

# Beyond Rough and Tumble: Low-Income Fathers' Interactions and Children's Cognitive Development at 24 Months

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## SYNOPSIS

**Objective.** The purpose of this investigation was to explore associations between father–child interactions and children's cognitive status in an under-represented group of low-income, ethnically diverse families. **Design.** Participants were 65 inner-city fathers and their 24-month-old children (34 boys, 31 girls). Father–child interactions were videotaped for 10 min at home during semistructured free play, and mental scale scores on the Bayley Scales of Infant Development were obtained on children. The quality of father–child interactions was assessed using 14 Likert ratings of fathers (e.g., responsiveness, language quality, and intrusiveness) and 12 of children (e.g., play, participation, emotional regulation, and communication). **Results.** Factor analyses revealed 2 patterns of engagement in fathers (Responsive–Didactic and Negative–Intrusive) and 3 in children (Playful–Communicative, Social, and Regulated). Thirty-six children scored within normal limits on the MDI and 29 scored in the delayed range. Together, fathers' and children's factor scores explained more than 25% of the variance in children's performance on the MDI. Logistic regressions indicated that fathers with high scores on the Responsive–Didactic factor were nearly 5 times more likely to have children within the normal range on the MDI than were low-scoring fathers. **Conclusions.** These findings point to the importance of considering fathers' role in early cognitive development, particularly in low-income families in which children begin to exhibit significant declines in their second and third years. Positive father–child interactions appear to obviate cognitive delay.

## INTRODUCTION

Growing recognition of the critical role of fathers in children's lives is reflected in a burgeoning of theoretical and empirical studies on fatherhood over the past 20 years (Lamb, 1997; Tamis-LeMonda & Cabrera, in

press). Investigators of fatherhood have moved beyond using mothers as "proxies" to fathers by including fathers' self-report and observations of father-child relationships in the study of children's development (Cooksey & Fondell, 1996; Fagan, 1996, 1999; Heermann, Jones, & Wikoff, 1994; Hossain & Roopnarine, 1994; Mosley & Thomson, 1995; Parke, 1996; Shields & Sparling, 1993). These investigations have firmly established the importance of father involvement for children. Nonetheless, four emphases characterize the majority of research on fathering: a focus on father absence or presence; comparisons of fathers' interactions to those of mothers; examination of fathers' influence on older children and adolescents; and a focus on middle-income fathers. Still lacking is an understanding of the variegated nature of involvement in "present" father homes, particularly those from ethnically diverse, low-income backgrounds, and whether and how they affect the developmental outcomes of their young children (Black, Dubowitz, & Starr, 1999; Brophy-Herb, Gibbons, Omar, & Schiffman, 1999; Cochran, 1997). These purposes lay at the heart of the present investigation.

### Beyond Father Absence and Presence

Much of the research on father involvement has dichotomized fathers as absent or present, underscoring the harsh realities of absentee fathers for children's well-being (Furstenberg & Harris, 1993; Lerman, 1993; Margiglio, 1987; Mott, 1990; Perloff & Buckner, 1996; Seltzer & Bianchi, 1988). Children who grow up in father-absent homes are at risk for low school achievement (Astone & McLanahan, 1991), increased school dropout (Krein & Bellar, 1988; McLanahan & Sandefur, 1994), behavioral or emotional problems (Gabel, 1992), high rates of violence, delinquency, and substance abuse (Matsueda & Heimer, 1987; Sampson, 1987), low involvement in the labor force (McLanahan & Sandefur), and early sexual activity and child bearing (McLanahan & Sandefur; Newcomer & Udry, 1987).

One possible interpretation of the adverse effects of father absence may be its associated economic hardships. Children in father-absent homes are likely to live in communities of poverty where there are high levels of unemployment and crime; poor housing quality, schooling, and health care; and a lack of resources (Duncan & Brooks-Gunn, 1997). Alternatively (or in addition to these indirect effects), it may be that present fathers benefit their children through positive engagements and emotional support (Carlson & McLanahan, *in press*). It is necessary to move beyond dichotomous measures of fathering — for example, by focusing on the quality of father-child interactions — to better understand why father presence matters for children.

### Beyond Comparisons to Mothers

A growing number of investigations have shifted focus to the nature of fathering in fathers who remain involved in their children's lives. Oftentimes, however, such studies directly compare father-child interactions to mother-child interactions, thereby limiting appreciation of the within-groups variation that characterizes father engagements. Comparative studies indicate that fathers are more likely to tease their children (Labrell, 1994), engage in "rough-and-tumble play" (Clarke-Stewart, 1980; Hossain & Roopnarine, 1994; MacDonald & Parke, 1984; Parke, 1996; Stevenson, Leavitt, Thompson, & Roach, 1988; Yogman, 1981), encourage risk-taking and socialize gender roles (Power, 1981), and prohibit their infants' activities (Brachfeld-Child, 1986). They are less likely to be sensitive to their children's interests and activities (Power & Parke, 1983) and are less engaged with them (Belsky, Gilstrap, & Rovine, 1984).

The consequence of this comparative approach has been a generally robust characterization of fathers as disciplinarians who are aficionados of roughhousing, and mothers as verbal-didactic nurturers. Although these findings highlight the unique qualities of fathering and mothering, they potentially result in narrow views of fathers' and mothers' roles. Studies that challenge gender stereotypes indicate that fathers and mothers both encourage exploration during play with their infants (Power, 1985), alter their speech patterns to infants by speaking slowly and using shorter phrases (Dalton-Hummel, 1982; Golnikoff & Ames, 1979; Rondal, 1980). Both fathers and mothers have also been found to respond to their infants' cries and smiles (Berman, 1980), are sensitive to their 1-year-olds when preoccupied with a task (Notaro & Volling, 1999), and adjust their behaviors to accommodate developmental changes to infants' competencies (Belsky, Gilstrap, & Rovine, 1984; Crawley & Sherrod, 1984). Together, these findings suggest that fathers do and can engage in play that extends beyond that of rough-and-tumble.

