

MATERNAL RESPONSIVENESS, INTRUSIVENESS, AND NEGATIVITY DURING PLAY WITH INFANTS: CONTEXTUAL ASSOCIATIONS AND INFANT COGNITIVE STATUS IN A LOW-INCOME SAMPLE

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ABSTRACT: Maternal parenting behaviors during a mother–infant play interaction were examined in a sample of 160 low-income mothers and their 15-month-old infants. Maternal responsive/didactic, intrusive, and negative behaviors were coded from videotapes and examined in relation to mothers' age, marital status, stressful life events, and depressive symptoms, and infants' cognitive scores at 15 and 25 months. Younger maternal age and increases in stressful life events were associated with increases in mothers' negative behaviors whereas being married was positively associated with mothers' responsive/didactic behaviors and inversely associated with their negative and intrusive behaviors. Mothers' depressive symptoms were inversely associated with both responsive/didactic and intrusive behaviors and predicted lower cognitive scores in infants at 15 months, but not 25 months. Maternal responsive/didactic behaviors predicted infant cognitive scores at both ages after controlling for maternal characteristics and other parenting behaviors. Intrusiveness moderated associations between both responsive/didactic and negative parenting behaviors and infant 25-month cognition. Maternal age, marital status, psychological resources, and contextual sources of stress play a central role in the quality of parenting among low-income mothers, and positive mother–infant interactions are strong predictors of infants' early cognitive status.

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Parenting is foundational to a range of developmental outcomes in children (Borkowski, Ramey, & Bristol-Power, 2002; Collins, Maccoby, Steinberg, Hetherington, & Bornstein, 2000). For this reason, much research has been devoted to understanding the factors that contribute to positive parenting in early development (Brooks-Gunn & Duncan, 1997; Landry, Smith, Miller-Loncar, & Swank, 1997; V.C. McLoyd, 1990, 1998). Theoretical and empirical work on the “determinants” of parenting indicate that parents' psychological functioning, characteristics of children, and contextual sources of stress and support are main areas of influence (Belsky, 1984). Parenting, however, is not a unidimensional construct but rather is made up of multiple behaviors, including positive and negative affect (Belsky, 2006; Waters, Wippman, & Sroufe, 1979), responsiveness (Ainsworth, Blehar, Waters, & Wall, 1978; Bornstein, Tamis-LeMonda, Hahn, & Haynes, 2008), levels of control or intrusiveness (Grolnick, 2003; Ispa et al., 2004); and didactic behaviors (e.g., language and cogni-

tive stimulation; O'Connell & Bretherton, 1984; Tamis-LeMonda, Uzgiris, & Bornstein, 2002). Parents may display some behaviors but not others, and it follows that parents' personal characteristics and other contextual factors may predict certain aspects of parenting but not others.

As such, specificity of associations is critical to investigations that focus on parenting and infant development. For instance, whereas research has demonstrated that responsive and didactic parenting behaviors are positively associated with children's outcomes (DeWolff & van IJzendoorn, 1997; Hirsh-Pasek & Burchinal, 2006; Landry, Smith, Swank, Assel, & Vellet, 2001; O'Connell & Bretherton, 1984; Tamis-LeMonda, Bornstein, & Baumwell, 2001), relations between maternal intrusive behaviors and children's outcomes do not show clear patterns of association. Some studies have demonstrated a negative association between intrusiveness and child development (Ainsworth et al., 1978; Ispa et al., 2004; Murray & Hornbaker, 1997) whereas others have not (Brody & Flor, 1998; Carlson & Harwood, 2003; Eshel, Landau, Daniely, & Ben-Aaron, 2000). Researchers have suggested that the association between intrusiveness and child outcomes differs across

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cultural and socioeconomic contexts (e.g., Deater-Deckard & Dodge, 1997; Dodge, Pettit, & Bates, 1994; Lansford, Deater-Deckard, Dodge, Pettit, & Bates, 2004; Laosa, 1980), but definitive evidence in support of this hypothesis across contexts is lacking.

In response, in the current study we aim to advance the literature on specificity in correlates and outcomes of maternal parenting behaviors in the context of maternal characteristics and psychological functioning. We focus on multiple parenting behaviors and infants' outcomes in the first 2 years in a diverse, low-income sample. To date, most studies have focused on middle-income families, and longitudinal examinations are rare. Specifically, we examined (a) whether maternal age, being married, depressive symptoms, and reported stressful life events predict specific maternal behaviors; (b) whether the quality of maternal parenting behaviors predict infant cognitive outcomes when infants are approximately 15 months old; and (c) whether associations between maternal behaviors and infants' cognitive status persist over time. Examination of associations between maternal characteristics and maternal parenting behaviors among low-income mothers could provide valuable information to practitioners by increasing knowledge of risk and preventive factors associated with parenting quality for populations subject to the strains of impoverished circumstances.

MATERNAL AGE, DEPRESSION, STRESS, AND MARITAL STATUS IN THE CONTEXT OF ECONOMIC DISADVANTAGE

Maternal age is associated with mothers' parenting behaviors (Berlin, Brady-Smith, & Brooks-Gunn, 2002; Bornstein, Putnick, Suwalsky, & Gini, 2006). Sensitive, responsive parental behavior—shown to be integral in the formation of attachment relationships and subsequent child development (Ainsworth et al., 1978; Berlin & Cassidy, 2000)—has been characterized as low in the parenting behaviors of very young mothers (Barratt & Roach, 1995; Garcia Coll, Hoffman, Van Houten, & Oh, 1987). Children of adolescent mothers also have been shown to be cognitively disadvantaged, especially as they are less likely to be exposed to rich language environments (Brooks-Gunn & Furstenberg, 1986; Culp, Appelbaum, Osofsky, & Levy, 1988; Field, Widmayer, Stringer, & Ignatoff, 1980; Jaffee, Caspi, Moffitt, Belsky, & Silva, 2001). In addition, negative and intrusive/controlling mothering behaviors are more prevalent in the parenting of young mothers when compared to older mothers (Berlin, Brady-Smith, & Brooks-Gunn, 2002; Culp et al., 1988).

