



## Poverty reduction and childhood opportunity moves: A randomized trial of cash transfers to low-income U.S. families with infants

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### ARTICLE INFO

#### Keywords:

Low-income mothers

Neighborhood opportunity

Residential mobility

Unconditional cash transfers

### ABSTRACT

Black and Hispanic children have a higher likelihood of experiencing neighborhood poverty than white children. This study uses data from the Baby's First Years (BFY) randomized trial to examine whether an unconditional cash transfer causes families to make opportunity moves to better quality neighborhoods. We use Intent to Treat linear regression models to test whether the BFY treatment, of receiving \$333/month (vs. \$20/month) for three years, leads to moves to neighborhoods of greater childhood opportunity. Overall, we find no relation between the BFY treatment and neighborhood opportunity across time. However, we find effect modification by maternal baseline health. High-cash receipt among mothers with poor health at baseline corresponds with moves to neighborhoods of greater childhood opportunity.

### 1. Introduction

Poverty affects a large number of children, harms child development, and restricts life achievement (National Academies of Sciences, 2019). Twelve percent of American children live in poverty (Bureau, 2022). In 2023, an estimated 11 million children comprised the largest demographic group in poverty in the US (Dawson, 2019). Children of color, children under age five, and children of single mothers have much higher chances of living in poverty (Dawson, 2019). Compared with children born into affluent families, children exposed to poverty show an elevated risk of adverse physical and mental health in adolescence and adulthood, as well as reduced educational attainment and lower lifetime earnings (Duncan et al., 2010; Duncan and Brooks-Gunn, 2000). This evidence, however, has not included a rigorous evaluation of whether US-based interventions that reduce poverty, by increasing income, would benefit child health.

Extensive work on cash transfers to increase income among families

has concentrated in low-to middle-income countries. These studies, by and large, report salutary benefits on children's health, school attendance, adult mental health, and women's decision-making power (Bastagli et al., 2019). In the US, unconditional cash transfers, as opposed to in-kind benefits, remain limited. One review published in 2023 found nine unconditional cash transfer programs to families with children in the US, including Baby's First Years (BFY) (Shah and Gennetian, 2024). These programs varied in size and scope (Shah and Gennetian, 2024). Only two other programs in the US randomized participants to cash: The Bridge Project (\$1000/month to 100 low-income mothers in New York City for six months) and The Columbia Life Improvement Monetary Boost (CLIMB) (\$500/month to 200 fathers in Columbia, South Carolina) (Shah and Gennetian, 2024). Six-month impact reports show that treatment mothers in The Bridge Project achieved greater financial stability through savings and received greater childcare from non-family members when compared to control mothers (Bastagli et al., 2019). Literature on evidence from the CLIMB program, however, is

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<https://doi.org/10.1016/j.healthplace.2024.103320>

Received 9 January 2024; Received in revised form 6 June 2024; Accepted 14 July 2024

Available online 2 August 2024

1353-8292/© 2024 Published by Elsevier Ltd.

forthcoming.

The Baby's First Years (BFY) study, initiated in 2018, represents the first large-scale US randomized controlled trial (RCT) of unconditional cash transfers to low-income families with newborns (Shah and Genetian, 2024). Unconditional, as opposed to conditional cash transfers, do not require study participants to comply with conditions or actions to receive the cash transfer (Baird et al., 2014). Non-Hispanic Black and Hispanic mothers and children comprise over 80% of the BFY participants, which researchers recruited from four metropolitan areas (Baby's First Years). Mothers in the treatment group receive monthly cash transfers of \$333 for the first several years of the child's life and the BFY control group receives \$20 per month. Prior examinations of BFY report that the children of mothers randomized to the high-cash group show better neurodevelopmental outcomes relative to the control group (Troller-Renfree et al., 2022; Sperber et al., 2023). Infants of mothers receiving the high-cash gift show faster-paced brain activity when compared to infants of control mothers, in a pattern that has previously been associated with thinking and learning (Troller-Renfree et al., 2022). Additionally, treatment mothers spend more money on child-focused items such as books, toys, diapers, and clothing, and increase the time they spend with their infants (Genetian et al., 2022). Studies also find greater produce consumption among toddlers whose mothers receive the high-cash gift (Sperber et al., 2023). Mothers randomized into the high-cash gift, however, did not show improvement in subjective well-being, parenting stress, or health outcomes among their children. (Magnuson et al., 2022).

Poverty is not randomly distributed across space. Moreover, neighborhood poverty correlates positively with the concentration of racial/ethnic minoritized populations. Indeed, racial/ethnic residential segregation serves as one key cause of the geographic concentration of poverty and affluence (Massey, 1996; Goetz et al., 2019; Kane et al., 2017) as well as health disparities (Osypuk et al., 2012; Christian et al., 2015; Diez and Mair, 2010). Racial residential segregation and the differential spatial distribution by race and income results from institutional racism and the inequitable distribution of resources and power in the US. Discriminatory actions and legalized housing policies by the government and leading institutions such as (but not limited to) redlining, blockbusting, racial covenants, real estate steering, urban renewal, and racial violence reinforcing spatial separation have perpetuated concentrated, area-level poverty and limited opportunities for minoritized populations (Massey and Denton, 2003). For this reason, we ground our study within the Geography of Opportunity framework, which posits that place-based opportunities influence quality of life, with large disparities in access to high opportunity neighborhoods by race, socioeconomic status, and other facets of social stratification (Osypuk and Acevedo-Garcia, 2010; Briggs, 2005; Galster and Killen, 1995; Hanley, 2007).

