsivity; Decode = Reading Decoding; Comp = Reading Comprehension.
$^{*}p < .05$. $^{**}p < .01$.

Table 3. Estimates of Structural Model.

	Estimate	β	SE	***p*-value**	**Lower**	**Upper**
Employ —>CS	0.102	0.028	0.058	0.076	-0.048	0.248
FITNR —>CS	0.031	0.143	0.011	0.006**	0.012	0.066
Education —>CS	0.107	0.817	0.015	0.000**	0.075	0.150
Employ —>EM	0.279	0.064	0.085	0.001**	0.054	0.500
FITNR —>EM	0.046	0.214	0.017	0.006**	0.018	0.099
Education —>EM	0.087	0.673	0.022	0.000**	0.036	0.146
CS—>Decode	4.210	0.569	0.909	0.000**	1.886	6.569
EM —> Decode	1.586	0.211	0.507	0.002**	0.235	2.901
Employ —> Decode	0.018	0.001	1.215	0.988	-3.203	3.146
FITNR —> Decode	0.394	0.246	0.309	0.202	-0.099	1.324
Education —> Decode	-0.263	-0.271	1.011	0.794	-1.197	2.197
CS—>Comp	4.172	0.595	0.712	0.000**	2.333	6.008
EM —> Comp	1.129	0.159	0.377	0.003**	0.137	2.101
Employ —> Comp	-0.974	-0.031	0.943	0.302	-3.352	1.492
FITNR —> Comp	0.307	0.202	0.199	0.122	-0.050	0.945
Education —> Comp	-0062	-0.068	0.788	0.937	-0.852	1.824
Employ->CM->Decode	0.430		0.279	0.123	-0.170	1.263
FITNR->CM->Decode	0.130		0.057	0.021**	0.036	0.325
Education->CM->Decode	0.452		0.115	0.000**	0.202	0.810
Employ->CM->Comp	0.426		0.266	0.109	-0.172	1.181
FITNR->CM->Comp	0.129		0.053	0.015**	0.040	0.309
Education->CM->Comp	0.447		0.099	0.000**	0,248	0.766
Employ->EM->Decode	0.422		0.198	0.026**	0.038	1.060
FITNR->EM->Decode	0.072		0.036	0.047*	0.009	0.204

Table 3. Continued

Education->EM->Decode					
	0.138	0.054	0.010**	0.023	0.309
Employ->EM->Comp	0.315	0.146	0.031*	0.018	0.779
FITNR->EM->Comp	0.015	0.027	0.058	0.005	0.151
Education->EM->Comp	0.098	0.040	0.014**	0.012	0.299

Note. CS=Cognitive Stimulation; EM=Emotional Investment; Employ=Mother Employment Status; FITNR=Fixed Income to Needs Ratio; Education=Mother Education Level; Decode=Reading Decoding; Comp=Reading Comprehension 95% confidence intervals were obtained using bootstrapping. *p<.05. **p<.01.

VITA

McKenzie Martin, M.A., is a final-year doctoral candidate in the Clinical Psychology Ph.D. Program at the University of Tennessee, Knoxville. She completed her B.A. and M.A. at the University of Tennessee in 2019. Her master's thesis explored the impact of caregiver stress and parenting strategies on child externalizing behaviors. Her dissertation investigates the effects of early family economic concerns and caregiver investment on children's reading development. McKenzie's research interests focus on using assessment techniques to study behavioral disorders, neurocognitive dysfunction, family functioning and learning problems. Her goal is to inform psychological research and develop targeted intervention programs that involve the family system.

In her role as the Senior Student Representative in the UT Clinical Psychology Ph.D. program, McKenzie demonstrated leadership and commitment. She also served as the project coordinator for the Strengthening Underserved Communities by Cultivating Engagement and Supporting Scholars (SUCCESS) program. This initiative provides trauma-focused cognitive behavioral therapy (TF-CBT) to children in an after-school program in the East Knoxville community. Currently, McKenzie is completing her predoctoral internship at the University of Louisville School of Medicine.