Age, however, is only one of many contextual factors related to maternal parenting. It also is critical to examine the role of mental health—stress and depression—in parenting sensitivity and intrusiveness. High levels of stress and depression may compromise a mother's ability to engage positively with her infant. Depressive symptoms are fairly widespread among mothers, particularly those living in poverty who rarely have the resources or access necessary to obtain treatment for their condition (Albright & Tamis-LeMonda, 2002; Downey & Coyne, 1990; Leadbeater & Linares, 1992). Maternal depression can interfere with a mother's ability to be responsive to her infant, setting up early risk factors in the development of mother-child relationships, and compromis-

ing infants' opportunities for learning about their worlds (Burrous, Crockenberg, & Leerkes, 2009; Campbell, Cohn, & Meyers, 1995; Cummings & Davies, 1994; Erikson, Sroufe, & Egeland, 1985). The effects of these risks are heightened in the context of socioeconomic hardship (V.C. McLoyd, 1998).

Along similar lines, maternal stress may affect children directly by disrupting the mother-child relationship and compounding the effects of other contextual risks (V.C. McLoyd, 1990; Sameroff, 2010; Sameroff & Seifer, 1983). Economic disadvantage in particular is linked to increased stress on parents and subsequently lower quality of parenting (Conger et al., 1992). Furthermore, high levels of stress also can indirectly influence infants by adversely affecting a mother's relationship with her infant's father and other family members, thereby compromising the availability of support (Belsky, 1984; Belsky & Crnic, 1990; Burchinal, Follmer, & Bryant, 1996).

Finally, maternal marital status has been posited to partially buffer the adverse effects of risk factors associated with poverty on children (Burchinal et al., 1996; S. Cohen & Wills, 1985; Fletcher, 2009; Hashima & Amato, 1994). In particular, being married has been linked to the alleviation of strains on the maternal role in numerous ways (Belsky, 1984; Cox, Owen, Lewis, & Henderson, 1989; Furstenberg, Brooks-Gunn, & Morgan, 1987; Tamis-LeMonda, Shannon, Cabrera, & Lamb, 2004; Waite & Gallagher, 2000). For example, it has been suggested that marriage represents a more long-term commitment to children on the part of fathers (Berger, Carlson, Bzostek, & Osborne, 2008). Mothers who are married may be able to rely on the support and assistance of the other parent, and this support can alleviate the burden of stressors. Specifically, married mothers have reported lower incidence of depression (Cunningham & Knoester, 2007), and low-income parents who are married have been shown to demonstrate higher levels of positive parenting (Berger et al., 2008). Thus, consideration of maternal age, stress and depression, and contextual supports is a vital part of investigations into parenting in low-income populations (Bornstein et al., 2006; Driscoll & Easterbrooks, 2007).

MATERNAL PARENTING BEHAVIORS AND CHILD DEVELOPMENT

A large body of research has demonstrated strong associations between the quality of maternal parenting behaviors and children's development (Berlin & Cassidy, 2000; Frankel & Bates, 1990; Olson, Bates, & Bayles, 1984; Tamis-LeMonda et al., 2001). In particular, maternal sensitivity, or the contingent and appropriate responsiveness of mothers to their children's cues, is a primary predictor of positive cognitive and behavioral outcomes in children (Ainsworth et al., 1978; Bornstein, 1989; Burchinal, Campbell, Bryant, Wasik, & Ramey, 1997; DeWolff & van IJzendoorn, 1997; Landry et al., 2001; Tamis-LeMonda & Bornstein, 2002).

Beyond responsiveness, descriptive, diverse language use has been correlated with positive cognitive outcomes in children (Bornstein, 1995; Clarke-Stewart, VanderStoep, & Killian, 1979; Dieterich, Assel, Swank, Smith, & Landry, 2006; Tamis-LeMonda, Baumwell, & Cristofaro, in press). In addition, the example

and encouragement of sophisticated play by parents (Borkowski et al., 2002; O'Connell & Bretherton, 1984; Tamis-LeMonda & Bornstein, 1994) as well as flexibility and nondirectiveness toward children (Clarke-Stewart et al., 1979; Grolnick, McMenamy, & Kurowski, 1999) have been associated with the development of child competence.

In contrast, foundational research examining associations between parenting and children's development has linked what has been termed "harsh" or "negative parenting" to negative child outcomes and warm, but "authoritative," parental control to positive child outcomes (Baumrind, 1971). This research also has demonstrated that nondirectiveness in the style of "permissive" parenting can lead to less optimal outcomes if children are not provided with appropriate scaffolding (Baumrind, 1971; O'Connell & Bretherton, 1984). Yet, consensus on the relation between maternal directiveness or intrusiveness and child outcomes has yet to be reached, as some studies have shown that intrusive and controlling parental behaviors tend to inhibit children's ability to engage in symbolic play, and further have been shown to negatively affect later academic functioning (Barber, 2002; Egeland, Pianta, & O'Brian, 1993), while other studies have either not found such links or demonstrate moderation by sociocultural context (Carlson & Harwood, 2003; Deater-Deckard & Dodge, 1997; Eshel et al., 2000). It has been suggested that when intrusive or restrictive parenting styles are not normative within a culture or ethnic groups, they are linked to negative child outcomes (e.g., Barber, 2002; Egeland et al., 1993; Landry et al., 2001) whereas where in certain ethnic groups where more intrusive or restrictive parenting is normative (e.g., among African American and Latino parents), this parenting style does not negatively affect children (e.g., Brody & Flor, 1998; Carlson & Harwood, 2003; Deater-Deckard, Dodge, Bates, & Pettit, 1996; Lansford et al., 2004). At the same time, other researchers have suggested that it is socioeconomic status that accounts for these differences in links between intrusive parenting and child outcomes (e.g., Dodge et al., 1994; Hoff-Ginsberg, 1991; Laosa, 1980) and contend that in most cases, since a larger proportion of African American and Hispanic families live in low-income households, ethnicity has not always been adequately disentangled from socioeconomic status.

