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FATHER-CHILD INTERACTIONS AT 24 AND 36 MONTHS AND DEVELOPMENTAL OUTCOMES AT PREKINDERGARTEN

by

Shareesa L. McMurdie

A thesis submitted in partial fulfillment
of the requirements for the degree

of

MASTER OF SCIENCE

in

Family, Consumer, and Human Development

Approved:

Lori A. Roggman Major Professor	Troy E. Beckert Committee Member
Lucy M. Delgadillo Committee Member	Mark R. McLellen Vice President for Research and Dean of the School of Graduate Studies

UTAH STATE UNIVERSITY
Logan, Utah

2012

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ABSTRACT

Father-Child Interactions at 24 and 36 Months and Developmental Outcomes at Prekindergarten

by

Shareesa L. McMurdie, Master of Science

Utah State University, 2012

Major Professor: Lori A. Roggman
Department: Family, Consumer, and Human Development

This study looked at father teaching interactions and singing in toddlerhood as predictors of child cognitive and language outcomes at prekindergarten in a low-income, ethnically diverse sample. Results found that, overall, father teaching interactions in toddlerhood predicted child cognitive and language outcomes at prekindergarten and father singing in toddlerhood predicted language outcomes. Fathers provided slightly more teaching interactions at child age 24 months than at 36 months, and sang more frequently at 36 months.

Within ethnic groups, father teaching interactions were statistically significant in predicting cognitive and language development outcomes for children of African American (approached significance for language outcomes) and European American fathers, but not for children of Latino American fathers. Father singing in toddlerhood approached significance for language outcomes at prekindergarten for children of

European American and Latino American fathers, but not for children of African American fathers.

Overall, father behaviors were found to positively predict child outcomes, suggesting that fathers provide an independent additive contribution to children's developmental skills that reflect school readiness. Independently of what mothers do, fathers play a unique role in child development and provide positive parent-child interactions that support children's early development.

(73 pages)

PUBLIC ABSTRACT

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Overall, father behaviors were found to positively predict child outcomes, suggesting that fathers provide an independent additive contribution to children's early development and school readiness. Fathers play a unique role independently of mothers, by providing positive parent-child interactions that support children's early development.

ACKNOWLEDGMENTS

I would like to thank Lori Roggman, my major advisor, for putting so much time and effort into producing this document, especially at such a busy time in her own career. I could not have made it without her constant encouragement, positive attitude, and belief in my abilities. I would also like to thank my committee members, Troy Beckert and Lucy Delgadillo, who have been wonderful teachers and given me great insights into making this study the best it could be.

I would also like to thank my husband, Chace, and son, Baylor, for keeping me sane and happy even though this has been a challenging experience. I also need to express deep appreciation for my family and in-laws for investing so much time into caring for Baylor when I could not. Above all, I must express gratitude for a caring Heavenly Father who has guided me every step of the way. I have truly been blessed with so many resources, and express deep gratitude for all of them.

Shareesa L. McMurdie

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CHAPTER I

INTRODUCTION

Statement of the Problem

A generation ago, Michael Lamb (1975) referred to fathers as the "forgotten contributors to development," and now research is supporting that statement in finding that fathers are physical, social, and emotional providers who directly and indirectly affect child development (Lamb & Tamis-LeMonda, 2004). Despite an increase in father research in recent decades, current researchers generally agree that an all-encompassing fatherhood theory is yet to be explored due to the diversity in fathering practices (Pleck, 2007). Without a strong theory base, father-child research benefits from an exploratory approach in order to find associations between father actions and child developmental outcomes.

Fathering behaviors with young children have not been widely studied, and parenting researchers tend to focus on mothers as the primary caregivers, especially for infants, and downplay or ignore the influence that fathers' parenting interactions can have on their very young children (Cook, Roggman, & Boyce, 2011). Research that does involve fathers in early child interactions has found that specific father behaviors influence child development in the early years (Shannon, Tamis-LeMonda, London, & Cabrera, 2002; Tamis-LeMonda, Shannon, Cabrera, & Lamb, 2004).

