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Research Article

The protective role of parental work intensity for children in poverty in the United States

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The protective role of parental work intensity for children in poverty in the United States

Alicia García-Sierra[1]

Abstract

BACKGROUND
In-work poverty – where families remain below the poverty threshold despite being employed – has been a persistent issue in many Western countries, particularly affecting families with children. Parents in such households may adjust their work intensity, namely the number of weeks worked annually, to buffer the negative impact of poverty on their children.

OBJECTIVE
This study examines whether an increase in parental work intensity acts as a resilience mechanism that helps to shield children from the developmental harms associated with poverty. Specifically, it examines the moderating role of parental work intensity in the relationship between poverty status and children's reading ability.

METHODS
Using longitudinal data from the National Longitudinal Survey of Youth 1979 Child and Young Adult (1988–2012), I employ OLS and individual fixed-effects models to estimate the relationship between parental work intensity and children's outcomes. The study population consists of children aged 5–15.

RESULTS
The results show that, for children in poverty, increased parental work intensity is positively associated with improved reading ability. This association is more pronounced among girls, Hispanic children, and children from racial groups that are neither Black nor Hispanic. By contrast, parental work intensity does not appear to be related to children's reading ability for children from families not in poverty.

CONTRIBUTION
This study highlights how specific features of parental employment – particularly work intensity – can function as resilience mechanisms that protect children from the negative developmental effects of poverty. It addresses a key gap in the literature, which has

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largely focused on parental unemployment, paying limited attention to families where the parents are employed but still experiencing poverty.

1. Introduction

Can parents shield their children from the effects of growing up in poverty? This study explores whether parental work intensity – defined as the cumulative number of weeks that parents within a household are employed during a given year – can mitigate the negative impact of poverty on children's lives.

Although much of the literature on child poverty has focused on the impact of parental unemployment on children's well-being and development (Guo and Harris 2000; Kiernan and Mensah 2011), a different phenomenon has gained prominence among families in recent decades: in-work poverty (Fraser, Gutiérrez, and Peña-Casas 2011). This term refers to households where individuals remain below the poverty threshold despite being employed (Marx and Nolan 2012), emphasizing that employment alone does not guarantee financial stability. Families with children are particularly vulnerable to in-work poverty (Halleröd, Ekbrand, and Bengtsson 2015; Polizzi, Struffolino, and Van Winkle 2022), making it essential to explore the ways employed parents adapt to these financial challenges.

Parents experiencing in-work poverty often adopt adaptive strategies, which are defined here as intentional actions or behaviours aimed at managing financial challenges and maintaining family well-being under constrained circumstances (Bussemakers and Kraaykamp 2020; Bartova et al. 2023; Bawati et al. 2025). One such strategy is increasing their work intensity, either by taking on additional hours at their current jobs or by seeking secondary employment. This effort to increase work intensity represents a form of family resilience in the face of adversity (Masten 2018).

Children may benefit from increases in parental work intensity in three distinct ways. First, an increase in household income resulting from higher work intensity can help ensure that basic needs such as food, housing, and healthcare are met (Jackson et al. 1998). This alleviation of immediate financial stressors is crucial for reducing the negative impacts of poverty and fostering positive child development.

Second, children may observe and internalise their parents' adaptive behaviours, learning from their resilience and resourcefulness (Prinzie et al. 2004; Vågerö, Aronsson, and Modin 2018; Rose et al. 2018). This process of internalisation could contribute to children's own ability to adapt to challenges in the future. This process might occur because children often learn by watching their parents tackle adversity, adopting similar problem-solving strategies in their own lives. Explicit parental narratives about the

importance of effort and resilience can reinforce this, and these experiences can shape children's aspirations and instil a sense of agency in them.

Third, in countries like the United States, higher work intensity may provide access to employment-related benefits such as health insurance and paid leave (Allègre and Jaehrling 2011; Vandelannoote and Verbist 2017). These benefits can contribute to greater household stability and create a more supportive environment for children's development.

Furthermore, work intensity is a more malleable factor than the actual wage level, which is often determined by companies or public sector policies. Unlike wages, which are largely outside a worker's control, parents can adjust their work intensity more directly to improve their financial situation (Drago, Wooden, and Black 2009). By leveraging this malleability, parents may use work intensity as a pathway to alleviate the impact of poverty on their children's lives.

To examine this question, I combine data from the National Longitudinal Survey of Youth 1979–Children and Young Adults Supplement (NLSY79-CYA), tracking children aged 5 to 15 from 1988 to 2012. The NLSY79-CYA offers high-frequency and repeated measures, allowing detailed tracking of parental working intensity, income, and children's development, measured as reading ability. I implement baseline OLS models and individual fixed effects models to deal with the potential endogeneity among the variables of interest. The poverty variable identifies whether a household's net income, adjusted for household size, falls below the poverty threshold established by the Census Poverty Income Guidelines. This measure captures absolute poverty, which refers to a fixed standard of living necessary to meet basic needs such as food, shelter, and clothing (Callan and Nolan 1991). The work intensity variable captures the total number of weeks parents were employed during the previous calendar year.

The findings show that children in poverty benefit significantly from their parents increasing their work intensity, which is associated with improvements in their reading ability. This result is consistent across both cross-sectional models and individual fixed effects models that exploit within-individual variation over time. Notably, girls, Hispanic children, and children who are neither Black nor Hispanic appear to benefit the most from this increase in parental work intensity. However, parental work intensity has almost no impact on the reading ability of children from families who are not in a situation of poverty.

This study addresses a significant gap in the literature: While most research on the impact of poverty on children has focused on parental unemployment, far less is known about how the intensity of parental employment – specifically among those who are working yet remain in poverty – shapes children's developmental outcomes. Beyond filling this empirical gap, this study contributes to broader debates on family resilience in the face of socioeconomic hardship. It examines how families experiencing in-work

poverty respond not through mere endurance but through transformative strategies (Keck and Sakdapolrak 2013; Bartova et al. 2023; Bawati et al. 2025) – in this case, by increasing parental work intensity – to reallocate resources and restructure family dynamics in ways that enhance children's development.

2. Theoretical frame

2.1 The impact of growing up in poverty on children's lives

Growing up in poverty has been shown to negatively impact children's lives, both in the long and short term (Bradshaw 2002; Ferguson, Bovaird, and Mueller 2007; Hair et al. 2015). Exposure to poverty, especially when cumulative over the years, impacts physical health outcomes, with these associations persisting into mid-life, regardless of later living conditions (Evans and Cassells 2014). Moreover, individuals who experience childhood poverty generally have worse mental health as adults (Ratcliffe and McKernan 2010), as well as a lower probability of marriage, cohabitation, or having children (Lesner 2018). Deprivation experienced during childhood increases the chances of being in a situation of poverty during adulthood, which has been named the cycle of poverty (Leseman and Slot 2014).

In the short term, the impact of poverty on children is most evident in their cognitive and socioemotional development (Korenman, Miller, and Sjaastad 1995; Taylor, Abdurokhmonova, and Romeo 2023). Research demonstrates that poverty during early childhood negatively affects cognitive development by early ages (Duncan, Brooks-Gunn, and Klebanov 1994; Yoshikawa, Aber, and Beardslee 2012; Chzhen and Bruckauf 2019). The theoretical causal chain linking childhood poverty to these developmental outcomes operates through three specific mechanisms: household resources, parenting quality and home environment, and biological-developmental pathways.

