The impact of unconditional cash on parenting behaviors among 4-year-old children from families with low income in the U.S.

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All materials used in this study are available at https://www.babysfirstyears.com/data-and-documentation; anonymized data are publicly available at https://www.icpsr.umich.edu/web/DSDR/studies/37871/; and analytic code will be made available upon publication. Our analyses were preregistered; see the main text for more details.

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Abstract

Objective: This study examines the impacts of a monthly unconditional cash transfer on parenting behaviors among low-income mothers of four-year-olds.

Background: Prior research has demonstrated that low income is negatively associated with the quality of parenting and the amount of time mothers spend engaging in enriching activities with their children. Yet, whether unconditional cash transfers to families with low incomes will improve these dimensions of parenting is unclear.

Method: Families in this study are participants in the Baby's First Years (BFY) study, an RCT in which mothers received either a monthly high-cash gift ($333) or a monthly low-cash gift ($20) for the first 76 months of their child's life. Analyses include intent-to-treat (ITT) estimates of the cash gift on pre-registered parenting outcomes, including observed quality of parent-child interactions during a video play task, as well as maternal reports of child meal and sleep routines, time spent on mother-child activities, and non-pre-registered child speech scores, among n=886 mothers of four-year-olds.

Results: Pre-registered measures of parenting outcomes did not differ between mothers receiving the high-cash gift compared to mothers receiving the low-cash gift. Exploratory analyses showed that mothers who received the high-cash gift spent more time on enriching activities with the focal child and were more likely to have regular sleep routines than mothers receiving the low-cash gift.

Conclusion: Monthly, unconditional cash alone may be insufficient to make large changes in time use or sustained changes in the quality of parenting behavior for four-year-olds in families with low income.

INTRODUCTION

Children growing up in low-income families face worse outcomes across a variety of metrics, including physical health (Aber et al., 1997), emotional and behavioral health (Yoshikawa et al., 2012), and cognitive development and school achievement (Brooks-Gunn & Duncan, 1997; Chaudry & Wimer, 2016). Differences in the key dimensions of parenting behaviors between caregivers in high- and low-income families have been theorized to explain these differences in developmental outcomes (NASEM, 2019; Yeung et al., 2002). However, most studies of how parenting is affected by household income are correlational (Chazan-Cohen et al., 2009; Hsin & Felfe, 2014), leaving open the question of whether increases in family income might improve parenting behaviors. This paper investigates how an unconditional cash transfer, which increased net household income among families residing in or near poverty at the birth of their child (Gennetian et al., 2024), affected parenting behaviors after four years of receipt.

Impacts of poverty on parenting and development in early childhood

Poverty is associated with parenting behaviors that are often described as lower quality, including less developmentally supportive parent-child interactions and fewer parental investments (e.g., money and time spent on behalf of promoting children's development, Guryan et al., 2008; Heckman & Mosso, 2014; Kalil & Ryan, 2020). Poverty creates several challenges for parents, including economic stress, poorer mental health, and limited access to high-quality education and healthcare for children (Beasley et al., 2022; Mundoc et al., 2024). These poverty-related stressors and constraints can negatively impact parents' capacity to engage in high-quality, supportive parent-child interactions (McLoyd, 1990). Family income may also influence how parents allocate their time. While lower- and higher-income mothers report similar levels of enjoyment when caring for children (Kalil et al., 2025), higher-income parents spend more time

engaged in developmentally beneficial activities with their young children than lower-income parents, and less time on household chores and errands (Bastian & Lochner, 2022).

Limited financial resources may constrain parents' ability to establish consistent daily routines during early childhood (Fiese & Everhart, 2008). These constraints are compounded by conditions of low-wage labor markets, in which parents—especially mothers—experience disproportionately high levels of schedule unpredictability, with unanticipated changes occurring on about 13% of days and affecting nearly all over time, leading to increased negative mood and poorer sleep (Ananat & Gassman-Pines, 2021). Unstable schedules often force reliance on complex, informal child-care arrangements and heighten psychological distress, making it more difficult to coordinate caregiving (Schneider & Harknett, 2022; Harknett et al., 2022). Beyond scheduling issues, lower family income is associated with lower levels of parental responsiveness and cognitive stimulation (Lugo-Gil & Tamis-LeMonda, 2008; Yeung et al., 2002), whereas higher maternal income is linked to greater parenting sensitivity and warmth (Lombardi, 2021).

