

**Baby's First Years:  
Statistical Analysis Plan for Phase Two (Data Collections at ages 6 and 8)**

The current analysis plan focuses on impact analyses of in-person child assessments at universities for the child ages 6 and 8 follow-up, which were proposed for Phase 2 of the BFY project.

**Project Summary**

In the Baby's First Years (BFY) study, one thousand infants born to mothers with incomes falling below the federal poverty threshold in four metropolitan areas in the United States were assigned at random within each of the metropolitan areas to one of two cash gift conditions. The sites are: New York City, the greater New Orleans metropolitan area, the greater Omaha metropolitan area, and the Twin Cities. IRB and recruiting issues led to a distribution of the 1,000 mothers across sites of 121 in one site (the Twin Cities), 295 in two of the other sites (New Orleans and Omaha) and 289 in New York. (We have also randomly sampled a subset of participating families in each of the four sites to participate in an in-depth qualitative study, but do not elaborate on those plans in this document.)

Mothers were recruited in postpartum wards of 12 participating hospitals shortly after giving birth and, after consenting to participate in a longitudinal child development study, were administered a 30-minute baseline interview. They were then informed about the opportunity to receive a cash gift. The "high-cash gift" treatment group mothers (40% of all mothers) are receiving unconditioned cash payments of \$333 per month (\$3,996 per year) via debit card for 76 months. Mothers in the "low-cash gift" comparator group (60% of all mothers) are receiving a nominal payment – \$20 per month, delivered in the same way and also for 76 months. The 40/60 randomization assignment is stratified by site, but not by hospitals within each of the four sites.

BFY was originally designed to study the effects of poverty reduction via a monthly unconditional cash transfers on child development for the first three years of life, with the cash gifts set to be distributed for 40 months (3 years, 4 months). In response to the COVID-19 pandemic and the need to postpone in-person research activities, the cash transfers were extended for an additional year, through 52 months (4 years, 4 months), enabling us to postpone in-person direct child assessments to age 4. Subsequently, payments were extended a second time, such that they will now be provided to participants for a total of 6 years, 4 months. Interviews conducted at child ages 1, 2 and 3 provide information about family functioning as well as several maternal reports of developmentally-appropriate measures of children's cognitive and behavioral development. An in-person visit at universities at the child age 4 follow-up provided high-quality measures of child well-being as well as maternal responses to a briefer questionnaire.

We have worked with state and local officials to ensure to the extent feasible that the study's cash gifts are not considered countable income for the purposes of determining benefit levels from social assistance programs. Conditional on participants' consent and our success in securing agreements with state and county agencies, we are also collecting state and local administrative data on parental employment, utilization of public benefits such as Medicaid and Supplemental Nutrition Assistance Programs (SNAP), and any involvement in child protective services.

The compensation difference between families in the high and low cash gift groups has the potential to boost family incomes by \$3,756 per year, an amount shown in the economics and developmental psychology literatures to be associated with socially significant and policy-relevant improvements in children's school achievement. After accounting for likely attrition, a total sample size of 800 at ages 6 and 8 years, divided 40/60 between high and low cash-gift groups, provides sufficient statistical power to detect meaningful differences in cognitive, emotional and brain functioning, and key dimensions of family context (see below).

At the ages 6 and 8 in-person visits at universities we will administer validated, reliable and developmentally sensitive measures of language, executive functioning and socioemotional skills. We will also collect the same measure of resting EEG that we did at age 4 (see below).

The family process measures that we will gather are based on two theories of change—via investments and stress—that might change in response to receipt of the cash gifts. *Investment pathway*: Additional income enables parents to buy goods and services for their families and children that support cognitive development. These include higher quality housing, nutrition and non-parental child care; more cognitively stimulating home environments and learning opportunities outside of the home; and, by reducing or restructuring work hours, more parental time spent with children. *Stress pathway*: A second pathway is that additional income may reduce parents' own stress and improve their mental health. This may allow parents to devote more positive attention to their children, thus providing a more predictable family life, less conflicted relationships, and warmer and more responsive interactions.

## **Analysis Plan**

*Pre-registered Hypotheses.* As detailed in the Baby's First Years [clinicaltrials.gov](https://clinicaltrials.gov)'s Study Record Versions, we originally preregistered hypotheses with [clinicaltrials.gov](https://clinicaltrials.gov) within a month after recruitment began (May, 2018) and have preregistered updates prior to each data collection wave.

*Overview of Hypothesis Testing.* Our Phase 2 key aims are to evaluate the impacts of the high- versus low-cash gifts on validated, reliable, and developmentally-sensitive measures of reading and math achievement, self-regulation, and socioemotional functioning, as well as lower rates of special education and grade retention at child ages 6 and 8 – this is Aim 1 in our Phase 2 NICHD application. Aim 2 calls for measurement of developmentally-sensitive electroencephalographic-based measures of brain functioning at child ages 6 and 8. Aim 3 is focused on hypotheses and data related to family expenditures, neighborhood quality, parent

stress and mental health, parenting practices, and children’s time spent in nonparental care, all gathered at child ages 6 and 8.

The study’s basic empirical approach will use the survey and neuroscience data to compare the pooled cross-city \$333/month and \$20/month groups on a wide range of family process and child outcome measures. Because of random assignment, the low-cash gift group average outcomes enable us to identify the average outcomes corresponding to the counterfactual state that would have occurred for families and children in the high-cash gift group if they had not been offered the additional \$313/month cash gift. Therefore, differences in outcomes for the high- compared with the low-cash gift group (after random assignment) can be interpreted as an estimate of the causal effect of the \$313/month cash gift (regardless of whether treatment-group participants actually expend all of the funds.) These are commonly known as intent-to-treat effects. In contrast to prior pre-registrations, this child age 6 and 8 preregistration provides directional hypotheses for all of our pre-registered primary and almost all of our secondary hypotheses and will assess them using one-tailed tests (see discussion below).

Before conducting these main analyses, all measures will be examined for psychometric equivalence (configural invariance) across race/ethnicity and whether Spanish or English is a primary language spoken at home.

All pre-registered hypotheses focus on full-sample impacts, although we will also estimate in exploratory analyses moderation of impacts by child gender, race/ethnicity (Black/African American vs. Latino families), presence of older siblings in the family at birth, and depth of poverty at birth (income to needs  $\leq .5$  or not).

*Estimation strategy.* We illustrate our approach to estimation in a simple regression framework. The “Intent-To-Treat effect” (ITT) is captured by the estimate of the coefficient  $\pi_1$  in a regression of some child or family process outcome (Y) on a dichotomous indicator for assignment (Z) to the high-cash gift group as in (1).

$$(1) Y = Z\pi_1 + X\beta_1 + \varepsilon_1$$

“Take-up” of the cash gifts is virtually universal, with fewer than six families never having used their debit cards by child age 3. We will adjust standard errors using robust variance estimation techniques (Cameron et al. 2008). We will estimate (1) without and then with baseline demographic child and family characteristics (X) to improve the precision of our estimates by accounting for residual variation. These baseline measures, all gathered prior to random assignment, have been checked for adequate variation and sufficient independence from other baseline measures. They include: dummy variables for three of the four sites; mother’s age, completed schooling, household income, net worth, general health, mental health, race and Hispanic ethnicity, marital status, number of adults in the mother’s household, number of other children born to the mother, whether the mother smoked or drank alcohol during pregnancy and whether the father is currently living with the mother; and child’s sex, birth weight, gestational

age at birth, birth order and interview/assessor ID. For child outcomes we also control for child's age in months at the time of the survey/assessment.

We will apply our regression estimation strategy to the assessment-based measures of cognitive, language, self-regulation, and socio-emotional functioning and EEG measures of brain activity gathered at ages 6 and 8. To investigate family process impacts, we will apply our estimation strategy to maternal and family measures gathered at child ages 6 and 8.

*Attrition.* The greatest threat to internal validity is bias from sample attrition overall, within site, and differential attrition rates by treatment status overall and within site. We will carefully track response rates by site, by treatment status across sites, and then treatment status within site. Response rates were very high for the ages 1-3 data collections and varied across measures at age 4. Of the original 1,000 recruited participants, we secured interviews with 931 at age 1, 922 at age 2, and 922 again at age 3. By age 4, 5 mothers and 5 children had died and we gathered information on between  $n=634$  (for child EEG) to  $n=882$  (for maternal reports of behavior problems) of the remaining 990 families.

For ages 6 and 8 data collections, we will conduct sensitivity checks to evaluate whether missing data might be biasing estimates using weighting strategies and with multiple imputation. We will use two types of weights created by the Toolkit for Weighting and Analysis of Nonequivalent Groups (TWANG) (Ridgeway et al. 2022) in our regression analyses. Broadly speaking, TWANG uses generalized boosted models to flexibly estimate propensity scores and analytic weights. Generalized boosted modeling is a flexible and nonparametric estimation method that has been shown to outperform other algorithms for propensity score estimation with respect to bias (McCaffrey et al., 2004). These models will include all baseline control variables and the child's age.

First, we will create inverse probability of treatment weights, which are intended to provide estimates of the average treatment effect on the treated (ATT). 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 analytic sample given their baseline observed characteristics, thereby creating a weighted sample in which the low-cash and high-cash gift groups have similar baseline characteristics. This should reduce any bias that is arising from non-equivalence on baseline covariates in the treatment and control analytic samples.

Second, we will create a set of non-response weights intended to adjust for missing data. These weights adjust regression estimates using a weight corresponding to the inverse probability of providing enough usable data to be included in our analytic sample. Weighting in this way produces an analysis sample with characteristics similar to the full BFY baseline sample.

We will also address the problem of missing data using multiple imputation strategies with all available data (including all survey and administrative data on outcomes and predictor variables). Multiple imputation is an appropriate method if, conditional on observed information, data are missing at random. Finally, because we have permission to collect administrative data

from over 75% of mothers, we will be able to compare survey respondents and survey non-respondents on receipt of income from social programs.

*Interpretation of parameters.* The coefficients obtained in our regression models will be used to quantify the causal effects of the \$313/month difference in cash gift money on ages 6 and 8 child brain circuitry, cognitive development and socioemotional functioning. We will use the same methods to generate causal impact estimates for the family processes in each of the conceptual pathways. Examining the possible mediational mechanisms in this way uses a series of separate regression equations to estimate program effects on possible treatment mediators, rather than estimating a structural-equation mediation model, and has been effectively used to infer possible mediation in comparable studies. This approach is preferred because it preserves the exogenous (experimental) variation in income generated by random assignment. The underlying insight is that randomization occurred with respect to receipt of the cash gifts and not on the basis of the proposed pathway mediators. With the potential for multiple mediators, a causal interpretation cannot be given to mediational models without very strong, often implausible, assumptions that there are no unobserved confounds of the association between the mediator and outcome. Still, the pattern of impacts can yield important insight as to which processes are likely to be present and absent and set the stage for future analyses.

*Statistical power.* The compensation difference between families in the high- and low-cash gift groups amounts to \$313 per month and \$23,788 over the course of the 76 months. The annual equivalent of this amount is in the range of income increases associated with child impacts of around .20 sd in studies of welfare experiments and the EITC (Duncan, Morris & Rodrigues, 2011; Morris, Duncan, Clark-Kauffman, 2005; Dahl & Lochner, 2012). After accounting for likely 20% attrition in the age-6 lab visit, and in the absence of adjustments for sample clustering within hospitals or increased precision owing to the inclusion of baseline covariates in our impact estimates, a sample size of 800 at age 6 or 8, divided 40%/60% between high and low payment groups, provides 80% statistical power to detect a .18 sd impact on cognitive functioning and family processes at  $p < .05$  in a one-tailed test and a .20 sd impact at  $p < .05$  in a two-tailed test. For our planned EEG measurements (see below), we anticipate a sample size that is closer to 700 than 800. A sample size of 700 at age 6 or 8, divided 40%/60% between high and low payment groups, provides 80% statistical power to detect a .19 sd impact on cognitive functioning and family processes at  $p < .05$  in a one-tailed test and a .22 sd impact at  $p < .05$  in a two-tailed test.

