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Conditions of Poverty, Parent–Child Interactions, and Toddlers' Early Language Skills in Low-Income Families

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Abstract

Objectives The study examined the relations between parent–child interaction in the first year of life to toddlers' language skills at age 2 years for a sample of children reared in poverty; of specific interest was testing the Family Stress Model, which proposes that the conditions of poverty influence children's language skills through caregiver well-being (e.g., distress, depression) and interaction dysregulation. *Methods* Participants were from the Kids in Columbus Study, a birth-cohort study of children born to urban families experiencing material hardship. Caregiver questionnaires were collected when the child was 4–7 months to document poverty conditions (maternal hardship, institutional resources), caregiver well-being (depression, distress), and dysregulation in parent–child interactions. The Bayley-III assessed receptive and expressive language skills when the children were 2 years. *Results* On average, receptive language skills were nearly *1 SD* below the normative mean. Path models showed a significant effect of caregiver-child dysregulated interactions on toddlers' language skills, and an indirect effect of maternal distress on parent–child interactions and, in turn, toddlers' language skills. *Conclusions for Practice* This study confirmed the theoretical Family Stress Model as a viable representation of the effects of poverty on the language skills of toddlers reared in homes experiencing socioeconomic disadvantage.

Keywords Language development · Poverty · Parent–child interaction · Parental distress · Parental depression

Significance

What is already known on this subject? Children reared in low-income homes experience lags in their language development and experience greater risk for language impairment.

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The Family Stress Model proposes that children's language skills may be affected by poverty via caregiver distress and depression and dysregulated parent–child interaction. *What this study adds?* This study examines parent–child interaction as a potential contributor to the language skills of toddlers' residing in low-income homes. Dysregulated parent–child interaction in the first year of life significantly predicted toddlers' language skills 18-months later; in addition, parent–child interactions mediated the relations between caregiver distress and children's language skills.

Introduction

In the United States, an estimated two of five young children reside in a low-income household, and half of these youngsters reside in poverty (Proctor et al. 2016). It is well-documented that being reared within a low-income household and, correspondingly often, a low-income neighborhood, exerts negative effects on children's development in a number of skill domains, including social competence,

self-regulation, and behavioral control (for reviews, respectively, see Eamon 2001; Evans and Kim 2013; Shaw and Shelleby 2014). The particular focus of the present study concerns the effects of poverty on young children's language development, which is of increasing concern given new evidence that the conditions of poverty affect the structural architecture of brain regions underlying language skills (Brito and Noble 2014; Noble et al. 2015b). Further, Noble et al. recently showed that the effects of poverty on young children's language skills are apparent as early as 2 years of age, with children in lower-income homes performing nearly one standard deviation lower than 2-year-olds in advantaged homes (Noble et al. 2015a). Such findings reflect the well-documented effects of children's environment on their developing language skills (Harlaar et al. 2010).

Of the varied features of children's environments, parenting processes, especially the quality of caregiver-child interaction, are especially important to children's language skills and linguistic growth trajectories (Huttenlocher et al. 2002; Rowe 2012). For instance, toddlers whose interactions with their caregivers feature high levels of responsive talk (i.e., talk in which the caregiver adheres to the child's focus) have steeper linguistic trajectories relative to children who experience lower levels of responsive talk (Landry et al. 2001). Responsiveness promotes children's early language growth because it reduces the cognitive demand of early interactions, such that children do not need to modulate their attentional resources during learning opportunities, and increases periods of joint sustained attention. The latter is theorized to be especially important for the linguistic development of young children (Farrant and Zubrick 2012).

The extent to which poverty affects the nature of caregiver-child interactions, and in turn, may influence young children's language skills, is not thoroughly understood. However, the Family Stress Model would stipulate that the conditions of poverty, such as lack of institutional resources (e.g., financial savings) and exposure to economic hardships (e.g., eviction), lead to stressors and dysfunction within the family system, which can impede the healthy caregiver-child interactions that facilitate early language development (Perkins et al. 2013). In such a model, the conditions of poverty directly affect the quality of parent–child interactions by diminishing parental capacity to engage in positive, emotionally supportive ways with their children (McLoyd 1990).

The purpose of the present study is to examine potential mechanisms through which conditions of poverty experienced by caregivers when children are infants—especially access to institutional resources and experiencing economic hardship—are associated with toddlers' language skills. Our guiding hypothesis is that the conditions of poverty *indirectly* influence toddlers' language skills via dysregulated caregiver-child interactions, which are associated with caregivers' mental well-being (distress and depression). That

is, poverty affects the child via its effects on children's caregivers and in turn the quality of caregivers' interactions with their children. Our primary objective was to determine whether poverty conditions, especially caregiver-reported institutional resources and economic hardship, are associated with the language skills of children reared in poverty via the mediating effects of parent–child dysfunctional interactions. We also sought to examine whether parents' well-being (distress, depression) contributed to parent–child dysfunctional interactions, consistent with the Family Stress Model.