### Beyond Rough and Tumble: Fathers' Effects on Toddlers

Studies indicate that father involvement is associated with children's well-being, cognitive development, and social competence during childhood and adolescence (Grolnick & Slowiaczek, 1994; Harris, Furstenberg, & Marmer, 1998; Lamb, 1997; Mason, Cauce, Gonzales, & Hiraga, 1994; MacDonald & Parke, 1984; Nord, Brimhall, & West, 1997; Yogman, Kindlon, & Earls, 1995). However, only a handful of investigators has examined how fathers' interactions relate to children's achievements during the second year of life, when children rapidly advance in language and other symbolic com-

petencies (Tamis-LeMonda & Bornstein, 1990, 1994). One study found qualitative characteristics of father involvement (e.g., behavioral sensitivity) to be associated with toddlers' problem solving (Easterbrooks & Goldberg, 1984). Fathers' scaffolding during teaching interactions predicted problem solving and literacy skills in 2-year-old children (Conner, Knight, & Cross, 1997). A recent study of low-income African American fathers and their 3-year-olds indicated that fathers who were nurturant during play had children with better cognitive and language competencies (Black et al., 1999). These studies highlight the role of fathers in children's early cognitive development, but a contradictory study found that fathers' behaviors with their children at 12 months and 30 months of age were not associated with children's 30-month McCarthy scores (Hunter, McCarthy, MacTurk, & Vietze, 1987). Thus, further examination of whether fathering relates to early cognitive outcomes is warranted.

Given the bi-directional nature of father-child relationships (Bell, 1979), it is critical to consider children's contributions to the quality of father-child interactions. Fathers' interactions vary with children's gender, temperament, and health status (Field, 1981; Harrison & Magill-Evans, 1996; Lamb, 1997; Power, 1981). It is likely that links from fathers' interactions to children's cognitive achievements are explained by stability in children themselves. Precocious children might solicit sensitive exchanges from their fathers, and these interactions might, in turn, predict outcomes in children. To date, no study has considered whether and how fathers contribute to children's cognitive development beyond children's own contributions to father-child engagements and abilities.

### Beyond the Mainstream: The Missing Population of Fathers

The vast majority of research on the beneficial effects of father involvement has been based on European American, middle-class, intact families. An important challenge is to describe the nature and consequences of father involvement in low-income, minority men, whose economic resources, unstable employment, and limited education often infringe on their ability to develop positive relationships with their children (Black et al., 1999; Brophy-Herb et al., 1999; McAdoo, 1986, 1988; McLoyd, 1989, 1990). Unsurprisingly, research on low-income fathers is often deficit based — emphasizing the absence of many low-income fathers in their children's lives and their inability or unwillingness to provide economically and emotionally for their children (Cochran, 1997; Furstenberg & Harris, 1993; Lerman, 1993; Marsiglio, 1987; McAdoo, 1986, 1988; Perloff & Buckner, 1996). Although the harsh reality is that many poor children are reared without fathers, there is a large population of low-income fathers

struggling and succeeding at maintaining positive relationships with their children. Fortunately, researchers have recently begun to make progress in describing the relationships of fathers and children from such diverse ethnic groups and social classes (Black et al., 1999; Brophy-Herb et al., 1999; Fagan, 1996).

### This Study

This study extends research on father-child interactions in four key ways: (1) we focus on father-child engagements in fathers who are present in their children's lives; (2) we examine the nature of within-groups variation in fathers' interactions with children, rather than comparing fathers to mothers; (3) we assess the bi-directional nature of father-child interactions in relation to children's mental development at age 2, a period that has largely been ignored in extant research; and (4) we examine father interactions in an underrepresented group of ethnically diverse, inner-city fathers.

Specifically, we assessed the nature of father-child interactions as fathers played with their 2-year-olds, and we examined fathers' influence on children's cognitive development. We hypothesized that fathers who were more sensitive would have children who were more responsive and competent during dyadic play. We also expected both fathers' and children's behaviors during play to predict children's developmental status. With respect to demographic measures, we expected older, employed, more educated fathers, as well as those residing with their children to exhibit more sensitive parenting. In turn, we expected fathers high in sensitivity to have children with higher Mental Developmental Index (MDI) scores on the Bayley Scales of Infant Development. Considering demographic and behavioral measures together, we speculated that the quality of fathers' interactions with children would be the strongest predictor of children's developmental status, even after controlling for children's own behaviors.

## METHODS

### Participants

Families were recruited when they applied to have their children receive childcare and parenting services at community agencies in a large city. During the application process, parents were informed of the research being conducted at the agencies through a university partnership. Written consent to participate in the research was obtained from mothers. As a first

step toward identifying and contacting fathers for study participation, we visited the homes of 134 mothers participating in the research project; 88 (65.6%) agreed to have their child's father contacted; 85 of those were identified as biological fathers and 3 as adoptive fathers. Of the 46 mothers who refused father contact, over half ( $n = 29$ ) reported that the child's father was absent from his child's life; 24 (52.2%) of those stated that neither they, nor their child had any contact with their child's father; 3 (6.5%) mothers reported that their child's father was incarcerated; and 2 (4.3%) fathers were deceased. Another 17 mothers (37%) refused to provide contact information due to high levels of conflict in their relationships, domestic violence, or substance abuse.

Of the 88 identified fathers, 75 (85.2%) agreed to participate. Of the remaining 11 identified fathers, 7 refused participation on account of being too busy (e.g., working two jobs, moving) and 4 refused because they felt uncomfortable with the research. Two additional fathers could not be located and were subsequently reported as no longer being involved in their children's lives. Seventy of the 75 fathers (93.3%) completed the interview and video; the other 5 completed only the interview. Two fathers did not complete the videotaped portion of the study because of scheduling difficulties, and 2 stated they felt uncomfortable being videotaped. The remaining father could not be videotaped because the mother refused the videotaped portion of the study. Three videotapes were discarded due to the child's excessive distress during taping, and 1 because of sound problems. One child had Down's Syndrome and was not included in analyses. The final sample therefore comprised 65 fathers and their children (34 boys, 31 girls). Sixty-one percent ( $n = 40$ ) of fathers had been living with their children since birth, and the majority, 71% ( $n = 46$ ), were single.