*Multiple comparisons.* One strength of this study is the collection of survey, child assessment, neuroscience and administrative data on a wide range of outcomes and explanatory pathways. However, the probability of rejecting a true null hypothesis for at least one outcome is greater than the significance level used for each test. We will address the possibility of false positives while minimizing the reduction in statistical power to detect meaningful effects. Best-practice methods differ across disciplines so we will draw from multiple approaches with the goal of ensuring that results from one approach are consistent with results from others (Romano & Wolfe, 2005; Porter, 2018; Benjamini, 2010; Holm, 1979; Westfall & Young, 1993; Schochet,

2008). Where possible we have aggregated measures used to test our pre-registered hypotheses into indexes. In the case of related measures that cannot be aggregated into a single index, we will estimate the statistical significance of the entire family (“familywise error rate”) using stepdown resampling methods in Westfall and Young (1993) and Westfall, Tobias and Wolfinger (2011). Pre-registered clusters of measures are identified with grey bars in appendix tables.

*Data release.* We are releasing data and documentation from the study to the research community through the Inter-university Consortium for Political and Social Research approximately 18 months following the end of each data collection wave to enable independent researchers to pursue replication, mediation, moderation as well as other related analytic questions.

### *Additional Details for Age 6 and 8 Resting EEG Hypotheses and Analyses*

Consistent with our approach at Age 4, we are updating our analysis plan for the ages 6 and 8 collection with primary and secondary hypotheses that have been informed by results from our age-1 resting EEG treatment impacts (Troller-Renfree et al., 2022) and, in the case of age 6, our ongoing but as yet unpublished analyses of the Age-4 resting EEG data. As with other outcomes at ages 6 and 8, we now provide directional hypotheses for all of our pre-registered primary and secondary hypotheses and will assess them using one-tailed tests (see discussion below).

Our analysis plan includes preregistration of an index of mid- to high-frequency power (described below; primary hypothesis) as well as a more traditional neuroscientific investigation of power within bands (described below; secondary hypotheses). Please see the history of preregistrations, including analysis plans, for more detail.

*Ages 6 and 8 primary hypothesis and analyses:* Because of limitations in power expected with multiple testing adjustments, we are preregistering a single composite index of mid-to-high-frequency whole-brain power summed across alpha, beta, and gamma bands (defined as between 7 and 45 Hz). This frequency composite index sums absolute power across all single-Hz interval in the Alpha, Beta, and Gamma bands.

Because this approach is based on an estimated intent-to-treat difference in a single index score, there is no need for multiple-testing adjustments. Covariates will include all covariates preregistered at baseline as well as the number of artifact-free epochs contributed by each participant. Power values above the 99th percentile of their respective power band distribution will be truncated from above at the 99th percentile. We hypothesize that, in the eyes-closed condition, the high-cash gift group will show more power in this composite relative to the low-cash gift group. One-tailed t-tests will be used to test this directional hypothesis.

*Ages 6 and 8 secondary hypotheses and analyses:* Our primary EEG-based hypothesis (detailed above) creates a single composite based on data gathered in the eyes-closed condition. Here we preregister the corresponding analyses of data from the eyes-open condition as

secondary hypotheses, with the same directional hypotheses as the eyes-closed condition. We expect effects to be smaller in the eyes-open than in the eyes-closed condition, but do not pre-register hypotheses related to condition by group differences as they will be tested in separate models, are not of immediate theoretical interest, and we are likely to lack the statistical power to detect them.

A second set of secondary analyses are based on a different estimation approach. Consistent with another RCT examining brain activity (Debnath et al., 2020; Marshall et al., 2004; Vanderwert et al., 2010, 2016), we will analyze band-specific effects using mixed-effects models, with group as the between-subjects factor and region as within-subjects factor, to examine ITT impacts on each band of relative power in the eyes-closed condition. Bands will be defined as follows: Theta 3-6 Hz, Alpha 7-12 Hz, Beta 13-20 Hz, Gamma 21-45 Hz. Again, covariates will include all preregistered covariates as well as the number of artifact-free epochs contributed by each participant. Power values above the 99th percentile of their respective power band distribution in absolute power will be truncated from above at the 99th percentile. Our secondary hypotheses for each band are as follows: Theta (high-cash<low-cash), Alpha (high-cash>low-cash), Beta (high-cash>low-cash), and Gamma (high-cash>low-cash). One-tailed t-tests will be used given directional hypotheses. No further multiple-testing adjustments beyond the use of multi-level models will be used (Gelman et al., 2012).

The mixed effects models will also enable us to rank the four power bands by the (absolute) size of their impacts. Although we are not preregistering hypotheses regarding these rankings, we can record our expectations about them. Based on past results from this project (Ages 1 and 4), a review of the relevant literature, and the expertise of our neuroscience team, we expect that the cash gift impact will be largest in the Alpha band at both ages 6 and 8. Following Alpha, associations between SES and Theta are the most reported in the literature and, as such, we expect that the impact of the cash gift will second largest in the Theta band, although we have seen no indication of this difference at Ages 1 and 4. Finally, some group differences in Beta and Gamma were detected at Age 1, but preliminary analyses suggest these are not detectible at age 4. Continuous, correlational relations between SES and Beta and Gamma are less consistent in the broader literature (perhaps as these bands are easily influenced by artifacts, as we saw some evidence of at Age 4), leading us to expect that impact of the cash gift will be smallest for these bands at Ages 6 and 8. In supplemental, exploratory analyses, we will report the same analyses for absolute power and in the eyes-open condition.

A few changes in our EEG analysis plans between age 4 and ages 6 and 8 are worth noting. First, as with other study outcomes, we now provide directional hypotheses for all analyses. As such, we now also propose the use of one-tail analyses to test these hypotheses. This switch to one-tailed tests was motivated by two factors. First, one-tailed tests provide more statistical power for testing our hypotheses. Second, although we had directional hypotheses in the past, these were not always clearly preregistered and, as such, two-tailed tests were used. However, since our initial preregistration, more evidence has emerged linking SES to EEG (Brito et al., 2020, 2022; Cantiani et al., 2019; Maguire & Schneider, 2019; Rockers et al., 2023)

as well as our own analyses (Troller-Renfree et al., 2022), which supports our making directional hypotheses for all bands. However, we are still unsure of which brain regions are likely to drive these whole-brain effects as the literature is mixed with significant findings inconsistently observed in almost every region of the brain. As such, we make no region-specific hypotheses.

#### *Additional Details for Age 6 and Age 8 Epigenetic Processing and Analysis*

We are preprocessing age 4 genome-wide DNA-methylation on a newly released array (EPIC v2) and will then upload a more detailed age-6 and age-8 DNA-methylation preprocessing pipeline on OSF, which will probably deviate from age 4 given new bioinformatic tools and lessons learned. We will re-preprocess age-4, age-6 and age-8 DNA-methylation together to minimize technical artifacts. We will exclude DNA-methylation sites and samples failing technical criteria (e.g., low detection p threshold, sex mismatch) based on methylation-wide data *before* these preregistered methylation profile scores are computed. We will follow preregistered intent-to-treat analyses described in this document and add the following variables as covariates to DNA-methylation analyses: cell composition, technical DNAm factor (plate), child's age in months at the time of age-6 and age-8 data collection.

We hypothesize the following with regard to *child epigenetic outcomes*:

- 1) We hypothesize slower pace of aging, as measured by DunedinPACE, in the high-cash gift group, relative to the low-cash gift group. Methylation pace of aging was developed from DNA-methylation analysis of Pace of Aging in the Dunedin Study birth cohort (Belsky et al., 2022). Pace of Aging is a composite phenotype derived from analysis of longitudinal change in 18 biomarkers of organ-system integrity (Belsky et al., 2015). Increments of methylation pace of aging correspond to “years” of physiological change occurring per 12-months of chronological time. We will also report GrimAge Acceleration, which we consider an exploratory analysis. GrimAge represents a DNA-methylation metric designed to predict morbidity and mortality (Lu et al 2019). Briefly, the initial phase entailed the computation of models incorporating physiological indicators, age, sex, and smoking history, with the objective of optimizing mortality prediction within the Framingham Heart Study Offspring cohort (Lu et al., 2019). GrimAge will be based on principal components of DNA-methylation to bolster reliability (Higgins-Chen et al., 2022) and residualized for chronological age derived from sample receipt age to reflect accelerated biological age.
- 2) We hypothesize higher Epigenetic-g in the high-cash group relative to the low-cash gift group. Salivary DNA-methylation profiles of cognitive functioning, i.e., “Epigenetic-g”, can be computed on the basis of weights from a blood-based epigenome wide association study of general cognitive functions (g) in adults (McCartney et al., 2022). General cognitive ability was derived from the first unrotated principal component of logical

memory, verbal fluency and digit symbol tests, and vocabulary. Epigenetic-g is conceptually distinct from biological aging. If a higher quality measure of epigenetic profile of cognitive functioning becomes available at the time of analysis, we will substitute that instead.

We hypothesize the following with regard to *maternal epigenetic outcomes*:

- 1) We hypothesize slower pace of aging, as measured by DunedinPACE (Belsky et al., 2022), in the high-cash gift group, relative to the low-cash gift group. We will also report GrimAge Acceleration (Lu et al 2019; described above) and PhenoAge Acceleration as exploratory analyses. PhenoAge is conceptualized on the foundation of physiological markers and chronological age, which are subsequently employed to model a novel sample derived from DNA methylation, culminating in the establishment of a definitive DNA methylation clock (Levine et al., 2018). This metric exemplifies the age, measured in years, at which the average mortality risk in the NHANES III cohort aligns with the mortality risk as forecasted by the PhenoAge algorithm. PhenoAge will be based on principal components of DNA-methylation to bolster reliability (Higgins-Chen et al., 2022) and residualized for chronological age derived from sample receipt age to reflect accelerated biological age.

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Domains (in gray) and sub-domains	Measure source	Psychometrics	Age preregistered <u>Primary Outcome</u>	Age preregistered <u>Secondary Outcome</u>	Measures and notes (All measures between grey lines measured in the same wave will be subject to multiple testing adjustments)
<b>Language Development</b>					
<b>Language Milestones</b>	Squires et al., 2009	sensitivity .86 specificity .85		1	Measured using ASQ- Communication Subscale
<b>Vocabulary*</b>	Fenson, 2002; Jackson-Maldonado, 2012	internal consistency .85		2	Measured by short-form versions of the MacArthur Communicative Development Inventories
	Martin & Brownell, 2011		4		Measured by Receptive One Word Picture Vocabulary Test (ROWPVT) We will administer the monolingual (English) or bilingual (English/Spanish) versions as appropriate. Because the two versions of the test are not co-normed, the primary outcome will be a derived "conceptual score," or sum of the raw scores on all individual items that appear on both versions of the test.
	Martin & Brownell, 2011	Internal consistency: English version: .96 to .97; Bilingual version: .94 to .98	6, 8		Expressive One-Word Picture Vocabulary (EOWPVT). Monolingual and Bilingual. Score range monolingual version: 0-185, bilingual version: 0-180; higher scores indicate better performance. Because the two versions of the test are not co-normed, the primary outcome will be a derived "conceptual score," or sum of the raw scores on all individual items that appear on both versions of the test. Expect higher scores in high- than low-cash gift group.
<b>Maternal concern for language delay</b>	Glascow, 1997		3		Measured by the sum of the two questions included in the PEDS on expressive language and articulation and receptive language: 1. Do you have any concerns about how your child talks and makes speech sounds? (0: No; 1: Yes or a little) 2. Do you have any concerns about how your child understands what you say? (0: No; 1: Yes or a little)
<b>Academic Achievement: Reading</b>					
<b>Reading</b>	McGrew & Woodcock, (2018)	Test-retest reliability ages 5-19: 0.92		6, 8	Woodcock Johnson IV Test of Achievement: Letter-Word Identification. Score range: 0-78; higher scores indicate better performance. Expect higher scores in high- than low-cash gift group.
<b>Reading comprehension</b>	McGrew & Woodcock, (2018)			8	Woodcock Johnson IV Test of Achievement: Passage Comprehension. Score range: 0-52. Expect higher scores in high- than low-cash gift group.