Mobility out of high-poverty neighborhoods benefits individuals. Strong evidence of this claim derives from the Moving to Opportunity (MTO) study, a long-running housing policy experiment. In the MTO housing experiment, low-income (predominantly Hispanic and non-Hispanic Black) families, living in public housing, were randomized to one of three groups: 1) experimental group that received a housing voucher to rent in lower-poverty neighborhoods, as well as housing counseling; 2) Section 8 group that received a housing voucher to rent in any neighborhood; and 3) the control group that did not receive a housing voucher but remained eligible for other housing assistance. Families in the experimental group moved to lower poverty and greater opportunity neighborhoods, in the short- and long-term, when compared to the control group (Nguyen et al., 2017; Kim et al., 2023; Sanbonmatsu et al.; Ludwig et al., 2011; Moving to Opportunity for Fair). The Section 8 group had average mobility outcomes when compared to the experimental and control groups (Nguyen et al., 2017; Kim et al., 2023; Sanbonmatsu et al.; Ludwig et al., 2011; Moving to Opportunity for Fair Housing Demonstration).

Recent work on MTO finds that younger children whose families

received the housing voucher show beneficial economic and education outcomes by the time they reach early adulthood (Chetty et al., 2016a). Owing to data and sample size constraints of MTO, however, that work cannot assess benefits that result from neighborhood mobility during the early years of development (< 3 years). Additionally, MTO provided income subsidies in the form of housing vouchers, rather than unconditional cash transfers, with all three groups receiving some form of housing assistance.

In this manuscript, we leverage the BFY randomized trial of unconditional cash transfers to test whether income supplementation helps families pursue positive residential mobility. Randomization in the RCT study design controls for both measured and unmeasured factors between the treatment and control groups. Therefore, the exposure of interest (treatment) has no relation with other variables if we have balanced participant characteristics between both groups. While other studies address confounding by balancing measured covariates through regression-based techniques, such designs can only control for measured variables (Rothman and Greenland, 1998). This may result in residual confounding as controlling for multifaceted constructs such as socioeconomic status remains challenging. The RCT study design addresses this concern and allows for causal interpretation of the relation between receiving the high-cash treatment and changes in neighborhood opportunity for children.

We view BFY as an appropriate study to examine this hypothesis for several reasons. First, housing typically constitutes the largest monthly cost in a household budget. Second, the birth of a child marks the beginning of a period in which many families move (Bruckner et al., 2019). If mothers do move, they may invest BFY's additional income in so-called opportunity moves—to lower-poverty neighborhoods characterized by greater childhood opportunity (Chetty et al., 2016b; Acevedo-Garcia et al., 2008, 2020). Such opportunity moves have the potential to not only reduce psychological strain on mothers but also increase access to health-promoting child investments and amenities. In addition to reduced area-level poverty, aspects of the neighborhood which allow children to thrive likely include a broad set of conditions and resources. The availability of high-quality early childhood education, healthy environments (e.g., proximity to healthy food outlets, green space, and health care facilities, as well as distance from environmental hazards such as air and noise pollution), and availability of social and economic resources, as well as social capital, may influence children's healthy development and long-term outcomes (Acevedo-Garcia et al., 2020; Chetty et al., 2022a, 2022b).

In addition to testing how the BFY treatment may promote opportunity moves among this low-income sample, we explore whether some subgroups benefit more from the treatment than others. Several trials of social exposures find differential responses according to level of vulnerability or health (Osypuk et al., 2012; Ertel et al., 2007; McCormick et al., 2006; Arcaya et al., 2016; Arcaya et al., 2017; Grafova et al., 2014). Unconditional cash support may affect mothers differently through health selection or consumption patterns (Arcaya et al., 2016, 2017; Grafova et al., 2014; van Kippersluis and Galama, 2014)–(Arcaya et al., 2016, 2017; Grafova et al., 2014; van Kippersluis and Galama, 2014). We therefore explore whether neighborhood moves following randomization into the high-cash treatment group vary by levels of baseline depression, self-rated health, and educational attainment. Treatment heterogeneity has direct relevance for social policy so that legislators may understand how all groups may benefit from a policy. Differences in groups may suggest that certain subpopulations should have priority for eligibility over others. This manuscript represents an important contribution to the field due to the rigor of our approach that allows us to make strong inferences about whether cash transfers cause opportunity moves during a highly influential period of child development.

## 2. Methods

### 2.1. Study population

BFY is an ongoing RCT in which unconditional monthly cash transfers are given to 1000 mothers. Between May of 2018 and June of 2019, researchers recruited mothers shortly after giving birth from the post-partum wards of 12 U.S. hospitals in four metropolitan areas: New York City, New Orleans, the Omaha metropolitan area, and the Twin Cities (Minneapolis and St. Paul). Participation required that mothers be 18 years of age or older; speak either English or Spanish; live in the state of recruitment with no immediate plans to move out of state; and report household income in the previous calendar year below the federal poverty guidelines. For example, the federal poverty guidelines in 2018 for a family of four constituted a household income below \$25,100 (Bureau, UC). Additionally, their newborns must not have required intensive care and had to be discharged into the custody of their mothers. Details of recruitment and randomization appear in Noble et al. (2021). The study had very low non-compliance among both groups. Researchers randomized 1003 mothers to treatment and control groups and three mothers notified the study within two days of completing the baseline interview that they did not want to participate in the study. Therefore, the study comprised 1000 mother-infant pairs with three noncomplying mothers who immediately dropped out (Noble et al., 2021). Additionally, in the first year of the study, 3% ( $n = 15$ ) of the control mothers and <1% ( $n = 1$ ) of the treatment mothers never used their unconditional cash funds (Gennetian et al., 2022).

Researchers registered the BFY trial at [clinicaltrials.gov](https://clinicaltrials.gov). Hypotheses about measures and statistical procedures, as well as published study results to date, appear at [clinicaltrials.gov](https://clinicaltrials.gov) under the identifier NCT03593356. As an extension of the ongoing BFY RCT (registered in 2018), we did not pre-register hypotheses and analytic procedures for this study. We did, however, receive federal funding in 2022 for this study and obtained the BFY RCT data in November 2022 for our analysis.