At the time of interview, fathers ranged from 18 to 46 years of age ( $M = 25.88$ ,  $SD = 6.45$ ), and mothers ranged from 16 to 38 years of age ( $M = 23.53$ ,  $SD = 5.82$ ). The children were between the ages of 23 and 30 months ( $M = 25.51$ ,  $SD = 1.66$ ). Fathers came from diverse racial backgrounds: 63.1% ( $n = 41$ ) Latin American, 29.2% ( $n = 19$ ) African American, 4.6% ( $n = 3$ ) Asian American, and 4.6% ( $n = 2$ ) European American. Mothers' racial background generally paralleled the breakdown of fathers: 53.81% ( $n = 35$ ) Latin American, 35.4% ( $n = 23$ ) African American, 4.6% ( $n = 3$ ) Asian, 4.6% ( $n = 3$ ) biracial, and 1.5% ( $n = 1$ ) European American. Fifty-one fathers spoke English, and 14 spoke another language (12 Spanish, 2 Mandarin). Almost half, 43.1% ( $n = 28$ ), of fathers completed 11 or less years of high school, 32.3% ( $n = 21$ ) graduated from high school or received their GED, and 24.6% ( $n = 16$ ) completed some college or graduated from college. Forty-seven percent ( $n = 30$ ) of mothers completed 11 or fewer years of high school, 26.1% ( $n = 17$ ) graduated from high school or received their

GED, and 24.7% ( $n = 16$ ) completed some college or graduated from college. All families were low-income and eligible to receive some form of governmental assistance (e.g., Medicaid, food stamps, vouchers from the Women, Infants and Children program). More than half of fathers, 84.6% ( $n = 55$ ), reported working full-time or part-time, and their mean monthly income was \$1,226.49 ( $SD = \$981.94$ ; range: \$0 to \$4,000). The majority of mothers, 72.3% ( $n = 47$ ), did not work outside the home.

### Procedures

A team of research assistants conducted separate home visits with mother-child and father-child dyads. During the 24-month mother-child visit, children were administered the mental scale of the BSID-II (Bayley, 1993) by a trained researcher. At this visit, mothers were asked to identify the father or father-figure who was most important in the target child's life. On receiving written permission from mothers to contact their child's father, researchers contacted the identified father by telephone and informed him of the research. A home visit was scheduled with men who agreed to participate, and written consent was obtained during the home visit. Fathers' visits consisted of an interview and videotape of father-child interactions. Fathers were given \$30, a small gift for their children, and a copy of the videotaped interaction.

Father-child interactions were videotaped during four activities, including 10 min of semistructured free play that formed the basis of the present investigation. During free play, toys were presented to fathers in three separate bags (Bag 1 - a book; Bag 2 - a pizza set and telephone; and Bag 3 - a farm with farm animals). Fathers were asked to sit on a mat with their children, to ignore the camera, and to do what they would ordinarily do with their children. They were instructed to only play with the toys from the three bags and to start with Bag 1, move on to Bag 2, and finish with Bag 3. They were told that they could divide up the 10-min as they liked. Fathers were asked not to allow their children to use a pacifier during the videotaping, so that the researchers could hear children's verbalizations.

### Measures

*Demographic data.* Demographic information, including marital status, age, race, education, and employment status, as well as information about fathers' residency was collected during interviews with fathers and mothers. In addition, fathers were asked how often they spent one or more hours a day with their child, how much help they provided in caring for

their child, and how much influence they had in making major decisions about their child's education, religion, and health care needs. All responses were rated using 3- or 5-point Likert scales.

*Bayley Scales of Infant Development, 2nd Edition (BSID-II; Bayley, 1993).* Children were administered the mental scale of the BSID-II. The mental scale includes 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 ( $r = .73$ ). A Mental Developmental Index (MDI) score of 85 to 100 is within normal limits.

*Father-child interactions.* The quality of father-child interactions was assessed using the Caregiver-Child Affect, Responsiveness, and Engagement Scale (C-CARES; Tamis-LeMonda, Ahuja, Hannibal, Shannon, & Spellmann, 2001; see Appendix), which rates various father, child, and dyad behaviors. Fourteen father and 12 child items were used. Although additional items were coded, six father items and two child items were excluded due to insufficient variability or poor interobserver agreement (e.g., positive touch, negative touch, teasing, and paternal responsiveness to distress). Each item was rated using a 5-point Likert scale ranging from 1 (*not observed*) to 5 (*constantly observed*). The C-CARES is based on both the Meadow-Orlans (Meadow & Schlesinger, 1976) and the Mahoney (1992) Scales of Mother-Child Interaction, extending these two scales in three ways. First, it adds several variables relevant to children's cognitive status (e.g., parent's language use, quality of language and play sophistication). Second, it assesses father and child behaviors using conceptually parallel items (e.g., items such as "emotional attunement" and "responsiveness" were coded separately for both fathers and children). Third, bipolar items have been replaced with separate, unipolar items (e.g., "positive affect" and "negative affect" rather than "affect").

Father items included: positive verbal statements, negative verbal statements, participation with child, responsiveness to nonverbal cues, responsiveness to verbal cues, emotional attunement, flexibility, intrusiveness, structuring, achievement orientation, amount of language, quality of language, symbolic play, and creative play. Child items included: positive affect, negative affect, emotional regulation, participation with caregiver, responsiveness to caregiver, emotional attunement, involvement with toys, persistence, amount of language, quality of language, symbolic play, and creative play.



For purposes of interobserver reliabilities, between 13 and 15 videotapes (20%) were randomly selected and coded separately by two researchers. Intraclass correlations and percent agreement were calculated for each item. Correlations ranged from .66 to .96 for father items, and from .66 to .93 for child items. Percent agreement within one was 100% for all father items, and ranged from 88% to 100% for child items. Despite passable agreement, we opted to team-code all videotapes so that any disagreements could be resolved prior to finalizing scores. For all 65 videotapes, a team of two or three trained researchers simultaneously viewed the videotaped interactions, but coded independently. During their first observation of the videotaped interactions, the researchers watched the dyad more generally and recorded notes about the interaction. In a second pass, they observed and coded the father's behavior. In a third pass, they observed and coded the child's behavior. Finally, the researchers reviewed their codes together. Any disagreements were discussed, and, if needed, the videotape was reviewed a fourth time until final consensus was reached. All coders were unaware of children's scores on the MDI.