Domains (in gray) and sub-domains	Measure source	Psychometrics	Age preregistered <u>Primary Outcome</u>	Age preregistered <u>Secondary Outcome</u>	Measures and notes (All measures between grey lines measured in the same wave will be subject to multiple testing adjustments)
<b>Academic Achievement: Math</b>					
<b>Math</b>	McGrew & Woodcock, (2018)	Test-retest reliability ages 5–19 = 0.91	6, 8		Woodcock Johnson IV Tests of Achievement: Applied Problems. Score range: 0-56; higher scores indicate better performance. Expect higher scores in high- than low-cash gift group.
<b>Executive Function and Behavioral Regulation</b>					
<b>Executive Function</b>	Diamond & Taylor, 1996; Weiland & Yoshikawa, 2013; Bierman et al., 2008			Originally registered for age 4 and then dropped	Intended to be measured by the pencil tap test. This item was preregistered as an age-4 secondary outcome but was dropped on September 13, 2022, due to evidence of floor effects, and numerous reports from research staff that children were not understanding the instructions.
<b>Executive Function: Minnesota Executive Function Scale</b>	Carlson, 2017; Carlson, & Zelazo 2014	MEFS: validity .92 test-retest .93	4, 6, 8		Measured by the Minnesota Executive Function Scale (MEFS). Score range: 0-100; higher scores indicate better performance. Expect higher scores in high- than low-cash gift group.
<b>Executive Function: NIH Toolbox Flanker Inhibitory Control and Attention Test</b>	Gershon, Wagster, Hendrie, Fox, Cook, & Nowinski, 2013	Test-retest: English 3-15 yo: ICC=0.95; 20-85 yo: ICC=0.83. Spanish 18-85 years old: $\rho=.65$	6, 8		Measured by the NIH Toolbox Flanker task. Score range: 0-30; higher scores indicate better performance. Expect higher scores in high- than low-cash gift group.
<b>Working Memory</b>	Wechsler (2012)		6		Measured by the Wechsler Preschool and Primary Scale of Intelligence (WPPSI) picture memory subtest. Picture Memory score range: 0-35, higher scores indicate better performance. Expect higher scores in high- than low-cash gift group. We pre-register three scores (MEFS, Flanker, Picture Memory), with a plan to do a confirmatory factor analysis and pre-register the impact on the common factor.
<b>Working Memory</b>	Wechsler (2011)		8		Measured by Wechsler Intelligence Scale for Children: 5th Edition (WISC-V) subtest Digit Span. Score Range 0-54. Higher scores indicate better performance. Expect higher scores in high- than low-cash gift group. We will pre-register three scores (MEFS, Flanker, Digit Span), with a plan to do a confirmatory factor analysis and pre-register the impact on the common factor.

Domains (in gray) and sub-domains	Measure source	Psychometrics	Age preregistered <u>Primary Outcome</u>	Age preregistered <u>Secondary Outcome</u>	Measures and notes (All measures between grey lines measured in the same wave will be subject to multiple testing adjustments)
<b>Socio-Emotional Processing</b>					
<b>Social-Emotional Problems</b>	Briggs-Gowan et al., 2004	internal consistency .65-.79 test-retest reliability .87		1, 2	Measured by the Brief Infant–Toddler Social and Emotional Assessment (BITSEA)
<b>Behavior/Emotional Problems</b>	Achenbach et al., 2000	parent report reliability .80	3, 4		Measured by a shortened version of the Child Behavior Checklist measuring the following areas: emotionally reactive, anxious/depressed, attention problems, and aggressive behavior. At age 3, we will estimate the statistical significance of the entire family of related measures in the Child Socio-Emotional Processing outcome cluster measured during the same wave using step-down resampling methods for multiple testing (see statistical analysis plan for more details; Westfall and Young, 1993).
<b>Social-Emotional Behavior</b>	Roggman et al., 2013; Griffen & Friedman, 2007; Belsky, 2007			Originally registered for age 1 but unable to be coded	Measured using NICHD SECCYD parent-child-interaction task coding scheme, with child codes Positive Mood, Negative Mood, Activity Level, Sustained Attention, Positive Engagement at age 1 and agency, negativity, persistence, affection at age 4. (Due to funding limitations, this was not feasible to code, and we have no immediate plans to do so).
<b>Maternal concern for behavioral and social-emotional problems</b>	Glascocoe, 1997		3		Measured by the sum of the two questions included in the PEDS on behavior and social-emotional: 1. Do you have any concerns about how your child behaves? (0: No; 1: Yes or a little) 2. Do you have any concerns about how your child gets along with others? (0: No; 1: Yes or a little)
<b>Behavior/Emotional Problems</b>	Achenbach, McConaughy, Ivanova, & Rescorla (2011)	internal consistency .80 - .92, test-retest reliability .81-.85	6, 8		Measured by the maternally-reported Brief Problem Monitor (BPM), assesses attentional, behavioral, and internalizing problems in children. 19 questions and answer choices. Score range: 0-38; higher scores indicate more behavioral problems. Expect lower scores in high- than low-cash gift group. 3 answer choices: 0. Not true as far as you know, 1. Somewhat true, 2. Very true

Domains (in gray) and sub-domains	Measure source	Psychometrics	Age preregistered <u>Primary</u> Outcome	Age preregistered <u>Secondary</u> Outcome	Measures and notes (All measures between grey lines measured in the same wave will be subject to multiple testing adjustments)
<b>Visual Processing and Abstract Spatial Perception</b>					
<b>Visual processing and abstract spatial perception*</b>	Wechsler & Naglieri, 2006	internal consistency .88 test-retest reliability .77	Originally registered for age 4 but not able to be calculated	4, for matrices subtest only	The Wechsler Nonverbal Scale of Ability was originally pre-registered as a Primary Outcome. The IQ score is calculated using two subtests -- Matrices and Recognition -- and we began our fieldwork on July 9, 2022 with both. On the basis of preliminary analysis of the first 71 cases, we discovered that 21% of participants scored at the floor of the Recognition assessment. We therefore dropped the Recognition subtest from our data collection instrument on September 30 2022, precluding us from calculating IQ in subsequent participants. Scores on the Matrices subtest, which measures visual processing and abstract spatial perception (not IQ per se), are now registered as an age-4 secondary outcome.
<b>Fluid Reasoning</b>					
<b>Fluid Reasoning*</b>	Wechsler(2012)		6		Measured by the Wechsler Preschool and Primary Scale of Intelligence (WPPSI) fluid reasoning index, assessed through a composite of two tasks: picture concepts (score range: 0-27; higher scores indicate better performance) and matrix reasoning (score range: 0-26; higher scores indicate better performance). Expect higher scores in high- than low-cash gift group.
<b>Perceptual Reasoning</b>					
<b>Perceptual Reasoning*</b>	Wechsler (2011)		8		Measured by the Wechsler Abbreviated Scale of Intelligence–Second Edition (WASI-II) perceptual reasoning index, assessed through a composite of two tasks: block design (score range: up to 8 years old: 0-57; > 9 yo: 0-71; higher scores indicate better performance) and matrix reasoning (up to 8 years old: 0-24; > 9 yo: 0-30; higher scores indicate better performance). Expect higher scores in high- than low-cash gift group.
<b>Pre-Literacy</b>					
<b>Pre-Literacy</b>	Hutton et al., 2019; Hutton et al., 2021			4	Measured by The Reading House

Domains (in gray) and sub-domains	Measure source	Psychometrics	Age preregistered <u>Primary Outcome</u>	Age preregistered <u>Secondary Outcome</u>	Measures and notes (All measures between grey lines measured in the same wave will be subject to multiple testing adjustments)
<b>Resting Brain Function</b>					
<b>Age-1 Resting Brain Function</b>	Tomalski et al., 2013; Otero et al., 2013; Marshall et al., 2004	n/a		1	Measured by low-density mobile electroencephalography at Age 1: we preregistered group differences in theta, alpha, gamma power.
<b>Age-4 Resting Brain Function</b>	Tomalski et al., 2013; Otero et al., 2013; Marshall et al., 2004; Troller-Renfree et al. 2022	n/a	4	4	Measured by high-density in-lab electroencephalography (EEG) <b>Age-4 Primary:</b> Because of limitations in power expected with multiple testing adjustments, we are preregistering a single composite of mid-to-high-frequency whole-brain power summing across alpha, beta, and gamma bands, from 7 to 45 Hz. <b>Age-4 secondary:</b> We hypothesize greater frontal gamma power in the high-cash gift group, and plan to analyze a full model of regions nested within bands, with the plan to report all exploratory outcomes. See attached analysis plan. Note: The original preregistration of EEG data collected when children were 12 months old included hypotheses across multiple frequency bands. Please see the history of preregistrations, including analysis plans.
<b>Age-6 and Age-8 Resting Brain Function</b>	Brito et al., 2020; Brito et al., 2022; Cantiani et al., 2019; Debnath et al., 2020; Gelman et al., 2012; Maguire et al., 2019; Marshall et al., 2004; Rockers et al., 2023, Troller-Renfree et al., 2022; Vanderwert et al., 2010; Vanderwert et al., 2016		6, 8		Measured by high-density in-lab electroencephalography (EEG). Ages 6 and 8 Primary hypothesis: Because of limitations in power expected with multiple testing adjustments, we are preregistering a single composite index of mid-to-high-frequency whole-brain power summed across alpha, beta, and gamma bands (defined as between 7 and 45 Hz). This frequency composite index sums absolute power across all single-Hz interval in the Alpha, Beta, and Gamma bands. We hypothesize that, in the eyes-closed condition, the high-cash gift group will show more power in this composite relative to the low-cash gift group. One-tailed t-tests will be used to test this directional hypothesis. See the Statistical Analysis Plan for additional details.

Domains (in gray) and sub-domains	Measure source	Psychometrics	Age preregistered <u>Primary Outcome</u>	Age preregistered <u>Secondary Outcome</u>	Measures and notes (All measures between grey lines measured in the same wave will be subject to multiple testing adjustments)
<b>Task-Related Brain Function</b>	Brito et al., 2020; Brito et al., 2022; Cantiani et al., 2019; Debnath et al., 2020; Gelman et al., 2012; Maguire et al., 2019; Marshall et al., 2004; Rockers et al., 2023, Troller-Renfree et al., 2022; Vanderwert et al., 2010; Vanderwert et al., 2016			6, 8	Age 6 and 8 secondary hypotheses: Our primary hypothesis (detailed above) is based on data gathered in the eyes-closed condition. Corresponding analyses of data from the eyes-open condition will be pre-registered as one of our secondary hypotheses, with the same directional hypotheses as the eyes-closed condition. We expect effects to be smaller in the eyes- open than in the eyes closed condition but do not pre-register hypotheses related to condition by group differences as they will be tested in separate models, are not of immediate theoretical interest, and we are likely to lack the power to detect them. A second set of secondary analyses are based on a different estimation approach. Consistent with another RCT examining brain activity (Debnath et al., 2020; Marshall et al., 2004; Vanderwert et al., 2010, 2016), we will analyze band-specific effects using mixed-effects models, with group as the between-subjects factor and region as within-subjects factor, to examine ITT impacts on each band of relative power in the eyes-closed condition. Our secondary hypotheses for each band are as follows: Theta (high-cash<low-cash), Alpha (high-cash>low-cash), Beta (high-cash>low-cash), and Gamma (high-cash>low-cash). One-tailed t-tests will be used given directional hypotheses. No further multiple-testing adjustments beyond the use of multi-level models will be used (Gelman et al., 2012). See the Statistical Analysis Plan for additional details.
<b>Auditory Discrimination Brain Function*</b>	Choeur et al., 2000; Garcia-Sierra et al., 2011; Kuhl et al., 2005	n/a		4	Measured by mismatch negativity (MMN) ERP with larger differences between standard and deviant stimulus in high-cash gift group compared to the low-cash gift group.

