Mothers’ and fathers’ parenting stress, responsiveness, and child wellbeing among low-income families

Kaitlin P. Warda,*, Shawna J. Lee

a School of Social Work, Department of Psychology, University of Michigan, Ann Arbor, MI 48109, United States
b School of Social Work, University of Michigan, Ann Arbor, MI 48109, United States

ARTICLE INFO

ABSTRACT

Robust research shows that parenting stress is associated with lower levels of parental sensitivity toward their children (i.e., parental responsiveness), thus negatively influencing child outcomes. While research supports these associations, most studies utilize self-report measures of parental responsiveness and exclude fathers. This study examines whether observed parental responsiveness mediates the relationship between parenting stress and child cognitive development, prosocial behavior, and behavior problems in a large sample of diverse low-income families. Data were obtained from the Building Strong Families Project (N = 1,173). Dyadic bootstrapped mediation models were estimated in Mplus. For mothers and fathers, parenting stress was negatively associated with responsiveness (β = −0.08, 95% CI = [−0.14, −0.02], p = .012), and responsiveness was positively associated with child cognitive development (β = 0.15, 95% CI = [0.11, 0.19], p < .001) and child prosocial behavior (β = 0.12, 95% CI = [0.08, 0.15], p < .001). Mothers’ responsiveness was negatively associated with child behavior problems (β = −0.07, 95% CI = [−0.13, −0.01], p = .020), but fathers’ responsiveness was not (β = −0.01, 95% CI = [−0.06, 0.05], p = .814). For mothers and fathers, parenting stress was indirectly related to child cognitive development and prosocial behavior via responsiveness. Indirect effects were not found for mothers or fathers when predicting child behavior problems. To improve children’s wellbeing, interventions may consider strengthening responsiveness and reducing parental stress among both mothers and fathers.

1. Introduction

Parenting stress, which is characterized by taxing or frustrating interactions between parents and children (Abidin, 1995), is a challenge that many parents face. According to the National Survey of Children’s Health (U.S. Department of Health and Human Services [USDHHS], 2014), parents of approximately 11% of children in the U.S. usually or always feel stress related to parenting. This percentage is higher for low-income families, where parents of approximately 19% of children usually or always feel parenting stress (USDHHS, 2014). Individuals may experience stress from being a parent for a multitude of reasons, including child-rearing difficulties, child-related financial burdens, child behavioral management, and the coordination of everyday activities. Parenting stress has long been recognized as a predictor of children’s outcomes, including child behavior problems, child attention problems, and child cognitive development (Guajardo, Snyder, & Peterson, 2009; Neece, Green, & Baker, 2012). Due to the prevalence of parenting stress being relatively high (USDHHS, 2014), it is essential to understand the consequences of parental stress as well as the factors that explain or mediate the relationship between parenting stress and children’s outcomes.

Prior research suggests that parenting stress influences parent-child interactions by reducing the quality of parental responsiveness, which may, in turn, influence child outcomes (Conger, Rueter, & Conger, 2000). Many existing studies measure parent-child interactions via maternal reports, which may be influenced by social desirability bias, recall bias, and other factors. Further, few studies have examined these relationships among fathers, even though the quality of father-child interactions can influence children’s outcomes (Caldera, Volling, & Barr, 2018; McWayne, Downer, Campos, & Harris, 2013). To address these gaps in the literature, this study examines whether parenting stress relates to child outcomes via an observational measure of

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* This research was supported by a grant from the Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHD) (1R15HD091763-01) to Dr. Shawna J. Lee.

Corresponding author at: School of Social Work, Department of Psychology, University of Michigan, Ann Arbor, MI 48109, United States.
E-mail addresses: kpward@umich.edu (K.P. Ward), shawnal@umich.edu (S.J. Lee).

https://doi.org/10.1016/j.childyouth.2020.105218

Received 17 January 2020; Received in revised form 26 June 2020; Accepted 27 June 2020
Available online 02 July 2020
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parental responsiveness among both mothers and fathers in a large sample of diverse low-income families.

1.1. Family stress model

Broadly, the family stress model (Conger et al., 2000, 2002; McLoyd, 1990) posits that financial stressors exert influence on parental psychological states, which impacts how parents interact with their children, thus influencing child outcomes. Parents who experience financial stress may engage in fewer nurturing behaviors toward their children, be more punitive toward their children, and show more indifference in interactions with their children (Elder, Nguyen, & Caspi, 1985; McLoyd, 1989). Further, changes in the quality of parenting due to financial stress has been linked with changes in child behavior, such as increased hyperactivity and aggression (Mistry, Vandewater, Huston, & McLoyd, 2002). These patterns may be amplified among racial and ethnic minority populations in the U.S., who tend to experience disproportionate amounts of financial strain and racial discrimination (McLoyd, 1990; Murry, Brown, Brody, Cutrona, & Simons, 2001).