The study randomly assigned four hundred mothers to the “high-cash” group who received \$333 per month. Six hundred mothers were randomized to the “low-cash” group and received \$20 per month. In the hospital, mothers retrieved a debit card that loaded the monthly cash transfers on the evening prior to the day of the child’s birthdate, accompanied by a text alert (Sperber et al., 2023). To the extent possible, the cash transfer did not affect the mother’s eligibility for safety net programs such as the Supplementary Nutritional Assistance Program (SNAP). We specified, as our exposure variable, assignment to the high-cash treatment group (\$333/month), compared with the low-cash control group (\$20/month). We created a binary indicator for treatment (1, treatment; 0, control). Using surveys, BFY has measured outcomes among the mothers and infants at four timepoints: Baseline (0 years) immediately following the infant’s birth, Year 1 (1 year after birth), Year 2 (2 years after birth), and Year 3 (3 years after birth). Our study used data from Baseline, Year 1, Year 2, and Year 3, which comprised all the data available to us at the time of our tests.

We obtained mother’s address using a sample management tracking system for each survey year and geocoded them to census tract identifiers. Using the SAS Programming GEOCODE procedure, we obtained latitude and longitude geographic coordinates for each residential address provided at Baseline, and Years 1, 2, and 3. We then linked residential latitude and longitude geographic coordinates to census tracts by utilizing 2018 TIGER/Line shapefiles from the US Census Bureau (Bureau UC). We conducted a spatial join between the geographic coordinates (as spatial points) and census tract (as areas). If coordinates corresponded to a particular tract, the procedure merged the two components assigning geographic coordinates to census tracts. Through an iterative procedure, we obtained 997 geographic identifiers with valid residential addresses for 99% of the BFY sample mothers at Baseline and 98% for both treatment and control groups in Years 1, 2, and 3 of the

study (Fig. 1).

We then linked each mother’s census tract at each wave to the tract Childhood Opportunity Index 2.0 (COI). The Childhood Opportunity Index serves as a composite metric of neighborhood conditions that children experience and attempts to capture important dimensions of opportunity (Acevedo-Garcia et al., 2020). Grounded in the Geography of Opportunity framework (Galster and Killen, 1995), COI defines neighborhood opportunity as “the context of neighborhood-based conditions and resources ... that influence children’s healthy development and long-term outcomes such as health and socioeconomic mobility” (Acevedo-Garcia et al., 2020). As a validated population-based composite index of 29 indicators, the COI measures neighborhood opportunity for families in three domains (health/environment, education, and social/economic) in each census tract, nationwide (Acevedo-Garcia et al., 2014, 2016). Specific indicators within the COI include availability and quality of early education centers and schools; high school graduation rates and adults with high-skilled jobs; poverty and employment rates; air pollution levels; housing vacancy rates and home ownership; and availability of green spaces and healthy food outlets (Acevedo-Garcia et al., 2020). We applied the 2015 COI 2.0 and merged COI scores to where the mothers lived from 2018 to 2021. Although the 2015 COI scores precede our study period, we utilized the most recent data available at the time and anticipate stability given that neighborhoods, on average, change gradually (Schmidt et al., 2014).

COI ranges from 0 to 100, with higher values indicating higher neighborhood opportunity. The COI 2.0 measure permits cross-metropolitan area comparisons, which allows us to compare the patterns across our BFY sites. As our primary outcome variable, we used the change in COI between survey waves as a measure of changes in neighborhood opportunity. This measure ranged from  $-83$  to  $73$  among BFY participants, with negative values indicating a decline in opportunity. Mothers who did not move or mothers who moved to a neighborhood with the same COI value received a change score of zero. In the US, all neighborhoods receive a ranking according to their COI z-score. Z-scores are then divided into 100 rank-ordered, standardized units with each unit comprising 1% of the US child population, ranging from 1 (lowest opportunity) to 100 (highest opportunity). A change of  $-83$  would therefore indicate a downward trajectory of 83 standardized units of childhood opportunity that include indicators for health, socioeconomic factors, and the environment (Child Opportunity Index). As a result, we assigned each mother’s census tract-year observation a COI value. Within our sample, 11 census tract-year observations did not have assigned COI values since the COI database has data on 85% of US census tracts. We dropped 0.3% of census tract-year observations from further analysis owing to missing COI.

To create the COI change measure between each survey wave, we created a COI Change Score by subtracting COI values for each wave from the subsequent survey wave wherein  $\text{Year 1} - \text{Baseline} = \text{COI Change 1}$ ,  $\text{Year 2} - \text{Year 1} = \text{COI Change 2}$ , and  $\text{Year 3} - \text{Year 2} = \text{COI Change 3}$  moves. We then added the COI change values to create a COI Change Score ( $\text{COI Change 1} + \text{COI Change 2} + \text{COI Change 3} = \text{COI Change Score}$ ). For the change score, a positive value indicates an improvement in neighborhood opportunity whereas a negative value indicates a decline. This value provides the overall change in neighborhood opportunity over the course of the four survey waves. We did not have COI values for 20 mothers at Baseline and Year 3 due to missing location information. For these mothers, we computed changes in COI between Baseline, Year 1, Year 2, and Year 3 with the available location information. We did not impute any missing data for the COI change measure.