## RESULTS

Results are presented as follows. First, preliminary analyses examine measures associated with father participation to better understand the nature of the select group of fathers in the study. Second, descriptive information on fathers' and children's behavior ratings on the C-CARES and children's MDI scores are reported. Third, factor analyses of fathers' and children's behaviors are reported. Fourth, correlations between demographic variables, fathers' and children's behaviors, and children's performance on the MDI are presented. Next, multiple regressions examine the joint contributions of father and child behaviors to children's MDI scores. Finally, binary logistic regressions explore whether specific father and child behaviors significantly shift the odds of a child being delayed on the MDI.

### Measures Associated with Father Identification and Participation

Initial analyses assessed relations between various mother, father, and child measures, and three measures of father selection in the study: (1) whether mothers identified a father as present in her child's life, (2) whether mothers permitted researchers to contact the child's father, and (3) whether the identified father agreed to participate in the study. Maternal age, education, employment, and relationship with child's biological

father; paternal employment; and child gender and MDI scores were all examined in relation to these dichotomous measures.

Mothers' education and relationship to father were associated with father absence or presence such that more educated mothers and those married or living with their partners were more likely to identify fathers as involved in their child's life,  $\chi^2(2, N = 125) = 8.11, p < .05$ ;  $\chi^2(3, N = 134) = 57.05, p < .001$ , respectively. In addition, father presence was positively associated with children's MDI scores in the full sample,  $r(127) = .21, p < .05$ .<sup>1</sup> With respect to whether mothers permitted us to contact fathers, 92.5% of mothers who were married or living with their partners, 85.7% who were romantic partners, and 70.6% who were friends with their child's father permitted the researchers to contact their child's father. Conversely, only 42.9% of mothers who no longer had a relationship with their child's father permitted researchers to contact fathers. These rates of consent significantly differ,  $\chi^2(3, N = 105) = 13.84, p < .01$ . Finally, none of the measures we examined distinguished the 85% of fathers who agreed to study participation from the 15% who refused.

### Descriptive Statistics

The final sample was comprised of highly involved fathers. Almost three quarters of the fathers ( $n = 47$ ) reported that they spent "every day or almost every day" with their child, and that they had a great deal of influence in making major decisions regarding their child's health care, education, and religion ( $n = 46$ ). Two-thirds ( $n = 42$ ) reported they provided "a lot of help" in caring for their child. Resident fathers reported spending more time with their children and providing more help in caring for their children than did non resident fathers,  $ts$  range = 2.80 to 2.99,  $ps < .05$ .

The means and standard deviations of father and child C-CARES items are presented in Table 1. Fathers' and children's 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 to 5). The only skewed child item was creativity (skewness = 2.50); logarithmic transformation reduced the skewness to 1.69, therefore, child's creativity was retained for further analyses.

Children's mean score on the MDI was 86 ( $SD = 12.16$ ), with a range of 49 to 108. When the outlier of 49 was eliminated, children's mean score on the MDI was shifted by only one point, 87 ( $SD = 10.55$ ). Because this low score was accurate, did not substantially affect the group's mean on the

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<sup>1</sup>Bayley scores were not available on 7 of the 134 children.

**TABLE 1**  
Fathers' and Children's Behaviors

Behavior Items	Fathers			Children		
	<i>M</i>	<i>SD</i>	<i>Range</i>	<i>M</i>	<i>SD</i>	<i>Range</i>
Positive affect	—	—	—	3.33	1.15	1-5
Negative affect	—	—	—	1.87	0.89	1-4
Positive verbal statements	2.64	1.26	1-5	—	—	—
Negative verbal statements	3.00	0.74	1-4	—	—	—
Emotional regulation	—	—	—	4.02	1.13	1-5
Involvement with toys	—	—	—	4.03	0.83	2-5
Persistence	—	—	—	3.48	1.06	1-5
Participation level with partner	4.20	0.81	2-5	3.46	1.02	25
Responsiveness to nonverbal cues	3.26	1.11	1-5	—	—	—
Responsiveness to verbal cues	3.69	1.03	1-5	—	—	—
Responsiveness to caregiver	—	—	—	3.63	0.93	2-5
Emotional attunement	3.05	1.23	1-5	2.86	1.31	1-5
Flexibility	3.26	1.07	1-5	—	—	—
Intrusiveness	2.28	1.13	1-5	—	—	—
Structuring	3.58	0.97	2-5	—	—	—
Achievement orientation	3.20	1.11	1-5	—	—	—
Amount of language	4.08	0.91	2-5	2.82	1.10	1-5
Quality of language	3.40	0.95	2-5	2.60	1.13	1-5
Symbolic play	2.80	1.14	1-5	2.25	1.02	1-5
Creative play	2.15	1.37	1-5	1.28	0.60	1-4

MDI, and did not alter associations obtained in subsequent analyses, this child was retained in the study. In addition to treating MDI scores as continuous, we dichotomized scores based on the documented cutoffs of the mental scale scores in the BSID-II manual (MDI score classifications: 84 or below = mildly to significantly delayed; 85 or above = within normal limits to accelerated performance). Specifically, children MDI scores were coded as: within normal limits (MDI > 85) or as developmentally delayed (MDI < 85) (Bayley, 1993). Thirty-six (55.4%) of the children scored within normal limits,  $M$  MDI = 94.6 ( $SD$  = 6.14), and 29 (44.6%) scored within the delayed range,  $M$  MDI = 75.1 ( $SD$  = 8.43).

#### Factor Analyses of Father and Child Behaviors

Two sets of exploratory factor analyses with varimax rotation were performed to investigate the underlying structure of fathers' and children's behaviors as measured on the C-CARES: (1) factor analysis of 14 items of father behaviors, and (2) factor analysis of 12 items of children behaviors.