In recent years, researchers have extended the family stress model to examine external stressors beyond financial stress, including parenting stress, which can serve as a predictor of parent-child interactions. For example, parenting stress is shown to reduce parental responsiveness toward their children, which refers to parenting behaviors such as sensitivity to the child’s needs, quickly and contingently responding to children, and engaging in positive interactions with children (Landry, Smith, & Swank, 2006). Also, parents who have higher levels of parental stress tend to have an authoritarian parenting style, engage in harsh parenting, be less involved with their child, and have an insecure attachment with their child (Belsky, Woodward, & Crnic, 1996; Rholes, Simpson, & Friedman, 2006; Tharner et al., 2012). This empirical evidence demonstrates that parenting stress is an important variable to consider in the context of the family stress model.

Although the family stress model theoretically accounts for the roles of both mothers and fathers in influencing child outcomes, most studies have focused on mothers. Recent studies suggest that higher maternal parenting stress is associated with lower child health ratings (Larkin & Otis, 2019), and mothers’ supportiveness mediates the relationship between parenting stress and child behavior problems (Cherry, Gerstein, & Cicciola, 2019). When examining fathers, cross-sectional studies show that fathers’ parenting stress is associated with lower self-reported measures of caregiving involvement (Fagan, Bernd, & Whitteman, 2007) and child behavior problems (Lee, Pace, Lee, & Knauer, 2018). Longitudinal studies find that parenting stress significantly influences mothers’ and fathers’ parental sensitivity (Lau & Power, 2019; Pelchat, Bisson, Bois, & Saucier, 2003) as well as their responsiveness toward and involvement with their children (Coats & Phares, 2019; Ponnet et al., 2013). These studies suggest that, like mothers’ parenting stress, fathers’ parenting stress may be an important determinant of parenting-child interactions and child outcomes. However, existing studies are limited in study design (e.g., cross-sectional analysis; Fagan et al., 2007; Lee et al., 2018), measurement of the parent-child interactions (e.g., non-observational; Ponnet et al., 2013), and the lack of testing mechanisms that explain the relationship between parenting stress and child outcomes (e.g., Pelchat et al., 2003). This study aims to respond to these gaps by exploring whether mothers’ and fathers’ parenting stress relates to future child outcomes through the mechanism of parental responsiveness.

1.2. Mothers’ and fathers’ responsiveness and child outcomes

Bornstein, Tamis-Lemonda, Hahn, and Haynes (2008) define parental responsiveness as “... the prompt, contingent, and appropriate reactions parents display to their children in the context of everyday exchanges” (Bornstein et al., 2008, pg. 867). In observational studies, parental responsiveness is measured based on the quality of the parent-child interaction, parents’ demonstration of positive regard toward their child, and parents’ sensitivity to the child. As parents respond promptly and warmly to their children in the context of caregiving and can benefit their children (Jeong et al., 2019). Responsive parenting behaviors are thought to foster healthy child outcomes, including cognitive development and prosocial behavior (Brady-Smith et al., 2013; Fuligni et al., 2013; Fuligni & Brooks-Gunn, 2013; Jeong et al., 2019; Lemelin, Tarabulsy, & Provost, 2006; O’Neal, Weston, Brooks-Gunn, Berlin, & Atapattu, 2017; Wang, Christ, Mills-Koonce, Garrett-Peters, & Cox, 2013; b2010 b0270 b0330). Consistent with the family stress model, parenting stress inhibits parental responsiveness to their child (Crnic, Gaze, & Hoffman, 2005; Crnic & Ross, 2017).

Importantly, both fathers’ and mothers’ responsive parenting behaviors have an important impact on children’s outcomes (Cabrera et al., 2018; McWayne et al., 2013). Although there are relatively few studies examining father responsiveness in early childhood, studies show that the father-child relationship quality directly predicts child prosocial behavior (Ferreira et al., 2016). Positive paternal involvement is positively associated to children’s cognitive development (Dubowitz et al., 2001). In addition, fathers’ responsiveness in infancy is associated with fewer child externalizing behaviors in middle childhood (Trautmann-Villalba, Gschwendt, Schmidt, & Laucht, 2006).

1.3. Dyadic models with mothers and fathers

Family researchers have long acknowledged that parents are non-independent from one another; thus, researchers need to account for this dependence in statistical analyses. Yet, much of the available literature either presents analyses that focus on mothers only, or analyzes mothers and fathers in separate models. For example, in one study that analyzed mothers and fathers in separate models, the authors found that maternal, but not paternal, sensitivity was related to children’s prosocial behavior (Newton, Laible, Carlo, & Steele, 2014), suggesting that mothers’ sensitivity influences children’s prosocial behavior, while fathers’ sensitivity does not. However, Kenny (2010) cautions that by analyzing mothers and fathers in separate models, researchers may be reducing statistical power and finding differences between parents, when no such difference statistically exists. Ideally, mothers’ and fathers’ responsiveness could be analyzed in a dyadic fashion in order to account for both influences on future child outcomes (Kenny, 2010).

