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Can a Poverty Reduction Intervention Reduce Family Stress and Improve Stress-Related Processes among Families with Infants? An Experimental Analysis.

Katherine A. Magnuson*, Paul Y. Yoo, Greg J. Duncan, Hirokazu Yoshikawa, Kathy Trang, Lisa A. Gennetian, Sarah Halpern-Meekin, Nathan A. Fox, & Kimberly G. Noble

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***Corresponding Author: Katherine Magnuson, UW Madison, Institute for Research on Poverty, kmagnuson@wisc.edu**

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Abstract

Objective: The goal of this study is to examine the causal impacts of a poverty reduction intervention on components of the Family Stress Model. **Background:** The Family Stress Model is a theoretical framework explaining the relationship between poverty and child development. Although robust correlational evidence supports this model, few poverty reduction interventions used an experimental approach to understand whether decreases in poverty affect the key elements of the Family Stress Model. **Method:** The Baby's First Years study recruited 1,000 low-income mothers of newborns. Shortly after giving birth, mothers were randomized to receive an unconditional monthly cash gift of either \$333 or \$20 per month. Follow-up data were collected from 931 mothers approximately 12 months after the birth of their child. **Results:** Although the intervention produced a moderate increase in household income and reduced poverty, we observe no detectable improvements in mothers' subjective reports of economic hardship, psychological distress, the quality of their relationship with a partner, or the quality of play with their infants. However, mothers who received the higher cash gift amounts reported more frequently engaging in enriching child activities during the first year of life than did mothers who received lower cash gift amounts. **Conclusion:** We find little support for the hypothesis that the key elements of the family stress model are affected by a moderate poverty reduction among families raising young children. **Implications:** Future research needs to further expand, refine, and evaluate how family processes are affected by moderate poverty-reduction interventions for different populations.

Can a Poverty Reduction Intervention Reduce Family Stress and Improve Stress-Related Processes among Families with Infants? An Experimental Analysis

Research has shown that income poverty experienced during childhood is associated with worse child, youth, and adult outcomes. Aspects of development affected by early poverty include learning, educational attainment, physical and mental health, and adult earnings (National Academies of Sciences, Engineering, and Medicine, 2019). The negative effects of poverty may be particularly strong when it is experienced during early childhood, relative to later in childhood and in adolescence (Duncan et al., 2012). According to an influential theoretical framework—the Family Stress Model—family processes play an important role in explaining associations between income poverty and children’s outcomes (Masarik & Conger, 2017). However, the extent to which anti-poverty policies and initiatives causally affect the key family processes that are part of the Family Stress Model is not well understood.

Many longitudinal, non-experimental studies have assessed the Family Stress Model (see Figure 1 and Masarik & Conger, 2017). The model emphasizes the cascading effects of economic hardship, which contribute to parental psychological distress and reduce the quality of family relationships, parenting, and child outcomes. The goal of this study is to examine the extent to which the first year of a multi-year poverty reduction program—which provides about a \$4,000 annual increase in income, distributed monthly as a debit-card-based cash gift to low-income mothers of newborns—affects components of the Family Stress Model.

Background

The Family Stress Model argues that economic hardship resulting from income poverty increases parental psychological distress and decreases emotional well-being, which has an adverse effect on co-parental relationships and parenting quality. In turn, more harsh and less

warm parenting results in worse child and adolescent outcomes, most often as higher levels of behavior problems (Figure 1; Conger, et al., 1994; Conger et al., 2002;). The model was first developed in the context of the Great Recession and Iowa farm floods and has since been applied to urban families of differing racial and ethnic backgrounds and other specific populations (Iruka et al., 2012; Masarik & Conger, 2017; Mistry et al., 2002; Neppl et al., 2016; Raver et al., 2007). In addition, some studies provide support for specific pathways in the model. For example, Tang and Sinanan (2015) found that declines in income among parents living in poverty were associated with reductions in parental warmth.

INSERT FIGURE 1 HERE

In observational studies, the Family Stress Model is often assessed in its entirety, by estimating path models with observational data. However, the model can also be applied in the context of poverty reduction experiments to examine whether cash supports that reduce family poverty causally improve the family processes. Theoretically, reductions in poverty should lead to improvements in each of the negative processes that comprise the Family Stress Model, with larger improvements in components closest in proximity to poverty reduction in the model (i.e., toward the left-hand side of Figure 1).

Most conditional cash transfer (CCT) and unconditional cash transfer (UCT) studies have been conducted in low- and middle-income countries. Experimental evaluations of these programs typically include some measures of economic well-being as well as physical and mental health, but not high-quality measures of family processes. Systematic reviews find that, on average, cash transfer programs improve food security and indicators of economic well-being and generate small reductions in intimate partner violence and mental health problems (Baranov et al., 2021; Bastagli et al., 2016; Cooper et al., 2020; Kabeer & Waddington, 2015; Manley et

al., 2020; Pega et al., 2017). An evaluation of a CCT study conducted in New York City and Memphis found reduced economic hardship and small positive improvements in parents' psychological well-being (Miller et al., 2016).

Systematic reviews suggest considerable heterogeneity in the estimated impacts of cash transfer programs on families across and within studies (Cooper et al., 2020). For example, whereas some studies find a positive impact of cash supports on adults' psychological well-being, an evaluation of an unconditional cash transfer program in Ecuador found that monthly cash transfers amounting to 10% of income improved young children's development, but generated null to negative effects on maternal mental health among those with the lowest incomes (Paxson & Schady, 2010; Fernald & Hidrobo, 2011).

In the United States, studies of Earned Income Tax Credit (EITC) expansions and welfare reform policy changes provide inconsistent evidence that poverty reduction policies and programs improve processes outlined in the Family Stress Model (Boyd-Swan et al., 2016; Morgan et al., 2022; Morris, et al., 2009). For example, Evans and Garthwaite (2014) found that the 1990s expansions of the EITC resulted in mothers with low levels of education reporting fewer bad mental health days and depressive symptoms and having lower levels of biomarkers related to cumulative stress. In contrast, a synthesis of welfare reform studies showed that programs that increased mothers' incomes by a few thousand dollars generated only selective reductions in economic hardship and improvements in maternal mental health. In addition, these studies reported null to small impacts on the quality of family relationships and parenting (Morris, et al., 2009).