Domains (in gray) and sub-domains	Measure source	Psychometrics	Age preregistered <u>Primary</u> Outcome	Age preregistered <u>Secondary</u> Outcome	Measures and notes (All measures between grey lines measured in the same wave will be subject to multiple testing adjustments)
<b>Health: BMI</b>					
<b>Body Mass Index (BMI)</b>	Kuczmarski, 2000	n/a		4, 6, 8	Measured by CDC BMI percentile scales <u>Age 6/8:</u> We expect to see a reduced percentage of overweight or obese (greater than or equal to 85th percentile) children in the high-cash gift group compared to the low-cash gift group. We will report mean percentile scores of the two groups in descriptive analyses.
<b>Health: Physiological Stress</b>					
<b>Physiological Stress: Hair cortisol</b>	Ursache et al., 2017; Meyer et al., 2014; Davenport et al., 2006	n/a		Originally registered for age 4 but unable to collect	Our original plan was to measure physiological stress using hair cortisol concentration. The first several months of data collection revealed large racial and ethnic differences in willingness to provide a hair sample, due to both cultural and practical reasons. Because of the large amounts of non-random missing data, which would both compromise our statistical power and limit the generalizability of any findings, we dropped hair cortisol from our data collection procedures on October 25, 2022.
<b>Physiological Stress: Nail cortisol</b>	Phillips et al., 2021			6, 8	Child nail samples will be collected to yield a measure of the concentration of cortisol in pg/mg (picograms per milligram). To ensure cortisol levels are within an expected range, values above 500 and equal to or less than 0 will be assigned a missing value. To account for potential outliers, values below 500 will be truncated at the 99th percentile. Cortisol values will be log-transformed. We hypothesize the high-cash gift group will have lower cortisol values when compared to the low-cash gift group. If both fingernail and toenail are collected we will control for whether fingernail or toenail.

Domains (in gray) and sub-domains	Measure source	Psychometrics	Age preregistered <u>Primary Outcome</u>	Age preregistered <u>Secondary Outcome</u>	Measures and notes (All measures between grey lines measured in the same wave will be subject to multiple testing adjustments)
<b>Health: Sleep</b>					
<b>Sleep problems</b>	Yu et al., 2012	reliability .9	3	1, 2	Measured by PROMIS Sleep Disturbance- Short Form adapted from ECHO; For ages 1 and 2, additive index of the following items with 5-point answer (0: never; 1: almost never; 2: sometimes; 3: almost always, 4: always): 1. difficulty falling asleep 2. sleeping through night (reverse coded) 3. problem with sleep 4. problem sleeping Age 3, item 1 was not included in the survey
<b>Health: Other Indicators</b>					
<b>Overall Health, Medical Care, Diagnosis of Condition or Disability</b>	Child's overall health item source: Idler & Benyamini, 1997 Halim et al., 2013	n/a	3	1, 2	Additive index of the following items*: 1. Child's overall health? (4: excellent, 3: very good, 2: good, 1: fair, or 0: poor) 2. About how many times in the last year did you take child to a doctor because [he/she] was sick? 0-1 times, 2-5 times, 6+ 3. About how many times in the last year did you take child to a doctor because [he/she] was hurt or injured? 4. Did you ever have to take child to the Emergency Room because [he/she] was sick, hurt or injured? (Y/N) 5. How many times ER? 6. Has child been diagnosed with any health condition or disability since birth? (Y/N) *factor analysis of items will be conducted to scale the index
<b>Overall Health</b>	Child's overall health item source: Idler & Benyamini, 1997	n/a		4, 6, 8	Additive index of the following two items (reverse score 1, then add 1 and 2): 1. Child's overall health? 5 answer choices: excellent, very good, good, fair, or poor. Score range: 1-5; higher scores indicate better health. Expect higher scores in high- than low-cash gift group. 2. About how many times in the last year was child sick? 4 answer categories: 0-1 times, 2-3 times, 4-6 times, 7+. Score range: 1-4; higher scores indicate increased occurrences of illness. Expect lower scores in high- than low-cash gift group.

Domains (in gray) and sub-domains	Measure source	Psychometrics	Age preregistered <u>Primary</u> Outcome	Age preregistered <u>Secondary</u> Outcome	Measures and notes (All measures between grey lines measured in the same wave will be subject to multiple testing adjustments)
<b>Diagnosis of Health Condition</b>					
<b>Diagnosis of Health Condition</b>	BFY PIs			6, 8	Has child been diagnosed with any chronic health condition? Yes/No. If yes, asthma and/or something else? We will estimate whether there are group differences, but do not formulate a directional hypothesis, because of two offsetting possibilities: i) the high-cash gift group may have better access to services, which may lead to higher rates of diagnosis and/or ii) the cash gifts may lead to fewer chronic health conditions.
<b>Diagnosis of Developmental Condition</b>					
<b>Diagnosis of Developmental Condition</b>	Study PIs	n/a		4, 6, 8	Dichotomous measure 1:yes 0:no, constructed from the questionnaire categories: Diagnosis of Dev. Condition: speech delay, autism, ADHD, something else (this Q is part of Health Qs) We will estimate whether there are group differences, but do not formulate a directional hypothesis, because of two offsetting possibilities: i) the high-cash gift group may have better access to services, which may lead to higher rates of diagnosis and/or ii) the cash gifts may lead to fewer developmental conditions
<b>Special Services (IEP)</b>	PSID, 2021			6, 8	Maternal report of whether the child has an IEP or receives special educational services using questions adapted from the School Enrollment and Expectations section of the PSID Child Development Supplement. 1: yes; 0: no We will estimate whether there are group differences, but do not formulate a directional hypothesis, because of two offsetting possibilities: i) the high-cash gift group may have better access to services, which may lead to higher rates of diagnosis and receipt of special education and/or ii) the cash gifts may lead to higher school achievement and therefore lower need for special education and individual education plans.

Domains (in gray) and sub-domains	Measure source	Psychometrics	Age preregistered <u>Primary Outcome</u>	Age preregistered <u>Secondary Outcome</u>	Measures and notes (All measures between grey lines measured in the same wave will be subject to multiple testing adjustments)
<b>Child Epigenetic Pace of Aging</b>					
<b>Methylation pace of aging</b>	Belsky et al., 2015; Belsky et al., 2020; Belsky et al., 2022; Higgins-Chen et al., 2022; Levine et al., 2018, Lu et al., 2019	n/a		4	Methylation pace of aging was developed from DNA-methylation analysis of Pace of Aging in the Dunedin Study birth cohort. Pace of Aging is a composite phenotype derived from analysis of longitudinal change in 18 biomarkers of organ-system integrity. In contrast, so-called epigenetic clocks are trained on chronological age. Increments of methylation pace of aging correspond to “years” of physiological change occurring per 12-months of chronological time. The second iteration (DunedinPACE) takes into account an additional measurement occasion (collected 20 years after inclusion) and only includes the most reliable DNA methylation probes, i.e. probes with little variation between technical replicates. If a higher quality measure of epigenetic aging at the time of analysis becomes available, we we will substitute that instead.
				6, 8	Expect slower DunedinPACE- pace of aging in high-cash group: Methylation pace of aging was developed from DNA-methylation analysis of Pace of Aging in the Dunedin Study birth cohort. Pace of Aging is a composite phenotype derived from analysis of longitudinal change in 18 biomarkers of organ-system integrity. Increments of methylation pace of aging correspond to “years” of physiological change occurring per 12-months of chronological time. We will also report GrimAge Acceleration, which we consider an exploratory analysis. GrimAge represents a DNA-methylation metric designed to predict morbidity and mortality. Briefly, the initial phase entailed the computation of models incorporating physiological indicators, age, sex, and smoking history, with the objective of optimizing mortality prediction within the Framingham Heart Study Offspring cohort. GrimAge will be based on principal components of DNA-methylation to bolster reliability and residualized for chronological age derived from sample receipt age to reflect accelerated biological age.

Domains (in gray) and sub-domains	Measure source	Psychometrics	Age preregistered <u>Primary Outcome</u>	Age preregistered <u>Secondary Outcome</u>	Measures and notes (All measures between grey lines measured in the same wave will be subject to multiple testing adjustments)
<b>Child DNA Methylation</b>					
<b>DNA methylation</b>	McCartney et al, 2022	n/a		4, 6, 8	Expect higher Epigenetic-g in high-cash group: Salivary DNA-methylation profiles of cognitive functioning, i.e., “Epigenetic-g”, can be computed on the basis of weights from a blood-based epigenome wide association study of general cognitive functions (g) in adults. General cognitive ability was derived from the first unrotated principal component of logical memory, verbal fluency and digit symbol tests, and vocabulary. Epigenetic-g is conceptually distinct from biological aging. If a higher quality measure of epigenetic profile of cognitive functioning becomes available at the time of analysis, we will substitute that instead.
<b>Child Nutrition</b>					
<b>Consumption of healthy foods</b>	Los Angeles County WIC Survey, 2017			2, 6, 8	Additive index of the number of times per day consumed the following items: 1. eat fruits 2. eat vegetables Index score: 1: zero, 2:1 time, 3: 2 times, 4: 3 times, 4: 5 times, 6: 5 or more times. Score range: 1-12; higher scores indicate more consumption of healthy foods. Age 6/8: Expect higher scores in high- than low-cash gift group.
<b>Consumption of unhealthy foods</b>	Los Angeles County WIC Survey, 2017; Hunsberger et al., 2012			2, 6, 8	<u>Age 2:</u> Additive index of the number of times per day consumed the following items: 1. juice, soda, chocolate milk or other sweet drinks 2. eat sweets <u>Age 6/8:</u> . Additive index of the number of times per day consumed the following items: 1. salty snacks such as potato chips, Doritos, Fritos, tortilla chips; 2. sweets or sweetened foods, such as sweetened cereals, fruit bars, Pop-Tarts, donuts, cookies, or candies 3. drink sweetened beverages such as juice, soda, chocolate milk, or other sweet drinks? Index score: 1. zero, 2. 1 time, 3. 2 times, 4. 3 times, 5. 4 times, 6. 5 or more times. Score range: 1-18; higher scores indicate more consumption of unhealthy foods. Expect lower scores in high- than low-cash gift group.

Domains (in gray) and sub-domains	Measure source	Psychometrics	Age preregistered <u>Primary</u> Outcome	Age preregistered <u>Secondary</u> Outcome	Measures and notes (All measures between grey lines measured in the same wave will be subject to multiple testing adjustments)
<b>Any Maternal Concern for Developmental Delay</b>					
<b>Parents' Evaluation of Developmental Status (PEDS)</b>	Glascoe, 1997			3	Measured by the total score across categories of components of the PEDS, which includes 10 survey items.
<b>Total "predictive concerns" in the PEDS</b>	Glascoe, 1997			3	Measured by the total number of maternal-reported concerns that are "predictive of developmental delay" in the PEDS
<b>School Achievement</b>					
<b>Retention</b>	PSID, 2021			6, 8	Maternal report of whether the child has repeated a grade, adapted from the School Enrollment and Expectations section of the PSID Child Development Supplement. Item: Has child ever been held back a grade? (no/yes) Expect fewer retentions in high cash group.
<b>School Behavior</b>					
<b>Suspensions</b>	SIPP, 2023			6, 8	Maternal report of the number of school suspensions, adapted from the Survey of Income and Program Participation. Item: Has child ever been suspended or expelled from school? (no/yes) Expect fewer suspensions in high cash group.
<b>Child engagement in school</b>	Ehrle & Moore, 1999	Cronbach's alpha=.76		6, 8	Maternal report of child's engagement in school using an item adapted from the Survey of Income and Program Participation. "How often would you say that (CHILD) cares about doing well in school"? 4 answer choices: 1. none of the time; 2. some of the time, 3. most of the time; 4. all of the time. Score range: 1-4; higher scores indicate more engagement in school. Expect more engagement in high cash group.
<b>Attendance</b>	BFY PIs			8	During the last 12 months, how many times has (CHILD) been absent? Answer is estimated number of days. Expect fewer absences in high cash group.

Domains (in gray) and sub-domains	Measure source	Psychometrics	Age preregistered <u>Primary Outcome</u>	Age preregistered <u>Secondary Outcome</u>	Measures and notes (All measures between grey lines measured in the same wave will be subject to multiple testing adjustments)
<b>School Quality</b>					
<b>School Quality</b>	Stanford data matched to name of school and city/district			8	Gathered from school names and city/district. We expect an increase in school quality for the high cash group. The measure we select will be a function of what data will be available at the time of Age 8 wave.