### 2.2. Statistical analysis

In a properly executed randomized trial study, the randomization procedure should balance all possible characteristics, whether measured or unmeasured, between the treatment and control groups at baseline. In

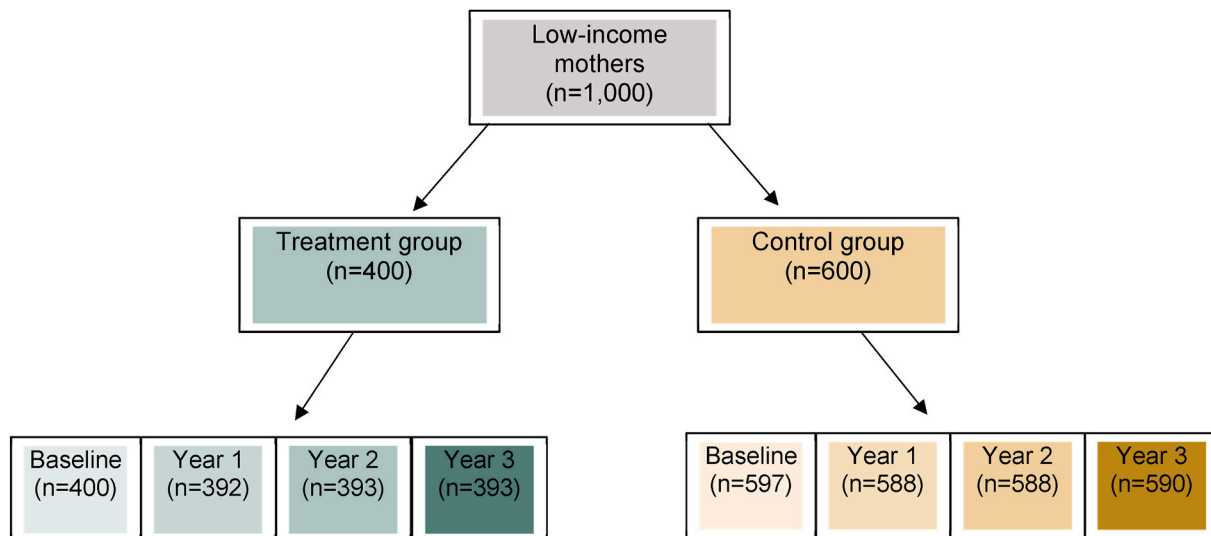


Fig. 1. Sample of 1000 low-income mothers randomized to treatment and control groups with neighborhood-level geographic information at Baseline, Year 1, Year 2, and Year 3 study waves, 2018–2021.

prior research using the BFY sample, researchers found baseline balance between treatment and control groups overall ( $p = 0.238$ ), despite minor differences across groups for certain variables (Noble et al., 2021).

To test our main hypothesis, we conducted OLS regression analyses, specifying the outcome as the change in COI over four survey waves while adjusting for baseline demographic and socioeconomic characteristics, as outlined in the original preregistration plan. While we do not need to control for baseline covariates in a randomized trial, doing so adjusts for differences arising by chance between groups and increases the precision of our analysis. We employed intent-to-treat (ITT) regression models which preserve the original random assignment, regardless of compliance with treatment. We also modeled robust standard errors (SE) to adjust for heteroscedasticity in residuals (related to clustering of observations in space).

In our exploratory analysis, we tested for effect modification of BFY treatment on changes in neighborhood opportunity by baseline depression, health status, and educational attainment. This exploration is motivated by theoretical and empirical work which documents both non-random “selection” into neighborhoods by baseline health measures, as well as differential sensitivity of benefit receipt, by health and educational attainment, following randomization to interventions (Ertel et al., 2007; McCormick et al., 2006; Arcaya et al., 2016, 2017; Grafova et al., 2014; Cooper et al., 2020; Osypuk, 2024). We defined depression using the Center for Epidemiological Studies – Depression (CES-D) scale, health status as good or poor health, and educational attainment as having less or more than a high school education. We used the two measures of maternal health available at baseline: the 20-item Center for Epidemiological Studies-Depression (CES-D) scale (continuous, range: 0 to 60) and self-rated health. Consistent with past work, we created a binary variable for self-rated health in which mothers with poor or fair health received a “1” and mothers with good, very good, or excellent health received a “0” (Health Status, 2023). In further exploration, we tested if socioeconomic characteristics such as having less than a high school education may also modify the relation between BFY treatment and neighborhood opportunity. Our alpha value threshold for statistical significance was set *a priori* at  $p < 0.05$ .

### 3. Results

Table 1 shows baseline characteristics of the BFY study sample. Hispanic and non-Hispanic Black mothers comprise >80% of the

sample. Treatment and control groups have approximately equivalent mean age of mothers. Most (45.9%) of the sample comprises mothers who never married and more than 90% self-reported good, very good, or excellent health in both groups. Maternal depression was approximately the same for treatment and control mothers.

To further test balance of measured baseline characteristics between groups, we calculated the effect size of the difference between the means for each maternal demographic, socioeconomic, and mobility characteristic by conducting the standardized mean difference (Cohen’s D). We use Cohen’s D to interpret the magnitude of a difference and expect that randomization will balance all covariates at baseline. The Cohen’s D measure for all characteristics falls below the 0.2 threshold.

On average, the BFY sample at baseline lives in a neighborhood at the 25th percentile of COI. In other words, 75% of US households live in a neighborhood with higher COI than our study sample. This result aligns with prior evidence of evaluations within low-income groups (Acevedo-Garcia et al., 2020). The high-cash treatment group shows a mean change of neighborhood opportunity of 0.80 over the study period (2018–2021), indicating that the treatment group experienced a very modest increase in neighborhood opportunity of 0.80 points (on a scale of 0–100). However, this mean change in neighborhood COI over the study period is lower than the mean change in COI exhibited by the control group (1.98). Although modest, the positive values of COI change for both groups indicate moving to neighborhoods of greater opportunity. The standard deviation of change in COI remains large for both treatment and control groups at 23.7 points. This indicates greater dispersion of change in COI values; however, the distribution of the outcome remains normal (Appendix Figure A1).

In terms of residential moves due to address changes, control mothers moved slightly more often than treatment mothers during the study period (63.8% of control group and 61.0% of treatment group). A smaller fraction of mothers never moved (36% of control group and 38.5% of treatment group) followed by mothers who only moved once (34.0% of control group and 33.3% of treatment group). Both treatment and control mothers moved more often between Baseline to Year 1, as opposed to the subsequent study years (35.5% of control group and 35.2% of treatment group) (Stilwell et al., 2024).