In addition to including mothers and fathers in the same statistical model when possible, it is important to consider sociodemographic variables that may influence parenting stress, parental responsiveness, and child outcomes. For example, several factors can influence parenting stress, including depression, parental relationship status, and the number of children in the household (Chang et al., 2004; Cooper, McLanahan, Meadows, & Brooks-Gunn, 2009; Lee et al., 2018; Leigh & Milgrom, 2008). Additionally, parental age, race, income, and education level may influence the quantity and quality of parental responsiveness (Baker, 2017; Harper & Fine, 2006). Prior research also indicates that a child’s gender may be an important factor to consider, such that parents of girls may experience slightly less parenting stress when children are toddlers, and parents of boys tend to rate their children higher on problem behaviors (Willford, Calkins, & Keane, 2007). Thus, these variables were deemed relevant to account for in the current study.

1.4. The current study

In summary, parental responsiveness may serve as a mechanism through which parenting stress affects child outcomes. Few studies to date have tested these associations among mothers and fathers simultaneously using dyadic models. This study responds to these gaps in the literature by (a) using an observed measure of parental responsiveness, (b) testing whether parental responsiveness serves as a
mechanism in the relationship between parenting stress and child outcomes, (c) examining these associations among mothers and fathers simultaneously, and (d) modeling positive and negative child outcomes, including child cognitive development, child prosocial behavior, and child behavior problems. Using data from a large sample of diverse low-income families, we hypothesize the following:

1) Mothers’ and fathers’ parenting stress at 15-months will be negatively associated with observed parental responsiveness at 36-months.

2) Mothers’ and fathers’ observed parental responsiveness at 36-months will be positively associated with child prosocial behavior and child cognitive development, and negatively associated with child behavior problems, at 36-months.

3) The relationship between mothers’ and fathers’ parenting stress at 15-months will be indirectly related to all three child outcomes at 36-months via observed parental responsiveness at 36-months.

2. Methods

2.1. Participants and procedure

Data came from the Building Strong Families (BSF) Project (Hershey, Devaney, Wood, & McConnell, 2014). The BSF project was a randomized controlled trial (RCT) of relationship education courses for low-income heterosexual couples aimed to improve child well-being and strengthen relationships. The control group did not receive services or participate in the relationship education intervention. Eligibility criteria included (1) the mother and father were both at least 18 years old, (2) the mother and father both provided informed consent to participate in the study, (3) the mother and father were expecting a baby or had a child under three months old, (4) the mother and father were romantically involved, and (5) the mother and father were unmarried at the time of their child’s conception. Couples were recruited from programs serving low-income families, such as maternity wards, hospitals, health clinics, prenatal clinics, and Special Supplemental Nutrition Programs for Women, Infants, and Children (WIC) clinics. Given the fact that parents were unmarried at the start of the study and were recruited from sites that served low-income families, BSF is described as a low-income sample throughout BSF documentation (Dion, Avellar, & Clary, 2010). Data collection via survey occurred between 2005 and 2011 across eight U.S. sites at three time points: near the time of the child’s birth (Baseline), 15 months post-Baseline, and 36 months post-Baseline (Hershey, Devaney, Wood, & McConnell, 2014). Mathematica Policy Research analyzed the effectiveness of the RCT and found no intervention effects on the study’s key outcomes, including father involvement, the likelihood of marriage, relationship quality, and coparenting quality (Wood, Moore, Clarkwest, & Killewald, 2014). However, they did find a small intervention effect that suggested that children in the treatment group exhibited fewer behavior problems. Since BSF was an RCT, all analyses in this study controlled for assignment to the BSF intervention group. The Institutional Review Board at the University of Michigan considered our secondary analyses of de-identified data exempt from further review.

The full sample of BSF data included 5,102 couples. Only some couples participated in the in-person assessments, during which our key mediator variable, responsiveness, was measured (Hershey et al., 2014). Couples participating in the Florida, San Angelo, and Boston programs did not participate in the in-person assessments. At other sites, not all parents were invited to participate in the in-person assessments. According to Hershey et al. (2014), couples who enrolled very early and very late during the enrollment period were not invited to participate in the in-person assessments. Therefore, we dropped all participants who had missing data on the responsiveness variable (n = 3,929). This resulted in a final sample size of 1,173 families. Similarly, not all children took the Peabody Picture Vocabulary Test (PPVT; a key dependent variable); therefore, for analyses involving the PPVT, we dropped any child with missing PPVT data (n = 361), leaving a final sample size of 812 for the PPVT analyses.

Table 1 presents the demographic characteristics of the sample. On average, mothers were approximately 23 years old, and fathers were 26 years old. The majority of couples identified as Black (52%) and were unmarried at Baseline (92%) and 36-months (69%). Nearly half of couples both had a high school education (48%), and approximately half of the children in the sample were male (51%). The majority of couples stated they were living in the same household at least most of the time at 15-months (78%) and 36-months (70%), and only had one child together (75%). Some statistically significant correlations between study variables of interest include maternal responsiveness and maternal parenting stress (r = –0.12, p = .001); paternal responsiveness and paternal parenting stress (r = –0.09, p = .005); maternal parenting stress and maternal depression (r = 0.31, p < .001); and paternal depression and paternal parenting stress (r = 0.29, p < .001).