Given these differences in parenting behaviors, and studies that point to the importance of the quality of parenting for children's development, scholars have argued that parenting quality is likely to be an important explanation of why low-income children fare poorly. Among families with young children in the US, there is evidence to suggest that family income impacts children's development via both quantity and quality of parenting behaviors, and particularly cognitively stimulating activities with children (Attanasio et al., 2022; Cunha & Heckman, 2008; Yeung et al., 2002). Thus, policies that improve overall family financial resources may also improve children's developmental trajectories. However, causal evidence in the U.S. of how increases in income among families at the lower end of the income distribution may impact parenting is

lacking (Jaffee et al., 2025). Internationally, causal evidence is also scant because the quality of parenting behaviors has only been assessed as an outcome of programs that combine cash transfers and parenting interventions. These studies have yielded conflicting results (Gao et al., 2024; Little et al., 2021) and, of course, cannot be interpreted as the impact of solely a cash transfer (Premand & Barry, 2022).

In summary, while a large body of work demonstrates that parenting behaviors differ between high- and low-income families, it remains an open question whether providing parents with greater economic resources through cash transfers would lead to more parental investments in children and higher quality of parenting behaviors that support children's development, particularly in the U.S. context.

Background: The Baby's First Years Study

The Baby's First Years (BFY) study is the first randomized controlled trial of a poverty reduction intervention during the early childhood years. It provides mothers with incomes at or below the federal poverty threshold with one of two amounts of cash transferred to a debit card monthly. The high-cash gift group received $333 a month, and the low-cash gift group received $20 a month. BFY is conducted across four US sites to assess the impact of the high-cash gift on family life and children's cognitive, emotional, and brain development.

Prior research on the BFY study has found that families receiving the high-cash gift during the first three years were less likely to live in poverty (Gennetian et al., 2024). Additionally, significant effects of the intervention were found on mothers' time spent in enriching activities with their child, as well as maternal spending on child-specific goods through age 3 (Magnuson et al., 2025; Gennetian et al., 2024). However, many other dimensions of parenting and family relationships appear not to have been affected by the higher cash transfers.

Finally, the intervention had no impact on the participation of mothers or other members of the household in the formal paid workforce (Sauval et al., 2024), on mothers' use of non-parental childcare (Stilwell et al., 2024), or on household composition (Shah et al., 2025).

This paper examines the impact of the BFY monthly, unconditional cash transfer on the quantity and quality of some dimensions of parenting when the children were 4-year-olds. The data used in our analysis are more complete than in previous BFY studies that consider parenting outcomes and included in-person data collection. In addition, this paper used data from children when they were four years old, and as a result, the families have received more months of the cash gift than in prior papers reporting impacts on parenting outcomes (Gennetian et al., 2024; Magnuson et al., 2025).

We examine four main pre-registered outcomes that include direct observation of the mother and BFY child, as well as maternal reports from a survey. Two measures – the Child Meal and Sleep Routine Index and the Time on Mother-Focal Child Activities – measure the frequency of parent-child activity, while the other two measures – the Index of Mother's Positive Parenting Behaviors and Mother-Child Language Interactions – measure the quality of parent-child interactions. This study provides a deep look into the parenting of 4-year-olds, combining both subjective and objective assessments of parenting behavior, in a large sample of families with low incomes.

METHODS

Sample

The BFY study was approved by the Institutional Review Board of Teachers College, Columbia University; the University of California, Irvine; and the New York State Psychiatric Institute.

Information on preregistration for the larger BFY study can be found at clinicaltrials.gov, ID:NC-T03593356.

To be eligible for the BFY study, mothers had to report incomes at or below the federal poverty threshold, who at the time they were in the hospital to give birth, between May 2018 and June 2019. Study recruitment occurred in 12 hospitals across four sites: New York City, the New Orleans metropolitan area, the Omaha metropolitan area, and the Twin Cities (Minneapolis and St. Paul) metropolitan area. In addition to income, mothers and infants also had to meet the following eligibility criteria: mothers were of legal age for informed consent; infants were a singleton birth and admitted to the newborn nursery (not an intensive care unit); mothers resided in the recruitment state and reported that they were not highly likely to move from the state or country within 12 months; infants were discharged in the mothers' custody; and the mother spoke English or Spanish.

Mothers were first asked to participate in a longitudinal study about their child's development, and only after completing a survey, were they told about the possible cash gifts. The baseline interview included information on sociodemographic factors such as parental education, household income, race, ethnicity, and infant sex.

Baseline interviews were conducted with 1,051 eligible mothers, of whom 1,003 agreed to receive the cash gift. Mothers were randomized to the "high-cash gift group" ($333 monthly) or the "low-cash gift group" ($20 monthly) at the site level. Three mothers were excluded because they declined the cash gift within a day of completing the baseline interview. The final study sample consists of 1,000 mothers and infants (Noble et al., 2021). Data collection was conducted annually around the time of the child's birthday, and the study had over 90% retention during the first three years.