Fathers play an important role in child cognitive and language development, which are central in the early years of life to set the groundwork for later academic

achievement (Bronte-Tinkew, Carrano, Horowitz, & Kinukawa, 2008; Cabrera, Shannon, & Tamis-LeMonda, 2007b; Martin, Ryan, & Brooks-Gunn, 2007; Roggman, Boyce, Cook, Christiansen, & Jones, 2004). Mothers generally spend more time with their children than fathers (Bronte-Tinkew et al., 2008), so naturally, studies have focused on the influence of maternal warmth, responsiveness and stimulation on child cognitive outcomes (Martin et al., 2007). However, mothers and fathers provide both similar and unique ways to affect development beginning in early childhood.

Although fathers spend less time with their children than mothers do, research has found that father behaviors are linked to short-term child cognitive outcomes (Lugo-Gil & Tamis-LeMonda, 2008; Tamis-LeMonda et al., 2004). Long-term cognitive outcomes, however, have yet to be extensively researched and linked to father behaviors, particularly in low income, ethnically diverse populations (Bronte-Tinkew et al., 2008; Sarkadi, Kristiansson, Oberklaid, & Bremberg, 2008; Tamis-LeMonda et al., 2004). Most research targeting child cognitive and language outcomes has used middle-class, European American populations, minimizing variability and generalizability (Cabrera et al., 2004).

Low income populations may particularly benefit from research addressing child cognitive and language development since low income children tend to fall below population norms on cognitive development scales, suggesting delay (Lugo-Gil & Tamis-LeMonda, 2008). Low income families tend to have decreased accessibility to economic resources and education, which research links to child developmental outcomes (Cabrera et al., 2007b; Lugo-Gil & Tamis-LeMonda, 2008).

Father Involvement and Interactions

Lamb, Pleck, Charnov, and Levine (1987) defined the basic categories of father involvement which they termed engagement, accessibility, and responsibility. Engagement is the most direct way to interact with a child and includes cognitively stimulating teaching interactions. Accessibility is the presence and availability of a father and responsibility is the extent to which a father provides financial support as well as caregiving. Factors that may affect father involvement include the father's level of education, residency status, ethnicity, relationship to the child's mother, and the child's gender (Boller et al., 2006; Cabrera et al., 2004; Cabrera, Fitzgerald, Bradley, & Roggman, 2007a; Cook et al., 2011; Shannon, Tamis-LeMonda, & Cabrera, 2006).

Father-child interactions influence child cognitive and language outcomes by providing cognitively stimulating teaching exchanges. Fathers can provide teaching interactions in various ways for their young children by engaging in quality father-child play (Grossman et al., 2002; Palm & Fagan, 2008; Roggman et al., 2004; Shannon et al., 2002) reading books (Duursma, Pan, & Raikes, 2008; Palm & Fagan, 2008; Saracho, 2007), singing songs or nursery rhymes (Mathematica Policy Research [MPR], 2000, 2002) and using complex language (Roggman, Cook, Innocenti, Jump Norman, & Christiansen, 2009).

Singing may be an important contributor to cognitive and language development for children because listening to music can improve cognitive task performance by acting as an independent cognitive stimulant (Rauscher, Shaw, & Ky, 1995; Schellenberg, 2005). Cognitive effects from music listening are rarely researched for young children,

but studies have found that infants respond to music and are more highly engaged in interactions when singing is involved (O'Neill, Trainor, & Trehub, 2001). Fathers tend to sing to their children during caregiving activities and playful interactions (Trehub, Hill, & Kamenetsky, 1997).

Most parenting research focuses on mother-child interactions and discounts the father's influence on child development. Fathering behaviors in childhood have not been widely studied, particularly for low income, ethnically diverse populations, but literature shows that fathers affect their children in many ways and their contributions to development are important. Father-child interactions can directly and indirectly affect children's short-term cognitive and language development, which highlights the need for research of long-term developmental outcomes.