It also could be that the association between intrusiveness and child outcomes depends on the context within which parents display intrusive behaviors. For example, evidence has suggested cases where, overall, researchers found negative associations between intrusiveness and child outcomes; this association was moderated by parental warmth (Ispa et al., 2004; L. McLoyd & Smith, 2002), emphasizing the importance of accounting for other behaviors that parents concurrently display. Yet, in many studies, intrusive or controlling parenting behaviors are seldom examined separately from harsh/negative parenting behaviors (Deater-Deckard et al., 1996; Lansford et al., 2004), rendering it unclear whether negative associations with child outcomes are stronger for negative rather than for intrusive behaviors. Taken together, the current state of the research on intrusiveness has highlighted the need to look at multiple parenting behaviors in context.

With respect to the implications of parenting for children's outcomes, note that current research is informed by the knowledge that gains in one domain of development have reverberations throughout the developing system (Thelen & Smith, 1998). This is the case for infants in particular, whose mental health, social competence, and cognitive development are inextricably linked and jointly supported by parenting behaviors. For example, maternal responsiveness is associated with both secure attachment relationships and increases in the time infants subsequently spend exploring their environments and learning about their worlds (Berlin & Cassidy, 2000). Similarly, children's cognitive and language development afford better opportunities for self-expression and are linked to increases in emotional regulation and reductions in dysregulated displays of frustration such as tantrums (Lemerise & Harper, 2001; Vallotton, 2011). Mothers' parenting behaviors thus have implications on numerous levels for children's development, as they can provide inputs that directly or indirectly affect multiple domains of development at once. For example, responsiveness expressed in the modeling of elaborate language can directly provide both the inputs for cognitive and language development and also enhance children's development of emotional regulation.

In response, we ground the present study in research that has established the links between parenting and infant cognitive development and expand upon current knowledge by examining whether *distinct* parenting behaviors in context differentially predict infants' cognitive status (concurrently and over time) under conditions of socioeconomic disadvantage. We expected responsive and didactic maternal behaviors to positively predict infants' scores on the Mental Developmental Index (MDI) of the Bayley Scales of Infant Development (BSID-II; Bayley, 1993), and negative parenting behaviors to yield inverse associations. However, because intrusive parenting varies in its association to child outcomes across studies, these analyses are exploratory. We further examine contextual factors and ask whether maternal characteristics of age and marital status or psychological factors of depressive symptomatology and stressful life events predict distinct measures of parenting. Finally, we examine whether parenting measures mediate any associations between maternal characteristics, maternal psychological factors, and infant cognitive outcomes, and whether specific measures of parenting are moderated in the context of other measures of parenting.

METHOD

Participants

Participants were 160 mothers and their 15-month-old infants (71 girls, 89 boys), who were recruited when they applied to receive childcare and parenting services for low-income families at community agencies in a large, urban city. Mothers were informed of the research project either from a program service provider or a posted flyer describing the study. Interested mothers directly contacted the research project or through their service providers. Families accepted into the study qualified for low-income status and were eligible to receive some form of governmental assistance

(e.g., Medicaid, food stamps, vouchers from the Women, Infants and Children program). A follow-up visit with families was conducted when infants were 25 months of age.

Mothers averaged 21 years ($SD = 6.03$) at the time of their infants' birth; infants averaged 15 months ($SD = 1.82$) at the time of the first assessment and 25 months ($SD = 1.61$) at the follow-up assessment. More than half of mothers (55%, $n = 88$) were 19 or younger at the time of their infants' births. Mothers came from diverse racial/ethnic backgrounds: Latin American, 42.5% ($n = 68$), African American, 41.3% ($n = 66$), biracial, 8.1% ($n = 13$), Asian, 5% ($n = 8$), and European American, 3.1% ($n = 5$). Twenty-five mothers reported that their child's biological father was their husband (18.8%), 23 (17.3%) described the father as a "live-in partner," and 40 (30.1%) considered him as a "boyfriend." Twenty-nine mothers (21.8%) identified their child's father as a friend, and 16 (12%) said they had no relationship with their babies' biological father. More than half of the mothers, 59.4% ($n = 95$) obtained less than a high-school degree, 19.4% ($n = 31$) graduated from high school or received their GED, and 20% ($n = 32$) completed some college or graduated from college (Data were not available for 2 mothers.) The majority of the mothers (72%) did not work outside the home.

Procedure

Data collection was performed by a team of research assistants who conducted home visits with the mothers and their infants when infants were 15 and 25 months of age. Each visit consisted of an interview and the videotaping of mother–infant interactions during play followed by administration of the BSID-II to the infants. Mothers were given \$40, a small gift for their infants, and a copy of the videotaped play interaction for their participation.

Mother–infant play interactions took place during a 10-min period of semistructured free play, which was coded for several parenting behaviors. Mothers were presented with three separate bags containing different toys (Bag 1: a book; Bag 2: child-size pots and pans set; Bag 3: "Noah's Ark" boat and animal figures) (Brady-Smith, O'Brien, Berlin, Ware, & Fauth, 2000; National Institute of Child Health & Human Development Early Child Care Research Network, 1997, 1999; Vandell, 1979). It was requested that mothers sit on a mat with their infant, ignore the camera, and do whatever they would normally do. They were instructed to play only with the toys from the three presented bags and to proceed with exploring the bags in order from Bags 1 to 3. They were told that they could divide up the 10-min as they liked. For the researchers to be able to hear the infants' verbalizations, mothers were asked not to allow their infants to use pacifiers during the videotaping.