The Family Stress Model was developed with, and largely applied to, families with school-age children and youth. Several aspects of the model may require expansion or

refinement when applied to families with infants. First, romantic partner relationships may change in both unmarried and married households following the birth of a child (Carlson et al., 2004). Early versions of the Family Stress Model focused on families with two heterosexual parents, while later work included single-mother families (Barnett, 2008). Owing to considerable complexity and fluidity in family structures, especially in the early years of a child's life, the concept of parental relationship quality may need to be expanded to include the quality of both co-parenting relationships with a former partner, as well as romantic relationships with partners who are not biological parents of the resident children.

Second, while the Family Stress Model focuses on the contribution of economic hardship to psychological distress of the parent, it may be especially useful to also assess parenting stress (Dalimonte-Merckling & Brophy-Herb, 2019, Winstone, Curci & Crnic, 2021). Given the care and attention required in the first year of life, infancy creates uniquely intensive demands on parenting. Even when parents have other children, the birth of a child often necessitates a reorganization of responsibilities and roles within families, and this can contribute to stress associated with the parenting role (Nomaguchi & Milkie, 2020).

Other extensions of the model are related to expanding the range of measures of parental distress considered. Specifically, studies of the Family Stress Model generally use survey-based measures of parents' psychological distress, most often depression, anxiety, and hostility; however, general perceived stress, as distinct from mental health and parenting stress, is also high in contexts of economic hardship, and may affect the quality of family relationship as well as parenting quality (Magnuson & Duncan, 2019). Because stress processes are cumulative and physiological in nature, they can be measured by hormonal indicators of stress, such as hair

cortisol concentrations. However, there is not yet rigorous evidence on the extent to which family income or poverty is associated with hair cortisol (Ursache et al., 2017).

The current study provides the first U.S.-based test of the effects of an unconditional cash transfer program on family process components of the Family Stress Model, measured among mothers of 12-month-olds. Our research questions are: (1) Does a poverty reduction intervention for low-income mothers of infants in the United States reduce economic hardship, maternal stress (self-reported and physiological), parenting stress, and mothers' depressive and anxiety symptoms? (2) Does a poverty reduction intervention improve co-parenting and relationship quality with current or past romantic partners? And finally, (3) does a poverty reduction intervention improve aspects of parenting, including engagement with the infant?

Method

Data

We use data from Baby's First Years (BFY), an ongoing randomized control trial in which unconditional monthly cash gifts are being given to 1,000 mothers with newborns. When recruited into the study, all mothers reported an income below the federal poverty threshold. Mothers were invited to participate in the study shortly after they gave birth in 12 U.S. hospitals between May, 2018 and June, 2019. Mothers were residing in four metropolitan areas: New York City, New Orleans, Omaha, and the Twin Cities (Minneapolis and St. Paul). To participate, mothers had to be 18 or older; speak either English or Spanish; live in the state of recruitment with no immediate plans to move out of state; and report household income in the previous calendar year below the federal poverty threshold. In addition, their newborns must not have required intensive care, and had to be discharged into the custody of their mothers.

A total of 1,000 mothers with newborns were enrolled in the study. Details of recruitment and randomization can be found in Noble et al. (2021). Four hundred mothers were randomly assigned to the “high-cash” gift group receiving \$333 per month and six hundred were randomly assigned to the “low-cash” gift group receiving \$20 per month. Following randomization, mothers were given a debit card that was activated at the hospital. Monthly cash gifts are loaded onto the 4MyBaby card on the evening prior to the day of the child’s birthdate and are accompanied by a text alert (see Gennetian et al., in press, for details about the cash gift). Efforts were made to ensure that, to the extent possible, the cash gift did not affect the mother’s eligibility for safety net programs such as the Supplementary Nutritional Assistance Program (SNAP). Preregistered hypotheses about some measures and statistical procedures, can be found on clinicaltrials.gov under identifier NCT03593356.

The first follow-up data were collected from 931 mothers when the babies were about 12 months old, between July 2019 and July 2020. The follow-up data were collected during a home visit, and included an in-person maternal survey, a video recording of mother-child interactions, cutting a sample of the mother’s hair, and mobile electroencephalography (EEG) to measure the child’s brain activity. Because of the COVID-19 pandemic, the study switched from in-person to telephone data collection on March 13, 2020. At that point it was no longer possible to collect video, hair, or EEG data. In all, 605 mothers completed data collection during a home visit and 326 completed a survey by phone.

After adjusting for a small number of mother-child separations and infant deaths, the overall survey response rate was 94% (Appendix Figure 1). Videos of mother-child interactions were collected for 570 dyads (94%) and hair samples from 409 mothers (68%). Reasons for not completing the videorecorded interaction task included equipment error, the child not being

available, and mother's refusal. Reasons for not providing a hair sample include the use of corticosteroids and mother's refusal.

Measures

Following Figure 1, we organize the outcome measures into the following five categories: Economic Resources, Economic Pressure, Maternal Psychological Distress, Maternal Co-parental and Romantic Relationship Quality, and Parenting Quality. We provide more details on the available measures for each category in Table 1. We report Cronbach's Alpha for the scales and indices for the full sample and have confirmed that there were no substantive differences in these statistics across racial and ethnic groups or by survey language (Spanish vs. English).

INSERT TABLE 1 HERE

Economic Resources

At the time of the age-1 follow-up, mothers reported household pre-tax income in the previous calendar year and listed current adults and children in the household. We divided the average total household income per month, including the BFY cash gift, by the corresponding federal poverty threshold for a given household to create the "income-to-needs ratio." An income-to-needs ratio of 1.0 corresponds to 100% of the federal poverty threshold. In 2019, the federal poverty threshold for a family of four with two children was \$2,161 per month (or \$25,926 for that year). In addition, we created a dummy indicator of whether the household income was below the federal poverty line (i.e., income-to-needs of less than 1).