Study Purpose

This study will look at fathers' teaching behaviors during interactions with their very young children in relation to the children's later cognitive and language development outcomes. The primary purpose of this study is to examine fathers' teaching interactions and singing practices in the toddler years in relation to the children's cognitive and language development outcomes prior to the child's entrance to kindergarten. A secondary purpose of this study is to assess variation in these interactions and their predictive associations with child outcomes among three major ethnic groups: African Americans, European Americans, and Latino Americans. The following research questions were addressed.

1. Do father-child teaching interactions and singing practices in toddlerhood predict child cognitive and language development outcomes at prekindergarten?

2. Do fathers who report singing to their children also provide more teaching interactions at 24 and 36 months than fathers who report not singing to their children?

3. How do fathers' early teaching interactions and singing practices in toddlerhood vary among African American, European American, and Latino American fathers?

4. How do the associations between fathers' early teaching interactions and singing practices in toddlerhood and child cognitive and language development at prekindergarten vary among African American, European American, and Latino American families?

CHAPTER II

LITERATURE REVIEW

Introduction

Research on parenting has, until recent decades, focused on mothers as the primary caregiver and ignored or diminished the role fathers play within the family (Cook et al., 2011). Research focusing on father roles and involvement with their children has evolved much since Lamb (1975) referred to fathers as the "forgotten contributors to development" and spurred research on how father involvement affects children's development.

Urie Bronfenbrenner's evolving bioecological theory of human development may provide a theoretical insight into parenting and father involvement. The theory looks at the ecological surroundings that influence human development through the process of interaction between the human and its immediate and remote environments (Bronfenbrenner & Morris, 2005).

Nested systems affect an individual's development within the bioecological model and consist of the microsystem, mesosystem, exosystem, and macrosystem. The microsystem is comprised of the people who regularly and directly participate in the life of the person over an extended time period, including fathers along with mothers. The mesosystem is the interaction between two or more microsystems and includes interactions among family members, coworkers, and peer groups, all of which potentially influence an individual's development, knowledge, and beliefs. The exosystem consists

of the neighborhood environment and mass media, and may offer multiple influences on individual fathers and their interactions with their children. Finally, the macrosystem is informal, implicit, and includes culture and the changing economic, educational, social, and political systems. This system level determines cultural roles, activities, and social networks within ethnic groups and influences culturally acceptable parenting practices (Bronfenbrenner & Morris, 2005). Bronfenbrenner's bioecological theory sheds light on not only individual parenting differences, but cultural and ethnic values that determine variance in parental, and more specifically, father involvement and behavior.

The quantity of father involvement is diverse among ethnic groups, partially due to differing familial and parenting values (Hofferth, 2003; Hossain & Roopnarine, 1994). These differences may be explained by the cultural macrosystems that directly and indirectly influence an individual father's involvement with his children. Unfortunately, much of the available research on father involvement lacks ethnically diverse samples, making it difficult to understand cultural variance among fathers, and the systems that influence their parental involvement.

Father research has mainly used small, White middle-class samples of fathers, thereby decreasing generalizability across socioeconomic status and ethnicity (Bronte-Tinkew et al., 2008). High immigration rates have changed the ethnic composition of the population in the United States, creating cultural diversity that challenges assumptions about fathers and their roles because parenting values vary cross culturally (Cabrera, Tamis-LeMonda, Bradley, Hofferth, & Lamb, 2000). Father research on low-income populations has also been lacking, which is unfortunate because lower levels of economic

resources and education have been strongly associated with poorer cognitive and language skills that typically leads to poor academic achievement for young children (Cabrera et al., 2007b; Duncan & Brooks-Gunn, 2000; Lugo-Gil & Tamis-LeMonda, 2008).