First, a situation of poverty is defined as a lack of the necessary resources to meet minimum needs (Hagenaars 1991). Therefore, in the case of child poverty, income is understood as a necessary condition to bring home resources which are important for the purchase of developmentally effective inputs (such as books and educational materials) as well as childcare or even extra tutoring (Chevalier et al. 2013; Cooper and Stewart 2020). The difference in developmentally focused expenditure between families in the United States is large: In 2006, low-income families in the United States spent $1,400 per child, while the average for high-income families was $9,400 (Duncan, Magnuson, and Votruba-Drzal 2014). Moreover, experimental research has shown that increasing income has a positive effect on the development of children from low-income families,

both in terms of their school engagement and their social behaviour (Morris and Gennetian 2003).

Second, poverty is often linked to lower-quality parenting. The family stress model posits that poverty increases parental stress, which negatively affects parent–child interactions (Masarik and Conger 2017). Some research indicates that financial insecurity negatively impacts the quality of parental engagement and care (Cantillon and Van den Bosch 2018). However, other studies suggest that income and parenting behaviours are not always perfectly correlated. Instead, other economic factors such as debt or deprivation are found to be more strongly connected to parenting practices (Cooper 2017). Moreover, the impact of poverty on children appears to be partly mediated by parenting style as well as by the parents' subjective well-being, with mothers' life satisfaction (Kaiser et al. 2017) and mental health (Cooper 2017) being particularly relevant. These findings are mostly consistent across different genders and countries (Schenck-Fontaine et al. 2020).

Third, exposure to poverty during childhood affects children's development through biological mechanisms. Taylor, Abdurokhmonova, and Romeo (2023) suggest that brain areas connected to cognitive performance are highly sensitive to environmental influences during childhood, impacting both the structure (neuroanatomy) and function (neurophysiology) of the brain. Poverty-induced chronic stress produces cortisol exposure that disrupts brain development, weakens memory and emotional regulation, and increases susceptibility to physical and mental health issues (Fernald and Gunnar 2009). Poverty is also associated with sleep disruption in children, affecting brain plasticity, regulation, and cognitive functioning (Sivertsen et al. 2017). Another example is nutrition: There is evidence that nutritional factors have a strong impact on cognitive development (Chilton, Chyatte, and Breaux 2007; Bouguen and Dillon 2024).

2.2 The relationship between poverty and employment status

Poverty rates among children vary significantly over time and across macro-contexts (i.e., policy) and micro-contexts (i.e., family characteristics). Regarding the family determinants of poverty, the groups that traditionally are at-risk of poverty are children in single-parent families, from migrant backgrounds, and whose parents have low educational qualifications and are unemployed (Cantillon and Van den Bosch 2018).

Despite unemployment traditionally being the focus of studies on family-level poverty, in recent decades there has been an alarming rise in a particular type of poverty: in-work poverty (Fraser, Gutiérrez, and Peña-Casas 2011; Marx and Nolan 2012), where individuals are employed yet earn incomes insufficient to surpass the poverty threshold of their country or region (Hick and Marx 2022).

In-work poverty has evolved to constitute an important share of poverty, especially among families (Fraser, Gutiérrez, and Peña-Casas 2011), and parenthood and subsequent births have been shown to significantly increase the risk of in-work poverty (Polizzi, Struffolino, and Van Winkle 2022). As a consequence there has been a rise in the percentage of children who are growing up in a situation of in-work poverty (Halleröd, Ekbrand, and Bengtsson 2015). Despite the relevance of this type of poverty among families with children, the relationship between in-work poverty and children's development remains unknown.

2.3 In-work poverty and child development

Since in-work poverty is, by definition, a dual phenomenon, the two elements, the poverty component and the in-work component, should also be considered in its relationship with child development.

Having already discussed the poverty component and three plausible theoretical mechanisms (resources, parenting, biology) in the previous section, it is now crucial to explore the impact of parental employment on children's cognitive development, a topic on which the literature remains inconclusive (Yetis-Bayraktar et al. 2013). Some traditional studies report negative associations, particularly as the result of maternal employment, citing attachment theory and the family stress model as explanations (Brooks-Gunn, Han, and Waldfogel 2002; Hill et al. 2005; Verropoulou and Joshi 2009). The attachment theory suggests that working parents may develop weaker bonds with their children, leading to less stimulation (Belsky and Rovine 1988). At the same time, certain work characteristics such as job insecurity have been shown to weaken the attachment between parent and children, especially in the first years of life (Gassman-Pines, Gibson-Davis, and Ananat 2015; Hongbo et al. 2020). The family stress model posits that maternal employment generates stress, negatively impacting parent–child interactions (Hoffman 1989).

However, more recent studies have highlighted the potential positive relationships between parental employment and children's outcomes. For instance, mothers with higher skills, who are more likely to choose to work, may provide their children with better stimulation despite their reduced time together (Parcel and Menaghan 1994). Although this dynamic reflects a selection effect rather than a causal relationship, it highlights an association between the variables of interest. Also, resources from employment may foster child development more effectively than time spent at home (Ruhm 2004). Parents often compensate for working hours by reducing housework, sleeping, and leisure time, or by increasing quality time with their children (Bianchi, Robinson, and Milkie 2006). Furthermore, job complexity positively impacts children's

development, as parents transfer problem-solving skills and cognitive resources to their children, resulting in long-lasting benefits for their children's abilities (Herman and Perry-Jenkins 2020).

An important follow-up question, then, is: What happens when children experience a situation of both poverty and employment in their household? Can the advantages of employment mitigate the adverse impact of poverty on child development? This is the question this study addresses.

2.4 Parental work intensity and child development under poverty

Previous research highlights various work-related aspects of parents that significantly affect their children's development and well-being. For instance, some parents transition into employment after previously staying at home (Fox et al. 2012), while others who are already employed might transition into full-time employment (Rönkä et al. 2017). Additionally, parents may opt for more flexible work arrangements to better accommodate their family responsibilities (Waldfogel 2010; Craig and Powell 2012). A positive relationship has also been observed between parents' work autonomy and children's cognitive skills (Heinrich 2014). These work characteristics, often linked to higher job quality, are typically associated with improved outcomes for children. They contribute to these outcomes by increasing household income, alleviating material deprivation, or facilitating access to job-related benefits such as health insurance and paid leave (Conger, Conger, and Martin 2010).

There are certain characteristics of parents' jobs that cannot be easily modified. This is the case with the quality of the job or the wages they receive. However, individuals are usually more in control of their work intensity (Gallie 2013). Work intensity is the percentage of time committed to employment. There are at least three ways in which work intensity can positively affect the development of children who are in poverty.

First, and most importantly, higher work intensity typically results in higher household income, which can alleviate some aspects of the material deprivation associated with poverty (Jackson et al. 1998). The increased income can provide better food, housing, and educational materials for children, directly supporting their development. Second, parents who work long hours can model a strong work ethic and perseverance, instilling the values of hard work and determination in their children (Prinzie et al. 2004). Third, higher-intensity work may provide access to job-related benefits such as health insurance, paid leave, and retirement plans, contributing to a more stable household environment that will positively impact children's well-being and development (Vandelannoote and Verbist 2017).

I would not expect work intensity to have the same moderating effect on child development in non-poor families as it does for children in poverty. Non-poor families are less likely to face the same financial pressures or time constraints, and work intensity may be less relevant in their households. As the family is already operating within a stable, well-resourced environment, additional work effort is less likely to directly enhance child development.