**TABLE 2**  
Factor Analysis of Fathers' Interactions (Unrotated)

Behavior Items	Factors	
	Responsive-Didactic	Negative-Intrusive
Positive verbal statements	.61	
Negative verbal statements		.60
Participation with child	.66	.47
Responsiveness to nonverbal cues	.82	
Responsiveness to verbal cues	.74	
Emotional attunement	.81	
Flexibility	.48	-.63
Intrusiveness		.76
Structuring		.66
Achievement orientation	.48	.62
Amount of language	.70	.48
Quality of language	.66	
Symbolic play	.65	
Creative play	.64	

Note. Extraction Method: Principal Component Analysis.

The factor analysis of the 14 father items indicated that a two-factor solution best fit the data<sup>2</sup> (see Table 2). A scree plot of the factor eigenvalues 5.19 and 2.92 supported the two-factor solution. The two factors accounted for 58% of the item variance. The first factor, labeled *Responsive-Didactic* (11 items), consisted of paternal behaviors that were positively responsive to children's cues (as reflected in high scores on items such as "contingent responsiveness," "emotional attunement," "positive verbal statements") as well as didactic (as reflected in high scores on items such as "explanatory language," "symbolic play," "creative play"). The second factor, labeled *Negative-Intrusive* (7 items), reflected paternal behaviors that were negative (as reflected in the item "negative verbal statements") and parent driven (as reflected in high scores on items such as "intrusiveness," "inflexibility," "achievement-orientation"). Both factors demonstrated good internal consistency with a coefficient alpha of .87 for the *Responsive-Didactic* factor and .74 for the *Negative-Intrusive* factor.

The factor analysis of the 12 child items indicated that a 3-factor solution best fit the data (see Table 3). A scree plot of the factor eigenvalues 4.65, 2.41, and 1.15 supported the 3-factor solution. The three factors accounted for 68% of the item variance. The first factor, labeled *Playful-Communicative*

<sup>2</sup>Both orthogonal and oblique rotations were tried; however, neither rotated solution improved the factor.

TABLE 3  
Factor Analysis of Children's Interactions (Varimax Rotation)

Child Behavior Items	Factors		
	Playful-Communicative	Social	Regulated
Positive affect	.46	.58	
Negative affect		-.35	-.70
Emotional regulation			.82
Involvement with toys	.53		.57
Persistence			.72
Participation with caregiver		.75	
Responsiveness to caregiver		.80	
Emotional attunement		.83	
Amount of language	.84		
Quality of language	.85		
Symbolic play	.81		
Creative play	.81		

Note. Extraction Method: Principal Component Analysis.

(6 items), consisted of child behaviors that were sophisticated in play and communication (as reflected in high scores on items such as "symbolic play," "creative play," "involvement with toys," "sophisticated language"). The second factor, labeled *Social* (4 items), reflected child behaviors that were social (as reflected in high scores on items such as "participation with father," "responsiveness," "emotional attunement," "positive affect"). The third factor, labeled *Regulated* (4 items), consisted of child behaviors that were highly regulated (as reflected in high scores on "emotional regulation," "persistence"). All three factors demonstrated good internal consistency with a coefficient alpha of .86 for the *Playful-Communicative* factor, .80 for the *Social* factor, and .73 for the *Regulated* factor.

Examination of all father and child factor scores indicated substantial variation, as reflected in the fact that scores generally ranged from less than 2 SDs below the mean to over 2 SDs above the mean. The exception was child *Playful-Communicative* factor, which was slightly skewed, ranging from -1.60 to 2.75 SDs below and above the mean.

#### Zero-Order Associations

Demographic data were assessed in relation to child and father factor scores and children's MDI scores. The majority of paternal demographic characteristics (residential status, age, income level, marital status, level of involvement) and maternal age did not relate to father or child factor scores,  $r$ s range = -.09 to .15,  $p$ s > .05. The exception was that paternal education pos-

itively related to children's scores on the *Regulated* factor,  $r = .25, p < .05$ . Also, mothers who worked outside of the home had children with lower scores on the *Regulated* factor,  $r = -.33, p < .01$ . The majority of child demographic characteristics (age and gender) did not relate to father and child factors,  $r$ s range =  $-.17$  to  $.14, ps > .05$ . Exceptions were that fathers of older children and daughters scored higher on the *Responsive-Didactic* factor,  $r$ s range =  $.25$  to  $.26, ps < .05$ . None of the paternal, maternal, or child demographic measures related to children's MDI scores,  $r$ s range =  $-.07$  to  $.14, ps > .05$ . Finally, six separate one-way ANOVAs were conducted to assess whether father and child factors and children's MDI scores differed based on paternal race [Latin American, African American, and other (Asian and European American)], maternal race [Latin American, African American, Asian, and other (European American and biracial)], and maternal education (less than 12th grade, high school graduate/GED, some college or more). No significant differences were identified,  $F$ s range =  $.14$  to  $2.77, ps > .05$ .

Relations between the two father factor scores and the three child factor scores were next examined (see Table 4). Fathers' interaction scores on the *Responsive-Didactic* factor positively related to children's scores on the *Playful-Communicative* and *Social* factors. Finally, we examined relations between the two father factor scores and three child factor scores and children's performance on the MDI (see Table 5). Fathers' scores on the *Responsive-Didactic* factor were positively correlated with children's MDI scores. Children's scores on the *Playful-Communicative* and *Social* factors were positively related to their performance on the MDI. Neither fathers' scores on the *Negative-Intrusive* factor nor children's scores on the *Regulated* factor related to children's scores on the MDI,  $r$ s =  $-.05$  and  $.11, ps > .05$ , respectively.

### Multiple Regressions

To evaluate the unique and joint contributions of father and child factor scores to children's cognitive developmental status, variables that contrib-

TABLE 4  
Correlations Between Father and Child Factors

Father Factors	Child Factors		
	Playful-Communicative	Social	Regulated
Responsive-Didactic	.33**	.65***	.08
Negative-Intrusive	-.18	.10	.08

Note. \*\* $p < .01$ . \*\*\* $p < .001$ .

**TABLE 5**  
Correlations between Children's MDI Scores  
and Father and Child Factors

Father and Child Factors	Children's MDI Scores
Father Factors	
Responsive-Didactic	.38**
Negative-Intrusive	-.05
Child Factors	
Playful-Communicative	.50***
Social	.27*
Regulated	.11

Note. \* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

uted significantly to children's MDI scores were included in multiple regression models (i.e., children scores on *Social* and *Playful-Communicative* factors, and father scores on *Responsive-Didactic* factor).