Economic Pressure

We have three measures of economic pressure. First,) is an additive index of 5 items from the U.S. Department of Agriculture's short-form measure of food insecurity (Blumberg et

al., 1999, which have high internal consistency ($\alpha=.86$). Second, we created an additive index of 5 economically stressful events (e.g., missing rent/mortgage payments) adapted from the economic stress index used in the Moving to Opportunity study (Kling, Liebman, & Katz, 2007). This index of economically stressful events had modest internal consistency ($\alpha=.54$). Modest internal consistency might be expected when summing across discrete events. Third, we used a single item that was included in the economic stress index items (i.e., “worry about being able to meet monthly living expenses”) with a 6-point response scale, because it so closely aligns with economic worry.

Mother’s Psychological Distress

The maternal survey included four self-reported measures of mothers’ stress and mental health. In addition, a sample of hair was analyzed for hair cortisol concentration, providing a direct measure of physiological stress. General perceptions of life stress were measured by the Perceived Stress Scale (Cohen et al., 1994, 1983), which had high internal consistency ($\alpha=.75$). We also constructed a parenting stress index by summing two adapted indices: the parent aggravation index from the Panel Study of Income Dynamics’ Child Development Supplement (Schickedanz et al., 2018); and the parenting competence index created for the Getting Access to Income Now (GAIN) study (reversed coded; Slack, Berger, & Collins, 2016). Together, this parenting stress index has modest internal consistency ($\alpha=.55$). Third, depression was measured by the Personal Health Questionnaire Depression Scale (PHQ-8; Kroenke et al, 2009), an additive index of 8 items with high internal consistency ($\alpha=.84$). Finally, anxiety was measured by the Beck Anxiety Inventory (Beck et al., 1988), an additive scale of 21 items with high internal consistency ($\alpha=.90$).

We collected a hair sample from 409 of the 605 mothers (68%), but only 364 had usable values. The hair sample yields a measure of the concentration of cortisol in picograms per milligram (pg/mg). Values of 750 and higher (n=45) are physiologically implausible and thus were not analyzed. Based on Gonzalez et al. (2019), we adjusted two outlier values with above 520 by recoding them as 520 pg/mg. All plausible values were then log transformed.

Mothers' Interparental and Romantic Partner Relationship Quality

Questions adapted from the Fragile Families and Child Wellbeing Study (FFCWS, McLanahan & Beck, 2010) were used to measure the quality of the mothers' co-parenting relationship in terms of support and trust. The additive index of 7 items had high internal consistency ($\alpha=.90$).

The maternal survey also included questions about the quality of mothers' romantic relationships which were sensitive in nature. For these items, the survey was administered via audio computer-assisted self-interviewing (ACASI), which allows mothers to record their answers directly into a programmed computer. Because it was not possible to combine ACASI with telephone interviews during the pandemic, responses to these sensitive questions were not collected for the mothers surveyed by phone. If a mother reported that she was not currently in a romantic relationship during the age-1 follow-up, she was asked to report on the quality of the relationship with her most recent partner. It is important to note that we were not able to discern whether the subset of mothers reporting on relationship quality with their last partner were referencing a relationship that had ended prior to their enrollment in the study.

We constructed three measures of mother's romantic relationship quality. An indicator of domestic violence (whether the mother's partner ever cut, bruised, or seriously hurt her in a fight), and an item that describes how often the mother argues with the partner on important

matters, both of which come from the FFCWS, were used as individual items. Finally, we measured the quality of the relationship between the mother and her romantic partner using a 10-item additive scale also from FFCWS. The scale had good internal consistency ($\alpha=.83$).

Parenting Quality

We measured three dimensions of parenting quality. First, to assess engagement in learning activities, we created an additive index of mothers' reported frequency of 4 activities that the mother or other members of the household engaged in with the child (Rodriguez & Tamis-LeMonda, 2011). This activities index had adequate internal consistency ($\alpha=.61$). Second, we assessed the use of harsh discipline through an indicator of whether the mother reported ever using spanking with her one-year-old child.

Finally, we assessed the quality of the parent-child interaction in the 10-minute video recording to capture affection, responsiveness, encouragement, and teaching in a total scale score, using the Parenting Interactions with Children: Checklist of Observations Linked to Outcomes (PICCOLO, Roggman et al., 2013). We were able to record the interaction for 570 of the 605 mother-child dyads in the in-person, pre-pandemic sample (94%). The team of trained coders included a bilingual master coder and two additional master coders. In total, 135 out of the 540 videos, or 25%, were either double-coded or consensus-coded, and all ICC reliability values exceeded the 75% as required (Roggman et al., 2013). After screening and processing the video for audio-video quality, we had usable data from 533 dyads.

Baseline Characteristics

Data collected at entry into the study that are theoretically and empirically linked to processes in the Family Stress Model served as covariates in our analysis. These covariates included: mother's age, mother's years of completed schooling, household income at baseline,

net worth, general health, depressive symptoms, race and ethnicity, marital status, number of adults in the household, number of other children born to the mother, number of cigarettes smoked per week during pregnancy, number of alcoholic drinks consumed during pregnancy, biological father living with the mother, as well as the child's gender assigned at birth, birth weight, and gestational age at birth. We also included as covariates the age of the child in months during age-1 data collection and whether the interview was conducted in person or over the phone.

At the time of study enrollment, mothers averaged about 27 years of age and had completed slightly less than 12 years of schooling on average (Table 2). About 40% of the sample identified as non-Hispanic Black and another 40% identified as Hispanic of any race. Close to half of the mothers had never been married, and a little over one-third of the mothers reported living with the biological father of their newborn. About one-third of the newborns were first births (not shown in Table 2). Comparable statistics for the pre-pandemic sample are shown in Appendix Table 1.

INSERT TABLE 2 HERE

Analytic Strategy

We used the random assignment design of the BFY clinical trial to estimate the causal effect of the additional \$333-per-month cash gift payments for approximately 12 months (depending on the exact timing of the age-1 interview), on measures that represent key elements of the Family Stress Model. Intent-to-Treat (ITT) effects were estimated by regressing each dependent variable on the high-cash gift group indicator. We adjusted all estimates for the covariates listed above and site indicators to increase the precision of our estimates and account

for any residual group differences in baseline characteristics following random assignment. We adjusted the standard errors using robust variance estimation techniques.