The following studies highlight the need for research on low-income populations. One study using data from the Early Head Start Research and Evaluation Project found, through structural equation modeling, that self-reported family income was correlated with child Bayley MDI scores at 14, 24, and 36 months (Lugo-Gil & Tamis-LeMonda, 2008). Another study using the same low income, ethnically diverse sample found that family income (collected from father interviews) was significantly related to child scores on the Peabody Picture Vocabulary Test and the Woodcock-Johnson letter-word recognition and applied problems tests at prekindergarten (Cabrera et al., 2007b). These studies suggest that young children living in low income households perform more poorly on cognitive and language development measures than children whose families experience higher incomes. Family income potentially influences the level of father involvement as well, leading to direct and indirect effects on children.

To understand more about how father involvement contributes to the early development of children at risk for poor academic achievement, the literature review will briefly consider factors that influence father involvement and father behaviors that contribute to child development outcomes related to school readiness.

Mothers and Fathers

Mothers are well known for providing the majority of caregiving (Martin et al., 2007) but it is important to note that mothers and fathers play both distinct and overlapping roles in their children's lives, making it important to include mothers in fathering research. Mothers are generally considered the primary provider for child care and stimulation (Martin et al., 2007) and fathers are more known for their playful interactions (Roggman et al., 2004) and for providing financial help (Lamb & Tamis-LeMonda, 2004), although many parents share these generalized responsibilities. Through continued research on both mothers and fathers, additional parental roles have been unearthed.

Mothers provide new learning experiences by taking their children out in the community to libraries, grocery stores, parks, and playgroups (Tamis-LeMonda, 2004). Fathers likewise provide stimulation to their children by engaging in pretend play and prompting complex language such as describing colors, shapes, and properties in the surrounding environment (Roggman, 2004; Tamis-LeMonda, 2004). A longitudinal study consisting of 33 low-income Early Head Start families found that fathers reported participating in teaching interactions such as reading, telling stories, and singing songs with their children on a daily basis, and, compared with mothers, posed more complex questions and used a more diverse vocabulary. Results indicated that fathers and mothers who reported reading to their children also reported singing songs and nursery rhymes with them (Rowe, Coker, & Pan, 2004). Fathers are more likely than mothers to encourage their children to take risks and be independent (Cabrera et al., 2004), and they

see themselves as a support, mentor, and teacher who guides and shapes values in the home by example (Summers, Boller, Schiffman, & Raikes, 2006).

In order to obtain the most accurate view of parenting, mothers and fathers need to be studied together within the same families (Cabrera et al., 2000; Tamis-LeMonda, 2004), because mother and father parenting may influence one another (Doherty, Kouneski, & Erickson, 1996; Pleck, 2007). For example, one observational study found that the mother's supportiveness and intrusiveness in parenting was positively related to the father's supportiveness and intrusiveness at child ages 2 and 3 years (Cabrera et al., 2007b). This study suggests that mothers and fathers influence one another when parenting within their families. Mothers may also affect the quantity and quality of their child's involvement with their father.

Father Involvement

Father involvement with young children has been linked to positive child outcomes (Cabrera et al., 2004; Pleck, 2007). Lamb and colleagues (1987) defined father involvement in three parts: accessibility (father presence and availability), engagement (direct contact, caregiving, and shared interactions), and responsibility (monitoring activities, making appointments, and caring for sick child). Positive paternal involvement is typically measured from the quantity and/or quality of the engagement aspect of father involvement. Although father involvement has been categorized into overarching themes, Lamb's definition did not explain factors that influence father involvement with their children.

Cabrera and colleagues (2007b) created a dynamic model mapping factors that influence father involvement. Father characteristics such as biological history, culture, and how he was raised by his parents influence a father's involvement with his children. Those father characteristics may also influence the family context, such as economic status and the mother-father relationship. Father involvement is also influenced by child characteristics (i.e., age and gender) and family characteristics (father residency and biological relatedness to the child). This model examines contextual factors that influence father involvement and shows pathways that may directly and indirectly promote child developmental outcomes. This model works well with Bronfenbrenner's bioecological theory in that outside factors affect individual development and decisions. According to the model proposed by Cabrera and colleagues, father involvement is influenced by the microsystem of family characteristics as well as the macrosystem of culture (Bronfenbrenner & Morris, 2005), and father involvement affects child developmental outcomes.