In the first regression model, children's scores on the *Playful-Communicative* factor and father scores on the *Responsive-Didactic* factor were entered simultaneously as predictors of children's performance on the MDI (see Table 6). The adjusted  $R^2$  indicated that this model explained 27% of the variance of children's cognitive development. The overall fit for the model achieved significance,  $F(2, 62) = 12.91, p < .001$ . Both children's *Playful-Communicative* factor scores and fathers' *Responsive-Didactic* factor scores retained their significance in the context of partner influence.

In the second regression, children's scores on the *Social* factor and fathers' scores on the *Responsive-Didactic* factor were entered simultaneously as predictors of children's performance on the MDI. The adjusted  $R^2$  indicated that this model explained 11% of the variance of children's cognitive development. The overall fit for the model achieved significance,  $F(2, 62) = 5.12, p < .01$ . Only fathers' *Responsive-Didactic* factor scores retained significance in the context of partner influence.

### Logistic Regressions

To examine relations to children's delay status specifically, we next examined father and child contributions to children's MDI performance in binary logistic regressions. In these analyses, children's MDI scores were treated dichotomously — as developmentally delayed (i.e.,  $MDI < 85$ ) or within normal limits ( $MDI \geq 85$ ) (see Table 7). We considered these augmented analyses to be important for clinical and policy reasons. At a clinical level, children who perform below 85 on the MDI may be eligible to receive early intervention services, whereas children with scores at or above

TABLE 6  
Multiple Linear Regression Models Predicting Children's MDI Score

Model	Variables	B	Beta	t	95% C.I. of B	F(2,62)	Adjusted R <sup>2</sup>
Model 1	Child: Playful-Communicative	5.06	0.42	3.67***	2.31 to 7.81	12.91***	27%
	Father: Responsive-Didactic	2.86	0.24	2.08*	0.11 to 5.62		
Model 2	Child: Social	0.61	0.05	0.33	-3.16 to 4.39	5.12**	11%
	Father: Responsive-Didactic	4.16	0.34	2.20*	0.38 to 7.93		

Note. \* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .



**TABLE 7**  
Binary Logistic Regression Models Predicting Children's  
Delayed versus Normal Status

Model	Variables	B	Wald test	$\chi^2(2)$	Nagelkerke R <sup>2</sup>
Model 1				11.10**	21%
	Child: Playful-Communicative	0.58	3.53 <sup>+</sup>		
	Father: Responsive-Didactic	2.00	3.18 <sup>+</sup>		
Model 2				7.87*	15%
	Child: Social	0.33	0.85		
	Father: Responsive-Didactic	0.50	1.94		

Note. <sup>+</sup> $p < .10$ . <sup>\*</sup> $p < .05$ . <sup>\*\*</sup> $p < .01$ .

85 would likely be ineligible. At a policy level, we aimed to document whether fathers shift the odds of a child being delayed, and if so by how much. Conceptually, odds ratios might bear more social impact than the reporting of explained variance, which is the traditional metric of continuous regressions.

In the first logistic model, *Playful-Communicative* child factor score and *Responsive-Didactic* father factor score were entered simultaneously as predictors of children's delay status. The Nagelkerke  $R^2$  indicated that this model explained 21% of the variance, with the overall fit being significant,  $\chi^2(2, N = 65) = 11.10, p < .01$ . When combined, the two predictors reliably distinguished between children who were developmentally delayed and those who were not. Neither child scores on the *Playful-Communicative* factor nor fathers' *Responsive-Didactic* factor scores uniquely predicted delay status, although both approached significance (*Playful-Communicative*: Wald test = 3.53,  $p = .06$ ; *Responsive-Didactic*: Wald test = 3.18,  $p = .07$ ). This model correctly classified 65.5% of the children who were delayed and 69.4% of children who were not delayed (overall total: 67.7%). When the father and child factors were also dichotomized [high (upper 50%) and low (lower 50%)], the model yielded an odds ratio of 1.8: 1,  $p = .31$  for *Communicative-Playful* child factor and an odds ratio of 4.7: 1,  $p = .005$  for the *Responsive-Didactic* father factor (95% C. I.: *Communicative-Playful* = .60 to 5.14; *Responsive-Didactic* = 1.59 to 13.61). That is, fathers with high scores on their *Responsive-Didactic* factor were nearly five times more likely to have children who performed within the normal limits on the MDI than fathers with low scores. Children high on the *Communicative-Playful* factor were nearly twice as likely to perform within normal limits than their low-scoring counterparts.

A second model tested included the *Social* child factor score and fathers' *Responsive-Didactic* factor score as predictors of children's delay status.

The Nagelkerke  $R^2$  indicated that this model explained 15% of the variance, with the overall fit being significant,  $\chi^2(2, N = 65) = 7.87, p = .02$ . When combined, the two predictors reliably distinguished between children who were developmentally delayed and those who were not. The model correctly classified 55.2% of the children who were delayed and 77.8% of children who were not delayed (overall total: 67.7%). When the child and father factors were dichotomized, the model yielded an odds ratio of 1.3: 1,  $p = .64$  for the *Social* child factor and an odds ratio of 4.6: 1,  $p = .008$  for the *Responsive-Didactic* father factor (95% C. I.: *Social* = .42 to 4.05; *Responsive-Didactic* = 1.48 to 14.16). Again, fathers with high scores on their *Responsive-Didactic* factor were four and half times more likely to have children who performed within the normal limits on the MDI than fathers with low scores.

## DISCUSSION

The renewed interest in what fathers do and how they affect the development of their children has underscored the importance of including underrepresented fathers in ongoing research. Much of the extant literature has dichotomized what we know about fathers along social stereotypes. Research on the positive impact of father involvement is based on European American, middle-class samples (Lamb, 1997). In contrast, research on inner-city, ethnic minority men focuses on their absence and inability or unwillingness to financially support their children. This exploratory study represents a first step toward understanding the positive benefits of fathering for young children in a group of ethnically diverse, low-income men. Our aim was to build on extant research by moving beyond fathers' presence or absence to include variation among involved fathers, including those who do not reside with their children. Earlier research in this area has relied predominantly on fathers' self-report or on mothers' perceptions of the father-child relationship. By including observations of multiple dimensions of father-child interactions we sought to advance an understanding of the nature and consequences of father-child interactions (Belsky et al., 1984; Belsky, Youngblade, Rovine, & Volling, 1991; Clarke-Stewart, 1980; Heerman et al., 1994; Labrell, 1994; Lamb, 1997; Power & Parke, 1983; Roopnarine, Talukder, Jain, Joshi, & Srivastav, 1990; Yogman, 1981).