Methods

Data and Participants

Data are from the Kids in Columbus Study (KICS), a 5-year birth-cohort study of children born into poor and low-income families (Salsberry et al. 2016). The present study used data collected during the first 2 years of participation for an enrolled cohort of 322 mother–child dyads. Dyads were recruited from five Women, Infants, and Children (WIC) Centers located in a Midwestern metropolitan area. Eligible mothers: (a) were either pregnant or had an infant less than 3 months of age, (b) planned on being in the county for the entirety of the study (5 years), (c) were at least 18 years of age at enrollment, (d) had conversational English skills, and (d) had a child that was not premature or diagnosed with any severe medical conditions. At enrollment, participating mothers averaged 26 years old (range = 18 to 46), and approximately 60% were unemployed, with the majority of the families (80%) reporting an annual household income less than $30,000. About one-third of mothers (36%) identified as White/Caucasian, 41% as Black/African American, and 7% as Hispanic/Latino. Forty percent had high school diploma or equivalent as the highest level of education, 30% had some college education (no degree), and 10% had a college degree.

Measures and Analysis Plan

KICS data analyzed here were collected during home visits organized as a series of time-points (TPs) corresponding to children's ages, with TP 1 as the time of recruitment and approximately 6-month intervals between TPs. The current analyses use parent questionnaires collected at TP 2 that consisted of parent questionnaires when children were between 4 and 7 months, and direct assessments of children's language skills collected at TP 5, when children were around 2 years (20–25 months). Thus this study examines predictive relations among family variables collected during

the first year of life and children's future language skills at age 2 years.

Institutional Resources and Economic Hardship (TP 2)

Eight questions were used to evaluate the financial resources to which the family had access (Yoshikawa et al. 2008). Four questions focused on the extent to which any household member had access to specific *institutional resources*, such as bank accounts and credit cards, whereas four questions assessed the extent of *economic hardship* the family had experienced in the previous year, such as lost utilities or difficulty paying rent or mortgage. Each question was scored as 0 ("No") or 1 ("Yes"), and each subscale had a score range of 0 to 4. Higher scores for institutional resources and lower scores for economic hardship indicated more access to economic resources, and lower levels of hardship, accordingly.

Parent Distress and Parent–Child Dysfunctional Interaction (TP 2)

Mothers completed two subscales of the *Parenting Stress Index—Short Form* (PSI; Abidin 2012): (1) *Parental distress* (12 items), which assesses the level of distress a parent is experiencing in her role as a parent ("I feel trapped by my responsibilities as a parent"); and (2) *Parent–child dysfunctional interaction* (12 items), which focuses on the parent's perception of her interactions with the child (e.g., "My child rarely does things for me that make me feel good"). Items were rated on a 1 (strongly disagree) to 5 (strongly agree) point Likert scale, with the total score for each subscale ranging from 12 to 60. Reliability as measured by Cronbach's alpha was high for both subscales (0.89–0.90 in the standardization sample, 0.88–0.89 in the study sample).

Maternal Depression (TP 2)

Maternal depression was assessed using the *Edinburgh Postnatal Depression Scale* (EPDS; Cox et al. 1987), which examines the probability of postpartum depression based on reported mood symptoms. Mothers responded to 10 items characterizing how they felt during the past week (e.g., "I have been anxious or worried for no good reason") based on a 4-point Likert scale. Total scores ranged from 0 to 30, with scores of ten or greater suggesting an elevated risk of depression, per manual guidelines. Reliability was high (Cronbach's alpha = 0.86) with the current sample.

Child Language Skills (TP 5)

Children's language skills at 2 years were assessed using two subtests of the *Bayley Scales of Infant and Toddler Development—Third Edition* (Bayley 2005), Receptive Communication and Expressive Communication. A standardized assessment of core language competencies, scaled scores are normed to a mean of 10 and a standard deviation (*SD*) of 3. In the current study, we used scaled scores of receptive and expressive language subtests as the outcome variables for ease of interpretation.