Based on this, the first working hypothesis of this study is: Parents' work intensity has a positive relationship with reading ability for children in poverty, but this association is not observed for children in non-poor families (Hypothesis 1).

While increases in work intensity can yield benefits such as higher earnings and improved career trajectories, they are not without significant downsides. Increased work intensity often leads to reduced time available for familial responsibilities, including childcare and parent–child interactions (Hill et al. 2005; Huston and Rosenkrantz Aronson 2005). These constraints can result in greater reliance on external childcare arrangements (Hook, Ruppanner, and Casper 2022), which may not always be accessible or affordable for families in poverty. Moreover, heightened work intensity is frequently associated with elevated stress levels and a higher mental health burden in the long-term, particularly among parents who must navigate the competing demands of work and home life (Greenberger, O'Neil, and Nagel 1994; Felfe and Hsin 2012). These challenges may have cascading effects on family well-being and child outcomes in both poor and non-poor families. However, I would expect the negative effects to be more pronounced in poor families, given the greater constraints they experience. The second hypothesis therefore is: Parents' work intensity has a strong negative relationship with reading ability for children in poverty, and a moderated negative association for children in non-poor families (Hypothesis 2).

Understanding gender differences is crucial when examining the relationship between in-work poverty and children's outcomes. Prior research highlights that developmental trajectories vary by gender due to distinct developmental rhythms (Ardila et al. 2011). Existing studies indicate that poverty exposure impacts girls more than boys (Kim et al. 2019). Given girls' greater vulnerability to the effects of poverty, the third hypothesis is: The positive relationship between parents' work intensity and reading ability for children in poverty is more pronounced for girls than for boys (Hypothesis 3).

The effects of poverty on children can also differ across racial groups (McLeod and Nonnemaker 2000; Petterson and Albers 2001). Building on a similar rationale as the gender-based argument, and since Black and Hispanic children are more exposed to and show greater susceptibility to poverty than non-Black and non-Hispanic children, the fourth hypothesis is: The positive relationship between parents' work intensity and reading ability for children in poverty is stronger for Black and Hispanic children (Hypothesis 4).

Finally, poverty has been shown to be particularly damaging for children when experienced cumulatively over an extended period. This long-term exposure can exacerbate the negative impact on child development, affecting cognitive function, emotional well-being, and educational outcomes (Korenman, Miller, and Sjaastad 1995; Ratcliffe and McKernan 2010; Evans and Cassells 2014). Therefore, the final hypothesis is: The positive relationship between parents' work intensity and reading ability for children in poverty is particularly strong for children in long-term poverty (Hypothesis 5).

2.5 Parental work intensity as a form of family resilience

Children living in households experiencing poverty can face numerous challenges, such as material deprivation and psychosocial stress. However, parental work can be a protective factor, as it allows parents to mitigate some of the negative consequences of poverty. In the face of economic strain, parents may increase their work intensity as a strategic response to ensure their family's well-being (Béné et al. 2014; Neenan 2017; Bussemakers and Kraaykamp 2020).

Changes in work intensity frequently require a reorganisation of family dynamics, enabling the reallocation of time and resources to better support children's development. These adaptive responses can help buffer the impact of poverty by granting access to improved opportunities and sustaining a stable, supportive home environment, even amid constrained circumstances.

Thus, in this context, an increase in parental work intensity can be understood as a form of family resilience. This is defined as a proactive behavioural adaptation to adversity that aims to protect children's development (Masten 2018). This perspective is grounded in the family resilience literature (Davey et al. 2012; Bawati et al. 2025), which suggests that under situations of major distress, parents can adapt their behaviour to protect their children's well-being (Jones and Passey 2004; Wadsworth et al. 2011, 2013). Such resilience involves not only enduring hardship but also the proactive effort of the parents (Bartova et al. 2023).

2.6 A note on parental work intensity

Work intensity, defined in this study as the number of weeks worked throughout the year, can increase through several distinct pathways (Ward and Ozdemir 2013). For some, this may involve transitioning from part-time or seasonal work to full-time, year-round employment. Others may achieve increased work intensity by minimising interruptions

to their employment, such as reducing time-off for caregiving responsibilities, illness, or other life events. Additionally, individuals in certain sectors may fill employment gaps by engaging in multiple jobs or taking on additional gig work during previously unoccupied periods.

The opportunity to increase work intensity is shaped by structural and individual-level selection processes. Certain industries, such as healthcare, education, and manufacturing, offer more stable and predictable year-round employment opportunities than sectors like retail, agriculture, and tourism, where work may be cyclical or seasonal. Occupational roles also play a part: Jobs with higher flexibility or autonomy may allow workers to sustain consistent work weeks more easily than roles with rigid schedules or limited availability (Johnson and Lipscomb 2006). Socioeconomic and educational factors further influence these selection dynamics. Higher levels of education or skill specialisation often provide access to positions that support consistent year-round employment, while work precarity is usually more associated with low-skilled jobs (Bryan 2007).

This study examines the relationship between work intensity and its implications for children in poverty, compared to those not in poverty. However, the available data lack the granularity needed to distinguish between the different types of transitions that contribute to increased work intensity, such as moving to full-time employment, reducing unemployment spells, or taking on additional jobs. To address the issue of selection into work arrangements that facilitate increased work intensity, I include controls for parental education and wealth, which act as proxies for socioeconomic positioning and access to stable employment opportunities. While these controls provide some insight, they cannot fully capture the complex pathways and structural factors that influence increased work intensity. It is therefore crucial to interpret the findings with these limitations in mind.

3. Data and methods

3.1 Data

This study employs data from the National Longitudinal Survey of Youth 1979–Children and Young Adults Supplement (NLSY79-CYA), a nationally representative cohort study in the United States. This dataset tracks the offspring of women who were initially part of the NLSY79, a survey of individuals born between 1957 and 1964. These women, aged 14 to 22 at the start of the survey in 1979, provided longitudinal data on their children from 1988 through 2012. The data collection includes comprehensive assessments of the children's development, conducted biennially. The high frequency and repeated measures of the data allow for detailed tracking of parental working

arrangements, income, and development levels through almost the whole childhood period.

The sample is organised based on child-year observations, of children aged between 5 and 15 years living with their mothers, who are 21 to 55 years old. This age range is due to the availability of the outcome variables and the predictors. The final dataset comprises 13,307 child-year observations with complete information for all the variables of interest, at the mother and child level. These child-year observations correspond to 6,009 unique children, who are observed for an average of 2.25 years, and are clustered within 2,861 mothers. Figure A-1 in the Supplementary Materials shows the sample selection process, and the restrictions made at each stage.

The sample consists of both single-mother households and two-parent families. Among the individual-year observations, 87% pertain to families where the mother is married and living with her spouse. To account for this, I include controls for the mother's marital status, differentiating between married with spouse present and other situations such as divorced, married but without the spouse present, and cohabiting without being married. Additionally, I control for family size to capture broader household dynamics.

This study excludes families with no employment across the entire observation period, as the analysis relies on variation in work intensity. However, families experiencing transitions into or out of employment – including those with zero work weeks at either baseline or follow-up – are retained, as these cases add meaningful variation to the sample.