To assess the treatment and control group trajectories in COI, we plotted mean COI at Baseline, and Years 1, 2, and 3, by treatment group (Fig. 2). Higher COI values indicate moves to higher opportunity. Control group COIs increase linearly and modestly over time, from 25.4 to 27.7. Alternately, the high-cash treatment group displays a U-shaped

**Table 1**

Descriptive statistics of the Baby’s First Years Study: demographic, socioeconomic, and mobility characteristics of 1000 low-income mothers randomized to treatment and control groups over four survey waves, 2018–2021.

Baseline demographic and socioeconomic characteristics	Treatment group (N = 400)	Control group (N = 600)	Standard Mean Difference (Cohen’s D) <sup>a</sup>
<b>Race/Ethnicity (%)</b>			
non-Hispanic white	8.5	11.2	0.03
non-Hispanic Black	44.3	39.5	
Hispanic	41.5	40.5	
Other	5.8	8.8	
<b>Age (years)</b>	27.4	26.8	−0.10
<b>Years of education</b>	11.9	11.9	1.0E-5
<b>Marital status (%)</b>			0.15
Never married	49.5	42.5	
Single, living with partner	21.8	26.0	
Married	21.5	20.8	
Divorced/separated	2.8	5.0	
Other	4.5	5.7	
<b>Health status (%)</b>			−0.13
Poor health	8.3	12.2	
Good health	91.8	87.8	
<b>Maternal depression (CES-D score)<sup>b</sup></b>	7.0	6.9	−0.02
<b>Combined household income (\$)</b>	20,918.20	22,465.84	0.08
<i>Mobility Characteristics</i>			
<b>Median neighborhood rent (\$)</b>	1100.20	1110.28	0.04
<b>Change in Childhood Opportunity Index (COI)<sup>a</sup> (Standard Deviation)</b>	0.80 (23.7)	1.98 (23.7)	0.05

\*COI ranges from 0 to 100.

<sup>a</sup> Cohen’s D < 0.2 for all characteristics.

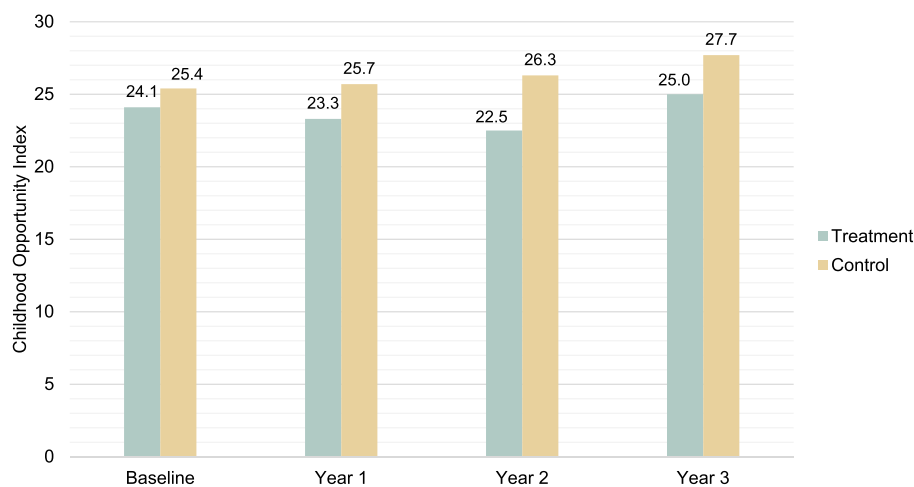
<sup>b</sup> Center for Epidemiologic Studies-Depression scale.

opportunity trajectory over time. The treatment group mean COI decreases from 24.1 at baseline, to 22.5 by Year 2, and then rises to 25 by Year 3 (Fig. 2). Although treatment group COI values remain slightly lower than control group COI values, this trend remains stable over time.

In our ITT regression results, we find no difference in change in neighborhood opportunity between the treatment and control groups (Table 2). The high-cash treatment shows a decrease of 0.45 in neighborhood COI following moves between the four survey waves. However, our findings do not reach conventional levels of statistical detection (Coef: 0.45; SE: 1.68, p = 0.76).

Table 3 explores whether mother’s baseline depression, self-rated health, and educational attainment modifies any BFY treatment-neighborhood opportunity relation. Results show effect modification by baseline measures of self-rated health. High-cash receipt among

mothers with poor health at baseline (as opposed to good health) corresponds with an 11.34 unit increase in COI (SE: 5.66, p < 0.05) (Table 3, Model B). In Appendix Figure A2, we show average change in COI among treatment and control groups by health status. Although a small proportion of our sample (8%), mothers with poor health in the treatment group show increases in COI (1.97) when compared with others (Appendix Figure A2). In our exploration of whether maternal depression or educational attainment (less than high school education in the low-income sample) serves as an effect modifier, we fail to reject the null (Table 3, Model A & C). Our results also remain robust to outlier-adjusted models (Appendix Table A1.)



**Fig. 2.** Neighborhood Childhood Opportunity Index (COI)<sup>a</sup> by survey wave (Baseline, Year 1, Year 2, and Year 3) among 1000 low-income mothers randomized to treatment and control groups, 2018–2021.

<sup>a</sup> COI ranges from 0-100



**Table 2**

Linear regression intent-to-treat results predicting change in Childhood Opportunity Index (COI) as a function of randomization into treatment among 1000 low-income mothers, over four survey waves, 2018–2021.