Statistical Analysis Plan and Missing Data

Data were analyzed using path analyses to examine relations among the conditions of poverty (institutional resources, economic hardship), maternal distress and depression, parent–child dysfunctional interaction, and children's language skills (see Fig. 1) using Mplus 7.11 (Muthén and Muthén 1998–2010). The model allowed us to test the direct and indirect pathways leading to children's language skills at age 2 years, especially the potential mediating effects of parent–child dysfunctional interaction. To evaluate the mediation effects, we used the product-of-coefficients approach (MacKinnon et al. 2002) with the bootstrapping procedure (Preacher and Hayes 2004, 2008). In contrast to alternative approaches such as Sobel's test (Sobel 1982), the bootstrapping method does not require the assumption of normality, and provides higher power and more robust estimates for indirect effects.

Fig. 1 Hypothesized model
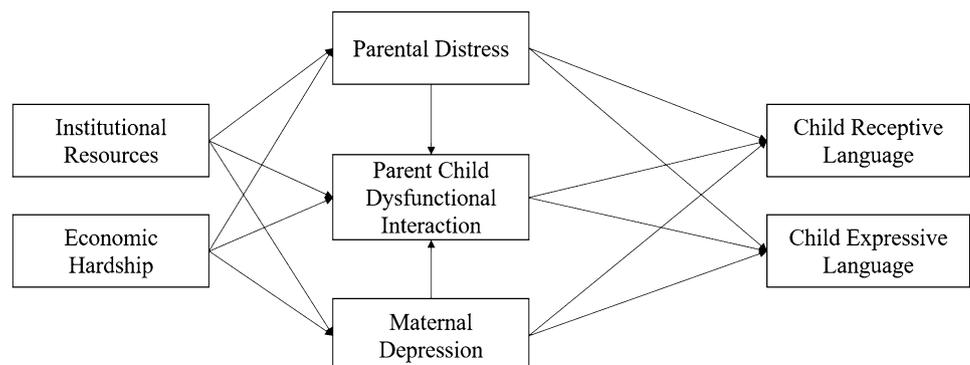
Missing Data

The sample size at recruitment was 322. After removing cases with missing data on all variables included in the analyses (n = 93), the analytical sample contained 229 dyads. Comparison between the removed cases and the analytical sample revealed no significant differences in basic demographics (e.g., age, sex, or ethnicity), although mothers in the analytical sample had higher levels of income and education. Within the analytical sample, missing data on direct language assessments was high (38%) due to attrition at TP 5. To utilize all data available, we employed full information maximum likelihood (FIML) to treat missing data in individual variables (Arbuckle et al. 1996).

Results

Table 1 summarizes the characteristics of the analytical sample, including all focal variables. Correlation coefficients among key variables appear in Table 2. The majority of the families came from low-SES backgrounds, as indicated by

low levels of maternal education and annual income, with limited access to financial resources. Specifically, 26% of the families had very low access to institutional resources (scored below 2), and 25% experienced two or more financial challenges (e.g., missed payment, lost service) in the past year. The average scores of parental distress were within the normal range, with 8% of mothers scoring in "high" or "clinically significant" range (above 80 percentile) for parental distress, and 2% for dysfunctional interaction. Finally, 20% of mothers scored above the risk threshold for maternal depression (10). At age 2 years, the sampled children scored below average in both receptive language (Mean = 7.5, SD = 2.4) and expressive language (Mean = 9.1, SD = 2.8) as compared to the normative sample (Mean = 10).

Path Analyses

Our path model demonstrated good model fit as shown in Table 3. Significant path coefficients are also shown in Fig. 2. Results indicated that both institutional resources and economic hardship significantly predicted mothers' well-being in terms of distress and depression. Specifically,

Table 1 Descriptive statistics of the analytical sample (N = 229)

Variable	Time [a]	Mean or % [b]	SD	Range
Child characteristics				
Sex: female	1	56.5%		
Ethnicity: non-white/hispanic	1	63.9%		
Age (months)	5	22.72	1.37	20–25
Bayley III receptive language (scaled score)	5	7.54	2.43	3–15
Bayley III expressive language (scaled score)	5	9.06	2.82	4–18
Maternal characteristics				
Highest education				
High school/GED	1	40.5%		
Some college	1	32.6%		
College or above	1	11.0%		
Unemployed	1	55.4%		
Married/living with partner	1	50.4%		
Age (years)	1	26.33	5.21	18–43
PSI-SF parental distress	2	24.00	8.68	12–50
PSI-SF parent child dysfunctional interaction	2	17.06	5.88	12–45
EPDS depression	2	5.83	4.91	0–19
Household characteristics				
Annual income: $0–$10,000	1	47.7%		
Annual income: $10,001–$30,000	1	36.0%		
Primary language: English only	1	85.2%		
Institutional resources	2	2.45	1.22	0–4
Economic hardship	2	0.92	1.14	0–4