3.2 The US context

The United States has traditionally had one of the highest in-work poverty rates among OECD countries. Hick and Marx (2022) report an in-work poverty rate of 13.8% in 2017. Work precarity, characterised by unstable, low-paying, and insecure jobs, plays a critical role in the persistence of in-work poverty in the United States. Many workers in precarious employment face irregular hours, unpredictable schedules, and limited access to benefits such as healthcare and paid leave (Edgell, Granter, and Gottfried 2015). These conditions make it difficult for families to achieve financial stability, even when all available adults are employed.

Work precarity disproportionately affects certain groups, including women, racial and ethnic minorities, and immigrants, reflecting systemic inequalities in the labour market (Blustein et al. 2020). For instance, women and minorities are more likely to be employed in sectors characterised by low wages and minimal job security, such as retail, hospitality, and caregiving services (Shin, Kalleberg, and Hewison 2023). Moreover, socioeconomic crises exacerbate the vulnerabilities of low-income workers (Shin 2013).

During economic downturns, job losses and reductions in work hours disproportionately affect those in precarious positions, pushing many households deeper into poverty (Walther and Pilarz 2024; Perri et al. 2024).

3.3 Variables

The main outcome of interest in this study is children's development, which is measured using the Peabody Individual Achievement Test (PIAT) for reading ability as a proxy. Interviewers conduct this assessment biennially, thus minimizing the risk of bias from mothers misreporting their children's abilities. The PIAT provides age-specific and relative measures of a child's reading skills, comparing each child's abilities with those of peers from the same age group. For the analysis, this variable has been standardised to have a mean of 0 and a standard deviation of 1, with values ranging from –2.83 to 2.07.

The PIAT Reading Recognition test assesses word recognition and pronunciation, fundamental components of reading ability, and has been shown to strongly correlate with other proxies of cognitive development, such as mathematical performance (Cirino, Child, and Macdonald 2018; Bernabini, Bonifacci, and de Jong 2021; Blaabaek 2021). Research suggests that reading ability and other developmental dimensions are significantly influenced by working memory and phonological awareness, as these underlying abilities are shared, which helps explain the parallel development observed across different domains (Child et al. 2019). Furthermore, strong reading skills have been recognised as a necessary condition for children's mathematical development (Erbeli et al. 2021), highlighting the critical role of reading as a central element in overall child development.

The two main predictors of interest in this paper are the work intensity of the parents and the poverty status of the family. Work intensity is operationalised as a continuous measure ranging from 0 to 104 weeks, based on the combined number of self-reported full- or part-time weeks worked in the past calendar year by the child's mother and her partner. A value of 0 indicates that neither parent worked any weeks, and these cases are only included when the parents work some weeks in the subsequent or previous period, thereby providing a source of variation that can be exploited for identification. This measure of work intensity is based on the use of the number of weeks unemployed in the in-work poverty literature (Kenworthy and Marx 2018; Van Winkle and Struffolino 2018).

By considering the combined work intensity of all adults in the household, I address a common problem in the literature on in-work poverty. This problem arises when household-level variables, such as total household income, are compared with individual-level variables, like a single person's labour market status. Such comparisons can lead to

misinterpretation, as they fail to account for the contributions of other household members to the household's overall economic situation. For example, an individual classified as unemployed may belong to a household with other working members. By using a household-level measure of work intensity, as recommended by Marx and Nolan (2012), this analysis ensures consistency between the levels of measurement for income and work intensity and provides a more accurate reflection of the household's poverty status.

The poverty status variable, provided by the NLSY dataset, considers whether, once household size is accounted for, the net household income falls below the poverty threshold assigned by the Poverty Income Guidelines. This measure captures absolute poverty, which refers to a fixed standard of living that defines the minimum income necessary to meet basic needs such as food, shelter, and clothing. It is a binary variable that takes a value of 1 if the family is below the poverty line and a value of 0 otherwise.

The NLS poverty measure is a well-established and standardised indicator that offers several advantages over alternative measures. First, it directly reflects the U.S. federal poverty guidelines, which are widely recognised and consistently updated by the Department of Health and Human Services based on the Census Guidelines, ensuring comparability across time and populations, and therefore closely tied to the policy context or historical poverty thresholds. Second, the NLSY poverty variable accounts for detailed family income data, including all income sources of respondents and their family members as reported during the survey. This approach ensures that the measure is comprehensive, capturing income from various components such as wages, transfers, and other sources. Additionally, the methodology adapts to the family size, since it establishes a baseline threshold for the first person in the family and increases this by a standard amount for each additional family member living in the household.

Descriptive statistics for all variables are presented in Table A-1 of the Appendix.

3.4 Analytical strategy

First, I implement an OLS model where children's reading abilities are the outcomes of interest, and the interaction between work intensity and poverty status is the main predictor.

$$CD_{i,t} = \beta_o + \beta_1 \, Work\ Intensity\ x\ Pov_{i,t} + \beta_2 \, Work\ Intensity_{\ i,t} + \beta_3 Pov_{i,t} + \beta_4 \, C_{i,t} + \varepsilon_{i,t} \quad (1)$$

where $CD_{i,t}$ is the children's development, β_1 is the coefficient for the interaction between work intensity and poverty status, $C_{i,t}$ is a vector of control variables, and $\varepsilon_{i,t}$ is

the error term for individual *i* at time *t*. Standard errors are clustered at the family level. The OLS models are implemented in a multi-step way. In the first model, I only include demographic controls (year, age of the mother, age of the child, race, sex, family size, marital status). In the second model I add the level of mothers' education (operationalised as the highest grade achieved), and in the fourth model I add wealth at the family level.

In the second stage of the analysis I employ individual fixed-effects (FE) models to leverage the longitudinal nature of the data by examining within-individual variations over time and to address potential endogeneity issues. This approach controls for all time-invariant unobserved heterogeneity, such as stable family characteristics or inherent parenting traits, and focuses on how changes in work intensity and poverty status are associated with the outcomes of interest. While FE models are a robust method for addressing time-invariant confounders, they are limited in their ability to handle dynamic endogeneity, time-varying unobserved factors, measurement error, and simultaneity between variables.

To address these concerns, I supplement the analysis with a dynamic panel data model, presented in the robustness section, which accounts for potential autocorrelation and the influence of prior outcomes. Moreover, I control for time-varying factors such as family size and marital status. Despite the stated limitations, the FE approach remains a strong analytical choice for exploring associations in this context, providing a nuanced understanding of the relationships under investigation while maintaining transparency about its constraints.

$$\begin{aligned} CD_{i,t} = \ & \beta_o \ + \beta_1 \, Work\ Intensity \ x \ Pov_{i,t-1} + \beta_2 \, Work\ Intensity_{i,t-1} \\ & + \beta_3 \, Pov_{i,t-1} + \beta_4 \, C_{i,t} + \alpha_i + \tau_t + \varepsilon_{i,t} \end{aligned} \quad (2)$$

where $CD_{i,t}$ is the children's development at time *t*, differing from Equation (1) in that it includes α_i which is the individual fixed effects for individual *i*. All models account for potential correlation within families by clustering standard errors at the mother level.[2]