*Notes.* Previous versions of this table specified that "All measures between grey lines will be subject to multiple testing adjustments". This is now changed to be "All measures between grey lines measured *in the same wave* will be subject to multiple testing adjustments".

The previous version of this table referred to "waves" of data collection. For clarity, we have replaced "wave" with "age", with both referring to the age of the baby at planned data collection. Assessment target time is around the child's birthday for each wave, i.e. 12 months, 24 months, 36 months, 48 months, 72 months, and 96 months.

Minor, non-substantive changes may be made to the wording of specific items across data collection years.

Due to COVID-19, the age 3 data collection wave is in the form of a phone survey. Thus, sub-domains that were supposed to be measured in-person at ages 2 or age 3 were postponed to age 4. These domains include: epigenetic age, DNA methylation, BMI, physiological stress, self-regulation, executive function, social-emotional behavior, IQ; resting brain function, auditory discrimination brain function. The sub-domain of child vocalizations was not measured in-person at age 2 (due to COVID-19) and is not being measured at later ages, so it is removed from the pre-registration table.

\*Indicates that the sub-domain was called something different in previous versions of this table. The changes are listed below: -

- Previously "Communicative Development (Vocabulary)"; presently "Vocabulary".
- Previously "Intelligence"; then "IQ". Presently re-named to domain tested (not IQ per se)
- Previously "Language Related Brain Function"; presently "Auditory Discrimination Brain Function".

Language Development	
<b>Language Milestones</b>	Squires, J., Bricker, D. D., & Twombly, E. (2009). <i>Ages &amp; stages questionnaires</i> . Baltimore, MD: Paul H. Brookes.
<b>Language Processing</b>	Golinkoff, R. M., De Villiers, J. G., Hirsh-Pasek, K., Iglesias, A., Wilson, M. S., Morini, G., & Brezack, N. (2017). <i>User's Manual for the Quick Interactive Language Screener (QUILS): A Measure of Vocabulary, Syntax, and Language Acquisition Skills in Young Children</i> . Paul H. Brookes Publishing Company
<b>Vocabulary*</b>	Fenson, L., Pethick, S., Renda, C., Cox, J. L., Dale, P. S., & Reznick, J. S. (2000). Short-form versions of the MacArthur Jackson-Maldonado, Donna, Virginia A. Marchman, and Lia C. H. Fernald. 2012. "Short-Form Versions of the Spanish MacArthur-Bates Communicative Development Inventories." <i>Applied Psycholinguistics</i> 34 (4): 837–68.  Martin, N. A., & Brownell, R. (2011). ROWPVT-4: Receptive One-Word Picture Vocabulary Test.  Martin, N., & Brownell, R. (2011). <i>Expressive one-word picture vocabulary test</i> (4th ed.). Novato: Academic Therapy Publications.
<b>Maternal concern for language delay</b>	Glascoc FP. <i>Parents' Evaluations of Developmental Status: A Method for Detecting and Addressing Developmental and Behavioral Problems in Children</i> . Nashville, TN: Ellsworth & Vandermeer Press, 1997.
Academic Achievement	
<b>Reading</b>	McGrew, K. S., & Woodcock, R. W. (2018). <i>Woodcock-Johnson IV Tests of Achievement</i> . Rolling Meadows, IL: Riverside Publishing.
<b>Reading Comprehension</b>	McGrew, K. S., & Woodcock, R. W. (2018). <i>Woodcock-Johnson IV Tests of Achievement</i> . Rolling Meadows, IL: Riverside Publishing.
<b>Math</b>	McGrew, K. S., & Woodcock, R. W. (2018). <i>Woodcock-Johnson IV Tests of Achievement</i> . Rolling Meadows, IL: Riverside Publishing.
Executive Function & Self-Regulation	
<b>Pencil Tap</b>	Diamond, A., & Taylor, C. (1996). Development of an aspect of executive control: development of the abilities to remember what I said and to "do as I say, not as I do". <i>Developmental psychobiology</i> , 29 (4), 315–334. <a href="https://doi.org/10.1002/(SICI)1098-2302(199605)29:4&lt;315::AID-DEV2&gt;3.0.CO;2-T">https://doi.org/10.1002/(SICI)1098-2302(199605)29:4&lt;315::AID-DEV2&gt;3.0.CO;2-T</a>  Bierman, K. L., Nix, R. L., Greenberg, M. T., Blair, C., & Domitrovich, C. E. (2008). Executive functions and school readiness intervention: impact, moderation, and mediation in the Head Start REDI program. <i>Development and psychopathology</i> , 20 (3), 821–843. <a href="https://doi.org/10.1017/S0954579408000394">https://doi.org/10.1017/S0954579408000394</a>

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**Appendix Table 10: Maternal and Family Focused Preregistered Hypotheses**

Domains (in gray) and sub-domains	Measure/Item source	Psychometrics	Age preregistered <u>Primary</u> Outcome	Age preregistered <u>Secondary</u> Outcome	Measures (All measures between grey lines measured during the same wave will be subject to multiple testing adjustments)
<b>Household Economic Hardship</b>					
<b>Index of economic stress</b>	MTO; Kling, Liebman, Katz, 2007			1, 2, 3, 4, 6, 8	<p><b>Age 1-4:</b> Additive index of dichotomous variables (higher score=more stress):</p> <ol style="list-style-type: none"> <li>worried about expenses? (0: occasionally or never; 1: frequently or more)</li> <li>whether spent more than income? (0: no; 1: yes)</li> <li>messed rent or mortgage (0 if homeless or not missed; 1 if missed rent or mortgage)</li> <li>Set aside rainy day funds for 1 mo (0: Yes 1: No)</li> <li>Ability to cover expenses for 1 mo with loss of income (0: Yes; 1: No)</li> <li>in past 12 mos, missed payments for water, gas, oil, electricity? (0: no or not applicable; 1: yes)</li> <li>in past 12 mos, gas, water, electricity ever shut off? (0: no; 1: yes)</li> <li>Since child's birth, have you ever been evicted or forced to leave? (0: No; 1: Yes). *changes to "in the past 12 months" for surveys at ages 2 through 4</li> <li>needed medical or dental care and did not get it? (0=no; 1=yes) *item 9 dropped at age 4 owing to survey time constraint.</li> </ol> <p><b>Age 6,8:</b> Additive index of dichotomous variables (higher score=more stress); expect less stress for high-cash group. In the past 12 months:</p> <ol style="list-style-type: none"> <li>have you ever missed a rent or mortgage payment? (1: Yes; 0: No)</li> <li>did you ever miss a payment for oil, gas, water, or electricity? (1: Yes; 0: No/Not applicable, do not pay or does not have these utilities)</li> <li>was your gas, water, or electricity ever shut off for nonpayment? (1: Yes; 0: No)</li> <li>have you ever been forced to leave or were evicted from your home? (1: Yes; 0: No)</li> <li>were you ever hungry, but didn't eat because you couldn't afford enough food? (1: Yes; 0: No)</li> <li>did you receive free food or meals? (1: Yes; 0: No)</li> </ol>
<b>Maternal Hardship</b>	BFY PIs			6, 8	<p>One item: 1. In the last 12 months, have you experienced an emergency need for extra money that would amount to \$500 or more? (1: Yes; 0: No) 1a. [If yes] Were you able to manage it? (Would you say: 1. Easily with no worries; 2. With some stress; 3. With a lot of difficulty; 4. Not at all, couldn't manage it) Expect less hardship for high-cash group.</p>
<b>Household Poverty rate</b>	US Census Bureau			1, 2, 3, 4, 6, 8	<p>Measured using the Census Bureau's poverty thresholds by size of family and number of children. Age 6/8: Expect lower poverty rate for high-cash group.</p>

**Appendix Table 10: Maternal and Family Focused Preregistered Hypotheses**

Domains (in gray) and sub-domains	Measure/Item source	Psychometrics	Age	Age	Measures (All measures between grey lines measured during the same wave will be subject to multiple testing adjustments)
			preregistered <u>Primary</u> Outcome	preregistered <u>Secondary</u> Outcome	
<b>Index of food insecurity*</b>	Economic Research Service, USDA, 2012			1, 2, 3, 4	Additive index of 6 dichotomized items (higher score=more food insecurity): 1. Food didn't last, no \$ for more (0: Never true, 1: sometimes or often true) 2. Can't afford balanced meals (0: Never true, 1: sometimes or often true) 3. Cut size or skip meals (0: No; 1: Yes) 4. If yes to (3), how often? (0: only one or two months; 1: almost every month or some months) 5. Eat less than should (0:No; 1: Yes) 6. Hungry+ (0:No; 1: Yes)
<b>Social Services Receipt</b>					
<b>Number of Benefits received by mother</b>	Study PIs			1, 2, 3	Additive index of dichotomized items (higher score=more benefits received): 1. Food stamps SNAP (0: not currently receiving; 1: currently receiving) 2. Free or reduced childcare* 3. Early Head Start or HS* 4. Women, Infants and Children (WIC) 5. State Unemployment 6. Cash assistance/TANF* 7. Medicaid coverage for self 8. Housing assistance 9. LIHEAP / heat/AC assistance* *Indicates benefits that were not asked about at age 3. Note: Age 4 benefit index was not pre-registered because of the availability of administrative records for some of the benefits
<b>Mother's Labor Market and Education Participation</b>					
<b>Time to labor market reentry from birth</b>	Current Population Survey			1	Continuous outcome: # of months until mom's reentry into labor market from birth of child derived from the following items: 1. did you ever work for pay since child's birth? 2. in what months did you work for pay?
<b>Time to full-time labor market reentry from birth</b>	Current Population Survey			1	Continuous outcome: # of months until mom's full-time reentry into labor market from birth of child derived from the following items: 1. did you ever work full time since child's birth? 2. in what months did you work full time?
<b>Mother's education and training attainment</b>	Current Population Survey			1, 2, 3	Dichotomous variable indicating that mother participated in education and/or job training activities since birth* *changes to "in the past 12 months" for surveys at ages 2 and 3.
<b>Mother's education attainment</b>	Current Population Survey			6,8	Dichotomous variable indicating that mother participated in education in the past 12 months plus any degrees received. Expect higher educational attainment in high-cash gift group.

**Appendix Table 10: Maternal and  
Family Focused Preregistered Hypotheses**

Domains (in gray) and sub-domains	Measure/Item source	Psychometrics	Age	Age	Measures  (All measures between grey lines measured during the same wave will be subject to multiple testing adjustments)
			preregistered <u>Primary</u> Outcome	preregistered <u>Secondary</u> Outcome	
<b>Mother's training attainment</b>	Current Population Survey			6, 8	Dichotomous variable indicating that mother participated in job training activities in the past 12 months. Expect more training in high-cash gift group.
<b>Mother's Labor Market Participation</b>	Current Population Survey			4, 6, 8	Dichotomous variable indicating whether mother is participating in the labor market using the item "do you currently work for pay?" We don't register group differences on employment and earnings impacts because of two offsetting arguments: i) income effects from our payments (our clawback arrangements with states preclude substitution effects) could lead mothers to opt for fewer work hours and possibly dropping out of the labor force altogether; or ii) our payment may enable the mothers in our study to engage in training activities and/or afford center-based child care that eventually boost earning and employment.
<b>Maternal Earnings</b>	PSID			4, 6, 8	Mother's Earnings in the previous calendar year. We don't register group differences on employment and earnings impacts because of two offsetting arguments: i) income effects from our payments (our clawback arrangements with states preclude substitution effects) could lead mothers to opt for fewer work hours and possibly dropping out of the labor force altogether; or ii) our payment may enable the mothers in our study to engage in training activities and/or afford center-based child care that eventually boost earnings
<b>Child-Focused Expenditures</b>					
<b>Index of child-focused expenditures (since birth)</b>	Lugo-Gil, Yoshikawa, 2006			1	Additive index of the following dichotomous items (higher score=more purchased): Since child's birth, purchased... 1. Crib? 2. Car seat? 3. High chair? 4. Safety covers for outlets? 5. Latches for cabinets? 6. Gate? 7. Smoke detector? 8. books (yes/no)?
<b>Index of child-focused expenditures</b>	Lugo-Gil, Yoshikawa, 2006, and Schild et al., 2003			1, 2, 3, 4, 6, 8	Continuous dollar amount of age-relevant items. Past 30 days, total \$ amount spent on... <u>Age 1:</u> 1. books 2. toys 3. clothes 4. diapers 5. videos; <u>Age 2-4:</u> 1. books 2. toys 3. clothes 4. activities 5. videos. <u>Age 6/8:</u> 1. clothing 2. electronic devices 3. toys 4. school materials 5. activities. 6. medical expenses 7. child care 8. travel Expect higher spending for high-cash group.
<b>Index of expenditures on all children in the household, including target child</b>	Schild et al., 2003			6, 8	Past 30 days, total \$ amount spent on all children in household. Expect higher spending for high-cash group. 1. clothes 2. electronic devices 3. toys 4. school materials 5. activities 6. medical expenses 7. child care 8.travel
<b>Cost of paid child care</b>	National Study of Early Care and Education			1, 2, 3, 4	Out of pocket spending on child care last month. 1. altogether, about how much money did you spend out-of-pocket on all of [CHILDNAME]'s child care arrangements last month? Note: Age 4: dropped wording "out-of-pocket"