Besides being directly engaged with their children, fathers also have indirect influences on their children's behavior and development (Lamb & Tamis-LeMonda, 2004; Pleck, 2007). Indirect effects of father involvement are much more difficult to determine in research than direct effects, due to multiple pathways. Financial (food, shelter, education, and goods and services) and social capital (parenting behaviors and community support) can have both direct and indirect influences on children's cognitive development, social development, and school readiness (Lamb & Tamis-LeMonda, 2004; Pleck, 2007). Father absence may also directly and indirectly contribute to negative child

outcomes due to the lack of a coparent and economic loss that comes with single motherhood, which leads to poorer education and psychosocial performance, conflict between parents, and the child's perceived abandonment (Cabrera et al., 2000; Day & Lamb, 2004; Lamb et al., 2004; Marsiglio, Amato, Day, & Lamb, 2000).

Multiple factors affect the level of father involvement including psychological issues, social support, cultural influences, child characteristics, and public policies (Lamb & Tamis-LeMonda, 2004). Other factors include the father's relationship to the child's mother, level of education, biological relatedness to the child, and residency status. Child age also seems to affect father involvement. One longitudinal study found that adolescent mothers reported high father involvement with their children in infancy, but father involvement then significantly decreased once the children entered toddlerhood (Lewin, Mitchell, Burrell, Beers, & Duggan, 2011). Following the model set by Cabrera and colleagues (2007a), factors that affect father involvement will be discussed beginning with the parental relationship, followed by child gender, and ending with father demographics which include the father's educational attainment, residency status, and biological relatedness to the child.

Father-Mother Relationship

Mothers often act as the gatekeepers to father involvement, determining how and when the father interacts with the child, especially in cases where the father does not reside with the mother and child (Lugo-Gil & Tamis-LeMonda, 2008). Because of this maternal role, the quality of the father's relationship with the child's mother is important to father involvement, and may potentially influence children's development. Fathers

who were married to their partners were more responsive with their infants, leading to better communicative skills in their children (Shannon et al., 2006).

Since mothers generally determine how fathers are involved with their children, it is important for fathers to maintain a positive relationship with the child's mother. A study of 138 African American adolescent mothers demonstrated the importance of a positive parental relationship. The study found that the mother-father relationship was the strongest predictor of father involvement, and mothers who were romantically involved and had a positive relationship with their child's father were more likely to report high father involvement (Lewin et al., 2011). Much of father research relies upon maternal reports of father involvement, which may be an unreliable measure, especially if mothers perceive father involvement differently than fathers. This discrepancy of involvement perception may result in lower maternal reports of father involvement (Honig, 2008). Besides seeing paternal involvement differently, mother-father conflict can further result in unclear father involvement reports. For example, parental conflict results in larger discrepancies between mother and father reports of the father's involvement (Honig, 2008). Furthermore, fathers report less verbal stimulation and physical play with their infants when partner conflict is high (Cabrera, Hofferth, & Chae, 2011). High marital conflict has also been linked to low quality parent-child relationships, which in turn have negative outcomes on children (Cabrera et al., 2004).

In order to determine father involvement more clearly, observational measures may be more beneficial than relying solely on maternal or paternal reports. This study employed father reports and observational measures to determine father engagement,

rather than relying exclusively on maternal or paternal reports of father involvement. Father involvement is often determined by the parental relationship, but child characteristics, such as gender, have also been found in the literature to influence the quality of father involvement.