The 10-min play interaction between mothers and infants took place first for the infants to become more familiar and comfortable with the researcher in the presence of their mothers. Following this session, researchers administered the BSID-II to infants. Visits were arranged with mothers for times when they felt their infants would be most alert; however, if for any reason researchers were

not able to perform assessments at that time (e.g., if an infant was fussy and noncompliant), an additional visit was scheduled for a time when infants were likely to be in a better mood.

Researchers were extensively trained on the BSID-II, first through initial lab training by other research assistants already certified on this assessment tool. Following this initial training, research assistants were required to practice administrations on nonstudy children and to videotape a practice assessment to be submitted to experts at the study headquarters for review. Experts needed to grant research assistants certification before they were permitted to perform BSID-II assessments in the field as part of the study.

Measures

Maternal parenting behaviors. The quality of mothers' parenting behaviors was assessed according to the Caregiver–Child Affect, Responsiveness, and Engagement Scale (C-CARES; Albright & Tamis-LeMonda, 2002; Tamis-LeMonda, Ahuja, Hannibal, Shannon, & Spellman, 2001), which rates parent behaviors on a Likert scale of 1 (*not observed*) to 5 (*constantly observed*). Thirteen parent items were used (positive affect, negative affect, responsiveness to child cues, emotional attunement to child, negative touch, incontrovertible negative verbal reinforcement, teasing, flexibility, intrusiveness, achievement orientation, play sophistication, amount of language, and quality of language). The C-CARES expands on both the Meadow-Orlans (Meadow & Schlesinger, 1976) and the Mahoney (1992) Maternal Behavior Rating Scale, Revised scales, which also assess parent–child interaction, along key dimensions. However, it provides several additional items relevant to children's cognitive levels, such as parent language quality and play sophistication. In addition, separate unipolar items are used for many measurements, such that "affect" is evaluated for both "positive affect" and "negative affect."

Videotaped mother–child play interactions were coded by two to three trained researchers who viewed tapes together, but coded independently. Maternal parenting behaviors were assessed after multiple viewings; interrater reliabilities ranged from 84 to 100% agreement (exact and within 1-point of agreement), with an average of 93%. Coders were unaware of the infant's performance on the standardized test of infant cognition (Bayley MDI).

The means, standard deviations, and ranges of maternal parenting behaviors are presented in Table 1. Mothers' ratings displayed modest to strong variability, as indicated by the fact that nearly all items were normally distributed and encompassed the full Likert-scale range (i.e., 1–5). Mothers scored lowest on negative affect, negative verbal reinforcement, negative touch, and teasing. Their highest scores were for positive affect, responsiveness, language amount, and language quality.

Three composite scores of parenting were computed based on research in our laboratory (Shannon, Tamis-LeMonda, & Cabrera, 2006; Shannon, Tamis-LeMonda, London, & Cabrera, 2002). Responsive/didactic parenting was the average of seven items: positive affect, responsiveness to child, emotional attunement,

TABLE 1. Descriptives on Items Composing Maternal Parenting Measures

Parenting items	<i>M</i>	<i>SD</i>	Range
Responsive/Didactic Parenting Dimension			
Positive Affect	3.37	1.01	1–5
Responsiveness to child cues	2.90	1.03	1–5
Emotional attunement	2.51	1.17	1–4
Achievement orientation	2.27	1.13	1–5
Amount of language	3.41	1.12	1–4
Quality of language	2.68	1.01	1–5
Symbolic play	2.16	0.91	1–5
Negative Parenting Dimension			
Negative affect	1.56	0.81	1–4
Negative touch	1.91	1.07	1–5
Negative verbal statements	1.54	0.70	1–4
Intrusive Parenting Dimension			
Inflexibility	2.24	1.01	1–5
Intrusiveness	2.31	0.97	1–5
Teasing	1.47	0.82	1–4

achievement orientation, amount of language, quality of language, and symbolic play. Negative parenting was the average of three items: maternal negative affect, negative touch, and negative verbal statements. Intrusive parenting was the average of three items: inflexibility (flexibility reverse-coded), intrusiveness, and teasing. The alpha level for the Responsive/Didactic Scale score was strong (.82); alphas were somewhat weaker for the Negative and Intrusive/Overbearing Scale scores (.54 and .60, respectively), likely due to the fact that these scales are composed of relatively few items and included items that demonstrate relatively low variance (particularly in the case of negative parenting behaviors). However, the two separate scale scores were retained for conceptual reasons to distinguish negative parenting behaviors from intrusive parenting behaviors.

Demographic data. Demographic information, including mother's age at the birth of the focus child, whether she was married, and her race/ethnicity as well as the focus child's age and gender, were collected at the 15-month interview. Mother's age at child's birth was included in analyses as a continuous variable. Mothers' reports of being married/not being married to their child's father was included in analyses as a 1/0 binary variable.

Center for Epidemiological Studies Depression Scale (CES-D; Radloff, 1977). Depressive symptoms in mothers were measured using the 20-item CES-D scale, which assesses the presence or absence of negative and positive thoughts, feelings, and behaviors within the past week through self-report. The items were administered to mothers, who responded on a scale of 0 (*rarely or never*) to 3 (*most or all days*). Total scores range from 0 (*absence of symptoms of depression*) to 60 (*severe depressive symptoms*). Scores above 16 are considered representative of clinical depression (Radloff, 1977).