**Appendix Table 10: Maternal and  
Family Focused Preregistered Hypotheses**

Domains (in gray) and sub-domains	Measure/Item source	Psychometrics	Age	Age	Measures  (All measures between grey lines measured during the same wave will be subject to multiple testing adjustments)
			preregistered <u>Primary</u> Outcome	preregistered <u>Secondary</u> Outcome	
Use of center-based care	National Study of Early Care and Education			1	1. Has child spent any time in childcare or day care? (Y/N)
				2, 3, 4	1. Has child spent 5 or more hours in a child care or day care center last week? (Y/N)
<b>Housing and Neighborhoods</b>					
<b>Index of perceptions of neighborhood safety</b>	MTO; Kling, Liebman, Katz, 2007			1, 2, 3	Additive index of two items (higher score=feels more safe). 1. how safe during day? (3: very safe, 2: safe, 1: unsafe, 0: very unsafe) 2. how safe during night? (3: very safe, 2: safe, 1: unsafe, 0: very unsafe)
<b>Index of housing quality</b>	MTO; Kling, Liebman, Katz, 2007			1	Additive index of 7 items (higher score=higher quality): 1. Bad walls (0: big problem; 1: small problem; 2: not problem) 2. bad plumbing 3. rodents 4. cockroaches 5. bad windows 6. bad heat 7. overall condition (3: excellent, 2: good 1: fair, 0: poor)
				2	Additive index of 9 items (higher score=higher quality): 1. Bad walls (0: big problem; 1: small problem; 2: not problem) 2. bad plumbing 3. rodents 4. cockroaches 5. bad windows 6. bad heat 7. bad air condition 8. bad locks~ 9. overall condition (3: excellent, 2: good 1: fair, 0: poor)
<b>Homelessness</b>	MTO; Kling, Liebman, Katz, 2007			1, 2, 3	Dichotomous indicator of whether the mother has ever been homeless or in a group shelter (age 1 "since birth", age 2-3 "in the past 12 months"): 0: No 1: Yes
<b>Excessive Residential mobility</b>	MTO; Kling, Liebman, Katz, 2007			1, 2, 3	Moved three or more times since birth of baby* (Y/N) *changes to "in the last 12 months" for surveys at ages 2 and 3
<b>Neighborhood poverty</b>	Kling, Liebman, Katz, 2007			1, 2, 3, 4, 6, 8	# of residents below poverty line in census tract divided by total number of residents in census tract. Age 6/8: Expect less neighborhood poverty in the high-cash group.

**Appendix Table 10: Maternal and Family Focused Preregistered Hypotheses**

Domains (in gray) and sub-domains	Measure/Item source	Psychometrics	Age preregistered <u>Primary</u> Outcome	Age preregistered <u>Secondary</u> Outcome	Measures (All measures between grey lines measured during the same wave will be subject to multiple testing adjustments)
<b>Family and Maternal Perceived Stress</b>					
<b>Perceived stress</b>	Cohen et al., 1994, 1983	alpha: .86		1, 2	Perceived Stress Scale (PSS): additive index of 9 items (0: never; 1: almost never; 2: sometimes; 3: fairly often; 4: very often) 1. upset because of something unexpected 2. felt unable to control important life things 3. felt nervous and stressed 4. confident in ability to handle personal probs (reverse coded - rc) 5. couldn't cope with all things to do 6. control of irritations in life (rc) 7. "on top of things" (rc) 8. angered bc of things outside control 9. could not overcome difficulties
				3	Perceived Stress Scale (PSS): additive index of 10 items (0: never; 1: almost never; 2: sometimes; 3: fairly often; 4: very often) 1. upset because of something unexpected 2. felt unable to control important life things 3. felt nervous and stressed 4. confident in ability to handle personal probs (reverse coded - rc) 5. couldn't cope with all things to do 6. control of irritations in life (rc) 7. "on top of things" (rc) 8. angered bc of things outside control 9. could not overcome difficulties 10. felt things were going "your way" (rc)~
<b>Parenting stress</b>	Items 1-4: Project GAIN Items 5-7: PSID-Child Development Supplement			1, 2 (originally also registered for age 4 and then dropped)	Aggravation in Parenting Scale: additive index of 7 items (0: Strongly agree-5: Strongly disagree): 1. confidence in parenting abilities 2. feels good about parenting abilities 3. thinks good parent 4. kids will say she was wonderful 5. giving up more for kids than ever expected 6. feels trapped (rc) 7. unable to do different things bc of kids (rc) Note: Index dropped from age 4 survey owing to time constraints

**Appendix Table 10: Maternal and  
Family Focused Preregistered Hypotheses**

Domains (in gray) and sub-domains	Measure/Item source	Psychometrics	Age	Age	Measures  (All measures between grey lines measured during the same wave will be subject to multiple testing adjustments)
			preregistered <u>Primary</u> Outcome	preregistered <u>Secondary</u> Outcome	
<b>Maternal Happiness and Optimism</b>					
<b>Global happiness</b>	The General Social Survey from NORC			1, 2, 3, 6, 8	One-item with 3-point response scale. <u>Age 1-3:</u> "Taken altogether, how happy are you these days?" (0: not happy; 1: pretty happy; 2: very happy) One-item with 3-point response scale. Expect higher score for high-cash group. <u>Age 6/8:</u> "Taken all together, how would you say things are these days, would you say that you are 1. very happy 2. pretty happy or 3. not too happy?" Expect higher score for high-cash group.
<b>Maternal Agency</b>	Snyder et al., 1991	alpha: .86 test-retest: .81		1, 2, 3	The Adult Hope Scale: additive index of 8 items with 5-point response scale (0: definitely false; 5: definitely true) 1. think of ways to get out of a jam 2. energetic pursuit of goals 3. lot of ways around any problem 4. ways to get what's important 5. solves problems 6. past has prepared me for future 7. pretty successful in life 8. meets goals set for oneself
<b>Maternal Physiological Stress</b>					
<b>Maternal hair cortisol</b>	Ursache et al., 2017			1, 4	At age 1, we attempted to collect maternal hair cortisol for all in-person visits, prior to the onset of the pandemic (when data collection became limited to phone-based survey administration only). This resulted in a hair sample being collected from 409 of the 605 mothers who participated in an in-person visit, with large racial and ethnic differences in willingness to provide a sample. At age-4, we attempted to improve collection rates following focus groups and the development of informational videos. However, the first several months of data collection again revealed large racial and ethnic differences in willingness to provide a hair sample, due to both cultural and practical reasons. Because of the large amounts of non-random missing data, which would both compromise our statistical power and limit the generalizability of any findings, we dropped hair cortisol from the age-4 data collection procedures on October 25, 2022.
<b>Maternal Executive Function</b>					
<b>Executive Function</b>	Carlson, 2017; Carlson & Zelazo 2014; Reflection Sciences 2021	ICC=0.69		4, 6, 8	Minnesota Executive Function Scale (MEFS). <u>Age 6,8:</u> We expect a higher value of the maternal MEFS standardized score for the high-cash gift group mothers than the low-cash gift mothers. Higher scores indicate better performance.

**Appendix Table 10: Maternal and  
Family Focused Preregistered Hypotheses**

Domains (in gray) and sub-domains	Measure/Item source	Psychometrics	Age	Age	Measures  (All measures between grey lines measured during the same wave will be subject to multiple testing adjustments)
			preregistered <u>Primary</u> Outcome	preregistered <u>Secondary</u> Outcome	
<b>Maternal Attentional Resources</b>					
<b>Scarcity-Primed Inhibitory Control and Attention</b>	Gershon et al., 2013; Slotkin et al., 2012; Zelazo et al., 2013	Test-retest: English 3-15 years: ICC=0.95; 20-85 years: ICC=0.83. Spanish 18-85 years: $\rho=.65$	6, 8		NIH Toolbox Flanker Inhibitory Control and Attention Test. Age-corrected standardized score. We expect a higher value of the maternal Flanker score for the high-cash gift group mothers than the low-cash gift mothers. Higher scores indicate better performance. Prior to the Flanker administration, respondent/mother will be asked to listen and reflect for a minute on these questions: "Imagine that an unforeseen event requires of you an immediate \$1,000 expense. Are there ways in which you may be able to come up with that amount of money on a very short notice? How would you go about it? How stressful would it be to manage this?"
<b>Maternal Mental Health</b>					
<b>Index of maternal depression</b>	Kroenke & Spitzer, 2002			1, 2, 3, 4, 6, 8	PHQ-8: additive index of 8 items (0: not at all; 1: several days; 2: more than half of days; 3: every day) Age 6/8: We expect less depression in the high- as opposed to low-cash group. 1. little interest or pleasure doing things 2. feeling down, depressed, hopeless 3. trouble sleeping or sleep too much 4. feel tired and no energy 5. poor appetite or overeating 6. feel like a failure 7. trouble concentrating 8. moving slowly or fidgety
<b>Index of maternal anxiety</b>	Steer & Beck, 1997  Spitzer et al., 2006	alpha: .92 test-retest: .75  alpha: .92 test-retest: .83		1, 3  2, 3, 4, 6, 8	Beck Anxiety Inventory: additive index of 21 common anxiety symptom items (0: not at all; 1: mildly; 2: moderately; 3: severely bothersome)  GAD-7: additive index of 7 items (0: not at all; 1:several days; 2: more than half the days; 3: nearly every day) Age 6/8: We expect less anxiety in the high- as opposed to low-cash group. 1. nervous and anxious 2. no control worrying 3. worrying too much 4. no relaxing 5. restless 6. annoyed and irritable 7. afraid
<b>Maternal Substance abuse<sup>x</sup></b>					
<b>Alcohol and cigarette use</b>	MTO; Kling, Liebman, Katz, 2007			1, 3	Additive index of the following items (0: never in last year; 1: less than 1x per month; 2: several times per month; 3: several times per week; 4: everyday): 1. How often do you smoke cigarettes? 2. How often drink alcohol?