4. Results

4.1 Descriptives

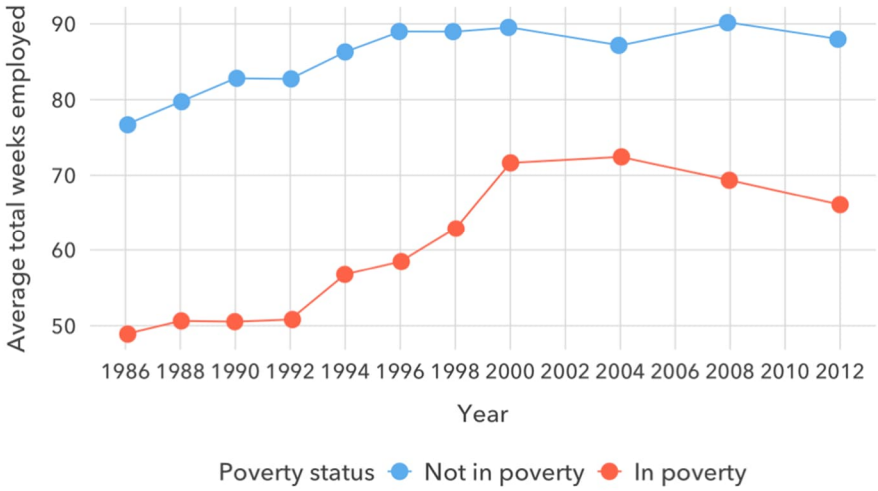
The mean reading ability is –0.465 for individuals in poverty and 0.071 for those not in poverty. A Welch Two-Sample t-test reveals that this difference in reading ability

[2] The replication materials for this study, developed using *R Studio*, will be made available in an online repository upon publication.

between those in poverty and those not in poverty is substantively relevant. In an unadjusted model including only work intensity as a predictor, I find that a 1 standard deviation increase in the work intensity of parents is associated with a 0.118 standard deviation increase in reading ability.

Figure 1 illustrates the average number of weeks that adults in a household are employed each year, categorized by their poverty status. The blue line, representing families not in poverty, shows a relatively stable average number of weeks employed across years. By contrast, the red line, which represents families in poverty, exhibits greater variability in employment weeks. Families not in poverty consistently work more weeks per year compared to those in poverty, although the gap reduces over time.

Figure 1: Average number of weeks employed over time, by poverty status



To examine the relationship between work intensity and poverty from an alternative angle, Figure A-2 in the Supplementary Materials displays the percentage of individuals in poverty across different categories of weeks employed. The data reveal that the percentage of individuals in poverty is notably high for those working less than 50 weeks per year, especially among those working between 0 and 9 weeks. However, for those working 50 weeks or more, the percentage of individuals in poverty decreases significantly as the number of weeks worked increases.

4.2 Main findings

The main findings are displayed in Table 1. Model (1) presents the baseline OLS model, which establishes the initial association between the variables of interest. Model (2) builds on this by incorporating a control for mothers' education. Model (3) further refines the analysis by adding a wealth control. Finally, Model (4) introduces the more robust individual fixed effects specification, which addresses potential endogeneity issues by accounting for unobserved heterogeneity.

The first notable finding is that there is no evidence of an association between the total weeks employed and children's reading ability for those not living in poverty. This is demonstrated by the estimates and 95% confidence intervals presented in the first row of Table 1, which are close to zero across all four models. The observed association is minimal and effectively negligible.

Table 1: Main findings

	Dependent variable: children's reading ability			
	(1) OLS with demographic controls	(2) OLS with education	(3) OLS with education and wealth	(4) Individual fixed effects
Work intensity	0.003 (–0.017, 0.023)	–0.020 (–0.040, 0.000)	–0.016 (–0.035, 0.004)	0.005 (–0.019, 0.029)
Poverty status (ref: not in poverty)	–0.181 (–0.246, –0.116)	–0.090 (–0.154, –0.026)	–0.087 (–0.151, –0.023)	0.044 (–0.025, 0.112)
Work intensity x Poverty status	0.117 (0.074, 0.159)	0.116 (0.074, 0.157)	0.114 (0.073, 0.156)	0.045 (0.001, 0.089)
Mothers' education		0.206 (0.189, 0.223)	0.197 (0.179, 0.214)	
Family wealth			0.063 (0.045, 0.080)	
Constant	–0.769 (–0.856, –0.682)	–0.697 (–0.782, –0.612)	–0.673 (–0.758, –0.588)	
Controls	Yes	Yes	Yes	Yes
Individual Fixed Effects	No	No	No	Yes
R squared	0.103	0.138	0.141	0.932
Observations	13,307	13,307	13,307	13,307

Note: Models (1), (2), and (3) control for year, age of the mother, age of the child, race, sex, family size, and marital status. Model (4) controls for year, family size, and marital status. In model (4) the year and the age variables are collinear, since they are highly correlated. For this reason, I only include the year measure as a proxy for both time trends and age. 95% confidence intervals in parentheses obtained from standard errors clustered at the level of the mothers.

Regarding the relationship between poverty and children's reading ability, for children at the average level of weeks employed, being in poverty is negatively associated with reading ability when examined through the OLS models (Models 1 to 3). The magnitude of this association varies across models. In Model 1, the baseline specification, the estimate indicates that being in poverty (compared to not being in poverty) is associated with a decrease of 0.181 standard deviations in a child's reading ability score.

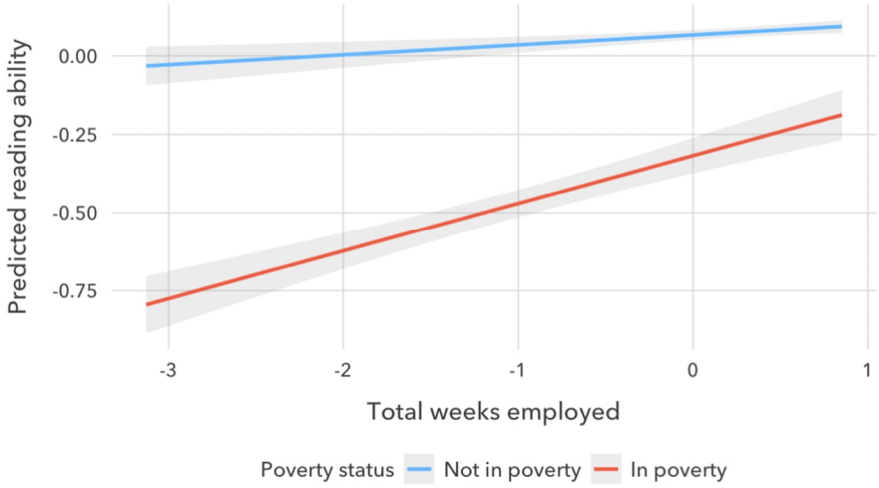
This effect size diminishes when additional controls, such as maternal education and family wealth, are included. When individual unobserved factors are accounted for using the fixed-effects specification (Model 4), transitioning into or out of poverty does not appear to impact children's reading ability.

The key estimate of interest in this study is presented in the third row of Table 1, which examines the relationship between work intensity and children's reading ability for those living in poverty. This association is different from zero in all models, with a magnitude of approximately 0.11 standard deviations in the OLS models (Models 1 to 3). In the fixed-effects model, this effect size decreases to 0.045 standard deviations. The effect size of 0.045 standard deviations for the interaction term is, for instance, approximately 71% of the wealth estimate, indicating that while work intensity has a meaningful impact on children's reading ability in the context of poverty, its effect is less pronounced than that of wealth or parental education. Nonetheless, both effects are small in absolute terms, underscoring the importance of other factors in explaining variations in children's reading ability.