We addressed the possibility of false positives by estimating the statistical significance of the entire family (“familywise error rate”) of outcomes using step-down resampling methods developed by Westfall and Young (1993). For the Westfall-Young adjustment, we place measures into the conceptual families as specified in the model depicted in Figure 1.

Unbiased ITT estimation requires that the high-cash and low-cash gift groups be similar to one another on observed and unobserved characteristics. We assessed overall group balance using a probit model to jointly predict group assignment using all the baseline characteristics and site indicators listed in Table 2. Overall, we do not find systematic group differences for the sample that completed the age-1 data collection ($p=.38$). Nevertheless, mothers in the high-cash gift group were more likely never to have been married and, relatedly, less likely to be living with the baby’s biological father at the time of the child’s birth. Mothers in the high-cash gift group were also more likely to report that their health was “good” or “excellent” (rather than “fair” or “poor”). To address potential bias from these minor differences and to increase the precision of ITT estimates, we control for the baseline characteristics shown in Table 2. This covariate-adjusted ITT model generates our preferred estimates of the causal effects of the high-cash gift.

Appendix Table 2 provides corresponding baseline balance information for our sample for which data were collected in person before the onset of the pandemic. The joint test for this subsample yielded a smaller and marginally significant p -value ($p=.06$), suggesting the possibility of baseline group differences within this subsample, and again making the covariate-adjusted model the preferred model for the analysis.

Results

Intent-to-treat analyses. Our research questions concern whether an unconditional monthly cash gift of \$333 improved measures of key constructs of the Family Stress Model. Results from the ITT analyses are grouped according to the boxes in Figure 1 (Table 3 and Figure 2). Starting from the left, changes in economic resources are hypothesized to influence other domains of the Family Stress Model as shown in Figure 1. With its \$3,756 annual cash gift payment difference between the high-cash and low-cash gift groups, BFY was designed to increase economic resources. Although the cash gifts did not count as income in determining eligibility for benefits from most safety net programs, changes in family composition or work effort in response to the payments might lead to group differences in net family incomes that averaged either more or less than \$3,756.

INSERT TABLE 3 and FIGURE 2

Using income-to-needs as a measure of economic resources, the first row of Table 3 shows that the simple mean differences favor the high-cash group by .07 income-to-needs units. Adjusting for baseline covariates increases this difference to .12 units, which corresponds to a 14% increase in household income-to-needs, which remains statistically significant after multiple testing adjustments. Similarly, the high-cash gift produces a covariate-adjusted 9-percentage-point decline in poverty, which remains statistically significant after adjusting for multiple testing. More details of the economic impacts of the first year of cash gifts can be found in Gennetian et al. (2022). Taken together, these findings suggest that the higher cash gift generated modest increases in economic resources and reductions in poverty. Nevertheless, it is also clear that about two-thirds of the mothers receiving high-cash gifts were still residing in households with incomes less than the federal poverty threshold when their child was a year old.

Next, we estimated the high-cash gift impacts on measures of economic pressure -- food insecurity, non-food economic hardships, and worries about expenses. We had expected that higher cash gift payments would reduce economic pressure, but point estimates show no reductions in reports of economic pressure, with effect sizes ranging from $+0.03$ SD to $+0.14$ SD (Table 3 and Figure 2). In our preferred models, the ITT estimate of impact on food insecurity is positive and marginally significant before multiple hypothesis adjustment but becomes nonsignificant after adjustment.

Panel 3 shows impacts of the high-cash gift on mothers' psychological distress. Mothers in the high cash group reported higher levels psychological stress (perceived stress, parenting stress, and hair cortisol) than mothers in the low cash gift group, but these differences were mostly small and non-significant. In the case of anxiety, the effect size was positive, more substantial ($.25$ SD), and robust to multiple hypothesis adjustment.

In exploratory analyses, mothers reported higher levels of anxiety for both the somatic and the psychological subindices of the Beck Anxiety Inventory (see Appendix Table 2). As also shown in Appendix Table 2, exploratory analyses indicated that the higher reports of parenting stress in the high-cash gift group appeared to be driven by items in the parent aggravation subscale rather than items that assess parenting competence.

With respect to mothers' reports of their romantic and co-parent relationship quality (Table 3), we find no significant differences between the high- and low-cash gift group mothers, either before or after adjustments for multiple hypothesis testing.

The final set of outcomes that we consider are mother-reported and observed measures of parenting quality. The mothers in the high-cash gift group reported more frequent engagement in activities such as reading books or playing with their children than mothers in the low-cash gift

group (0.16 SD effect size; $p < .05$). However, the high-cash gift was not associated with the quality of a mother's observed interactions with her infant or her reports of using spanking as a disciplinary strategy at age one.

Robustness checks. We conducted several robustness checks to determine whether our findings were sensitive to the model specifications. First, to better align with the Family Stress Model, some of the conceptual grouping of measures in the present analyses differed from those we preregistered (see Appendix Table 3); Appendix Table 4 provides impact estimates for the pre-registered groupings, and results are similar to those presented in Table 3. The different arrangement of measures adjusts p -values differently to correct for Type I error. Our findings are consistent and not sensitive to the different p -value adjustments.

Next, we used analytic weights that correct for imbalance of baseline characteristics across the high and low cash groups at age one. We also applied non-response weights to adjust the age-1 sample to reflect the characteristics of the full study sample at baseline. The pattern of these results did not differ from those found in our covariate-adjusted regression models reported in Table 3 (Appendix Tables 5 and 6). We also tested whether results varied by mode of interview (in-person vs. phone) for survey-based outcomes collected both before and during the COVID-19 pandemic. We found no statistically significant differences in the pattern of results related to the mode of survey administration (Appendix Table 7).