Table 1. *Descriptive Statistics of Mother and Child Baseline Characteristics by Cash Gift Group*

	Low-Cash Gift Group (N = 515)			High-Cash Gift Group (N = 371)			Difference between Groups	
	Mean/ proportion	SD	N	Mean/ proportion	SD	N	Hedge's g/ Cox's Index	p-value
Child is female	0.50		515	0.48		371	-0.05	0.58
Child weight at birth (pounds)	7.14	1.04	514	7.09	1.02	370	-0.04	0.50
Child gestational age (weeks)	39.11	1.21	511	39.02	1.24	371	-0.07	0.31
Mother's age at birth (years)	27.00	5.92	515	27.45	5.82	371	0.08	0.22
Mother's education (years)	11.92	2.75	509	11.88	2.93	369	-0.01	0.87
Mother's Race/Ethnicity								
White, non-Hispanic	0.10		515	0.08		371	-0.15	0.28
Black, non-Hispanic	0.40		515	0.45		371	0.12	0.11
Multiple, non-Hispanic	0.04		515	0.03		371	-0.18	0.48
Other or unknown	0.05		515	0.02		371	-0.57	0.00
Hispanic	0.41		515	0.42		371	0.02	0.56
Mother's Marital Status								
Never married	0.42		515	0.49		371	0.17	0.03
Single, living with partner	0.25		515	0.21		371	-0.14	0.17
Married	0.22		515	0.22		371	0.00	0.95
Divorced/separated	0.04		515	0.03		371	-0.18	0.24
Other or unknown	0.06		515	0.04		371	-0.26	0.28
Mother's health is good or better	0.88		515	0.92		371	0.27	0.05
Mother depression (CESD)	0.69	0.46	515	0.68	0.45	371	-0.02	0.76
Cigarettes per week in pregnancy	4.26	18.78	510	3.15	11.22	369	-0.07	0.23
Alcohol drinks per week in pregnancy	0.15	1.70	513	0.03	0.40	370	-0.09	0.11
Number of children born to mother	2.41	1.40	515	2.54	1.42	371	0.09	0.22
Number of adults in household	2.09	0.98	515	2.02	0.96	371	-0.07	0.33
Biological father lives in household	0.40		515	0.35		371	-0.13	0.10
Household combined income	22,625	21,849	485	20,816	16,062	345	-0.09	0.18
Household income unknown	0.06		515	0.07		371	0.10	0.48
Household net worth	-1,777	30,190	456	-2,205	12,670	331	-0.02	0.79
Household net worth unknown	0.11		515	0.11		371	0.00	0.78
Joint Test: $\chi^2(30)$ = 31.80, p-value = 0.28, N = 882.								

Notes: All p-values were derived from a series of OLS bivariate regressions in which each respective baseline characteristic was regressed on the treatment status indicator using robust standard errors and site-level fixed effects. The bivariate regressions were also run without site-level fixed effects, and the p-values differed on average by 0.014. The p-values without fixed effects do not appear in the table. The joint test of orthogonality was conducted using a probit model with robust standard errors and site-level fixed effects. Across all joint tests, 4 observations were dropped because of a perfect predictor issue from the missing indicator of child gestational age. Standardized mean differences were calculated using Hedges' g for continuous variables and Cox's Index for dichotomous variables. If there were more than 10 missing cases for a covariate, missing data dummies were included in the table and the joint test. If fewer than 10 cases were missing, missing data dummies were not included in the table but were included in the joint test. Two additional χ^2 tests of independence were conducted for the categorical variables: mother's race/ethnicity and mother's marital status. For both tests, p>0.05. Sources: Authors' calculations using Baby's First Years (BFY).

At age 4, 892 mothers completed an interview, resulting in an 89.2% response rate. Because of item-level missing data, the sample size for this study is 886. Mothers and children completed the age-4 survey components during an in-person visit to each of the university sites; written informed consent was obtained from mothers at the baseline and age-4 interviews.

Table 1 presents baseline descriptive statistics by treatment status for all participants in the age-4 analysis sample (n=886). About forty-one percent of mothers self-identified as Hispanic (e.g., Dominican, Mexican), and 42% self-identified as non-Hispanic Black. Approximately 9% of the sample self-identified as White. On average, mothers were about 27 years old and had completed almost 12 years of schooling. Thirty-eight percent reported living with the biological father of the baby at the time of the birth. Likely due to our exclusion of infants admitted to an intensive care unit, all babies were of healthy birth weight (M=7.1 pounds) and were born at full term (M=39.1 weeks).

A necessary condition for unbiased estimates is equivalence of the treatment groups at baseline. Using the 886 participants in the age-4 analysis sample, we assessed this using a joint test of orthogonality, which employed a probit model with robust standard errors and site-level fixed effects. In the joint tests, four observations were dropped due to a perfect predictor issue from the missing indicator of child gestational age. Results indicate that we are unable to reject the null hypothesis of joint equivalence (p=0.28; bottom panel of Table 1), suggesting that the two groups do not statistically differ across the set of baseline characteristics. The standardized mean group difference, averaged across all continuous variables, was 0.06, which is well below the maximum recommended value of 0.15. However, the standardized mean group differences for mothers' marital status, race, self-reported health, and residence of the biological father in the household did exceed the 0.15 threshold.