Variables	Change in COI Coefficient (SE) <sup>a</sup>
BFY Treatment	-0.45 (1.68)
Race/Ethnicity	
non-Hispanic white	-
non-Hispanic Black	-0.59 (2.91)
Hispanic	-3.24 (2.88)
Other	-1.82 (4.21)
Age	0.10 (0.16)
Years of education	0.43 (0.27)
Marital status	
Never married	-
Single, living with partner	5.09 (2.19)**
Married	4.43 (2.53)*
Divorced/separated	8.54 (4.39)*
Other	2.65 (3.46)
Health Status	
Good health	-
Poor health	-1.15 (2.86)
Combined household income (in \$1,000s)	0.009 (0.03)
Median neighborhood rent (in \$1,000s)	-0.318 (4.13)

\*p < 0.1, \*\*p < 0.05; \*\*\*p < 0.01; \*\*\*\*p < 0.001.

<sup>a</sup> Robust standard errors.

#### 4. Discussion

The Baby's First Years study provides an important opportunity to consider how poverty reduction during a sensitive period of development might shape parental investments in children from low-income families. In this paper, we consider whether a reliable cash transfer led mothers to move to neighborhoods that provided more resources and amenities that support healthy child development. Overall, the childhood opportunity landscape of the neighborhood did not differ between the high- and low-cash groups. However, exploratory results find that BFY cash treatment promotes opportunity moves for the subgroup of mothers reporting fair to poor health at baseline.

Strengths of the study include the RCT study design, which permits causal inference regarding the role of unconditional cash transfers on neighborhood mobility with respect to childhood opportunity. The three-year follow-up period, moreover, permits estimation regarding the cumulative effect of neighborhood trajectories. Recruitment of predominantly Black and Hispanic mothers also aligns the study inference to the population base which disproportionately experiences child poverty in the US (Dawson, 2019). That stated, limitations include lack of information about mothers' decisions to move. Neighborhood mobility may result from factors such as structural barriers, housing discrimination, as well as other needs such as wanting to be closer to family or having larger living spaces (DeLuca et al., 2019). In this analysis, we also modeled only one part of the residential selection and neighborhood change process: change in COI due to neighborhood moves or assuming no change in COI by staying. We did not examine how neighborhood COI changed across the BFY study period if families chose to stay. Neighborhoods themselves change much slower than people can achieve changes by moving; and prior literature shows that even when neighborhoods change, their rank order within the metro area remains roughly similar (Schmidt et al., 2014; Sampson and Wilson, 2013).

Residential moves are costly. Housing comprises a large part of low-income households' budgets. The null results for the BFY sample may suggest that the relatively modest cash transfer may not provide the means to enable families to relocate to neighborhoods of greater

childhood opportunity in the long term. In other work from the BFY project, researchers find that for each of the first three years, high-cash transfer households spent more on child-specific goods and reported more time spent on child-specific early learning or enrichment activities than the low-cash transfer group (Troller-Renfree et al., 2022; Sperber et al., 2023; Gennetian et al., 2022, 2023). They may, therefore, prioritize these goods over housing given the amount of the BFY cash transfer. Additionally, housing market discrimination could diminish the influence or efficiency of cash transfers, particularly by increasing the cost and length of a housing search and preventing mobility to neighborhoods of greater childhood opportunity (DeLuca et al., 2019).

We found that the BFY treatment promoted opportunity moves among mothers who had poor self-reported health at baseline. This finding suggests that the cash transfer may help these subgroups overcome barriers to residential mobility. The direction of the interaction runs counter to some previous work which reports that more disadvantaged subgroups have a relatively harder time benefiting from a treatment (Osypuk et al., 2024; Arcaya et al., 2016). However, van Kippersluis and Galama's work on sudden income gains coheres with our findings (van Kippersluis and Galama, 2014). They examined adult populations in the US and the United Kingdom and find that the least healthy, lowest-income respondents show the "healthiest" consumption patterns immediately following unexpected income gains. Whereas we hesitate to draw parallels between the distinct populations studied across these research contexts, it remains possible that healthier mothers in BFY use the cash transfer in fundamentally different ways than do less healthy mothers.

Our exploratory findings also add to the current literature on health selection into neighborhoods. Although much work finds that health status at baseline precedes subsequent moves into neighborhoods and neighborhood characteristics (Arcaya et al., 2016; Grafova et al., 2014; Osypuk, 2024), one study reports no direct relation (Arcaya et al., 2017). Work on the Moving to Opportunity (MTO) study reports that baseline health problems, in both children and adults, predict mobility into poorer neighborhoods upon use of housing vouchers (Kim et al., 2023; Osypuk, 2024). However, research among older adults finds that individuals in poor health experienced a decrease in neighborhood economic disadvantage, over time, among movers and stayers (Grafova et al., 2014).

Our findings enhance prior work on health selection in two ways. First, our study population comprises low-income mothers with newborns. Although poor health may deter certain populations from seeking more opportunistic neighborhoods or dissuade those who already live in neighborhoods close to resources (i.e., family, transit), new mothers are highly mobile (Bruckner et al., 2019). Mobility decisions in our population may therefore function in distinct pathways from those described in previous literature. Second, past studies, although robust, do not examine an unconditional cash transfer to participants. Money, as opposed to housing vouchers or other in-kind benefits, may provide low-income mothers with poor health the autonomy to make opportunistic neighborhood moves. We encourage future work in this area.

Health selection refers to the process in which aspects of health affect the ability and decisions of persons to move over time. Failure to account for the differential movement of persons by health status may introduce strong confounding in neighborhood effects studies (Chaix, 2009). Our BFY study avoids such bias due to its RCT study design, as opposed to other neighborhood effects studies using observational or cross-sectional designs that do not measure or adjust for residential mobility or neighborhood preferences. We find that treated mothers with poor self-rated health at baseline appeared more likely than untreated mothers to move to "child opportunity" neighborhoods. This finding, when placed within the larger literature on health selection, holds two key methodological implications. First, future residential mobility studies should continue to measure health longitudinally, including at baseline, of participants in an RCT or an observational study. Second, scholars would benefit from using two-tailed tests when investigating

**Table 3**

Linear regression intent-to-treat results predicting change in Childhood Opportunity Index (COI) as a function of the *interaction of treatment and depression at baseline* (A), *health status at baseline* (B), and *high school education* (C) among 1000 low-income mothers randomized to treatment and control groups, over four survey waves, 2018–2021.