**Appendix Table 10: Maternal and Family Focused Preregistered Hypotheses**

Domains (in gray) and sub-domains	Measure/Item source	Psychometrics	Age preregistered <u>Primary Outcome</u>	Age preregistered <u>Secondary Outcome</u>	Measures (All measures between grey lines measured during the same wave will be subject to multiple testing adjustments)
<b>Opioid use</b>	MTO; Kling, Liebman, Katz, 2007			1, 3	Number of times of opioid use in the past year (0: never in last year; 1: less than 1x per month; 2: several times per month; 3: several times per week; 4: everyday):
<b>Chaos in Home</b>					
<b>Index of chaos in the home</b>	Evans et al., 2005	alpha: .77 test-retest: .93		1, 2	Home Environment Chaos Scale: additive index of 20 items (higher score=more chaos): (0: not true; 1: true) 1. can find things (reverse coded - rc) 2. little commotion in home (rc) 3. always rushed 4. can "stay on top of things" (rc) 5. always late 6. "zoo" in home 7. can talk w/o interruption (rc) 8. always a fuss 9. family plans don't work out 10. can't hear oneself think at home 11. drawn into others' arguments 12. can relax at home (rc) 13. phone takes up a lot of time 14. atmosphere is calm at home (rc) 15. regular morning routine (rc) 16. eat together during daily (rc) 17. evening routine with child (rc) 18. regular late afternoon routine with child (rc) 19. child goes to bed at regular time (rc) 20. set aside for talking with child daily (rc)
<b>Maternal Relationships</b>					
<b>Physical Abuse</b>	Fragile Families and Child			1,2	1. Ever abused? (1: yes; 0: no)
<b>Frequency of Arguing</b>	Wellbeing Study			1,2	1. How often argue about things that are important to you? (1: never; 2: rarely; 3: sometimes; 4: often; 5: always)

**Appendix Table 10: Maternal and Family Focused Preregistered Hypotheses**

Domains (in gray) and sub-domains	Measure/Item source	Psychometrics	Age preregistered	Age preregistered	Measures (All measures between grey lines measured during the same wave will be subject to multiple testing adjustments)
			<u>Primary Outcome</u>	<u>Secondary Outcome</u>	
Relationship quality				1	Additive index of the following items (higher score=higher qual rel) 1. Partner fair and willing to compromise? (3: Often; 2: sometimes; 1: never) 2. partner expressed affection or love? (3: Often; 2: sometimes; 1: never) 3. partner insulted or criticized you or your ideas (0: Often; 1: sometimes; 2: never) 4. partner made you feel down or bad about yourself during an argument? (0: Often; 1: sometimes; 2: never) 5. partner encouraged or helped you to do things that were important to you? (2: Often; 1: sometimes; 0: never) 6. partner isolated you? (0: Often; 1: sometimes; 2: never) 7. partner hurt you physically (0: Often; 1: sometimes; 2: never) 8. partner sexually abused you? (0: Often; 1: sometimes; 2: never) 9. partner listened to you? (3: Often; 2: sometimes; 1: never) 10. partner made you feel afraid? (0: Often; 1: sometimes; 2: never) 11. partner threatened or hurt your child/children? <sup>+</sup> (0: Often; 1: sometimes; 2: never)
				2, 3	Dichotomous indicator of <u>current or recent</u> relationship quality, where poor quality is defined as 1 if the mother is in a relationship and has a score of 26 or below on the relationship quality scale (approximately the bottom tercile of the low cash gift group distribution of scores) and a 0 either if the mother is not in a relationship or is in a relationship and has a relationship quality index score of 27 or above (approximately in the top two terciles of the distribution).
<b>Maternal Physical Health</b>					
Global health	Idler & Benyamini, 1997			1, 2, 6, 8	One item with 5-point response scale "overall, how would you describe your health..." (1:poor - 5:excellent) Age 6/8: Expect better health for high-cash group
Sleep	Yu et al., 2012			1, 3	Additive index of the following items (higher score=higher qual sleep): 1. Quality of sleep (0: very poor-5: very good) 2. Difficulty falling asleep (0: not atll; 5: very much) (rc) 3. Felt tired (0: not at all-5: very much) (rc)
Mother's BMI	CDC scales			4, 6, 8	<u>Age 4:</u> Measured by CDC BMI percentile scales <u>Age 6, 8:</u> Dichotomous measure based on CDC BMI percentile scales We expect to see a reduced percentage of overweight or obese (BMI greater than or equal to 25) mothers in the high-cash gift group compared to the low-cash gift group. We will report mean BMI of the two groups in descriptive analyses.
<b>Parent-Child Interaction Quality</b>					
Adult word count	Xu et al (2009), LENA foundation			1	Measured using LENA processing software

**Appendix Table 10: Maternal and  
Family Focused Preregistered Hypotheses**

Domains (in gray) and sub-domains	Measure/Item source	Psychometrics	Age	Age	Measures  (All measures between grey lines measured during the same wave will be subject to multiple testing adjustments)
			preregistered <u>Primary</u> Outcome	preregistered <u>Secondary</u> Outcome	
<b>Conversational turns</b>	Xu et al (2009), LENA foundation			1	Measured using LENA processing software
<b>Index of mother's positive parenting behaviors</b>	Roggman, et al., 2013; Griffen & Friedman, 2007; Belsky, et al., 2007	inter-rater reliability varies by domain: .69- .80; alpha: .78		1, 4	Measured using PICCOLO coding of parenting behaviors from the total of four sub-scales (affection, responsiveness, encouragement and teaching) with responses ranging from 0: absent, 1: barely, 2: clearly. The total composite score is preregistered. Exploratory analyses will examine differences across the subscales, and factor analysis will be used to confirm the extent to which the four subscales best fit the data. Parent child interaction task and script adapted from the NICHD Study of Early Child Care and Youth Development.
<b>Index of mother's positive parenting behaviors</b>	(Aran et al., 2022; Biringen, 2008; Biringen et al., 2014; Darling & Steinberg, 2017; Leyva et al., 2017; Leyva et al., 2019)	ICCs for inter- rater reliability range between .76-.92		6, 8	Block play and a grocery shopping game (12 minutes). Grocery shopping game task and script adapted from Leyva et al., 2017 and Leyva et al., 2019. Coding: Measured using Emotional Availability scale (EAS) - 4th Edition middle childhood/youth version (Biringen et al., 2008; Biringen et al., 2014) coding of parenting behaviors from a total of four maternal sub-scales (sensitivity, structuring, non-intrusiveness, and non-hostility) with responses scored on a 7-point scale across the two PCI tasks. The additive total composite score will be pre-registered. We hypothesize a higher composite score for the high-cash gift group relative to the low-cash gift group.  Prior studies have reported a unidimensional structure of the maternal dimensions of the EAS data (Aran et al., 2022); although most evidence includes samples of younger children. Earlier work by the authors of the EA scales, using a prior version of the EAS, suggested two distinct factors of maternal style, an affective and a control one (see Biringen et al., 2014). Similarly, literature on parenting practices with older children and adolescents support the idea of distinct parenting dimensions related to parental support (i.e., warmth, responsiveness) and parental control (i.e., intrusiveness) (Darling & Steinberg, 2017).  Given the limited empirical evidence on the dimensionality of the EAS with children aged six, we will first conduct confirmatory factor analysis in the full sample using SEM to assess whether the measure is best represented by a single latent factor, as expected. If the goodness-of-fit statistics (RMSEA, CFI, TFI, SRMR) do not indicate support of a single factor structure, we will then perform split-half exploratory factor analysis (principal component analysis with oblique rotation) to determine how many factors underlie the EA parenting measure. Following the results of our exploratory analysis, we will conduct confirmatory factor analysis with a revised number of factors and assess fit statistics. Factor scores derived from this factor analysis will be used in exploratory analyses.

**Appendix Table 10: Maternal and Family Focused Preregistered Hypotheses**

Domains (in gray) and sub-domains	Measure/Item source	Psychometrics	Age preregistered	Age preregistered	Measures (All measures between grey lines measured during the same wave will be subject to multiple testing adjustments)
			<u>Primary Outcome</u>	<u>Secondary Outcome</u>	
<b>Maternal language quantity</b>	(Anderson et al., 2021; Rowe, 2008; Rowe, 2012)			6, 8	Measured by the total number of word tokens (adult word count) in maternal speech during the parent-child interaction tasks (Anderson et al 2021; Rowe, 2008; Rowe, 2012). Coded through transcripts at the utterance level. We hypothesize a higher adult word count for mothers in the high-cash gift group relative to the low-cash gift group.
<b>Maternal language quality</b>	(Anderson et al., 2021; Cristofaro & Tamis-LeMonda, 2012; Luo et al., 2022; Rowe, 2008; Rowe, 2012)			6, 8	Measured through three indicators of quality: Mean length of utterance (MLU; average number of morphemes per utterance), word types (number of different word roots produced) as indicators of language complexity and diversity, respectively (Anderson et al 2021; Rowe, 2008; Rowe, 2012), and the proportion of utterances that are wh- questions –What, Where, When, Which, Why, Who, and How (referential and inferential questions)– (Luo et al., 2022; Cristofaro & Tamis-LeMonda, 2012) in maternal speech during the parent-child interaction tasks. Language quality variables will be coded through transcripts at the utterance level. We will standardize each variable and run confirmatory factor analysis in the full sample to assess whether the measure is best represented by a single latent factor of language quality. If fit statistics (RMSEA, CFI, TFI, SRMR) do not indicate support of a single factor structure, we will use each individual measure for analyses. We hypothesize higher language quality scores, either the composite factor or the individual scores, for the high-cash gift group relative to the low-cash gift group.

**Appendix Table 10: Maternal and  
Family Focused Preregistered Hypotheses**

Domains (in gray) and sub-domains	Measure/Item source	Psychometrics	Age	Age	Measures  (All measures between grey lines measured during the same wave will be subject to multiple testing adjustments)
			preregistered <u>Primary</u> Outcome	preregistered <u>Secondary</u> Outcome	
<b>Epigenetic Pace of Aging</b>					
<b>Methylation pace of aging</b>	Belsky et al., 2015; Belsky et al., 2020; Belsky et al., 2022; Higgins-Chen et al., 2022; Levine et al., 2018, Lu et al., 2019			4, 6, 8	<p><b>Age 4:</b> Methylation pace of aging was developed from DNA-methylation analysis of Pace of Aging in the Dunedin Study birth cohort. Pace of Aging is a composite phenotype derived from analysis of longitudinal change in 18 biomarkers of organ-system integrity (Belsky et al., 2015). In contrast, so-called epigenetic clocks are trained on chronological age. Increments of methylation pace of aging correspond to “years” of physiological change occurring per 12-months of chronological time. The second iteration (DunedinPACE) takes into account an additional measurement occasion (collected 20 years after inclusion) and only includes the most reliable DNA methylation probes, i.e. probes with little variation between technical replicates.</p> <p><b>Age 6/8:</b> Expect slower DunedinPACE- pace of aging in high-cash group: Methylation pace of aging was developed from DNA-methylation analysis of Pace of Aging in the Dunedin Study birth cohort (Belsky et al., 2022).. Pace of Aging is a composite phenotype derived from analysis of longitudinal change in 18 biomarkers of organ-system integrity (Belsky et al., 2015). Increments of methylation pace of aging correspond to “years” of physiological change occurring per 12-months of chronological time. We will also report GrimAge Acceleration and PhenoAge Acceleration as exploratory analyses. GrimAge represents a DNA-methylation metric designed to predict morbidity and mortality (Lu et al., 2019). Briefly, the initial phase entailed the computation of models incorporating physiological indicators, age, sex, and smoking history, with the objective of optimizing mortality prediction within the Framingham Heart Study Offspring cohort (Lu et al., 2019). GrimAge will be based on principal components of DNA-methylation to bolster reliability (Higgins-Chen et al., 2022) and residualized for chronological age derived from sample receipt age to reflect accelerated biological age. PhenoAge is conceptualized on the foundation of physiological markers and chronological age, which are subsequently employed to model a novel sample derived from DNA methylation, culminating in the establishment of a definitive DNA methylation clock (Levine et al., 2018). This metric exemplifies the age, measured in years, at which the average mortality risk in the NHANES III cohort aligns with the mortality risk as forecasted by the PhenoAge algorithm. PhenoAge will be based on principal components of DNA-methylation to bolster reliability (Higgins-Chen et al., 2022) and residualized for chronological age derived from sample receipt age to reflect accelerated biological age.</p>
<b>Maternal DNA Methylation</b>					
<b>DNA methylation</b>	McCartney et al, 2022			4	<p><b>Age 4:</b> Salivary DNA-methylation profiles of cognitive functioning, i.e., “Epigenetic-g”, can be computed on the basis of weights from a blood-based epigenome wide association study of general cognitive functions (g) in adults (McCartney et al., 2022). General cognitive ability was derived from the first unrotated principal component of logical memory, verbal fluency and digit symbol tests, and vocabulary. Epigenetic-g is conceptually distinct from biological aging.</p>