Parenting Measures

We have six outcomes that span differing dimensions of parenting, measuring the frequency of engaging with children in activities, family routines, the quality of mother-child play, and the amount of mother-child speech. Based on maternal reports from a survey, we measure the frequency of parent-child activities using two pre-registered outcomes: child meal and sleep routine index, as well as time spent on mother-child activities. We assess the quality of parenting by coding the quality of video recordings of parent-child play interactions (pre-registered) and three (not pre-registered) mother-child speech scores. Pairwise correlations among parenting outcomes are presented in Table A.1.

Index of Mother's Positive Parenting Behaviors.

We videorecorded and later rated the mother-child interactions using the Parenting Interactions with Children: Checklist of Observations Linked to Outcomes (PICCOLO; Roggman et al., 2013), an observational measure of 29 developmentally supportive parenting behaviors. During the visit to university sites, we gave mothers two toys—a book and a play food set—and asked them to play with their children as they usually would for 10 minutes. The PICCOLO is made up of four domains – affection, responsiveness, encouragement, and teaching – and is rated on a scale from 0 to 2 (absent, barely, clearly). As expected from the literature, the correlation between these four domains ranges between 0.23 and 0.37. We derived total scores by summing across domains as recommended by the PICCOLO manual and as pre-registered by BFY, with higher scores signaling more developmentally supportive parenting. Scores on the PICCOLO are predictive of child development outcomes for young children across racial and ethnic groups (Roggman et al., 2013). Three English-Spanish bilingual coders, one master coder, and two additional coders coded the videos. A quarter of the videos in the dataset were double-coded for

reliability or consensus-coded, with reliability being computed between the master coder and the two additional coders separately. ICCs were higher than 0.75 in each domain (Affection: 0.87-0.88; Responsiveness: 0.76-0.77; Encouragement: 0.87-0.89; and Teaching: 0.89-0.92).

Out of 845 mother-child dyads who completed in-person assessments during a university visit, all components of the PICCOLO were completed in 811 cases. In 31 cases, the PICCOLO was not completed or was partially completed due to factors including parental or child refusal. In 3 cases, a video recording was completed, but the mother requested it be deleted, the research team lost it, or it was not recorded. For 86 mothers, recordings were not coded due to poor visibility in the video: either the mother's or the child's face was not visible (n=64), or due to discrepancies between coders that could not be resolved (n=22). Out of 725 coded PICCOLO recordings, 28 cases were excluded for the following reasons: missing scores (n=23), recording too short (n=3), recording too long (n=2). Therefore, the analytic sample for the index of mother's positive parenting behaviors includes 697 observations, which do not systematically differ from the full BFY sample in terms of baseline characteristics.

Mother-Child Language Interactions.

Counts of adult words, conversational turns, and child vocalizations were measured using the LENA system (Xu et al., 2009). These measures were not pre-registered. As described above, mothers and children were invited to complete a 10-minute semi-structured play session during the university site visit. We placed the small LENA recorder in a vest that the child wore to audio-record the play sessions. LENA's proprietary algorithm was used to estimate the number of adult words, conversational turns, and child vocalizations that occurred during these interactions. A count of child vocalizations is considered an indirect measure of parenting because it reflects the amount of engagement and interaction between the mother and child.

Prior work on this project validated the use of LENA estimates in 10-minute parent-child interactions (Egan-Dailey et al., 2024); manually transcribed word counts, and LENA-generated estimates were significantly correlated (Spearman's ρ ranged from .71 to .80, p_s<0.001). While sessions were intended to be 10 minutes long, there was a slight variation in session duration, and sessions were excluded if they were less than five or more than 15 minutes long (M=10.87, SD=1.02, range: 5.03-14.2). Counts (adult words, conversational turns, and child vocalizations) were then normalized per 10 minutes. Out of 819 participants who completed a LENA recording at the visit, 25 recordings were excluded for the following reasons: recording too short or session not completed (n=4); recording too long (n=1); equipment error or audio data loss (n=20). Therefore, the analysis includes 794 observations, which do not systematically differ from the full BFY sample in terms of baseline characteristics.

Child Meal and Sleep Routine Index.

We calculated a pre-registered child meal and sleep routines index from two maternal-report survey items. First, mothers were asked how often in the past week they got to eat at least one meal together with their child (scored as 0-2 days=0; 3+ days=1). On average, 95% of BFY mothers reported eating at least one meal together with their child for 3 or more days in the past week (Table 2, columns 1 and 2). Given the low variability on this item, we explore an alternative threshold of five or more days for eating a meal together in the past week. On average, 74% of BFY mothers reported eating at least one meal together with their child for five or more days in the past week.