2.2. Measures

2.2.1. Parenting stress

Parenting stress was measured at the 15-month time point using the Aggravation in Parenting Scale (Ehrle & Moore, 1997). The scale contained four items measured on a scale from 1 = none of the time to 4 = all of the time assessing if parents felt their children are harder to care for than most; if the child did things that bothered them; if they felt they were giving up their lives to meet their child’s needs more than

Table 1: Descriptive Statistics of Study Variables (N = 1,173).

<table>
<thead>
<tr>
<th>Variable</th>
<th>M</th>
<th>SD</th>
<th>Min</th>
<th>Max</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mothers Parenting Stress, 15 months</td>
<td>1.56</td>
<td>0.52</td>
<td>1</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fathers Parenting Stress, 15 months</td>
<td>1.52</td>
<td>0.52</td>
<td>1</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mothers Parenting Stress, 36 months</td>
<td>1.59</td>
<td>0.52</td>
<td>1</td>
<td>3.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fathers Parenting Stress, 36 months</td>
<td>1.60</td>
<td>0.51</td>
<td>1</td>
<td>3.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mothers Responsiveness</td>
<td>4.64</td>
<td>0.85</td>
<td>1.6</td>
<td>7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fathers Responsiveness</td>
<td>4.58</td>
<td>0.86</td>
<td>1.6</td>
<td>7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Child PPVT</td>
<td>90.24</td>
<td>15.33</td>
<td>26</td>
<td>142</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Child Prosocial Behavior</td>
<td>2.39</td>
<td>0.49</td>
<td>0.2</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Child Behavior Problems</td>
<td>0.39</td>
<td>0.26</td>
<td>0</td>
<td>1.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mothers Depressive Symptoms</td>
<td>4.51</td>
<td>5.67</td>
<td>0</td>
<td>36</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fathers Depressive Symptoms</td>
<td>3.86</td>
<td>5.42</td>
<td>0</td>
<td>34</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mothers Age</td>
<td>23.20</td>
<td>4.75</td>
<td>18</td>
<td>41</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fathers Age</td>
<td>25.52</td>
<td>4.75</td>
<td>18</td>
<td>41</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Biological children</td>
<td>1.35</td>
<td>0.72</td>
<td>1</td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>How Often Live Together, 15 months</td>
<td>3.35</td>
<td>1.12</td>
<td>1</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>How Often Live Together, 36 months</td>
<td>3.08</td>
<td>1.26</td>
<td>1</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Income-to-Poverty Status, 15 months</td>
<td>1.23</td>
<td>0.84</td>
<td>0</td>
<td>5.21</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Not all Ns total to 1,173 because of missing data on some demographic variables.
expected; and how angry they felt with their children. The scale's internal reliability in our sample was lower than desired (mothers: $\alpha = 0.53$, fathers: $\alpha = 0.52$).

### 2.2.2. Mothers' and fathers' responsiveness
Parental responsiveness was measured at 36-months during the semi-structured two-bag play task, which was designed to elicit meaningful parent-child interactions. This task, which was a modified version of the three-bag task used in the Early Childhood Longitudinal Study Birth Cohort (ECLS-B: Roisman & Fraley, 2008) as well as the Early Head Start Research and Evaluation Study (EHSREP; Nord et al., 2004), involved a 10-minute videotaped interaction where parents and children played with objects in bags in numerical order. Trained coders from Mathematica rated parents on five dimensions on a scale from 1 = low to 7 = very high: quality of the relationship, parents’ positive regard, parent cognitive stimulation, parent sensitivity, and parent detachment (reverse-coded). The scale exhibited good internal reliability in our sample (mothers: $\alpha = 0.85$; fathers: $\alpha = 0.84$).

### 2.2.3. Child PPVT
The PPVT-4 was administered to English-speaking children at the 36-month time point. The PPVT is a well-established standardized measure of children’s receptive language development (Dunn & Dunn, 2007) that assesses their knowledge of the meaning of words. Within the test, children are given a series of words (ranging from easy to difficult) that are accompanied by a picture card that contains multiple drawings. Children are instructed to point to the drawing that best represents each target word. The test typically takes approximately 20–30 min to complete and concludes when the difficulty level becomes too high for the child. Among population samples, the mean score of the PPVT is typically 100 and has a standard deviation of 15.

### 2.2.4. Child prosocial behavior
Child prosocial behavior was measured at 36-months by mother-reported responses on the Social Interaction scale of the Preschool and Kindergarten Behavior Scales—Second Edition (PKBS-2; Merrell, 2002). On a four-point Likert scale (0 = never, 1 = rarely, 2 = sometimes, 3 = often), mothers rated nine items on how frequently child behaviors occurred over the past month. Sample items include, “How often did [child] comfort other children who were upset,” “How often did [child] invite other children to play,” and “How often did [child] show affection for other children.” The scale's internal reliability in our sample was good ($\alpha = 0.75$).