To better illustrate the moderating role of work intensity in the relationship between poverty and children's reading ability, Figure 2 displays the predicted reading ability scores across varying levels of total weeks employed, distinguishing between children in poverty (red line) and those not in poverty (blue line). The results indicate that the gap in reading ability between the two groups narrows as the number of working weeks increases. Although both groups exhibit a slight positive slope, the increase is steeper for children in poverty, as reflected by the positive interaction term reported in Table 1.

Regarding the analyses across subgroups, Table A-2 shows that in situations of poverty, girls tend to benefit more from increased parental work intensity than boys. I also conducted additional analyses stratified by race/ethnicity for Black, Hispanic, and non-Black, non-Hispanic children. The results, presented in Table A-3, reveal that the interaction between work intensity and poverty is in place only for Hispanic and non-Black, non-Hispanic children. The moderating effect is more pronounced for non-Black, non-Hispanic children. By contrast, for Black children, work intensity does not appear to moderate the relationship between poverty and children's outcomes. Table A-4 presents the results for children who are in long-term poverty (i.e., if they experience continuous poverty for at least four years). These findings indicate that there are no significant differences between individuals exposed to poverty for a long versus a short period of time.

Figure 2: Predicted reading ability at different levels of weeks employed for those in poverty and not in poverty



Note: The predicted values are obtained from the individual-fixed effects results in Model (4) Table 1.

4.3 Sensitivity and robustness checks

Several tests of the assumptions of the OLS models are presented in the Supplementary Materials to ensure the robustness of the results. Figure A-3 presents the residuals plot and Q-Q plot, confirming that the linearity and normality assumptions hold. Table A-5 demonstrates that the results remain stable when using heteroskedasticity-robust standard errors. To check for autocorrelation in the residuals, I conduct a Durbin–Watson test, which yields a t-statistic of 1.2, indicating no autocorrelation and suggesting residual independence. I also examine multicollinearity using the Variance Inflation Factors (VIF). The results reveal high collinearity (VIF > 5) for the variables 'age of the mother' and 'year'. To address this issue, Table A-6 reports the main analyses after excluding the 'age of the mother' variable. The results remain similar.

To account for the possibility of autocorrelation and endogeneity in the reading ability trajectory I also run a dynamic panel data model, which is presented in Table A-7. The model utilizes the Generalized Method of Moments estimator with a two-step correction. The results from this dynamic model are consistent with those of the main

models. To further investigate the potential differential impact of work intensity, I rerun the main analysis excluding lone parents, who constitute 13% of the sample. The results remain consistent (see Table A-8). The main findings are also robust to the use of an alternative measure of at-risk-of-poverty, defined as 60% of the median equivalised household income (see Table A-9).

To address potential concerns about the role of income in the analyses, Table A-10 presents the models including a control for income percentiles. These findings show that while the inclusion of the income control reduces the size of the interaction term between total weeks employed and poverty status, it remains substantially relevant.

5. Discussion

This study explores the protective role of parental work intensity for children growing up in families experiencing in-work poverty. Over the past few decades the rise of in-work poverty has introduced new challenges (Halleröd, Ekbrand, and Bengtsson 2015), but it may also offer new opportunities for families to protect children from the damaging effects of poverty.

The results of this study support this idea. The positive interaction between work intensity and poverty status, observed across all models, suggests that children in poverty tend to improve their reading skills when their parents increase their work intensity. However, it is important to keep in mind the limited effect size of this moderating role of work intensity, which is between 0.05 and 0.1 standard deviations. By contrast, parental work intensity does not appear to play any role in children's outcomes for children who are not in poverty.

There are three potential explanations of these results. First, for families in poverty, a marginal increase in work intensity can significantly boost the resources available at home, which positively impacts children's development. Second, children exposed to a household where parents work intensively may develop resilience by adapting to challenging circumstances and developing coping strategies, which are especially valuable for children in poverty. Third, some US welfare programs require a certain number of working periods, which can indirectly provide children with access to beneficial welfare packages.

As expected, being in poverty is negatively associated with children's reading ability, although this estimate drops when we use individual fixed effects models. This negative relationship is consistent with all the previous literature on poverty and children's outcomes (Ratcliffe and McKernan 2010; Bradshaw and Main 2016; Kaiser et al. 2017; Kim et al. 2019).

The moderating role of work intensity for children in poverty is particularly evident for girls, but not for boys. This might be explained by differences in the impact of poverty by gender. Existing research indicates that girls are more vulnerable to poverty and its effects than boys (Hernandez and Pressler 2014). These results are also connected to a broader literature suggesting that girls might be more responsive than boys to the indirect benefits of parental behaviours, such as increased household stability, reduced financial stress, and parenting interactions (Szkody, Steele, and McKinney 2021). Consequently, given their heightened susceptibility, even a modest increase in parental work intensity could be particularly beneficial for girls.

With respect to race, Hispanic children and those from racial groups that are neither Black nor Hispanic appear to benefit more from increases in parental work intensity than Black children living in poverty. This finding is contrary to my expectations, and there are two factors that could explain this: (a) Black children may experience fewer increases in their parents' work intensity, potentially due to the greater exposure of Black mothers to unstable work arrangements (Storer, Schneider, and Harknett 2020); or (b) Black children may face more severe poverty conditions, where even higher parental work intensity is insufficient to substantially improve their circumstances (Drake and Rank 2009).

Although individual fixed effects models aim to approximate causal estimates by controlling for time-invariant confounders and incorporating key time-varying factors, and a dynamic panel data model is included in the robustness checks, these methods still have limitations. Fixed effects models cannot fully account for unobserved time-varying variables that may influence the outcomes, nor can they completely mitigate issues such as measurement error, simultaneity, or selection. These limitations constrain the extent to which causal inferences can be confidently drawn. While the results presented here suggest relationships that may have causal implications, they should be interpreted with caution.

A particularly challenging issue is selection. The opportunity to increase work intensity is shaped by both structural and individual-level factors, including industry type, occupational role, socioeconomic and educational background, and poverty status. To account for this, I control for parental education and wealth; however, these controls cannot fully capture all the structural factors that influence work intensity. Therefore, it is important to interpret these findings while keeping these limitations in mind.

A constraint of this study is that the measure of parental work intensity, while the best available given the data, is not without flaws. Specifically, by focusing on the number of weeks worked throughout the year, it does not account for whether parents worked full-time or part-time during those weeks, as that information is not available in the data with enough regularity. However, it is important to note that this measure aligns with the established literature on in-work poverty, which also uses weeks worked as a

key measure, albeit typically in a categorical manner to distinguish those in poverty from those who are not, rather than as a continuous explanatory variable, as in my case (see Kenworthy and Marx 2018; Van Winkle and Struffolino 2018 for an example of the former).

Additionally, there are two compelling reasons, beyond data availability, for using weeks per year rather than hours per year. First, weeks per year better captures long-term employment arrangements and stability, while hours per year may be more susceptible to short-term fluctuations. Second, individuals are generally more accurate in recalling the number of weeks they worked each year compared to the total hours worked during a year, which is the other available measure in the NLSY79 dataset. Therefore, using weeks per year reduces the likelihood of reporting errors.

While I rely on the PIAT reading ability test as a proxy for general development due to data availability and its established importance in developmental processes, this approach may not fully capture other critical dimensions of development, such as cognitive, emotional, social, and physical growth. Future analyses could incorporate additional assessments to provide a more comprehensive understanding of overall development.