Observational methods are key to understanding developmental pathways in children, and can provide important insights into the affective and social processes that characterize father-child relationships. Our analyses of father-child interactions identified two factors in fathers. The first, Re-

sponsive-Didactic, characterized paternal behaviors that were didactic, positive in affect, responsive, and emotionally attuned to children. The second, Negative-Intrusive, characterized father-driven achievement-orientation, high structuring, negative verbal statements, intrusiveness, and inflexibility. We also identified meaningful factors in children, all of which captured positive modes of engagement. The first, Playful-Communicative, was characterized by positive affect, sophisticated language, and play, and high involvement with toys. The second, Social, was characterized by responsiveness, emotional attunement, and positive affect. The third, Regulated, was characterized by emotional regulation and persistence with tasks.

Fathers' Responsive-Didactic behaviors positively related to children's Playful-Communicative and Social behaviors. Thus, contingent responsiveness, particularly when combined with high language quality and play, is associated with enhanced play and communication in children. These patterns parallel those identified in research on mother-child interactions (e.g., Baumwell, Tamis-LeMonda, & Bornstein, 1997; Tamis-LeMonda, Bornstein, & Baumwell, 2001). However, the causal directions of these father-child associations remain unclear, and likely reflect a bi-directional process. That is, children are far from passive recipients of fathering. Rather, children who exhibit sophisticated language and play may promote sensitive, didactic interactions in their fathers, and in turn be supported by these positive parenting experiences. Similarly, children who are less capable might be less rewarding social partners, thereby compromising the quality of their fathers' engagements.

Important, fathers' scores on the Responsive-Didactic factor predicted whether children scored in the normal or delayed range on the mental scale of the BSID-II and did so over and above children's own behaviors. Children in the normal range on the MDI were nearly five times more likely to share a warm, communicative, and playful relationship with their fathers. This finding is particularly relevant to understanding the plight of many minority children who begin to exhibit drop-off on standardized tests in their second year (Brooks-Gunn & Duncan, 1997; Smith, Brooks-Gunn, & Klebanov, 1997). These findings also contribute to current controversy as to whether fathers matter for children's cognitive growth. That is, certain studies accord with our findings on the importance of responsive and didactic fathering behaviors for children's cognition (Black et al., 1999; Connor et al., 1997; Easterbrooks & Goldberg, 1984), whereas others have found father involvement to be unrelated to children's developmental outcomes (Hunter et al., 1987). Again, however, the link between father engagements and children's performance on the MDI is not necessarily causal. Indeed, children's own behaviors during interactions with

their fathers also contributed unique variance to their MDI scores. Fathers with delayed children may become easily frustrated and be less tolerant than fathers with children who are "on-track", and these child effects may be manifest in the quality of father-child play interactions.

Although resident fathers reportedly spend more time with their children than nonresident fathers, unexpectedly, no differences were found in the quality of fathers' interactions or their children's interactions and developmental status based on residency. This finding may reflect the fact that these are self-selected fathers who appear to have a stable relationship with their children's mothers. Several studies indicate that nonresident fathers in a friendly relationship with their partner, as well as fathers in marriages with supportive spouses, have positive relationships with their children (Brody, Pillegrini, & Sigel, 1986; Carlson & McLanahan, in press; Goldberg & Easterbrooks, 1984; Volling & Belsky, 1992). We did not specifically measure the quality of the father-mother relationship, but the fact that 66% of mothers agreed to have researchers contact fathers suggests that the fathers in our study minimally have a neutral relationship with their children's mothers and are positively involved with their children.

The absence of an association between fathers' residence status and the quality of father-child interactions bears important policy implications. Low-income minority fathers have frequently been stereotyped as "deadbeat dads" who live apart from and spend little time with their children; they are often assumed to provide poor parenting (Furstenberg & Harris, 1993; Marsiglio, 1987). Deadbeat dads certainly exist, but our findings indicate that nonresident fathers can be as involved as resident fathers. When nonresident fathers are successful, their closeness to children may equal that of resident fathers. This stands in contrast to finding that residential status was associated with fathers' sensitivity during teaching interactions (Brophy-Herb et al., 1999). Nonetheless, the long-term trajectories of nonresident fathers' relationships to their children remain to be examined.

This study has several limitations that should be considered when interpreting findings. First, the small sample size is not representative of low-income men generally. However, the difficulty in gathering data on this population of fathers is by no means trivial. We visited and interviewed 134 mothers to ultimately obtain data on a consenting 75 fathers. Only 66% of mothers permitted us to contact fathers, and 85% of those fathers agreed to participate. By necessity, this sample of men was selected into the study both by their partners as well as by virtue of their own willingness to participate. Second, we evaluated fathers' engagement during semistructured, free-play, which posed few demands or challenges to the dyad. Because father-child interactions during play might facilitate more positive behaviors in dyads, negative or disciplinary behaviors were

rarely evidenced. Given that parent-child interactions are situation specific (Bornstein, Tamis-LeMonda, & Haynes, 1999), engagements in other contexts, such as mealtime or teaching might result in different behavioral patterns. Also, our assessment of father-child interactions was based on only 10-min of dyadic interaction. However, the finding that fathers' responsive-didactic engagements predicted MDI scores in light of such a limited observational period indicates the robustness and magnitude of fathers' influence, and it coincides with similar findings obtained from brief observations of mother-child interactions (e.g., Sumner & Spietz, 1994). Third, we adopted measures typically used in the assessment of mother-child interactions (e.g., sensitivity, affect, and participation), a practice that is common (Brophy-Herb et al., 1999; Heermann et al., 1994), but may lead to bias in assessing fathers. Still, our findings indicate such an approach might be appropriate in that qualities such as responsiveness, positive statements, and emotional attunement are likely to be important in both mothers and fathers alike. Finally, we focused on direct, concurrent relations between fathering and child outcomes, without examining potential indirect effects (e.g., through mothers or extended kin) or those that characterize fathers' contributions over time. Fathers who exhibit responsive-didactic behaviors might have partners who are also sensitive when interacting with their children and who bear equal or greater weight for children's cognitive status. Consequently, a fuller picture of children's early experiences rests on understanding the roles of the many caregivers in children's lives, including mothers, fathers, and extended kin. Moreover, fathers' responses occur within the context of interactions with children; the extent to which these early father-child interactions exert long-term, meaningful influence on children's cognitive achievements, and vice-versa, remains to be examined.