Next, mothers were asked if, in the past week, their child had a regular bedtime (scored as no=0; yes=1). Approximately 74% of BFY mothers reported that the BFY child had a regular bedtime (Table 2, columns 1 and 2). These two items were added together to create an index

(with a higher score indicating more routines). This aligns with results from prior research on preschoolers' bedtime routines using the Fragile Families and Child Wellbeing Study, which found that over 80% of sample children had a regular bedtime (Hale et al., 2009). The analytic sample for this pre-registered index includes 882 observations; this sample does not systematically differ from the full BFY sample in terms of baseline characteristics.

Time on Mother-Child Activities.

An index of the time mothers spent engaged in enriching activities with the focal child was pre-registered and constructed from a series of questions from the maternal survey (Gennetian et al., 2024; Rodriguez & Tamis-LeMonda, 2011). First, mothers were asked how often in the past week they engaged in different activities together with their child and how many minutes they spent on those activities: reading books, telling stories, playing together with toys, playing pretend games, engaging in learning activities, and screen time (screen time has positive effects on child language development when parents co-view with their child; Madigan et al., 2020). Across activities, these time variables have an average correlation of 0.29, with BFY mothers spending more minutes per week in each one, except for learning activities. We then calculated an additive index where the number of days reported doing the activity is multiplied by the number of minutes on a given day (with a higher score indicating more time spent in mother-child activities). Overall, 883 mothers received a score on this measure. As before, the analytic sample for this index does not systematically differ from the full BFY sample.

Analytical Strategy

Following our pre-registered analytic plan, we conducted intent-to-treat (ITT) analyses of the index of mother's positive parenting behaviors, child meal and sleep routine index, time on mother-focal child activities, and mother-child speech scores. These analyses estimate the impact

of the high-cash gift (relative to the low-cash gift) using a covariate-adjusted regression framework. We included the following maternal covariates from the baseline survey in analyses: age, education, household income, net worth, general health, mental health, race and ethnicity, marital status, number of adults in the household, number of other children born to the mother, whether the mother smoked and/or drank alcohol during pregnancy, and whether the child's father lives with the mother; and the following child characteristics: child's sex, gestational age at birth, and age (in months) at the interview or in-person assessment. We also control for the language in which the PICCOLO assessment and LENA session were conducted (respectively), as well as the total time spent on the activities for which PICCOLO was coded.

To address the possibility of false positives given multiple outcomes, we adjust the statistical significance of conceptually similar outcomes in a "family" using Westfall-Young step-down resampling (Westfall et al., 1993). Per our pre-registration, the first family, Frequency of Parent-Child Activity, includes the child meal and sleep routine index, and time on mother-focal child activities; while the index of mother's positive parenting behaviors and mother-child speech scores are grouped in the Parent-Child Interaction Quality family; results are presented in Tables 2 and 3.

RESULTS

Did mothers who received the BFY high-cash gift experience different parenting behaviors than children whose mothers received the low-cash gift? Across all our parenting measures, none reached conventional levels of statistical significance (see Table 2, Panel A).

We conducted exploratory analyses of the individual parenting items, without adjustments for multiple outcomes, and found that mothers in the high cash gift group were more likely to report that their child had a regular bedtime (Table 2, panel B).

Table 2. *ITT Impact Effects of Cash Gift on Parenting Outcomes at Age 4.*

	(1) Low-Cash Gift Group Mean	(2) High-Cash Gift Group Mean	(3) β (SE)	(4) Effect Size	(5) p-value	(6) W-Y p-value	(7) N
Panel A: Pre-Registered Outcomes							
Child Meal and Sleep Routine Index[1]	1.67	1.72	0.07+ (0.04)	0.12	0.07	0.11	882
Time on Mother-Focal Child Activities[1]	488.58	515.59	30.57+ (18.15)	0.12	0.09	0.11	883
Index of Mother's Positive Parenting Behaviors[2]	48.64	48.37	-0.17 (0.34)	-0.04	0.62	0.89	697
Adult Word Count[2,3]	710.22	729.83	22.64 (19.94)	0.08	0.26	0.62	794
Conversational Turn Count[2,3]	36.17	36.62	0.50 (1.39)	0.03	0.72	0.91	794
Child Vocalization Count[2,3]	65.86	67.45	1.36 (2.83)	0.04	0.63	0.91	794
Panel B: Individual Outcomes							
Regular Bedtime	0.71	0.78	0.07* (0.03)	0.16	0.02	·	882
Eat Meal Together with Child	0.95	0.94	-0.00 (0.02)	-0.02	0.79	·	883
Time Reading Books Together	45.89	50.08	4.43 (3.35)	0.09	0.19	·	883
Time Telling Stories	42.94	45.58	1.26 (3.80)	0.02	0.74	·	882
Time Playing Together with Toys	105.51	110.95	7.49 (5.57)	0.09	0.18	·	883
Time Playing Pretend Games	74.64	76.35	2.29 (5.41)	0.03	0.67	·	883
Time Learning Activities	96.09	101.27	5.41 (5.18)	0.07	0.30	·	882
Screen Time Spent Together	123.78	131.37	9.19 (5.77)	0.11	0.11	·	883
PICCOLO Affection Score	12.25	12.17	-0.10 (0.11)	-0.08	0.35	·	697
PICCOLO Encouragement Score	12.07	11.90	-0.17 (0.12)	-0.12	0.14	·	697
PICCOLO Responsiveness Score	13.37	13.31	-0.01 (0.09)	-0.01	0.87	·	697
PICCOLO Teaching Score	10.95	10.99	0.12 (0.18)	0.05	0.52	·	697