### 2.2.5. Child behavior problems
To measure child behavior problems at 36-months, mothers responded to 26 items on a three-point Likert scale (0 = never true, 1 = sometimes true, or 2 = often true) from the Behavioral Problems Index (BPI; Peterson & Zill, 1986). Sample items include “[child] has a very strong temper and loses it easily,” “[child] demands a lot of attention,” and “[child] is unhappy, sad, or depressed.” The scale's internal reliability in our sample was good ($\alpha = 0.86$).

### 2.2.6. Control variables
Some control variables that could influence our key variables of interest were included in all analyses. Mothers’ and fathers’ depressive symptoms at the 15-month time point were measured using the 12-item version of the Center for Epidemiologic Studies Depression Scale (CES-D) (Radloff, 1977). Mothers’ and fathers’ ages, the number of biological children the mother had with the father before the focal child was born (capped at 5), and maternal report of how often the parents lived together in the same household at 15- and 36-months (“residential status;” 1 = none of the time, 2 = some of the time, 3 = most of the time, 4 = all of the time) were specified as continuous variables. The couple’s income-to-poverty status at 15-months was also specified as a continuous variable. Marital status at the 15- and 36-month time points (0 = unmarried, 1 = married), child sex (0 = girl, 1 = boy), and treatment group (0 = control, 1 = treatment) were specified as dichotomous variables. Couples’ race was captured with a variable that Mathematica generated, which reflects the race of the couple; this variable was modeled with a set of dummy codes for whether couples identified as White (comparison), Black, Hispanic, or Other (“Other” included biracial couples). We also controlled for whether both parents had less than a high school education (comparison), whether one parent had a high school diploma, or both parents had a high school diploma.

### 2.3. Statistical analyses
We first scanned the data for missing data and outliers. No outliers were present. Scales in our models were all observed (i.e., no latent variables), and all scales were generated such that no missing values were permitted in the creation of the scale; nevertheless, few missing data were present on our key scales of interest (no missing data on responsiveness; 6.39% missing data on mothers’ parenting stress; 12.19% missing data on fathers’ parenting stress; < 1% missing data on child behavior problems and child prosocial behavior). Therefore, we utilized full-information maximum likelihood estimation (FIML), which uses all available data and has been documented as a generally unbiased way to handle missing data in structural equation modeling (SEM; Kline, 2016). Our analyses utilized the maximum likelihood estimator, which provides estimates and standard errors that are robust to non-normality. To determine whether our data fit our specified model, we examined the Comparative Fit Index (CFI), Root Mean Square Error of Approximation (RMSEA), and Standardized Root Mean Square Residual (SRMR). For CFI, values of 0.95 and greater generally suggest a good fit. For RMSEA and SRMR, values of 0.05 and below generally suggest a good fit (Hu & Bentler, 1999).

Because our data were dyadic, we followed Kenny’s (2010) guidelines for analyzing dyadic data. First, we correlated mothers’ and fathers’ parenting stress as well as mothers’ and fathers’ responsiveness measures. Next, we utilized SEM model comparison techniques, namely the chi-square difference test ($\chi^2$), to examine whether constraining mothers’ and fathers’ pathways to be equal fit the data better than unconstraining mothers’ and fathers’ pathways. A non-significant chi-square difference test indicates that mothers and fathers have statistically indistinguishable effects on each of the outcome measures; however, a significant chi-square difference test indicates that the estimated pathways statistically differ for mothers and fathers. To examine mothers’ and fathers’ indirect effects, we utilized mediation bootstrapping techniques (500 bootstraps), which is the most rigorous test of indirect effects to date (Shrout & Bolger, 2002). Following Shrout and Bolger (2002) recommendations for detecting indirect effects, we considered a statistically significant indirect effect to be detected through a bootstrapped 95% confidence interval that does not include zero.

Hypothesis 1 was examined by observing the pathways between parenting stress and parental responsiveness; Hypothesis 2 was examined by observing the pathways between parental responsiveness and the three child outcomes; Hypothesis 3 was examined by observing whether the 95% confidence intervals for the indirect effects excluded zero. Preliminary and descriptive analyses were conducted in Stata version 15.1, and path analyses were conducted in Mplus version 8 (Muthén & Muthén, 2018).