Another constraint of the data is that it does not distinguish between changes in work intensity driven by employer and those driven by employee choices, which could provide additional insights into the dynamics of employment and poverty. Similarly, it remains unclear whether the increases in work intensity are driven by one parent taking on additional work or by a previously unemployed parent entering the workforce as the second earner in the family. Moreover, this study lacks a direct exploration of the mechanisms linking parental work intensity and child development, despite their theoretical discussion. Finally, it does not assess the long-term impacts of increased work intensity on parents and children, as the dataset does not provide sufficient longitudinal observations to explore these associations over some decades.

6. Conclusions

This study contributes to the literature on family resilience by examining how families in poverty respond to socioeconomic hardship. Specifically, it investigates behavioural adaptation and reallocation of resources – namely, increases in parental work intensity – as potential strategies to protect children's development. The findings reveal that even in structurally constrained contexts, such as poverty situations in the United States, families engage in agency-driven responses that act as a buffer to protect children from the full impact of material deprivation.

By exploring how variations in work intensity function as a protective factor, this paper adds to ongoing debates on the conceptualisation of family resilience. Rather than portraying families as passive recipients of external shocks, the study highlights their agency (Bawati et al. 2025). At the same time, it situates these responses within broader structural constraints such as poverty and labour market precarity, thereby bridging two strands of resilience research: the behavioural emphasis of the family resilience tradition and the contextual focus of the social resilience literature.

This dual perspective is particularly important in light of critiques that resilience research can obscure socioeconomic inequalities by overemphasizing individual or family agency (Bawati et al. 2025). By centring poverty as a structural constraint and examining how families navigate it, this paper helps anchor resilience research within broader discussions of inequality.

Finally, the findings from this study have clear policy implications. To support parental work intensity without compromising child–parent time, policies should focus on flexible work arrangements, childcare support, and family-friendly scheduling. Flexible work options, such as remote work, flexible scheduling, and compressed work weeks, allow parents to align work hours with family needs. Childcare support, including subsidized childcare or on-site facilities, helps ensure that children are well-cared for while their parents are at work. Aligning school and after-school programme hours with work schedules can reduce logistical challenges. Together, these policies could promote a balance between professional and family responsibilities.

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Appendix

Figure A-1: Flowchart showing the sample selection process and the resulting child-year observations

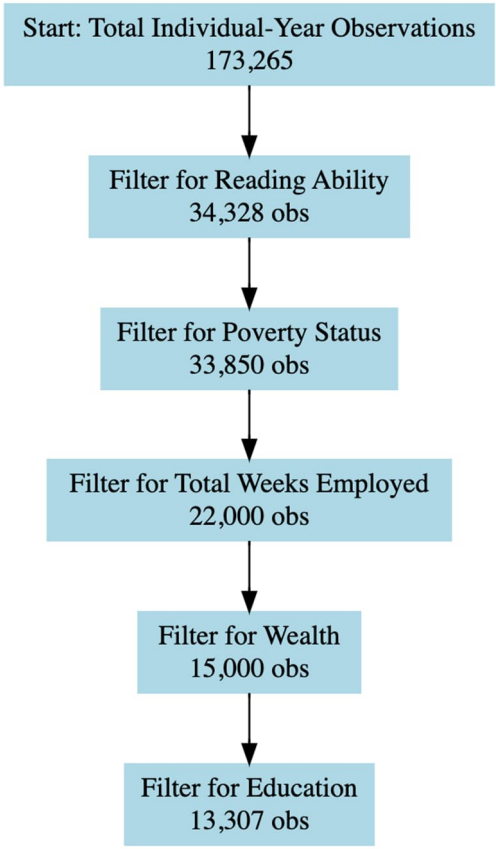
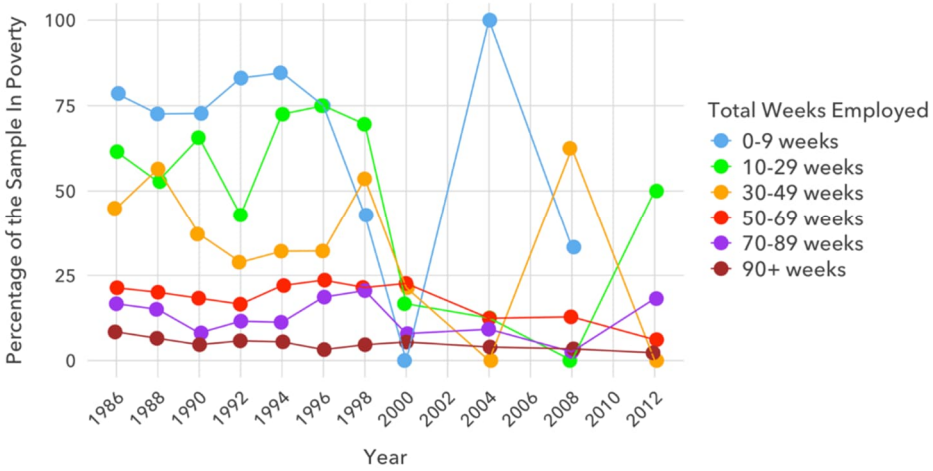


Figure A-2: Overtime trend of poverty status by total weeks employed



Note: For the purpose of the graph, I group the total weeks employed in groups of 10 weeks. However, in the main analyses this is treated as a continuous variable.