Bayley III: Bayley scales of infant and toddler development—third edition; PSI-SF: parenting stress index—short form; EPDS: Edinburgh post-natal depression scale

[a] Time point of data collection: 1 = recruitment, 2 = postpartum, 5 = year 2

[b] Means are reported for continuous variables and percentages for categorical variables

Table 2 Pearson correlations among key measures

Measure	1	2	3	4	5	6	7
1. Institutional resources	–						
2. Economic hardship	−0.197*	–					
3. Parental distress	−0.176*	0.204*	–				
4. Parent–child dysfunctional interaction	−0.164*	0.182*	0.563*	–			
5. Maternal depression	−0.175*	0.230*	0.633*	0.329*	–		
6. Child Bayley III receptive language	0.136	0.036	0.119	−0.073	0.080	–	
7. Child Bayley III expressive language	0.170*	0.011	0.040	−0.117	−0.006	0.758*	–

Bayley III: Bayley scales of infant and toddler development—third edition

*p < .05

Table 3 Results of path model: relations between financial resources, postpartum psychosocial state, and early language development

Pathway	Estimate	Beta	p-value
Financial resources → Postpartum psychosocial state			
Institutional resources → Parent distress	−0.989	−0.139	0.036
Institutional resources → Dysfunctional interaction	−0.280	−0.058	0.326
Institutional resources → Maternal depression	−0.542	−0.135	0.040
Economic hardship → Parent distress	1.339	0.176	0.008
conomic hardship → Dysfunctional interaction	0.337	0.065	0.269
Economic hardship → Maternal depression	0.879	0.205	0.002
Parent distress → Dysfunctional interaction	0.393	0.580	<0.001
Maternal depression → Dysfunctional interaction	−0.076	−0.064	0.376
Postpartum psychosocial state → Language development			
Parent distress → Child receptive language	0.077	0.225	0.066
Parent distress → Child expressive language	0.060	0.183	0.136
Dysfunctional interaction → Child receptive language	−0.104	−0.205	0.042
Dysfunctional interaction → Child expressive language	−0.099	−0.207	0.041
Maternal depression → Child receptive language	0.006	0.010	0.931
Maternal depression → Child expressive language	−0.027	−0.048	0.677

Model fit: Chi-squared = 4.417, df = 4, p = .353; RMSEA = 0.021, 90% CI [0.000, 0.104]; CFI = 0.999, TLI = 0.994, SRMR = 0.037

Estimate: Unstandardized estimate; Beta: standardized estimate

Fig. 2 Results of path model: Relations between financial resources, postpartum psychosocial state, and early language development. Note: All estimates are standardized. Only the significant paths are shown. *p < .05; **p < .01; ***p < .001
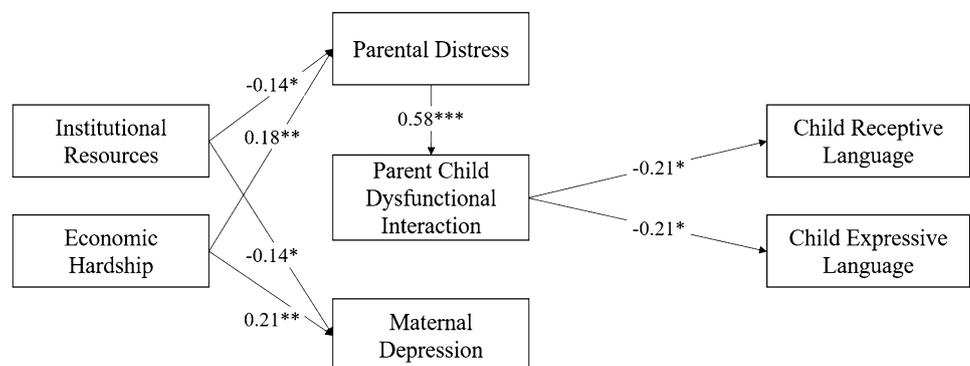
institutional resources were negatively related to parental distress and depression, whereas economic hardship positively contributed to both parental distress and depression. Since parent–child dysfunctional interaction was solely predicted by parental stress, the relation between financial resources and dysfunctional interaction was fully mediated by parental stress (institutional resources → parental stress → dysfunctional interaction: b = −0.08, p < .05; economic

hardship → parental stress → dysfunctional interaction: b = 0.10, $p < .05$).