### 3. Results

#### 3.1. Child cognitive outcomes
Results for the model examining child PPVT as the dependent variable are presented in Fig. 1. When comparing the unconstrained and constrained model, the chi-square difference test was non-significant ($\chi^2([3]) = 5.03$); therefore, the constrained model was examined. For both mothers and fathers, parenting stress at 15-months
was negatively associated with parental responsiveness at 36-months (mothers and fathers: B = −0.08, 95% CI = [−0.14, −0.02], p = .012). Additionally, parental responsiveness at 36-months was positively associated with child PPVT at 36-months (mothers and fathers: B = 0.15, 95% CI = [0.11, 0.19], p < .001). In terms of the direct effect, neither mothers’ nor fathers’ parenting stress at 15-months was associated with child PPVT at 36-months (mothers and fathers: B = −0.03, 95% CI = [−0.07, 0.02], p = .289). A statistically significant indirect effect was found (b = −0.34, SE = 0.14, p = .017, bootstrapped 95% CI [−0.62, −0.06]), signaling that parenting stress at 15-months was indirectly related to child PPVT at 36-months through parental responsiveness at 36-months.

### 3.2. Child prosocial behavior and child behavior problems

Results for the model examining child prosocial behavior and child behavior problems as the dependent variables are presented in Fig. 2. When comparing the unconstrained and constrained model for child prosocial behavior, the chi-square difference test was non-significant (χ^2 Δ[3] = 1.20); therefore, constrained pathways were examined for prosocial behavior. When comparing the unconstrained and constrained model for child behavior problems, the chi-square difference test was significant for the model pathways from the parenting stress and responsiveness measures to child behavior problems (χ^2 Δ[2] = 12.18); therefore, these pathways were unconstrained. For both mothers and fathers, parenting stress at 15-months was negatively associated with parental responsiveness at 36-months (mothers and fathers: B = −0.08, 95% CI = [−0.12, −0.03], p = .002). Parental responsiveness at 36-months was positively associated with child prosocial behavior at 36-months (mothers and fathers: B = 0.12, 95% CI = [0.08, 0.15], p < .001). In terms of the direct effect, neither mothers’ nor fathers’ parenting stress at 15-months was associated with child prosocial behavior at 36-months (mothers and fathers: B = −0.01, 95% CI = [−0.05, 0.03], p = .753). A small, but statistically significant indirect effect was found for prosocial behavior (b = −0.01, SE = 0.00, p = .007, bootstrapped 95% CI [−0.014, −0.002]), signaling that parenting stress at 15-months was indirectly related to child prosocial behavior at 36-months through parental responsiveness at 36-months.

Regarding child behavior problems, mothers’, but not fathers’, responsiveness at 36-months was associated with child behavior problems at 36-months (mothers: B = −0.07, 95% CI = [−0.13, −0.01], p = .020; fathers: B = −0.01, 95% CI = [−0.06, 0.05], p = .814). In terms of the direct effect, both mothers’ and fathers’ parenting stress at 15-months was associated with an increase in child behavior problems at 36-months, but mothers’ was more strongly related (mothers: B = 0.21, 95% CI = [0.14, 0.28], p < .001; fathers: B = 0.07, 95% CI = 0.01, 0.14, p = .32). The indirect effect was non-significant for both parents (mothers: b = 0.01, SE = 0.00, p = .067, bootstrapped 95% CI [0.00, 0.006]; fathers: 0.00, SE = 0.00, p = .827, bootstrapped 95% CI [−0.002, 0.002]).

### 3.3. Comparing mothers’ and fathers’ patterns of influence

Table 2 summarizes overall patterns of associations for mothers and fathers. For the child PPVT and prosocial behavior outcomes, the pattern of results was consistent for mothers and fathers: structural invariance testing indicated that mothers’ and fathers’ pathways did not differ in those models, and thus pathways could be constrained. For the PPVT outcome, for both parents there were (H1) significant associations from parenting stress to observed parental responsiveness; (H2) significant associations from observed parental responsiveness to PPVT; and (H3) observed parental responsiveness mediated the association from parenting stress to child PPVT (indirect effect). Similarly, for the measure of child prosocial behavior, for both parents there were (H1) significant associations from parenting stress to observed parental responsiveness; (H2) significant associations from observed parental responsiveness to child prosocial behavior; and (H3) observed parental responsiveness mediated the association from parenting stress to child prosocial behavior (indirect effect). Mothers and fathers did not differ in these patterns of associations.

However, for child behavior problems, although there were (H1) significant associations from mothers’ and fathers’ parenting stress to parental responsiveness, there were (H2) significant associations from parental responsiveness to child behavior problems for mothers only. Furthermore, (H3) parental responsiveness did not mediate the association from parenting stress to child behavior problems (indirect effect) for either parent.

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**Fig. 1.** Associations between parenting stress, responsiveness, and child PPVT. Mothers’ and fathers’ pathways are constrained. Dotted lines indicate pathways where p > .05. Note: Coefficients are standardized. Mothers’ and fathers’ pathways are constrained to be equal. Model controls for parental depression, race, education, age, number of biological children, child sex, treatment group, income-to-poverty ratio, marital status, and residential status. N = 812 *p < .05, **p < .01, ***p < .001. CFI: 1.00, RMSEA: 0.02; SRMR: 0.00. Indirect effect, mothers and fathers: b = −0.34, SE = 0.14, p = .017, bootstrapped 95% CI: [−0.62, −0.06].
Fig. 2. Associations between parenting stress, responsiveness, child prosocial behavior and child behavior problems. Mothers’ and fathers’ pathways are constrained, except for pathways from predicting child behavior problems. Dotted lines indicate pathways where $p > .05$. Note: Coefficients are standardized. Model controls for parental depression, race, education, age, number of biological children, child sex, treatment group, income-to-poverty ratio, marital, and residential status.