Figure A-3: Linearity and normality checks

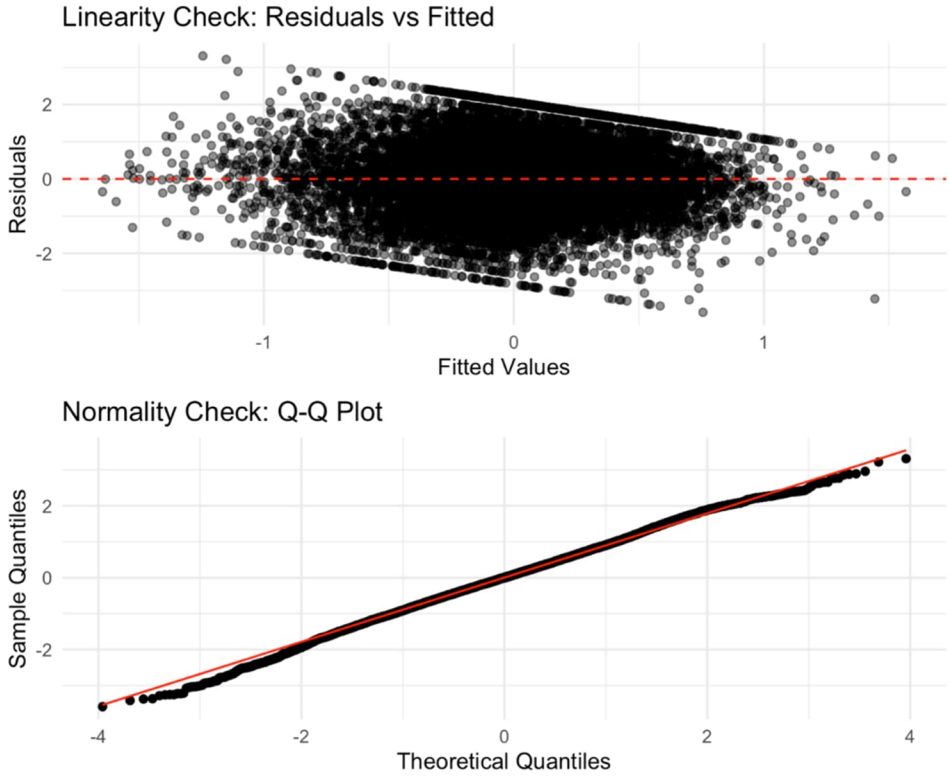


Table A-1: Descriptive statistics

Variable	Mean / proportion	Standard deviation	Mode	Minimum (after standardisation)	Maximum (after standardisation)	Minimum (before standardisation)	Maximum (before standardisation)
Continuous variables							
Reading ability	0	1	–	–2.831	2.066	65	135
Work intensity (total weeks employed by all adults in household)	0	1	–	–3.129	0.852	0	104
Family size	0	1	–	–2.856	9.054	2	16
Year	0	1	–	–1.547	2.869	1988	2012
Mothers' education (highest grade ever achieved)	0	1	–	–5.309	2.634	0	20
Wealth	0	1	–	–5.939	11.661	–1703842	3702997
Age of the mother at interview	0	1	–	–2.38	3.727	21	55
Age of the child	0	1	–	–1.924	3.049	5	15
Binary variable							
Poverty status	13.20% in poverty	–	Not in poverty	0	1	–	–
Race	21.10% Hispanic, 18.69% Black, 60.20% non-Black and non-Hispanic	–	Non-Black and non-Hispanic	0	1	–	–
Sex of the child	50.18% male	–	Male	0	1	–	–
Marital status	87% married, living with partner	–	Married, living with partner	0	1	–	–

Table A-2: Results stratified by gender

	Dependent variable: children's reading abilities	
	(1) Girls	(2) Boys
Work intensity	0.006 (–0.026, 0.038)	0.004 (–0.032, 0.041)
Poverty status	0.109 (0.012, 0.038)	-0.021 (–0.119, 0.077)
Work intensity x Poverty status	0.061 (0.001, 0.121)	0.029 (–0.035, 0.094)
Control for year, family size, and marital status	Yes	Yes
Individual fixed effects	Yes	Yes
Observations	6,629	6,678

Note: Individual fixed effects models. 95% confidence intervals in parentheses obtained from standard errors clustered at the level of the mothers.

Table A-3: Results stratified by race

	Dependent variable: children's reading abilities		
	(1) Black	(2) Hispanic	(3) Non-Black and non-Hispanic
Work intensity	0.032 (–0.021, 0.085)	0.028 (–0.017, 0.073)	–0.009 (–0.034, 0.016)
Poverty status	-0.249 (-0.376, -0.122)	–0.178 (–0.307, –0.050)	–0.113 (–0.210, –0.016)
Work intensity x Poverty status	0.054 (–0.036, 0.145)	0.105 (0.022, 0.188)	0.171 (0.108, 0.234)
Control for year, family size, and marital status	Yes	Yes	Yes
Observations	2,488	2,808	8,011

Note: OLS models. There was not enough variation at the individual level by subgroups to implement fixed effects models. 95% confidence intervals in parentheses obtained from standard errors clustered at the level of the mothers.

Table A-4: Long exposure

	Dependent variable: children's reading abilities.
Work intensity	0.010 (–0.013, 0.034)
Long exposure to poverty	–0.031 (–1.161, 0.098)
Work intensity x Poverty status	0.019 (–0.045, 0.083)
Control for year, family size, and marital status	Yes
Individual fixed effects	Yes
Observations	13,307

Note: Individual fixed effects models. 95% confidence intervals in parentheses obtained from standard errors clustered at the level of the mothers.

Table A-5: Heteroskedasticity-robust standard errors

	Dependent variable: children's reading abilities
Work intensity	–0.015 (0.010)
Poverty status	–0.086 (0.033)
Work intensity x Poverty status	0.114 (0.021)
Constant	–0.672 (0.044)
Control for year, age of the mother, age of the child, race, sex, family size, marital status, wealth, and education.	Yes
R squared	0.141
Observations	13,307

Note: This model includes Heteroscedasticity-Robust Standard Errors.

Table A-6: Results accounting for multicollinearity

	Dependent variable: children's reading abilities
Work intensity	–0.0140 (0.0100)
Poverty status	–0.0913 (0.0327)
Work intensity x Poverty status	0.1128 (0.0212)
Control for year, age of the child, race, sex, family size, marital status, wealth, and education.	Yes
R squared	0.140
Observations	13,307

Note: To prevent multicollinearity issues these results remove the 'age of the mother' control. Standard errors clustered at the level of the mothers are in parentheses.

Table A-7: Dynamic panel data model

	Dependent variable: children's reading abilities
Lag children's reading abilities	–0.233 (0.010)
Work intensity	–0.004 (0.013)
Poverty status	0.058 (0.036)
Work intensity x Poverty status	0.054 (0.024)
Observations	13,307

Note: The model estimates a dynamic panel data model using the Generalized Method of Moments (GMM) estimator with two-step correction. The dependent variable, children's reading ability, is regressed on its lagged value, along with the interaction term between work intensity and poverty status, and the control variables family size and marital status. The instrument set includes the lagged values of the dependent variable from 2 periods to 5 periods prior, which helps address potential endogeneity issues. The model accounts for individual-specific effects and uses a two-step estimator to provide robust standard errors. This approach is appropriate for handling dynamic relationships in panel data with potential autocorrelation and endogeneity. Standard errors are provided in parentheses.

Table A-8: Excluding lone parents

	Dependent variable: children's reading abilities
Work intensity	–0.0054 (0.013)
Poverty status	0.049 (0.041)
Work intensity x Poverty status	0.054 (0.027)
Individual FE	Yes
Control for family size and year	Yes
Observations	11,744

Note: Individual fixed-effects models excluding lone parents from the sample. Standard errors clustered at the level of the mothers in parentheses.

Table A-9: Results using an alternative measure of poverty

	Dependent variable: children's reading abilities
Work intensity	0.021 (0.014)
At risk of poverty	–0.135 (0.061)
Work intensity x At risk of poverty	0.118 (0.040)
Control for family size and year	Yes
Observations	12,851

Note: I constructed the at-risk poverty variable by comparing each household's income to a predefined poverty threshold, which is set at 60% of the median equivalised household income. To do this, I first calculated the equivalised income for each household by adjusting their income for family size, using an equivalence scale such as the square root of family size. I then determined the poverty threshold as 60% of the median of these equivalised incomes. Finally, I created a binary variable, where I assigned a value of 1 if the household's income was below the poverty threshold, indicating they were at risk of poverty, and 0 if their income was above or equal to the threshold, meaning they were not at risk of poverty. Standard errors clustered at the level of the mothers in parentheses.

Table A-10: Accounting for income percentiles

	Dependent variable: children's reading abilities
Work intensity	–0.0489 (0.0147)
Poverty status	0.0714 (0.0453)
Work intensity x Poverty status	0.1381 (0.0339)
Income percentile	0.0560 (0.0070)
Constant	–0.8792 (0.0696)
Control for education, wealth, family size, marital status, year, age of the child, age of the mother, sex, race, and income percentiles.	Yes
Observations	12,851

Note: Standard errors in parentheses, clustered at the level of the mother. Due to insufficient variation in income percentiles within individuals, it was not possible to implement the fixed effects specification for this analysis.