Stressful Life Events Scale, Difficult Life Circumstances Scale. Mothers' general life stress was measured through the occurrence or incidence of 20 traumatic events in the past year (Barnard et al., 1989; Belsky & Crnic, 1990). Sample items ranged from "Have you been robbed, mugged or attacked in the past year?" to "Have you started a new job?" A score of 1 or 0 was given to an answer of yes or no, respectively, and a composite score was compiled from all events that mothers reported having experienced.

BSID-II. Infants were administered the Mental scale of the BSID-II (Bayley, 1993) at 15 and 25 months. This measure consists of items that assess memory, problem solving, early number concepts, generalization skills, classification abilities, vocalizations, language, and social skills. The Mental scale correlates with scores on the McCarthy Scales of Children's Abilities ($r = .79$) and the Wechsler Preschool and Primary Scale of Intelligence ($r = .73$). An MDI score of 85 or above is within normal limits. In addition to treating MDI scores as continuous, scores were dichotomized based on the documented cutoffs of the Mental scale scores in the BSID-II manual (MDI score classifications: $\leq 84 =$ mildly to significantly delayed; $\geq 85 =$ within normal limits to accelerated performance). Specifically, infant MDI scores were coded as "within normal limits" ($MDI \geq 85$) or as "developmentally delayed" ($MDI < 85$).

RESULTS

Descriptives on maternal depressive symptoms and stress and infant cognition are presented first, followed by regressions testing the contributions of mothers' age, being married, stress, and depression separately to each of the three parenting measures. Next, regression analysis tests the unique and joint contributions of maternal age, marital status, stress and depressive symptoms, and measures of parenting to concurrent infant cognition. Regressions enter maternal characteristics (maternal age, marital status, and depressive symptoms and stress) in Step 1, followed by parenting measures (responsive/didactic, negative, and intrusive parenting) in Step 2, and then test for associations with interactions between parenting measures in Step 3. Finally, lagged associations are examined to infants' 25-month cognitive status, also controlling for earlier infant cognitive status. Associations between maternal education, maternal parenting behaviors, and child outcomes were tested, but examinations showed that holding other variables constant, maternal education did not predict parenting or child outcomes. Maternal education thus is not included in reported analyses. Further, mother ethnicity/race (i.e., Latin American or African American) was not associated with parenting or infant cognition at 15 or 25 months; thus, results are based on the full sample.

Descriptives on Depression and Stress

Mothers' depressive symptomology was high, ranging from 0 to 53 ($M = 23.76$, $SD = 16.51$). Sixty percent of mothers ($n = 96$) were classified as clinically depressed, based on scores of 16 or

TABLE 2. Maternal Age, Marital Status, Depressive symptoms, and Stressful Life Events as Predictors of Measures of Parenting

Variables	Responsive/Didactic Parenting	Negative Parenting	Intrusive Parenting
Age at child's birth	-0.14	-0.18*	-0.01
Mother is married	0.22**	-0.17*	-0.17*
Reported depressive symptoms	-0.18*	0.08	-0.26***
Reported stressful life events	0.06	0.17*	0.12
R ²	0.07*	0.15***	0.11***

Note. N = 160; Standardized β weights presented are from the final multiple linear regression equations.

†p < .10. *p < .05. **p < .01. ***p < .001.

above on the CES-D (Radloff, 1977). Rates of life stress were somewhat more moderate, with scores ranging from 0 to 11 of a possible 20 ($M = 3.69, SD = 2.28$). Stress and depression were only marginally related, $r = .14, p < .10$, indicating that they were tapping different features of mothers' psychological functioning.

Infant Scores: Bayley MDI

At 15 months, infants averaged 94 on the Bayley MDI ($SD = 9.32$), and scores within the sample varied substantially from 59 to 116. One hundred thirty-three (83.1%) infants scored within normal limits ($M = 96.9, SD = 5.96$), and 27 (16.9%) scored within the delayed range ($M = 77.9, SD = 6.28$), demonstrating that a small, but nontrivial, proportion of infants were at risk in terms of cognitive status. By 25 months, infants' MDI scores dropped significantly, $t = 8.55, p < .001$, to an average of 84 ($SD = 9.32$), and scores within the sample ranged from 54 to 113. Nearly half (47.9%) of infants scored within normal limits at 25 months of age, with the remaining infants (52.1%) scoring within the delayed range.

Aim 1: Demographic Characteristics, Stress, Depression, and Maternal Parenting Behaviors

Specificity of prediction was found among maternal characteristics and measures of parenting (see Table 2). Holding other variables constant, maternal age and stress significantly predicted mothers' negativity. Younger mothers and those experiencing higher stress were more likely to display negative parenting behaviors. In contrast, mothers who reported high levels of depressive symptoms were less likely to engage in either responsive/didactic or intrusive parenting, but there was no association to negative parenting. This suggests that depressive symptoms interfere with low-income mothers' overall engagement with their infants, rather than the valence of their engagements. Finally, being married predicted all three measures of parenting; married mothers were higher on responsive/didactic parenting behaviors and lower on negative and intrusive parenting behaviors than were unmarried mothers.

TABLE 3. Multiple Linear Regression Models Predicting 15-Month Child Cognition

Model	1	2	3
Variables			
Age at child's birth	0.03	0.07	0.09
Marital status	0.04	-0.02	-0.03
Reported depressive symptoms	-0.23**	-0.17*	-0.17*
Reported stressful life events	0.06	0.03	0.05
Responsive/didactic parenting		0.29***	0.30***
Negative parenting		0.02	0.18
Intrusive parenting		0.03	0.02
Interaction- responsive/didactic \times negative			-0.18
Interaction- responsive/didactic \times intrusive			0.01
Interaction- negative \times intrusive			-0.01
R ²	0.05†	0.13**	0.14**

Note. N = 160; Standardized β weights presented are from the final multiple linear regression equations.