<table>
<thead>
<tr>
<th>15-MONTHS</th>
<th>36-MONTHS</th>
<th>36-MONTHS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maternal Parenting Stress</td>
<td>Maternal Responsiveness</td>
<td>Child Behavior Problems</td>
</tr>
<tr>
<td>Paternal Parenting Stress</td>
<td></td>
<td></td>
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<tr>
<td>Paternal Responsiveness</td>
<td>Child Prosocial Behavior</td>
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</tbody>
</table>

Summary Comparing Patterns of Mother and Father Results.

Table 2

<table>
<thead>
<tr>
<th>Child Outcome Measure</th>
<th>Direct Effect</th>
<th>Pathway A H1: Stress → Responsiveness</th>
<th>Pathway B H2: Responsiveness → Outcome</th>
<th>Indirect Effect H3: Responsiveness as Mediator</th>
</tr>
</thead>
<tbody>
<tr>
<td>PPVT</td>
<td></td>
<td>M, F</td>
<td>M, F</td>
<td>M, F</td>
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<tr>
<td>Prosocial Behavior</td>
<td></td>
<td>M, F</td>
<td>M, F</td>
<td>M, F</td>
</tr>
<tr>
<td>Behavior Problems</td>
<td>M, F</td>
<td>M, F</td>
<td>M</td>
<td>–</td>
</tr>
</tbody>
</table>

Note: M denotes that the pathway was significant for mothers; F denotes that the pathway was significant for fathers. Dashed lines indicate a non-significant relationship for mothers and fathers.
model by proposing that parenting stress can negatively influence children’s cognitive and prosocial outcomes via an observed measure of parental responsiveness. Few studies have examined these components of the family stress model using large, diverse samples of low-income parents. Additionally, using an observational measure of responsiveness allowed this study to overcome some of the biases inherent in self-report data. While dozens of studies have utilized observational measures of responsiveness among mothers only (Brady-Smith et al., 2013; Fuligni et al., 2013; Fuligni & Brooks-Gunn, 2013; O’Neal et al., 2017), few studies of this scale (i.e., consisting of over 1,100 families) have utilized observational data of both father-child and mother-child responsiveness among low-income parents. Data from both mothers and fathers allowed us to conduct dyadic analyses that examined the processes linking mothers’ and fathers’ parenting stress to child outcomes (child cognitive development, child prosocial behavior, and child behavior problems), as well as to assess whether these associations differed between mothers and fathers.

There are several key findings of this study. First, the processes linking parenting stress, parental responsiveness, and child cognitive development and prosocial behavior appear to differ from the processes linking such parenting variables to child behavior problems (summarized in Table 2). Specifically, parental responsiveness did mediate the association between parenting stress and child cognitive development and prosocial behavior; however, parental responsiveness did not mediate the association between parenting stress and child behavior problems. Second, the associations between parenting stress, parental responsiveness, and child cognitive development and prosocial appear to be quite similar for mothers and fathers. However, mothers’ and fathers’ influence on child behavior problems differ, with mothers’ parenting stress and responsiveness being more strongly linked with child behavior problems that fathers’ parenting stress and responsiveness.

4.1. Parenting stress, observed parental responsiveness, and child outcomes

The results showing that mothers’ and fathers’ parenting stress at 15-months was positively associated with observed parental responsiveness at 36-months align well with prior literature that suggests parenting stress can directly affect the quality of mother-child and father-child interactions (Belsky et al., 1996). The observational measure of responsiveness utilized in this study (i.e., two bags task) captures important dimensions of the parent-child relationship, including the quality of the relationship, parental positive regard toward the child, parental sensitivity, and parental detachment during the interaction (Fuligni & Brooks-Gunn, 2013). Thus, this study suggests that the experience of parenting stress makes it less likely that mothers and fathers would engage in positive interactions with their child. The association from parenting stress to parental responsiveness was similar for mothers and fathers in this study, who were living in highly economically disadvantaged circumstances and likely experienced high levels of parenting stress.

Among both mothers and fathers, parental responsiveness was positively associated with children’s cognitive development and prosocial behavior at 36-months. Again, these findings align with prior studies among mothers that show parental responsiveness is associated with child outcomes (Gujardo et al., 2009; Wang, Christ, Mills-Koonce, Garrett-Peters, & Cox, 2013), including child cognitive abilities (Brady-Smith et al., 2013). Results of this study showed that parental responsiveness mediated associations between parenting stress and child cognitive development and prosocial behavior. The behaviors that parents utilize when they are responsive to their child may role model prosocial behavior, thus encouraging their children to engage in similar behaviors. Responsive parenting also provides an environment in which children’s cognitive development is enhanced.