Variables	Change in COI		
	Depression (A) Coefficient (SE) <sup>a</sup>	Health Status (B) Coefficient (SE) <sup>a</sup>	High school education (C) Coefficient (SE) <sup>a</sup>
INTERACTION: BFY Treatment*Depression	-0.30 (0.38)		
INTERACTION: BFY Treatment*Health Status			
Good health		--	
Poor health		11.34 (5.66)**	
INTERACTION: BFY Treatment*Education			
>High school diploma			3.30 (4.35)
<High school diploma			
BFY Treatment – Main effect	1.57 (3.06)	-1.53 (1.77)	-1.30 (1.85)
Depression – Main effect	0.23 (0.23)		
Health Status – Main effect			
Good health		--	
Poor health		-4.03 (3.71)	
Education – Main effect			
>High school diploma			
<High school diploma			-2.27 (2.74)
Race/Ethnicity			
non-Hispanic white	--	--	--
non-Hispanic Black	-0.53 (2.92)	-0.46 (2.91)	-0.49 (2.93)
Hispanic	-3.64 (2.87)	-3.18 (2.88)	-3.19 (2.89)
Other	-0.97 (4.32)	-1.59 (4.21)	-1.90 (4.29)
Age	0.09 (0.16)	0.09 (0.16)	0.11 (0.16)
Years of education	0.44 (0.27)	0.43 (0.27)	
Marital status			
Never married	--	--	
Single, living with partner	5.05 (2.20)**	5.03 (2.19)**	5.26 (2.21)**
Married	4.26 (2.54)*	4.58 (2.51)*	4.42 (2.53)*
Divorced/separated	7.57 (4.42)*	8.62 (4.46)*	8.31 (4.36)*
Other	2.27 (3.48)	2.40 (3.45)	2.94 (3.49)
Combined household income (in \$1,000s)	0.11 (0.33)	0.11 (0.32)	0.13 (0.33)
Median neighborhood rent (in \$1,000s)	-3.4 (4.09)	-3.31 (4.12)	-2.68 (4.12)

<sup>a</sup>Robust standard errors  
\*p<0.1, \*\*p<0.05; \*\*\* p<0.01; \*\*\*\* p<0.001

health selection into place, given that poor health at baseline may not promote neighborhood mobility in all contexts.

Additionally, our findings suggest that divorced/separated individuals in the treatment group may move to neighborhoods of greater childhood opportunity upon receiving the high-cash gift. Although we did not have any *a priori* hypotheses regarding individual-level characteristics (i.e., marital status, race/ethnicity) of treatment mothers who move to neighborhoods of greater childhood opportunity, we encourage future work to do so. Expounding these findings may fill a gap in the literature on the potentially opportunistic moves among divorced/separated individuals, as current work only reports greater housing instability among low-income populations (Kang, 2023). We speculate that moves to neighborhoods of greater childhood opportunity in these populations may imply doubling-up or moving-in with family members following changes in partnership.

Although BFY benefited the neighborhood opportunity trajectory of some subgroups, the BFY sample still remains well in the lower half of neighborhood opportunity. Low-income Black and Hispanic families occupy vastly worse neighborhood quality than do white (and higher income) families. In the case of race/ethnicity, the differences are so large as to represent entirely non-overlapping distributions of neighborhood quality, which have been produced by racial residential segregation and housing exclusion practices (Osypuk and Acevedo-Garcia, 2010; Osypuk et al., 2009). The design and evaluation of structural interventions to redress such unequal distributions would seem a critical area of further research.

## 5. Conclusion

We set out to examine whether a randomized treatment of large monthly cash transfers to low-income mothers in the US over three years stimulated moves to higher childhood opportunity neighborhoods. Counter to our hypothesis, we find no difference in likelihood of treatment group (vs. control group) families using the cash gift to make an opportunity move. However, exploratory analyses reveal that less healthy mothers in the high-cash treatment group show relatively more moves to higher opportunity neighborhoods. Although the magnitude of this exploratory result is small, it suggests that future work should consider subgroup differences in neighborhood mobility in relation to health at baseline (i.e., health selection) as well as in response to social and policy interventions for low-income households.

## Funding

Eunice Kennedy Shriver National Institute of Child Health and Human Development (Grant R21HD107508-02). Dr. Theresa Osypuk was additionally supported by P2CHD041023.

## Ethics approval

The University of California, Irvine Committee for the Protection of Human Subjects approved this study (Protocol #3196) as a reliance on Teachers College Columbia University primary IRB# 18–210.

**CRedit authorship contribution statement**

**Abhery Das:** Writing – review & editing, Writing – original draft, Visualization, Software, Resources, Methodology, Investigation, Formal analysis, Data curation. **Theresa L. Osypuk:** Writing – review & editing, Supervision, Funding acquisition, Conceptualization. **Paul Y. Yoo:** Writing – review & editing, Methodology, Data curation. **Katherine Magnuson:** Writing – review & editing, Project administration, Funding acquisition, Conceptualization. **Lisa A. Gennetian:** Writing – review & editing, Supervision, Resources, Funding acquisition. **Kimberly G. Noble:** Writing – review & editing, Project administration, Funding

acquisition. **Tim A. Bruckner:** Writing – review & editing, Writing – original draft, Supervision, Resources, Project administration, Methodology, Investigation, Funding acquisition, Conceptualization.