†p < .10. *p < .05. **p < .01. ***p < .001.

Aim 2: Prediction to Infant Cognition Within and Across Developmental Time

Table 3 presents results from the regression analysis predicting 15-month infant cognitive status. Mothers' depressive symptomology (inversely) and responsive/didactic parenting predicted infant cognition at 15 months of age, and both associations maintained after controlling for the other measures of parenting, mothers' age, whether mothers were married, and their reported stressful life events. Furthermore, associations between maternal depression and infant cognition were partially mediated by parenting in the form of mothers' responsive/didactic behaviors. That is, the magnitude of the association between maternal depression and infant cognition was diminished when responsive/didactic maternal behaviors were added in to the model (see Models 1 and 2, Table 3). The Sobel test measuring the significance of this partial mediation was significant, $t = -1.92, p < .05$.

We additionally tested whether parenting measures moderated each other (e.g., whether the benefits of responsive/didactic parenting were diminished in the context of relatively high negative parenting). When the three interaction terms were added into the model predicting 15-month infant cognition, no additional variance was explained, and interaction terms were not significant predictors of cognition; that is, parenting measures did not significantly moderate each other.

Prediction to 25-month child cognition. Regression analyses next tested whether maternal characteristics (i.e., mothers' age, marital status, depressive symptoms, and stressful life events) and earlier parenting measures would continue to predict infants' cognition 1 year later, after also controlling for stability in the child. Findings indicated that although maternal characteristics did not predict child cognition over time, mothers' responsive/didactic parenting

TABLE 4. Multiple Linear Regression Models Predicting 25-Month Child Cognition

Model	1	2	3
Variables			
Child 15-month cognition	0.28***	0.20**	0.19*
Age at child's birth	0.05	0.09	0.08
Marital status	-0.09	-0.13	-0.12
Reported depressive symptoms	-0.07	-0.03	-0.02
Reported stressful life events	0.05	0.03	0.04
Responsive/didactic parenting		0.25**	0.19*
Negative parenting		-0.03	-0.02
Intrusive parenting		0.07	0.12
Interaction- responsive/didactic × negative			0.02
Interaction- responsive/didactic × intrusive			-0.23**
Interaction- negative × intrusive			-0.28**
R ²	0.10**	0.16***	0.23***

Note. N = 160; Standardized β weights presented are from the final multiple linear regression equations.

† p < .10. * p < .05. ** p < .01. *** p < .001.

remained a significant predictor of child cognition above other variables in the model (see Table 4, Models 1 and 2).

We also tested whether parenting measures moderated each other in lagged models to 25-month child cognition. Interaction terms between responsive/didactic and intrusive parenting and between negative and intrusive parenting were significantly associated with later child cognition.

To further explore these interactions, graphs displaying the predicted values of child cognition for 1 SD above and below the mean (J. Cohen, Cohen, West, & Aiken, 2003) for both responsive/didactic and intrusive parenting holding all other variables constant are presented (see Figures 1 and 2). Specifically, the interaction between responsive/didactic and intrusive parenting indicated that infants who experienced high levels of maternal responsive/didactic parenting together with low levels of intrusive parenting fared best. However, when responsive/didactic parenting was low, high maternal intrusiveness was beneficial for infants. Thus, mothers who were low on responsive/didactic and intrusive parenting had infants who scored lowest on cognitive status, perhaps indicating a more detached parenting style.

A different pattern emerged regarding the interaction between intrusiveness and negative parenting. Low maternal intrusiveness coupled with low maternal negativity was associated with low cognitive status in infants, perhaps again reflecting maternal detachment. In addition, high intrusiveness coupled with high negativity also predicted relatively low cognitive status in infants, perhaps reflecting a hostile or harsh style of parenting. Infants who fared best in the combination of intrusiveness with negativity were those whose mothers were high in maternal intrusiveness, but low in negativity.

DISCUSSION

Importance of the quality of maternal parenting for children's development is undisputed (Borkowski et al., 2002; Collins et al., 2000); however, associations between specific parenting behaviors, their correlates, and links to children's cognitive status early in development are less well-established. Often, a single measure of parenting is examined, although parenting can be assessed on a range of measures that capture different ways of relating to children. Multiple parenting behaviors should be differentiated as well as considered in combination to offer a more comprehensive perspective of early parenting influences.

Furthermore, most studies that have assessed associations between maternal parenting behaviors and child outcomes have been cross-sectional, which limits causal inferences because children influence parents just as parents influence children. Longitudinal studies provide stronger evidence of the importance of specific features of parenting for children's development after considering children's own earlier contributions. In addition, specification of the parenting behaviors that predict positive child outcomes is especially important for children living in poverty, as high-quality parenting may buffer the developmental risks associated with economic hardship (Chazan-Cohen et al., 2009; Lugo-Gil & Tamis-LeMonda, 2008; V.C. McLoyd, 1990; Ryan, Fauth, & Brooks-Gunn, 2006). Thus, we sought to examine multiple parenting behaviors in a diverse population of low-income mothers, asked about associations between parenting measures and maternal characteristics, and examined their predictive validity for infant cognitive status within and across development.

The maternal characteristics of age, marital status, and psychological functioning yielded specific relations with the different measures of parenting. In particular, mothers' report of stressful life events was associated with more negative parenting behaviors while mothers' depressive symptomology was negatively associated with both intrusive and responsive/didactic parenting behaviors. Others also have found that depression compromises parenting (Albright & Tamis-LeMonda, 2002; Cummings & Davies, 1994; Erikson, Sroufe, & Egeland, 1985). Thus, while stress may increase mothers' negative behaviors, depressive symptoms interfere with mothers' overall ability to engage with their infants, whether those engagements are intrusive or responsive/didactic. Also note that mothers who were high on responsive/didactic parenting were more likely to be married to the father of their infants; this might indicate that fathers provided mothers with added support, as the literature has suggested that support is vitally important in the face of contextual risks (S. Cohen & Wills, 1985; Hashima & Amato, 1994). In contrast, maternal age predicted mothers' negativity toward infants. In sum, each of the predictors we examined held distinct associations to parenting measures, demonstrating that specificity is critically important in studies examining the correlates of parenting.