However, patterns of parental influence differed for the negative outcome of child behavior problems. Only mothers’ responsiveness was associated with lower child behavior problems, whereas fathers’ responsiveness was unrelated to child behavior problems. Further, mothers’ parenting stress was more strongly related to child behavior problems compared to fathers’. Although parental responsiveness played a mediating role in the associations of parenting stress to children’s cognitive development and prosocial behavior, this was not the case for child behavior problems: neither mothers’ nor fathers’ parental responsiveness was a mediator of parenting stress on child behavior problems. Overall, this pattern of findings may indicate that the parenting processes linked to positive outcomes (cognitive development, child prosocial behavior) differ in comparison to the processes associated with negative outcomes (child behavior problems).

4.2. Mother and father effects on child behavioral outcomes

Whereas mothers’ and fathers’ patterns of influence were quite similar for the positive outcomes of child cognitive development and child prosocial behavior, mothers’ and fathers’ patterns of influence differed for the negative outcome of child behavior problems. In terms of structural invariance testing, mothers’ and fathers’ pathways predicting children’s cognitive development and child prosocial behavior could be constrained to be equal; however, mothers’ and fathers’ pathways predicting child behavior problems could not be constrained to be equal. Specifically, mothers’ parenting stress predicted child behavior problems more strongly than fathers’, and mothers’ responsiveness predicted child behavior problems while fathers’ responsiveness did not. This suggests that, on the whole, mothers’ parenting stress and responsiveness were more strongly related to child behavior problems than fathers’. This highlights the importance of researchers acknowledging the non-independence of mothers and fathers: in some cases, maternal and paternal parenting may contribute to children’s outcomes at a similar strength; in other cases, maternal parenting may contribute to specific child outcomes at a higher strength than paternal parenting, or vice versa. However, researchers will need to replicate existing analyses that involve mothers and fathers and agree upon how to best model dyadic data (for example, by following Kenny’s [2010] guidelines) in order to determine whether mothers’ and fathers’ parenting contributes to child outcomes differently.

Our results for the differing effects of mothers’ and fathers’ parenting on the development of child behavior problems is consistent with prior research. A number of studies have also found modest influence, or no influence, of fathers’ parenting behaviors on child behavior problems, particularly when mothers and fathers are modeled simultaneously in statistical analyses. For example, using Fragile Families and Child Well-being data, one study simultaneously examined mothers’ and fathers’ use of discipline and found that maternal and paternal parenting did not impact child behavior problems in similar ways. Specifically, mothers’ spanking, but not fathers’ spanking, was associated with child aggression (Lee, Altshul, & Gershoff, 2015). Another study using Fragile Families and Child Well-being data investigated the associations of paternal anxiety and depression on child behavior problems and showed no significant associations of paternal mental health to child behavior problems (Meadows, McLanahan, & Brooks-Gunn, 2007). In a study that used BSF data (the same dataset as the current study) to examine the influence of mothers’ and fathers’ conflict behaviors on child outcomes, fathers’ reports of interparental conflict had no direct associations with child behavior problems, after accounting for maternal reports of interparental conflict (Lee, Pace, Lee, & Altshul, 2020). In sum, a number of studies—including the present study—suggest that mothers’ parenting behaviors may be more impactful than fathers’ parenting behaviors on children’s development of behavior problems, when mothers’ and fathers’ impacts are considered simultaneously. This is an important issue for further research and replication.

Researchers have suggested that, because mothers spend more time in daily caregiving of young children than do fathers (Craig, 2006;
interactions; alternatively, perhaps interventions that improve parent-child interactions may reduce parenting stress, which can impact child wellbeing and improve children’s well-being. Importantly, researchers and interventionists should consider the influence of both mothers and fathers when attempting to understand the relationships between parenting stress, parental responsiveness, and child wellbeing.

5. Conclusion

Parenting stress impacts many families across the U.S., especially low-income families. The family stress model suggests that external parenting stressors can influence parent-child interactions, which can then influence children’s outcomes. Overall, the study results are in concordance with the family stress model (Conger et al., 2000), and provide additional evidence that parental stressors impact parent-child interactions, which then impact child outcomes. Among a large, diverse sample of low-income families, we find that parenting stress is indirectly related to children’s cognitive development and child prosocial behavior through parental responsiveness. Although maternal and paternal parenting stress was found to be directly associated with child behavior problems, these relationships were not indirectly related to these outcomes through parental responsiveness. Patterns for mothers’ and fathers’ influence were largely similar for positive child outcomes (cognitive development and prosocial behavior), but differed when looking at the negative outcome of child behavior problems. Future studies should continue to examine how mothers and fathers contribute to child wellbeing and should strive to replicate the findings in this study among diverse samples using a fully longitudinal framework.

References