Finally, our study sample is not large enough to detect modest differences in estimated impacts across subgroups. However, exploratory interaction analyses did not show statistically significant differences in impacts by family characteristics. We found no clear differences in the pattern of effects between Black and Hispanic mothers as well as among those with higher and

lower incomes at the time of the child's birth. (Results of moderation analyses available from authors.) Future work will continue to explore possible differences across subgroups.

Discussion

The Family Stress Model was developed to explain how economic hardship negatively affects family processes and thus child and adolescent outcomes. Our study tests whether a reduction in hardship from monthly cash gift payments improves family processes in the case of families with infants. Using data from a randomized controlled trial, we examined whether distributing monthly cash gifts via debit cards to low-income mothers of newborns for approximately 12 months would generate causal impacts on key elements of the Family Stress Model.

We found that, relative to a \$20 monthly cash gift, a monthly unconditional cash gift of \$333 increased household income and reduced poverty as intended, albeit with relatively modest effects on each (a roughly 14% increase in income-to-needs and 9-percentage-point decline in the proportion of families under the federal poverty threshold). Contrary to expectations, the cash gifts did not reduce economic pressure or psychological stress/distress, nor did it improve relationship quality. Taken as a whole, 10 of 12 impact estimates in these three domains were in directions counter to the theoretical model, although virtually all were statistically nonsignificant. Most surprisingly, mothers assigned to the high-cash group reported significantly more anxiety than mothers in the low-cash group.

Consistent with theoretical expectations, maternal self-reported engagement in learning activities, including reading and playing with their children, was higher among mothers in the high-cash-gift group than among those in the low-cash-gift group. No statistical differences in

the quality of parent-child interactions were detected among the subsample who participated in a videorecorded ten-minute play session before the onset of the pandemic.

Taken together, our results suggest that counter to expectations, BFY did not improve family processes that are part of the Family Stress Model but did improve parenting quality as expected. Reviews of nonexperimental, observational studies conducted in the United States have generally found that reduced poverty or increased income among low-income families is associated with reductions in various aspects of parental stress and distress; improvements in relationship quality; and improvements in parenting (Masarik & Conger, 2017). However, findings from other experimental cash transfer studies and quasi-experimental studies of policy changes that increased income are more mixed (Cooper et al., 2020). Nevertheless, our findings of null to negative impacts on parent anxiety, parenting stress, and relationship quality are counter to hypotheses.

What might explain these patterns of effects? In the case of the null findings, the amount of increased income and poverty reduction from our experimental treatment was moderate. Although they amounted to almost a 20% increase in income, the cash gifts were unable to lift the incomes of the majority of mothers above the poverty threshold, much less out of most definitions of “low-income.” The fact that we did not see reduction in economic pressure or material hardship reinforces the notion that the magnitude of the cash transfer was not large enough to substantially improve these mothers’ economic situations. This may be due in part to the high costs of caregiving for infants. Added expenses for diapers, clothes, and car seats, for example, add up and are not sufficiently offset by increases public benefit programs (e.g., U.S. Department of Agriculture, 2022). It is possible that larger and longer-lasting increases in economic resources might improve key elements of the Family Stress Model.

What might account for the increases we see in mothers' reports of anxiety and parenting stress? Given that this finding was unexpected, our possible explanations are post-hoc and speculative. It is possible that mothers in the high-cash gift group have experienced increased anxiety and/or pressure to spend the cash in ways that benefited their children and families. It will be important to assess whether this finding persists over time and to explore other explanations in future analyses.

We observed increases in parental engagement in parent-child activities such as reading picture books or telling stories to their children. These kinds of parent-child activities have been associated with positive child cognitive development as early as the first two years of life (Tamis-LeMonda et al., 2004). Indeed, we have found suggestive evidence that infants in the high-cash gift group showed brain activity in a pattern that prior correlational studies have linked with the development of subsequent higher cognitive skills (Troller-Renfree et al., 2022). It is important to follow up with future waves of data collection, to examine whether multiple years of the cash gifts affect child developmental outcomes.

Some limitations should be taken into consideration. First, this study used self-reported measures of most of the outcomes considered, including relationship quality and anxiety symptoms, and self-reports may be biased. However, these measures have been shown in previous research conducted among low-income populations to have strong psychometric properties (Grothe et al., 2005; Whiteside-Mansell et al., 2007). In addition, about a third of the sample was surveyed at the beginning of the COVID-19 pandemic, and it is unclear whether or how these family processes were affected by the pandemic.

Our study findings suggest that providing \$333 per month in unconditional cash support for about 12 months (of a planned 52 months) does little to improve subjective reports of

economic pressure, reduce parent psychological distress, or improve relationship quality. On the positive side, we found that such support can result in small improvements in the frequency of mothers' reports of engaging in activities with their infants. A full accounting of the benefits of the cash gifts will consider a broader set of economic, family, and child development outcomes, and this work is ongoing (see Gennetian et al., 2022; Troller-Renfree et al., 2022). Future analyses will assess whether cash transfers affect family stress and well-being as well as early childhood development beyond the first year.