When considering the cognitive status of infants, we found notable declines over early development. Although most infants were within normal limits on a standardized mental development index

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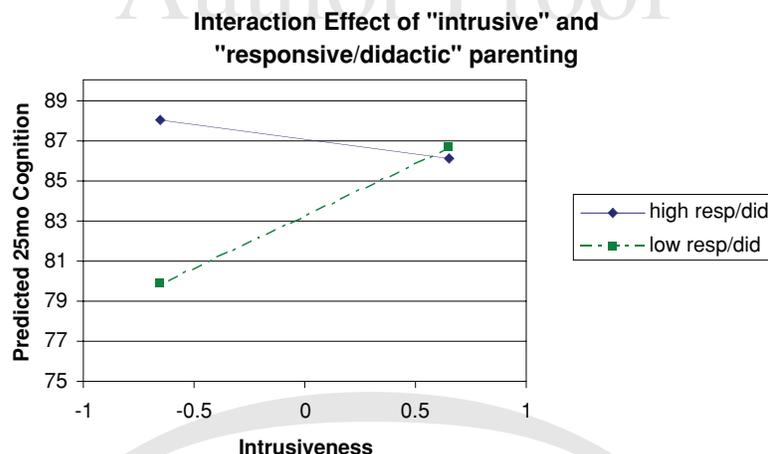


FIGURE 1. Responsive/didactic parenting by intrusive parenting predicting 25-month child cognition.

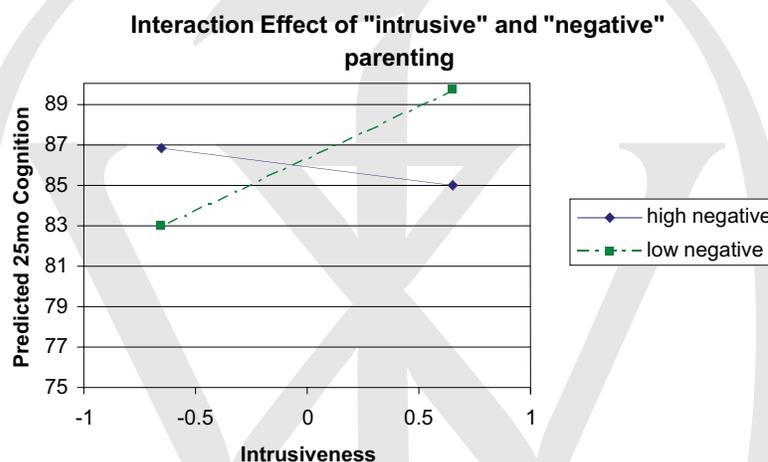


FIGURE 2. Negative parenting by intrusive parenting predicting 25-month child cognition.

at about 1 year of age, the proportion of infants at risk for cognitive delay increased substantially by 2 years of age. At that time, over half of the infants fell below population norms. Such decreases in cognitive status from about 1 to 2 years of age have been previously documented and are likely attributable to the increased language demands of cognitive assessments for 2-year-olds (Administration for Children and Families, 2002; McCall, 1983). These findings nonetheless highlight the need to identify factors early in development that might buffer children from the effects of disadvantaged circumstances. In the current study, mothers' responsive/didactic parenting strongly predicted infant cognitive status concurrently and over time, even after controlling for a variety of maternal characteristics, confirming the link between these two constructs that was demonstrated in recent longitudinal work (Pearson et al., 2011). Moreover, responsive/didactic parenting partially mediated associations between maternal depression and infant cognitive status at 15 months. That is, mothers who were lower on depressive symptoms displayed more positive parenting during play interactions with their infants, which in turn supported infants' cognitive development. Interventions that focus on mothers' mental health in

conjunction with parenting may have the added potential to benefit children's cognitive functioning.

Notably, mothers' responsive/didactic parenting of their 15-month-olds predicted infants' cognitive status at 25 months. However, when maternal responsive/didactic parenting was low, intrusiveness played a buffering role. In such instances, intrusiveness may have provided children with stimulation that they otherwise were not receiving. This finding not only reinforces previous research that has demonstrated the negative association between detached or uninvolved parenting and child outcomes (e.g., Berlin et al., 2002; Ryan et al., 2006) but also highlights the importance of examining intrusiveness in the context of other behaviors that parents concurrently display. The absence of *both* responsive/didactic *and* intrusive parenting was severely detrimental for children, but intrusiveness appears to provide children with parental stimulation in cases where mothers fail to display other positive parenting behaviors. In addition, although we did not measure infant mental health or social adjustment, due to links between cognitive and socioemotional development in infancy, it is possible that intrusive parenting also would buffer infants from mental health risks in

contexts where maternal responsive-didactic behaviors are relatively low. In contrast to the findings demonstrating the positive role of intrusiveness when responsive/didactic parenting was low, high intrusiveness was detrimental to infants in the current study *only* if mothers' negativity also was high. Conditions of high intrusiveness with high negativity might reflect hostile or harsh parenting. In this way, the current study aligns with previous research that has found negative associations between intrusiveness and child outcomes (Grolnick, 2003; Ispa et al., 2004; Whiteside-Mansell et al., 2003), but has noted these detrimental effects only when parents concurrently *also* display negative parenting. This may explain why some researchers have found no associations between intrusiveness and children's outcomes (e.g., Baumwell, Tamis-LeMonda, & Bornstein, 1997): Some mothers may display intrusiveness with negative affect (detrimental to children) whereas others may display intrusiveness without negative affect (which, in this sample of low-income families, was not detrimental to children). In addition, the influence of intrusiveness on child outcomes was moderated by responsiveness/didactic behaviors. Whereas studies on low-income mothers have often focused on the dangers of intrusive/controlling behaviors for children's development (e.g., Landry et al., 2001; Murray & Hornbaker, 1997), the harm or benefits of intrusiveness will depend on mothers' relative levels of responsive/didactic behaviors and negativity.