**Appendix Table 10: Maternal and Family Focused Preregistered Hypotheses**

Domains (in gray) and sub-domains	Measure/Item source	Psychometrics	Age preregistered <u>Primary</u> Outcome	Age preregistered <u>Secondary</u> Outcome	Measures (All measures between grey lines measured during the same wave will be subject to multiple testing adjustments)
<b>Frequency of Parent Child Activity</b>					
<b>Self-Report of Parent-child activities</b>	Rodriguez & Tamis-LeMonda 2011			1	Additive index of 4 items with response scale (higher score=higher frequency of activities): 1. read books (0: rarely or never; 1: a few times/month; 2: a few times/week ; 4:everyday ) 2. tell stories 3. play together 4. play groups
				2, 3	Additive index of 5 items with response scale (higher score=higher frequency of activities): 1. read books (0: rarely or never; 1: a few times/month; 2: a few times/week ; 4:everyday ) 2. tell stories 3. play together 4. play groups (not asked at age 3 due to COVID) 5. play pretend games
				4	Additive index of activities where the number of days reported doing the activity are multiplied by the number of minutes on a given day. Activities are: read books, tell stories, play game/build something, pretend play, learning activities, screen activities. 1. How many days did you participate in [activity]? (0: no days; 1.5: 0-1 days; 4: 3-5 days; 6.5: 6-7 days) 1a. On those days, how many minutes do you do [activity]? (2: 4 minutes or less; 7.5: 5-10 minutes; 15.5: 11-20 minutes; 25.5: 21-30 minutes; 35: more than 30 minutes).
	Rodriguez & Tamis-LeMonda 2011; BFY PIs			6, 8	Additive index of activities where the number of days reported doing the activity are multiplied by the number of minutes on a given day. We expect higher amount for high cash group. Activities are: read books, tell stories, play together, pretend play, physical games outside, learning activities, watch tv or videos. 1. How many days did you participate in [activity]? (1: no days; 2: 1-2 days; 3: 3-5 days; 4: 6-7 days) 1a. On those days, how many minutes do you do typically do this per day? (1: 15 minutes or less; 2: 15-30 minutes; 3: more than 30 minutes).
<b>Child meal and sleep routine index</b>	Study PIs			4, 6, 8	Additive index of 2 survey items (higher score=more routines); Age 6/8: expect higher score for high-cash group. In past week... <u>Age 4:</u> 1. eat meals together (0: 0 days; 1: 1+ days) <u>6/8:</u> 1. eat meals together (0: 0 days; 1: 1-2 days; 2: 3-5 days; 3: 6-7 days) <u>Ages 4/6/8:</u> 2. had regular bedtime (0: no; 1: yes) 2a. If yes, indicate bedtime

**Appendix Table 10: Maternal and  
Family Focused Preregistered Hypotheses**

Domains (in gray) and sub-domains	Measure/Item source	Psychometrics	Age	Age	Measures  (All measures between grey lines measured during the same wave will be subject to multiple testing adjustments)
			preregistered <u>Primary</u> Outcome	preregistered <u>Secondary</u> Outcome	
<b>Maternal Discipline<sup>x</sup></b>					
<b>Spanking discipline strategy</b>	Reichman et al., 2001			1, 2, 3	Dichotomous indicator using the following item: 1. In past month, have you spanked child due to misbehavior (1: yes; 2: no).
<b>Parent-Child Conflict Tactics Scale (CTSPC)</b>	Straus et al., 1998	alpha = .70 to .75		6, 8	Subscales: Nonviolent Discipline, Psychological Aggression, and Corporal punishment and 1 item from the Severe Assault (physical abuse) subscale. Total 14 items about conflict strategies with child and harsh discipline are asked about the past year. Min: 0 Max: 98 We expect a reduction of harsh discipline in the high-cash group compared to the low-cash group. 1.Once 2.Twice 3.3-5 times 4.6-10 times 5.11-20 times 6.More than 20 times 7.This has never happened. In the past year have you.... 1. Explained to [CHILDNAME] why something he or she did was wrong? 2. Put [CHILDNAME] in “time out” (or sent [CHILDNAME] to his or her room)? 3. Shook [CHILDNAME] ? 4. Hit [CHILDNAME] on the bottom with something like a belt, hairbrush, a stick, or some other hard object? 5. Gave him/her something else to do instead of what he or she was doing? 6. Shouted, yelled, or screamed at [CHILDNAME]? 7.Spanked him or her bottom on the bottom with your bare hand? 8.Swore or cursed at him or her? 9. Said you would send him or her away or would kick him or her out of the house? 10. Threatened to spank or hit him or her but did not actually do it? 11. Slapped him or her on the hand, arm, or leg? 12. Took away privileges or grounded him or her? 13. Pinched him or her? 14. Called him or her dumb or lazy or some other name like that?
<b>Parent School Involvement</b>					
<b>Parent School Involvement</b>	Tourangeau et al., 2019			8	We expect a positive effect on this additive index. During this school year, have you or any other adult members of your household... 1. attended an open house or a back-to-school night or similar type of event at [CHILDNAMEF]’s school? (1: Yes; 0: No) 2. attended a meeting of PTA, PTO, or Parent-Teacher Organization at [CHILDNAMEF]’s school? (1: Yes; 0: No) 3. gone to a regularly scheduled parent-teacher conference with [CHILDNAMEF]’s teacher or meeting with [CHILDNAMEF]’s teacher? (1: Yes; 0: No) 4. served as a volunteer in [CHILDNAMEF]’s classroom or elsewhere in the school? (1: Yes; 0: No)

**Appendix Table 10: Maternal and Family Focused Preregistered Hypotheses**

Domains (in gray) and sub-domains	Measure/Item source	Psychometrics	Age preregistered <u>Primary Outcome</u>	Age preregistered <u>Secondary Outcome</u>	Measures (All measures between grey lines measured during the same wave will be subject to multiple testing adjustments)
<b>Enrichment Activities</b>					
<b>Child enrichment</b>	Tourangeau et al., 2019			6, 8	We expect a positive effect on this additive index. In the past month, has anyone in your family... 1. visited a library with [CHILD] (1: Yes; 0: No); 2. gone to a play, concert, or other live show with [CHILD]? (1: Yes; 0: No) 3. visited an art gallery, museum, or historical site with [CHILD]? (1: Yes; 0: No) 4. visited a zoo, aquarium, or petting farm with [CHILD]? (1: Yes; 0: No)
<b>Child lessons, sports, etc. activity participation</b>	Adapted from Tourangeau et al., 2019			6, 8	We expect a positive effect on this additive index In the past year, outside of school hours, has [CHILD] ever participated in ... 1. organized athletic activities, like basketball, soccer, baseball, dance, or gymnastics? (1: Yes; 0: No) 2. academic activities, like tutoring, or math or language lessons? (1: Yes; 0: No) 3. art or crafts classes or lessons, for example, painting, drawing, or sculpture? (1: Yes; 0: No) 4. music classes or lessons like piano, other instruments, singing or choirs? (1: Yes; 0: No)

*Notes.* A previous version of this table referred to "waves" of data collection. For clarity, we have replaced "wave" with "age", with both referring to the age of the baby at planned data collection. Minor, non-substantive changes may be made to the wording of specific items across data collection years. The targeted age for each data collection wave is around the child's birthday, i.e. at 12 months, 24 months, 36 months, 48 months, 72 months, and 96 months.

+ indicates that items were omitted or programmed incorrectly in the age 1 survey administered to mothers and cannot be used to calculate outcomes. These include item 6 from the index of food insufficiency ("hungry"), and item 11 from the relationship quality index ("partner threatened or hurt your child/children?"). These indices were therefore comprised of one less item at age 1.

\*indicates outcomes that were not administered at age 1 once in-person interviews switched to phone interviews due to COVID-19 .

~Indicates that item was omitted from previous pre-registrations but was administered to mothers and is being included in the outcome analyses.

\*Indicates that the sub-domain was called something different in previous versions of this table. The sub-domain "Food Insecurity" was previously referred to as "Food Insufficiency" .

Due to COVID-19, the age 2 and age 3 data collection wave is in the form of a phone survey. Thus, sub-domains that were supposed to be measured in-person at ages 2 or age 3 are being postponed to age 4. These domains include: index of mother's positive parenting behaviors, epigenetic age, DNA methylation, BMI, physiological stress, cognitive resources. Additionally, sub-domains that we had not intended to include in pre-registration at age 3 have been added to the phone survey at age 3 and to the pre-registration table. These include: self-report of parent-child activities, spanking discipline strategy, anxiety.

Certain sub-domains were pre-registered at age 3 and are no longer preregistered because they are not being included in the age 3 data collection (due to time constraints). These include: global health, physical abuse, index of chaos in the home, parenting stress, index of housing quality.

Measure	description	Bibliography
<b>Preregistered measures</b>		
<b>Household Economic Hardship</b>		
<b>Index of economic stress</b>		Kling, J.R., Liebman, J.B., Katz, L.F. (2007). Experimental analysis of neighborhood effects. <i>Econometrica</i> , 75(1), 83-119.
<b>Maternal Hardship</b>		BFY Study PIs
<b>Index of food insecurity</b>		<a href="https://www.ers.usda.gov/media/8282/short2012.pdf">https://www.ers.usda.gov/media/8282/short2012.pdf</a>
<b>Household poverty rate</b>		Fontenot, Kayla, Jessica Semega, and Melissa Kollar, U.S. Census Bureau, Current Population Reports, P60-263, Income and Poverty in the United States: 2017, U.S. Government Printing Office, Washington, DC, 2018.
<b>Social Services Receipt</b>		
<b>Number of Benefits received by mother</b>		BFY Study PIs
<b>Mother's Labor Market and Education Participation</b>		
<b>Time to labor market reentry from birth</b>		
<b>Time to full-time labor market reentry from birth</b>		Current Population Survey, retrieved from: <a href="https://www.census.gov/programs-surveys/cps/technical-documentation/questionnaires.html">https://www.census.gov/programs-surveys/cps/technical-documentation/questionnaires.html</a>
<b>Mother's education and training attainment</b>		
<b>Maternal Earnings</b>		Panel Study of Income Dynamics <a href="https://psidonline.isr.umich.edu/">https://psidonline.isr.umich.edu/</a>
<b>Child-Focused Expenditures</b>		
<b>Index of child-focused expenditures</b>	Lugo-Gil, J., Yoshikawa, H. (2006). Assessing expenditures on children in low-income, ethnically diverse, and immigrant families. National Poverty Center Working Paper Series, 06-36.	Schild, J., Collyer, S. M., Garner, T., Kaushal, N., Lee, J., Waldfogel, J., & Wimer, C. T. (2023). Effects of the Expanded Child Tax Credit on Household Spending: Estimates Based on US Consumer Expenditure Survey Data (No. w31412). National Bureau of Economic Research. <a href="https://www.bls.gov/osmr/research-papers/2023/pdf/ec230010.pdf">https://www.bls.gov/osmr/research-papers/2023/pdf/ec230010.pdf</a>
<b>Cost of paid child care</b>		
<b>Use of center-based care</b>		National Study of Early Care and Education
<b>Housing and Neighborhoods</b>		
<b>Index of perceptions of neighborhood safety</b>		
<b>Index of housing quality</b>		Kling, J.R., Liebman, J.B., Katz, L.F. (2007). Experimental analysis of neighborhood effects. <i>Econometrica</i> , 75(1), 83-119.

**Residential mobility** neighborhood effects. *Econometrica*, 75(1), 83-119.

**Homelessness**

**Neighborhood poverty**

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<b>Parenting stress</b>	PSID-CDS Aggravation in Parenting Scale <a href="https://psidonline.isr.umich.edu/cds/cdsi_usergd.pdf">https://psidonline.isr.umich.edu/cds/cdsi_usergd.pdf</a> for items 5-7 5. giving up more for kids than ever expected 6. feels trapped (rc) 7. unable to do different things bc of kids (rc)	Project GAIN (Gaining Access to Income Now) <a href="https://preventionboard.wi.gov/Pages/OurWork/ProjectGAIN.aspx">https://preventionboard.wi.gov/Pages/OurWork/ProjectGAIN.aspx</a> for items 1-4 1. confidence in parenting abilities 2. feels good about parenting abilities 3. thinks good parent 4. kids will say she was wonderful

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