Despite the shortcomings of small-scale studies, they often stimulate hypothesis testing and serve as maps to the design and implementation of larger studies. In the absence of observational studies on fathering, researchers seeking to understand the nature and consequences of father involvement in underrepresented populations are working in the dark. Our findings suggest that, although many low-income men are absent from their children's lives (Lamb, *in press*; Marsiglio, 1987), those who develop nurturant, supportive relationships with their children may have potent effects on children's cognitive status. This exploratory study only skims the surface of our understanding of the role of low-income, minority fathers. We need to better understand the mechanism through which fathers achieve their effects. Are they direct or indirect? What emotional and cognitive processes mediate fathering and child outcomes? What is the effect of the father-child relationship on children's social, emotional, physical,

language, and cognitive development over time and in the context of mother and child effects? How might these findings enable researchers and practitioners to craft effective intervention programs for fathers and families who are in need of support?

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### ACKNOWLEDGEMENTS

The findings here are based on research conducted as part of the national Early Head Start Research and Evaluation Project funded by the National Institute of Child Health and Development, Ford Foundation, Administration of Children, Youth and Families, U. S. Department of Health and Human Services through Grant 90YF001 to New York University. The authors are members of the Early Head Start Research Consortium, which consists of representatives from 17 programs participating in the evaluation, 15 local research teams, the evaluation contractors, NICHD, ACYF, and Ford Foundation. The authors appreciate the additional support we received from two Research Challenge Fund Grants from New York University. We are indebted to the staff and families at local agencies and community-base organizations who participated in this study. We thank Mark Spellmann, Joanne Joseph, Bonnie Hannibal, and Ruth Picker for invaluable contributions.

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## APPENDIX

### Caregiver–Child Affect, Responsiveness, and Engagement Scale: Definitions

#### I. Caregiver Terms

1. **Positive Verbal Statements:** Expressions of approval, praise, and loving encouragement, such as "good boy," "you can do it!"
2. **Negative Verbal Statements:** Expressions of disapproval, criticism, and name-calling, such as "no," "stupid," "you don't like me."
3. **Participation with Child:** Amount of involvement with the child, *not* the quality of participation, such as actively observing or commenting on the child's play.
4. **Responsiveness to Non-Verbal Non-Distress:** Contingent and appropriate responsiveness to the child's *non-verbal* non-distress cues (e.g., gestures, gazes, and facial expressions).
5. **Responsiveness to Verbal Non-Distress:** Contingent and appropriate responsiveness to the child's *verbal* non-distress cues (e.g., vocalizations).
6. **Emotional Attunement:** Expresses and emulates the child's expressions of emotions (e.g., delight, empathy, and frustration) using voice quality, gestures, and facial expressions.

7. **Flexibility:** Willingness to bend the rules during play, such as accepting the child's disinterest in a particular activity or correcting the child's play initiation.
8. **Intrusiveness:** Interrupt, restrict, or hover over the child's exploration and play.
9. **Structuring:** Organize the environment and materials to maximize play and learning opportunities for the child, such as verbal instruction or limit setting.
10. **Achievement Orientation:** Encourage the child's cognitive achievement and knowledge through directive teaching, such as instructing the child to recite colors or to read.
11. **Symbolic Play:** Use symbolic play when engaging the child with toy materials, such as pretending to drink from a cup, feeding a doll or eating pizza.
12. **Creative Play:** Find different and unique ways of using toys or elaborate verbal scenarios to interest the child and enrich the play interaction, such as singing.
13. **Amount of Language:** Amount of verbal stimulation provided toward the child, irrespective of language content and style.
14. **Quality of Language:** Quality of verbal stimulation and richness of the language environment, such as explanatory verbal style, rather than imperative.

## II. Child Terms

1. **Positive Affect:** Expressions of positive attitude or emotional tone toward the caregiver or play activities, such as smiling, laughter, loving gazes, excitement, and pleasure.
2. **Negative Affect:** Expressions of negative attitude or emotional tone toward the caregiver or play activities, such as crying, sadness, pouting, frustration, anger, and overall discontent.
3. **Emotional Regulation:** Regulate all aspects of emotion, including sensitivity to or distractibility from the stimulation provided by the play material or the caregiver
4. **Participation with Caregiver:** Interest in interacting with the caregiver, such as initiating activity with the caregiver or carrying through a parentally initiated activity.
5. **Responsiveness to Caregiver:** Responds positively and appropriately to caregiver requests for interaction, such as 'tuning in' to the caregiver's requests for interaction.
6. **Emotional Attunement:** Expresses and emulates the caregiver's expressions of emotions (e.g., delight, empathy, frustration) using voice quality, gestures, and facial expressions.

7. Involvement with Toys: Participation, interest, and engagement with the toy materials.
8. Task Persistence: Focused, attentive, and persistent during exploration or when attempting to complete tasks.
9. Symbolic Play: Use symbolic play when engaging with toy materials, such as pretending to drink from a cup, feeding a doll, or eating pizza.
10. Creative Play: Find different and unique ways of using toys or say elaborate verbal scenarios that enrich the play interaction, such as using a fork to comb hair, or singing.
11. Amount of Communication: Amount of vocalizations or verbalizations provided by the child, irrespective of verbal content and style.
12. Quality of Communication: Frequency and clarity of vocalizations/verbalizations, such as communicating multiple single words spontaneously and using 2- and 3-word sentences.