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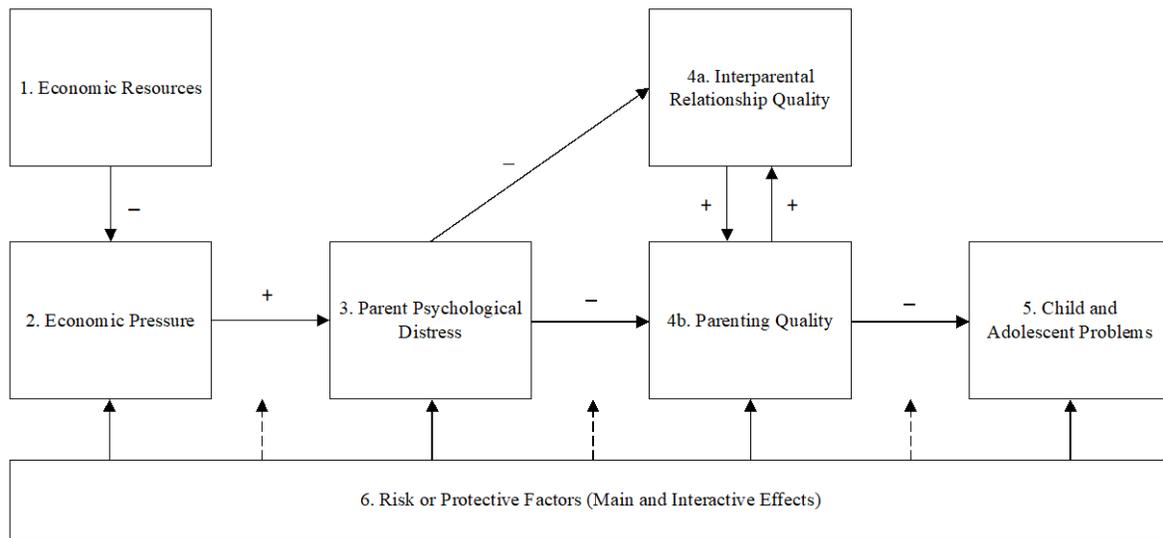
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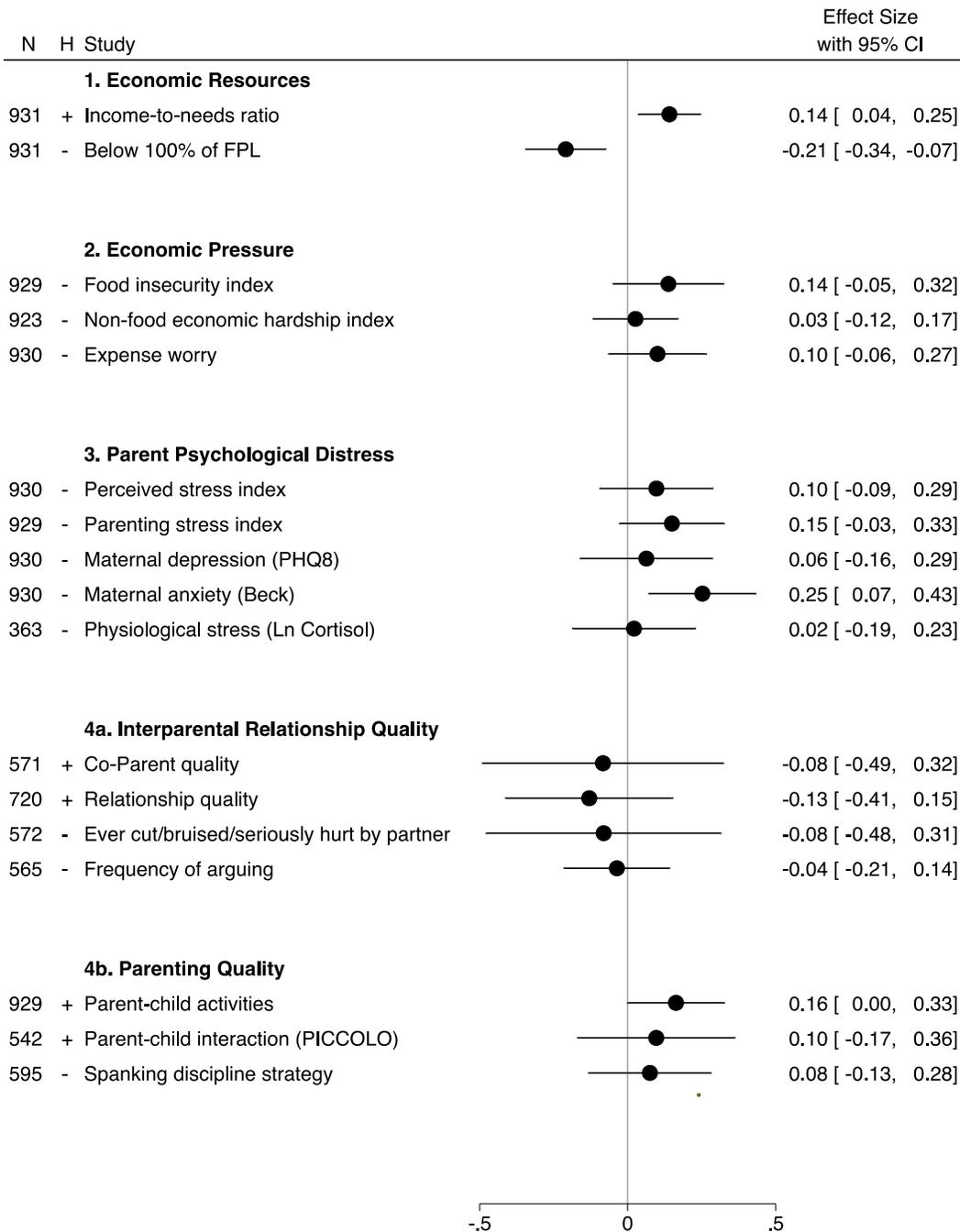
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Figure 1. Adaptation of the Family Stress Model



Notes: Authors' adaptation of the family stress model (Masarik and Conger, 2017).

Figure 2. Standardized Effect Size ITT Estimates with Adjusted Confidence Intervals, by Components of the Family Stress Model



Notes: FPL = Federal Poverty Level. The figure presents standardized and adjusted 95% confidence intervals of the cash-gift treatment effect on outcomes. The estimates were standardized by the standard deviation of the low-cash gift group and adjusted for multiple hypothesis testing with Westfall and Young's (1993) step-down resampling methods. Based on the Westfall and Young's adjusted *p*-value, degrees of freedom, and estimated effect size, the corresponding *t*-statistic and the standard error estimates were computed. Hypothesized direction of cash-gift treatment effects are presented in the "H" column with "+" for increase in outcome and "-" for decrease in outcome. Standardized ITT estimates for the two dichotomous outcomes, Below 100% FPL and Spanking Disciplinary Strategy, come from a linear probability models (LPM). Raw LPM coefficients are presented in Table 3. Applying a logistic regression and converting the resulting log of odds ratio into Cohen's *d* by a factor of the square root of 3 divided by pi estimates the effect sizes to be -.31 for Below 100% FPL (unadjusted *p*-value < 0.01) and +.23 for Spanking Disciplinary Strategy (unadjusted *p*-value = .40).