Out of the three caregiver indicators, dysfunctional parent–child interaction remained the only significant predictor of children's language skills. Specifically, with every 1 *SD* increase in parent–child dysfunctional interaction, children were expected to score 0.2 *SD* lower in receptive and expressive language. Meanwhile, although the direct effects of parental distress on child language skill were not significant, parental distress did exert an indirect effect on language skill via the mediating role of parent–child dysfunctional interaction (b = −0.12, $p < .05$). We further tested the indirect effects of financial resources on children's language skills, but no pathways were statistically significant.

Discussion

This study focused on contributors to the early language skills of children reared in low-income homes, especially the role of parent–child interactions. The Family Stress Model proposes that poverty conditions lead to deteriorated interactions, a consequence often of caregiver distress and depression (Perkins et al. 2013). In turn, these deteriorated interactions exert negative influence on the language development of young children, which helps to explain why children in low-income homes exhibit language skills significantly poorer than children in more advantaged homes (Noble et al. 2015b). The present findings showed that our sample of low-income children, at 2 years of age, performed nearly one standard deviation below the normative mean in receptive language skill, thus warranting the need for increased attention to contributors to language skill among children experiencing poverty. Further, findings showed that parent–child dysfunctional interactions, based on parent report when children were under 1 year of age, significantly predicted children's language skills at 2 years of age. While parental distress was associated with the nature of parent–child interaction, it was not directly linked to children's language skills; rather, parent distress was associated with dysregulated parent–child interactions, which in turn served to explain variance in children's language skills at age 2 years.

This study helps to clarify how the conditions of poverty, such as the economic hardships experienced by caregivers, lead to impaired language development even at very young ages in young children. Although the Family Stress Model is more commonly associated with children's social and emotional outcomes (Yeung et al. 2002), we find evidence it matters for early language development. This may be due to the critical importance of parent–child interactions for language development, and the fact that these interactions are shaped in part by financial and other forms of parental distress

(Mistry et al. 2002). Although the present findings suggest that caregiver stress may undermine caregiver-child interaction quality, which in turn may negatively affect children's language growth, our reliance on parent report for caregiver-child interaction quality is a limitation of this work. That is, with caregivers serving as informants of their own stress and caregiver-child interaction quality, it is possible that more stressed caregivers perceive lower-quality interactions with their children, when this is not the case. However, research using direct observations of caregiver-child interactions find that interaction quality is significantly lower for caregivers interacting with preschoolers with language disorders compared to typical peers (Thorpe et al. 2003); further, studies of preschool-aged children with resolved language disorders find that their caregiver-child interactions are higher-quality than children with un-resolved (persistent) language disorders (LaParo et al. 2004). Such work provides convincing evidence that the quality of caregiver-child interactions may play an important role in shaping young children's early language skills.

Given that language skills are foundational to numerous cognitive, educational, and health-related outcomes, and that the language skills of children as young as 2 years already show the adverse effects of poverty, it is crucial that interventions be explored to address the quality of parent–child interactions. Home visiting programs, a common early childhood intervention model, may be one route to doing so. For example, results from a randomized control trial of Nurse-Family Partnerships showed that home visits by nurses increased the responsivity of interactions between parents and their young children (Olds et al. 2002). Home visiting may also be a particularly viable route for improving language development because it has also been shown to reduce parental distress, a key predictor of interactions in our study (Lowell et al. 2011). Thus, home visiting programs can potentially influence language development through multiple routes.

Another potential intervention approach is directly training caregivers in strategies that facilitate children's early language growth. For instance, caregiver use of contingent responding in interactions with their young children is associated with accelerated language growth; contingent responding occurs when caregivers respond to and build upon children's contributions in conversations, rather than changing the focus. Recent work finds that caregivers can be trained to increase these behaviors which, in turn, accelerate children's language development (Levickis et al. 2014). Such trainings can be potentially offered in large-group formats at potentially very low costs.

Finally, a particularly important mechanism for enhancing the language skills of young children reared in low-SES homes is providing high-quality early-education opportunities to their youngsters during the first several years of

life. Early Head Start is one such program that provides subsidized support for infants and toddlers to attend center-based early childhood programming, which may provide an important mechanism for enhancing early language development (Love et al. 2005). Nonetheless, many early-education providers may themselves not have the skills and knowledge to foster young children's language skills (Cunningham et al. 2009). For this reason, there is a significant need to develop, test, and take to scale professional development approaches that positively affect the language-learning environments of early education settings serving infants and toddlers, including the quality of interactions they experience in non-maternal care. An additional and important benefit of early education for infants and toddlers in low-SES homes is that it may provide respite for caregivers as well as the opportunity for job training and employment. Such future research builds on the present studies showing that family financial stressors in the lives of low-income parents are indirectly but intricately associated with the language development of their children. Continuing to understand these pathways is key to improving language development of low-income children in the future.

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