Notes: [1] Outcome belongs to the family 'Frequency of Parent-Child Activity'. [2] Outcome belongs to the family 'Parent-Child Interaction Quality'. [3] Not pre-registered as an individual outcome for Age 4. Count normalized to 10 minutes (see text for description of variables).
All regressions include covariates and site fixed-effects (FE). OLS coefficients with robust standard errors in parentheses (column 3); p-values correspond to the high-cash gift group coefficient (columns 5 and 6). W-Y p-values (column 6) are calculated using Westfall & Young (1993) multiplicity adjustment by family of outcomes. +p<0.10; *p<0.05; **p<0.01. Covariates from baseline: child's sex, birth weight, and gestational age at birth; mother's age, marital status, race/ethnicity, completed schooling, general health, mental health, and number of biological children; household's income, net worth, and number of adults; mother smoked and drank alcohol during pregnancy, and father living with the mother. Other covariates included from Age 4: child's age at interview/assessment (in months), time spent, and language used in PCI task, and LENA language session. Sources: Authors' calculations using Baby First Years (BFY).

Using an alternative definition of eating meals together with a child (5 days or more), the impact of the cash transfer on the child's meal and sleep routine index is statistically significant ($p<0.05$).

Supplemental Analyses

Although the study had high rates of retention, we assessed the sensitivity of our findings to alternative specifications that adjust for nonresponse. To address whether results were affected by attrition and any imbalances in baseline characteristics, we adjusted regression analyses using two types of inverse probability treatment weights (IPTW) created by the Toolkit for Weighting and Analysis of Nonequivalent Groups (TWANG) (Ridgeway et al., 2024). TWANG uses generalized boosted models to estimate propensity scores and analytic weights flexibly (McCaffrey et al., 2004). These models included all baseline control variables and the child's age in months.

First, we constructed IPTW balancing weights to address potential imbalances introduced by differential response rates across the groups. In this approach, participants from the low-cash gift group analytic sample are weighted by the likelihood of being in the high-cash gift group, given their baseline observed characteristics, thereby creating a weighted sample in which the low-cash and high-cash gift groups have similar baseline characteristics (Table 3, columns 1 to 4). Using these weights, we found significant effects of the cash transfer on the Child Meal and Sleep Routine Index ($p<0.05$, adjusted for multiple testing). Children whose mothers received the BFY high-cash gift had a 0.1 higher score on the Child Meal and Sleep Routine Index (effect size of 0.18).

Additionally, we created a set of IPTW weights that adjust regression estimates for non-response. Weighting in this manner yields an analysis sample of each group with characteristics

comparable to those of the full BFY baseline sample (Table 3, columns 5 to 8). Again, we found that when considered alone, adjusting for multiple comparisons, none of the other outcomes were statistically significant, consistent with our main results (Table 2).

Finally, to further consider whether attrition was biasing our findings, we repeated the analysis by estimating the ITT effects of the cash gifts on parenting outcomes, conducting multiple imputation (Table 3, columns 9 to 11). We also considered whether impacts on parenting might differ depending on whether a mother had older children by stratifying the sample by the focal child's birth order (Table A.2). Compared to our main estimates, conducting multiple imputation with chained equations and restricting the sample for those when focal child had older siblings (respectively) yielded similar results. We did not observe any statistically significant differences between the high and low cash groups.

DISCUSSION

Parenting behaviors, including the amount of time parents spend with children and the quality of parents' positive and responsive interactions, are crucial to children's developmental outcomes during the early childhood years (Morris & Smith, 2022). Although prior research has demonstrated that low income can affect children by lowering the quality of parenting they experience (Kalil & Ryan, 2020), most studies are correlational, leaving open questions about whether reducing poverty or increasing income among families with low incomes has a causal effect on parenting behaviors. We leveraged a study of an unconditional cash transfer to examine whether increased income among families with low income would improve parenting behaviors related to both quality and quantity of parent-child interactions. We did not find statistically significant impacts on the pre-registered outcomes for the year 4 follow-up. However, we only had statistical power to detect effect sizes of about 0.2, and several non-significant effects were

in the expected direction but smaller than this minimum detectable effect size. Exploratory analyses showed that mothers who received the high-cash gift spent more time on enriching activities with the focal child and were more likely to have regular sleep routines than mothers receiving the low-cash gift.