Table 1. Summary of Measures

Outcome Measures	Items	Sample Item	α	Source / Note
Economic Resources				
Income-to-needs ratio	NA	How much did you earn from all your employers before taxes and deductions during [previous Year]?	NA	Total household income divided by federal poverty level
Below 100% of FPL (Federal Poverty Level)	NA	NA	NA	Income-to-needs ratio is less than 1.0
Economic Pressure				
Food insecurity index*	5	in the last 12 months, the food that we bought just didn't last, and we didn't have money to get more (<i>often/sometimes, never true</i>)	.86	Additive index of 5 dichotomized items of Food Insecurity (USDA, 2012). 3 items with 3-point response options were collapsed to a 0/1 indicator of food insecurity as preregistered.
Non-food economic hardship index	5	in the last 12 months, missed a rent or mortgage payment (<i>yes, no</i>)	.54	Additive index of select items in the economic stress index (Kling, Liebman, and Katz, 2007)
Economic worry	1	worry about being able to meet your monthly living expenses? (<i>all the time, very frequently, occasionally, rarely, very rarely, never</i>)	NA	1 item from the economic stress index (Kling, Liebman, and Katz, 2007)
Parent Psychological Distress				
Perceived stress index*	9	In the last month, felt that you were unable to control the important things in your life (<i>never, almost never, sometimes, fairly often, very often</i>)	.75	Additive Index. Cohen et al. (1994, 1983)
Parenting stress index	7	I feel trapped by my responsibilities as a parent (<i>strongly disagree, disagree, not sure, agree, strongly agree</i>)	.55	Additive index of the Aggravation index from PSID-Child Development Supplement (Schickedanz et al., 2018) and parenting competence index from project GAIN (Slack, Berger, Collins, 2016)
Maternal depression. PHQ8	8	In the past 2 weeks, felt down depressed or hopeless (<i>not at all, several days, more than half the days, nearly every day</i>)	.84	Additive Scale. Kroenke et al. (2009)
Maternal Anxiety. Beck Anxiety Inventory	21	In the past month, bothered by numbness or tingling (not at all, mildly, moderately, severely)	.90	Additive Scale. Beck (1988)
Physiological Stress. Hair Cortisol	NA	Measure of cortisol concentration from mother's hair sample	NA	Meyer et al. (2014)
Interparental Relationship Quality				
Co-parent quality -total	7	You can trust him to take good care of [child] (<i>always, sometimes, or rarely true</i>)	.90	Additive Index McLanahan, S., & Beck, A. N. (2010)
Ever hit by partner	1	Ever cut, bruised, or seriously hurt, in a fight, with your current partner (<i>yes/no</i>)	NA	1 item. Fragile Families and Child Wellbeing Study
Argue with partner	1	you and your current partner argue about the things that are important to you (<i>always, often, sometimes, rarely, never</i>)	NA	1 item. Fragile Families and Child Wellbeing Study
Relationship Quality	10	your partner, fair, and willing to compromise, when you had a disagreement (<i>often, sometimes, never</i>)	.83	Additive Scale adapted from Fragile Families and Child Wellbeing Study
Parenting Quality				
Parent-Child Activities	4	read books or look at pictures in a book with [child] (every day, few times a week, few times a month, rarely/not at all)	.61	Additive Index. Rodriguez and Tamis-LeMonda (2011)
Parent-Child Interaction: PICCOLO	29	Parent's voice is positive in tone and may show enthusiasm or tenderness (<i>absent, barely, clearly</i>)	.75	Observational assessment. Roggman et al. (2013)
Spanking as a discipline	1	In the past month have you spanked your one-year-old child because they were misbehaving or acting up? (<i>yes/no</i>)	NA	1 binary item. Reichman et al. (2001)

Note: * these two measures are each missing 1 item from the original index due to a survey error. NA=Not Applicable. Subscales/subindices of measures are described in Appendix Table 8. PHQ8=Personal Health Questionnaire Depression Scale. PICCOLO=Parenting Interactions with Children: Checklist of Observations Linked to Outcomes.

Table 2. Baseline Characteristics of the Full age-1 Analytic Sample (N = 931)

	<u>Low Cash Gift</u>		<u>High Cash Gift</u>		<u>Std Mean Difference</u>		<i>p</i> -value
	Mean (sd)	N	Mean (sd)	N	Hedges' g	Cox's Index	
<u>CHILD</u>							
Female	0.51	548	0.48	383		-0.07	0.40
Weight at birth (lbs)	7.13 (1.08)	547	7.11 (1.02)	382	-0.03		0.72
Gestational age (weeks)	39.09 (1.23)	544	39.03 (1.25)	383	-0.05		0.49
<u>MOTHER</u>							
Age at birth (years)	26.94 (5.84)	548	27.41 (5.75)	383	0.08		0.19
Education (years)	11.86 (2.83)	541	11.91 (2.98)	381	0.02		0.78
Race/Ethnicity							
White, non-Hispanic	0.11	548	0.08	383		-0.21	0.16
Black, non-Hispanic	0.39	548	0.44	383		0.12	0.07
multiple, non-Hispanic	0.04	548	0.03	383		-0.18	0.37
other or unknown	0.04	548	0.02	383		-0.43	0.07
Hispanic	0.42	548	0.42	383		0.00	0.77
Marital Status							
never married	0.42	548	0.50	383		0.20	0.02
single, living with partner	0.27	548	0.21	383		-0.20	0.05
married	0.22	548	0.21	383		-0.04	1.00
divorced/separated	0.05	548	0.03	383		-0.32	0.18
other or unknown	0.05	548	0.05	383		0.00	0.76
Health is good or better	0.88	548	0.92	383		0.27	0.02
Depression (CESD)	0.68 (0.44)	548	0.67 (0.45)	383	-0.01		0.85
Cigarettes per week during pregnancy	4.68 (20.32)	544	3.11 (11.10)	380	-0.09		0.12
Alcohol drinks per week during pregnancy	0.15 (1.66)	546	0.03 (0.39)	382	-0.10		0.09
Number of children born to mother	2.42 (1.37)	548	2.53 (1.42)	383	0.08		0.24
Number of adults in household	2.08 (0.98)	548	2.02 (0.97)	383	-0.06		0.35
Biological father lives in household	0.41	548	0.35	383		-0.15	0.06
Household combined income	22,313.09 (21282.42)	514	20,984.60 (16008.41)	356	-0.07		0.30
Household income unknown	0.06	548	0.07	383		0.10	0.62
Household net worth	-2,187.56 (29365.99)	489	-3,267.96 (20722.26)	342	-0.04		0.54
Household net worth unknown	0.11	548	0.11	383		0.00	1.00

Joint Test: Chi2(30)=29.55, *p*-value=0.38, n=927.