Further note that interactions between intrusiveness and both negative and responsive/didactic behaviors were significant predictors only of *later* child cognitive status and not *concurrent* child cognitive status. This finding suggests that associations between parenting behaviors in context and child cognition are manifested over time, such that while an instance of negative parenting in the context of low overall interaction may not in and of itself have lasting influence on child outcomes, to the extent that it represents experiences infants continue to have over time, the accumulation of such experiences predicts child cognitive status nearly 1 year later. These findings indicate the need to (a) distinguish maternal intrusiveness from negativity, (b) consider the effects of intrusiveness in the context of other maternal behaviors, and (c) identify combinations of parenting behaviors that buffer children from or expose them to the risk of low cognitive status early in development.

As the sample for the current study was composed primarily of African American and Latina mothers, these findings may hold only for minority parents and not European American parents. However, findings from our study are in line with research that has suggested that the lack of negative association between intrusive parenting and child outcomes would hold under conditions of socioeconomic disadvantage (e.g., Brody & Flor, 1998; Dodge et al., 1994; Hoff-Ginsberg, 1991; Laosa, 1980). Infants in the current sample living in low-income homes were at the highest risk for deficits in cognitive status when they did not experience either responsive/didactic or intrusive parenting. This may not have been the case in a sample with higher socioeconomic status. The fact that maternal education was not associated with infant cognitive status may be emblematic of the contexts of development experienced by the infants in the current sample. Although maternal education is

typically a strong predictor of child cognitive development (e.g., Brooks-Gunn & Zamsky, 1994), in the present study, education levels were limited (More than half of mothers had less than a high-school education.) and half of the mothers were teenagers at the time of their infant's birth, limiting their ability to gain the years of education that may be of benefit to their infants.

Although these findings underscore the importance of maternal parenting in early cognitive development, several limitations should be noted. First, although longitudinal research has presented a relatively strong case for the influences of parenting on infant development, the current study was nonexperimental, which diminishes the ability to draw causal inferences. However, experimental interventions aimed at increasing positive maternal parenting behaviors such as teaching and responsiveness in low-income populations demonstrate a causal relationship between the quality of maternal parenting and children's cognitive outcomes (e.g., Mendelsohn et al., 2005; Mendelsohn et al., 2007). Similarly, when mothers were taught to use more elaborate language during interactions with their children, increases in both children's language and memory skills were obtained (Bolland, Haden, & Ornstein, 2003). Second, the generalizability of findings regarding the influences of parenting measures on infants' cognitive status are limited by the relatively small sample and the selectivity of participants (all of whom sought social services such as Early Head Start).

Finally, the fact that observations of maternal parenting were limited to observed mother-infant play has implications for findings in two ways. First, note that mothers and infants interact daily across a range of situations, and the current study cannot generalize beyond instances of free play; however, research has repeatedly shown that the quality of parenting broadly is linked to key outcomes in children (e.g., Rodriguez et al., 2009). Second the positive nature of the interaction is likely related to the fact that observed negative parenting behaviors were relatively low in incidence, leading to low means on these items and a restriction of range, as well as low alphas for both the intrusive and negative parenting measures (each of which was only composed of three items). Although this was of concern, the conceptual need to separate negative from intrusive parenting behaviors was more pressing, and findings indeed suggest that these parenting behaviors should be distinguished from one another.

Despite these limitations, the current findings are relevant to practitioners and policymakers who seek to intervene in contexts characterized by socioeconomic disadvantage. In particular, it suggests that mothers' positive parenting has sustained influence on children's cognitive functioning and that over time may be foundational to children's school readiness. In addition, findings point to the fact that infants are most at risk when they experience low overall levels of maternal parenting. Interventions that especially promote responsive/didactic parenting early in infancy and target factors that may impede a mother's ability to sensitively interact with her infant could have long-lasting influence on the developmental trajectories of socioeconomically disadvantaged children. On the whole, poverty has serious negative implications for children's outcomes, but the current study adds to mounting evidence

that high-quality maternal parenting can buffer children from its effects.

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Q29

Author Proof

Queries

- Q1:** There is no caron accent on the “z” in Uzgiris in the text citation, as compared to the entry in the References; please check.
- Q2:** Eshel, Landau, Daniely, & Ben-Aaron, 2000, is not in the References; please add a complete entry there.
- Q3:** Please check the order of the last two coauthors; they are reversed in the entry in the References.
- Q4:** Barratt & Roach, 1995, is not in the References; please add a complete entry there.
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- Q9:** Culp, Appelbaum, Osofsky, & Levy, 1988, is not in the References; please add a complete entry there.
- Q10:** Waite & Gallagher, 2000, is not in the References; please add a complete entry there.
- Q11:** Are you referring to Tamis-LeMonda, Ahuja, Hannibal, Shannon, & Spellman (If so, please list the first 2 authors followed by et al.) or to Tamis-LeMonda, Bornstein, & Baumwell (If so, list all 3 authors.)?
- Q12:** Update? Also add the article title to the entry in the References regardless of whether it has been published.
- Q13:** Eshel, Landau, Daniely, & Ben-Aaron, 2000, is not in the References; please add a complete entry there.
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- Q24:** Please check the order of the last two coauthors; they are reversed in the entry in the References.
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