Our findings add to the existing prior BFY research. As in earlier stages of the study, the high-cash gift group families reported more time on mother-child activities than the low-cash gift group families, and spent more money on child-related expenditures (Gennetian et al., 2024; Magnuson et al., 2022; effect sizes of approximately 0.15). Similarly, previous studies of BFY families also found no high-cash gift impacts on mothers' parenting behaviors in an observed play task (Magnuson et al., 2022), or on mother-child language interactions (Egan-Dailey et al., 2024). The Child Meal and Sleep Routine Index was not measured in earlier ways; we lack earlier findings for comparison.

There are several possible explanations for this pattern of findings. It may be the case that cash alone may support mothers' reallocation of time use in small ways, but it is insufficient to make large changes in time use or sustained changes in the quality of parenting behavior. Put another way, the effects of cash transfers may be more selective than prior theory and research suggested. While the evidence is mixed, some studies outside the U.S. have found that cash, combined with parenting support programs, can positively impact parenting behaviors and child outcomes, whereas money alone does not (Premand & Barry, 2022; Fernald et al., 2017; Kagawa et al., 2017). It is also possible that family income is not a direct causal mechanism for parenting behaviors. Prior studies suggest that family income enhances children's development through parenting behaviors (Yeung et al., 2002), however causal evidence from the United States is

lacking. Our findings in this paper suggest that more work is needed to understand whether and how income affects differing dimensions of parenting time and quality.

Some limitations should be considered when interpreting our findings. In this study, we use both maternal report and observed measures of parenting. However, both types of measures have limitations. Short video-recorded and/or structured interactions are akin to "peak" mother-child interactions, and may not be representative of children's typical experiences throughout the day (Bergelson et al., 2019; Tamis-LeMonda et al., 2017). Indeed, mothers in our sample scored very highly on the pre-registered index of positive parenting behaviors, with nearly 90% of mothers scoring between 11 and 14 (possible scores range from 0 to 14). These overall high scores suggest that some mothers might be engaged in performative parenting during the videotaped task. Mothers' self-reports of their parenting behaviors may be subjective, and some mothers' answers may be affected by social desirability bias. Thus, these measures may not capture all variations in parenting that children experience in their everyday interactions with their mother, potentially obscuring the effects of the cash gifts. Future research may investigate ways to capture naturalistic parenting behaviors more effectively.

In conclusion, this study addresses a critical gap in the literature by providing causal estimates of the impact of regular cash transfers during a child's first four years of life on parenting behaviors. Leveraging the design of a U.S.-based randomized controlled trial of a poverty reduction intervention, we found that a modest monthly cash transfer produced small increases in time spent with children on certain enriching activities, such as reading, but had no effect on various aspects of parenting quality. This research offers new causal evidence on the effect of a modest income increase among families with low income, and raises new questions

for future investigations into how the impacts of cash transfers vary by income level and under what conditions cash transfers may support time spent with children and the quality of parenting.

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SUPPORTING MATERIAL

Table 3. *ITT Weighted and Multiple Imputations Impact Effects of Cash Gift on Pre-Registered Parenting Outcomes at Age 4*

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
	Balancing Weights				Non-Response Weights				Multiple Imputation		
	β (SE)	Effect Size	p-value	W-Y p-value	β (SE)	Effect Size	p-value	W-Y p-value	β (SE)	Effect Size	p-value
Child Meal and Sleep Routine Index[1]	0.10* (0.04)	0.18	0.01	0.03	0.06+ (0.04)	0.12	0.07	0.13	0.06+ (0.04)	0.12	0.08
Time on Mother-Focal Child Activities[1]	36.95+ (19.64)	0.14	0.06	0.06	30.55+ (18.16)	0.12	0.09	0.13	30.34+ (17.83)	0.11	0.09
Index of Mother's Positive Parenting Behaviors[2]	-0.18 (0.39)	-0.04	0.65	0.91	-0.16 (0.34)	-0.04	0.64	0.88	-0.14 (0.33)	-0.03	0.69
Adult Word Count[2,3]	44.78* (21.75)	0.16	0.04	0.12	21.65 (20.17)	0.08	0.28	0.64	22.18 (19.99)	0.08	0.27
Conversational Turn Count[2,3]	0.15 (1.61)	0.01	0.93	1.00	0.36 (1.40)	0.02	0.80	0.94	0.47 (1.38)	0.02	0.74
Child Vocalization Count[2,3]	0.15 (3.28)	0.00	0.96	1.00	1.04 (2.87)	0.03	0.72	0.94	1.71 (2.74)	0.04	0.53