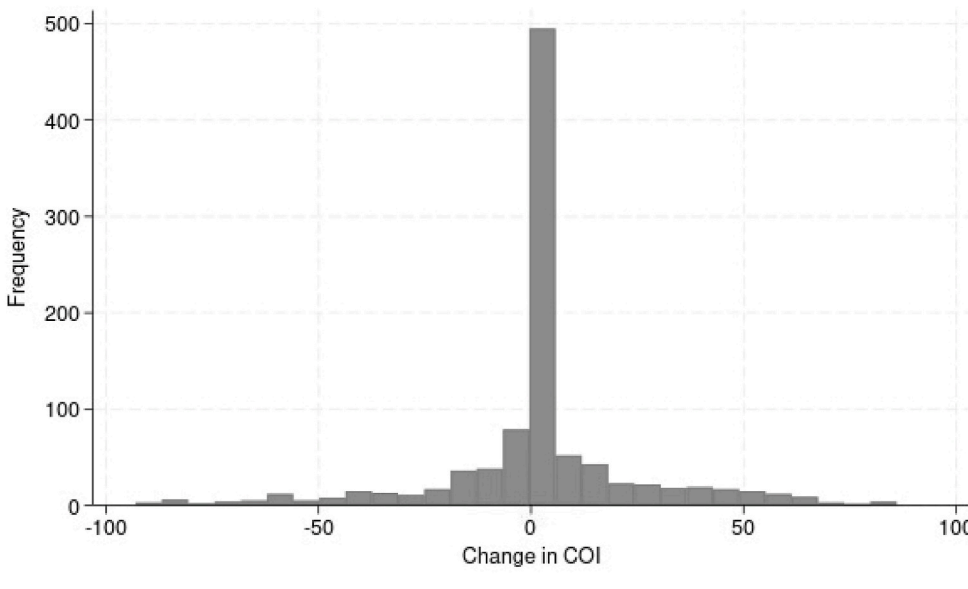
**Declaration of competing interest**

All authors declare no conflicts of interest.

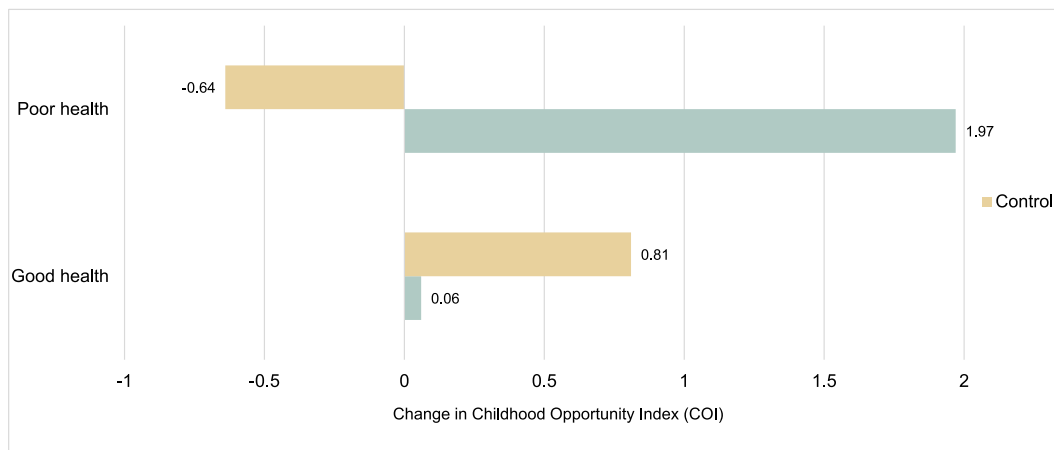
**Data availability**

The authors do not have permission to share data.

**Appendix**



**Fig. A1.** Distribution of change in neighborhood Childhood Opportunity Index (COI) among 1000 low-income mothers randomized to treatment and control groups, 2018–2021.



**Fig. A2.** Change in neighborhood Childhood Opportunity Index (COI) among 1000 low-income mothers randomized to treatment and control groups by health status at baseline<sup>a</sup>, 2018–2021.

<sup>a</sup>Health status determined at baseline survey. Mothers indicating poor or fair health categorized as 'poor health' and mothers indicating good, very good, or excellent health categorized as 'good health'.



**Table A1**

Linear regression intent-to-treat results predicting **outlier adjusted** change in Childhood Opportunity Index (COI) among 1000 low-income mothers randomized to treatment and control groups (A) and as a function of the interaction of treatment and health status at baseline (B), over four survey waves, 2018–2021.

Variables	Overall Coefficient (SE) <sup>a</sup>	Health status Coefficient (SE) <sup>a</sup>
BFY Treatment	-0.41 (1.03)	-1.32 (1.07)
Health status		
Good health		--
Poor health		-3.19 (2.23)
INTERACTION: BFY Treatment*Health status		9.10 (3.58)**
Race/Ethnicity		
non-Hispanic white	--	--
non-Hispanic Black	-1.99 (2.14)	-1.95 (2.11)
Hispanic	-3.19 (2.16)	-3.26 (2.14)
Other	-0.67 (2.81)	-0.54 (2.78)
Age	0.02 (0.09)	0.21 (0.09)
Years of education	0.39 (0.16)**	0.38 (0.16)**
Marital status		
Never married	--	--
Single, living with partner	3.63 (1.37)**	3.56 (1.36)**
Married	3.22 (1.47)**	3.34 (1.46)**
Divorced/separated	7.65 (3.18)**	7.70 (3.27)**
Other	2.67 (2.51)	2.45 (2.47)
Combined household income (in \$1,000s)	-0.30 (0.21)	-0.30 (0.20)
Median neighborhood rent (in \$1,000s)	2.3 (2.0)	2.1 (1.9)

<sup>a</sup>Robust standard errors

\*p<0.1, \*\*p<0.05; \*\*\* p<0.01; \*\*\*\* p<0.001

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