Notes: The *p*-values were derived from a series of OLS bivariate regressions in which each respective baseline characteristic was regressed on the treatment status indicator using robust standard errors and site-level fixed effects. The *p*-values without fixed effects do not appear in the table. The joint test of orthogonality was conducted using a probit model with robust standard errors and site-level fixed effects. Standardized mean differences were calculated using Hedge's *g* for continuous variables and Cox's Index for dichotomous variables. If there were more than 10 missing cases for a covariate, missing data dummies were included in the table and the joint test. If there were less than 10 cases missing, missing data dummies were not included in the table but were included in the joint test. Chi-square tests of independence were conducted for the two categorical variables: mother race/ethnicity and mother marital status. For both tests, *p*>0.05. All respondents with missing data on gestational age are in the control group. Thus, this dummy was removed from the joint test due to perfectly predicting failure. This results in a slightly smaller sample for the joint test.

Table 3. Cash-gift ITT Effect Estimates of Measures in the Conceptual Model

Family	Outcome	Hypoth. direction	N	Low-Cash Gift Group Mean (SD)	High-Cash Gift Group Mean (SD)	ITT Estimate	ITT Estimate covariate adj.	Effect Size	<i>p</i> -value	adj. <i>p</i> -value
1. Economic Resources										
1	Income-to-needs ratio	+	931	0.84 (0.84)	0.91 (0.66)	0.07 (0.05)	0.12* (0.05)	0.14	0.01	0.01
1	Below 100% of FPL	-	931	0.71 (0.45)	0.66 (0.48)	-0.06+(0.03)	-0.09* (0.03)	-0.21	<0.01	<0.01
2. Economic Pressure										
2	Food Insecurity Index	-	929	1.21 (1.67)	1.49 (1.77)	0.28* (0.12)	0.23+ (0.12)	0.14	0.05	0.15
2	Non-food economic hardship	-	923	1.07 (1.14)	1.14 (1.21)	0.06 (0.08)	0.03 (0.08)	0.03	0.71	0.72
2	Expense Worry	-	930	2.90 (1.65)	3.10 (1.59)	0.21+ (0.11)	0.17 (0.11)	0.10	0.12	0.23
3. Parent Psychological Distress										
3	Perceived Stress Index	-	930	10.82 (6.35)	11.39 (6.04)	0.55 (0.41)	0.62 (0.41)	0.10	0.13	0.32
3	Parenting Stress Index	-	929	15.05 (3.52)	15.68 (3.42)	0.64* (0.23)	0.53* (0.24)	0.15	0.03	0.10
3	Maternal Depression (PHQ8)	-	930	3.72 (4.09)	3.91 (4.41)	0.18 (0.28)	0.26 (0.28)	0.06	0.35	0.58
3	Maternal Anxiety (Beck)	-	930	4.58 (6.57)	5.94 (8.34)	1.35* (0.51)	1.66* (0.51)	0.25	<0.01	0.01
3	Physiological Stress (Ln Hair Cortisol)	-	364	1.73 (1.37)	1.89 (1.41)	0.08 (0.14)	0.03 (0.15)	0.02	0.84	0.84
4a. Interparental Relationship Quality										
4	Co-Parent Quality	+	720	19.36 (2.90)	18.95 (3.36)	-0.41+ (0.24)	-0.38 (0.24)	-0.13	0.12	0.37
4	Relationship Quality Index	+	572	26.98 (3.55)	26.58 (3.76)	-0.41 (0.31)	-0.30 (0.31)	-0.08	0.34	0.69
4	Ever cut/bruised/seriously hurt by partner	-	572	0.08 (0.28)	0.07 (0.25)	-0.01 (0.02)	-0.02 (0.02)	-0.08	0.35	0.69
4	Frequency of Arguing	-	566	2.56 (1.02)	2.48 (0.96)	-0.08 (0.08)	-0.04 (0.09)	-0.04	0.67	0.69
4b. Parenting Quality										
5	Parent-Child Activities Index	+	929	10.29 (2.68)	10.78 (2.58)	0.50* (0.17)	0.44* (0.18)	0.16	0.01	0.05
5	Parent-Child Interaction (PICCOLO)	+	543	41.39 (5.48)	41.63 (5.39)	0.25 (0.47)	0.53 (0.49)	0.10	0.28	0.48
5	Spanking discipline strategy	+	596	0.06 (0.24)	0.07 (0.25)	0.01 (0.02)	0.02 (0.02)	0.08	0.40	0.48

Note: ITT (Intent-to-treat) effect estimates of the cash-gift treatment are presented with standard errors in parentheses. Effect size is standardized using the standard deviation of the full low-cash gift group sample. The *p*-value adjustments are based on pre-registered Westfall and Young’s step-down resampling methods of addressing multiple hypothesis testing, where outcomes are grouped into families and their *p*-values adjusted collectively. For example, two outcomes make up family number 1. The arrangement of families in this table follows the conceptual model presented in Figure 1. Pre-registered hypothesized direction of the intervention effects are presented with “+” for increase in outcome and “-“ for decrease in outcome. FPL=Federal Poverty Level. PHQ8=Personal Health Questionnaire Depression Scale. PICCOLO=Parenting Interactions with Children: Checklist of Observations Linked to Outcomes.+ *p*<0.10; * *p*<0.05