Notes: [1] Outcome belongs to the family 'Frequency of Parent-Child Activity'. [2] Outcome belongs to the family 'Parent-Child Interaction Quality'. [3] Not pre-registered as an individual outcome for Age 4. Count normalized to 10 minutes (see text for description of variables). Balancing Weights (BW) are used to create a weighted sample in which the low- and high-cash gift groups have similar baseline characteristics. Non-Response Weights (NRW) are used to create a weighted sample in which each group has similar characteristics to the full baseline sample. All regressions include covariates and site fixed-effects (FE). OLS coefficients with robust standard errors in parentheses (column 3); p-values correspond to the high-cash gift group coefficient (columns 5 and 6). W-Y p-values (column 6) are calculated using Westfall & Young (1993) multiplicity adjustment by family of outcomes. +p<0.10; *p<0.05; **p<0.01. Covariates from baseline: child's sex, birth weight, and gestational age at birth; mother's age, marital status, race/ethnicity, completed schooling, general health, mental health, and number of biological children; household's income, net worth, and number of adults; mother smoked and drank alcohol during pregnancy, and father living with the mother. Other covariates included from Age 4: child's age at interview/assessment (in months), time spent, and language used in PCI task, and LENA language session. Sources: Authors' calculations using Baby First Years (BFY).

Table A.1. *Pairwise Correlations between Pre-Registered Parenting Outcomes at Age 4*

	(1)	(2)	(3)	(4)	(5)	(6)
(1) Child Meal and Sleep Routine Index	1.00					
(2) Time on Mother-Focal Child Activities	0.10**	1.00				
(3) Index of Mother's Positive Parenting Behaviors	-0.01	0.02	1.00			
(4) Adult Word Count[1]	0.02	0.03	0.45**	1.00		
(5) Conversational Turn Count[1]	-0.04	0.05	0.14**	0.30**	1.00	
(6) Child Vocalization Count[1]	-0.04	0.08*	-0.04	-0.00	0.87**	1.00

Notes: [1] Not pre-registered as an individual outcome for Age 4; variable normalized to 10 minutes (see text for description of variables). +p<0.10; *p<0.05; **p<0.01. Sources: Authors' calculations using Baby's First Years (BFY).

Table A.2. *ITT Impact Effects of Cash Gift on Pre-Registered Parenting Outcomes by Focal Child's Birth Order at Age 4*

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Focal Child is Firstborn					Focal Child has Older Siblings				
	β (SE)	Effect Size	p-value	W-Y p-value	N	β (SE)	Effect Size	p-value	W-Y p-value	N
Child Meal and Sleep Routine Index[1]	0.02 (0.07)	0.04	0.76	0.76	265	0.08+ (0.04)	0.15	0.08	0.14	617
Time on Mother-Focal Child Activities[1]	28.31 (36.42)	0.11	0.44	0.69	265	23.05 (22.21)	0.09	0.30	0.28	618
Index of Mother's Positive Parenting Behaviors[2]	-0.14 (0.63)	-0.04	0.82	0.97	202	-0.24 (0.47)	-0.05	0.56	0.82	495
Adult Word Count[2,3]	25.28 (38.43)	0.09	0.51	0.90	241	21.44 (24.14)	0.08	0.37	0.79	553
Conversational Turn Count[2,3]	0.12 (2.68)	0.01	0.96	1.00	241	1.13 (1.74)	0.06	0.52	0.83	553
Child Vocalization Count[2,3]	0.26 (5.40)	0.01	0.96	1.00	241	1.84 (3.50)	0.05	0.60	0.83	553

Notes: [1] Outcome belongs to the family 'Frequency of Parent-Child Activity'. [2] Outcome belongs to the family 'Parent-Child Interaction Quality'. [3] Not pre-registered as an individual outcome for Age 4. Count normalized to 10 minutes (see text for description of variables). All regressions include covariates and site fixed-effects (FE). OLS coefficients with robust standard errors in parentheses (columns 1 and 6). All p-values correspond to the high-cash gift group coefficient (columns 3, 4, 8, and 9). W-Y p-values (columns 4 and 9) are calculated using Westfall & Young (1993) multiplicity adjustment by family of outcomes. +p<0.10; *p<0.05; **p<0.01. Covariates from baseline: child's sex, birth weight, and gestational age at birth; mother's age, marital status, race/ethnicity, completed schooling, general health, mental health, and number of biological children; household's income, net worth, and number of adults; mother smoked and drank alcohol during pregnancy, and father living with the mother. Other covariates included from Age 4: child's age at interview/assessment (in months), time spent and language used in PCI task, and LENA language session. Sources: Authors' calculations using Baby First Years (BFY).