Child Gender

Child gender has yielded significant and nonsignificant associations with various aspects of father involvement. When a significant result is found for child gender, it is generally that father involvement is higher for male infants than female infants (Bronte-Tinkew, Carrano, & Guzman, 2006; Bronte-Tinkew et al., 2008; Duursma et al., 2008; Lamb, 1977; National Institute of Child Health & Human Development [NICHD] Early Child Care Research Network, 2000). A recent study comparing father involvement across ethnic groups found that fathers of boys engaged in more physical play than fathers of girls and African American fathers of sons reported higher engagement in caregiving, play, and visiting activities than European American and Latino American fathers of sons. The same study found that fathers of girls, however, engaged in literacy activities more frequently than fathers of boys (Leavell, Tamis-LeMonda, Ruble, Zosuls, & Cabrera, 2012).

Many studies have not found a statistically significant difference in father involvement between sons and daughters (Lugo-Gil & Tamis-LeMonda, 2008; Roggman et al., 2004; Shears, 2007; Tamis-LeMonda et al., 2004), perhaps due to outside factors that influence involvement with their children. A study of African American parents with their young children found no statistically significant difference in caregiving activities

based on the child's gender (Hossain & Roopnarine, 1994), and another study of low income Early Head Start fathers found that the child's gender did not determine how fathers conversed with their children (Rowe et al., 2004). Although child gender does not consistently influence father involvement, father demographics such as education and residency status play a key role in both the quantity and quality of a father's involvement with his child.

Father Level of Education

Father level of education has repeatedly been shown to influence father involvement with results indicating that fathers with more education are more involved with their children. Resident fathers sampled from the Early Childhood Longitudinal Study-Birth Cohort reported significantly lower involvement in teaching interactions by fathers who had a high school diploma, compared with fathers who had higher levels of education (Bronte-Tinkew et al., 2006). Among fathers from ethnic minorities, fathers who had a college education were involved in literacy activities with their children more frequently than fathers with only a high school education (Cabrera et al., 2011). These results are consistent with other studies showing that fathers without a high school diploma engaged in literacy activities with their children less frequently than fathers that had graduated from high school (Duursma et al., 2008; Leavell et al., 2012).

Involvement in literacy activities and other teaching interactions have been linked to child cognitive and language development, which suggests that a father's educational attainment may influence child developmental outcomes indirectly when more educated fathers do more activities with their children that involve talking, reading, and teaching.

Research has demonstrated that low levels of father education are related to poor cognitive outcomes in children, perhaps due to less father involvement. In the Early Childhood Longitudinal Study-Birth Cohort, infants of fathers with lower levels of education (less than a high school diploma) had significantly higher odds of a negative cognitive outcome (Bronte-Tinkew et al., 2008).

Conversely, young children in an ethnically diverse sample whose fathers had more than a high school education had better language outcomes at age 3 and better cognitive and language development outcomes at prekindergarten (Cabrera et al., 2007b). Father level of education has been established as important to the quantity and quality of father involvement, leading to positive child development outcomes. Father biological residency status will now be explored as a factor influencing father involvement.

Father Biological Relatedness and Residency Status

From 1980-2000, the quantity of father involvement increased for the average two-parent family, from spending 30-45% as much time as mothers to spending 67% as much on weekdays and 87% as much on weekends; while at the same time, father nonresidence became more prevalent, creating new barriers for fathers to be involved with their children (Cabrera et al., 2000). Most fathering research has focused on biological resident fathers because of the likelihood that these fathers will continue to be available and involved with their children (Cabrera et al., 2004), although residency status does not always determine interaction time (Rowe et al., 2004). Studies have found that biological resident fathers are more likely to have higher educational attainment than

other father types, which affects their level of involvement (Cabrera et al., 2004, 2007a; Tamis-LeMonda et al., 2004). Perhaps due to the level of involvement, children who live in a household with a biological resident father tend to score higher on cognitive and language development measures than children with a different father type (Boller et al., 2006; Cook et al., 2011; Tamis-LeMonda et al., 2004). The difference is probably because married biological parents, the most common marital status in which a biological father resides in the same household with his child, tend to be more educated, older, and have better socioeconomic status than cohabiting, never married, and divorced families (Gibson-Davis & Gassman-Pines, 2010), and thus more likely to be involved in activities that support children's cognitive and language development.

It is important to note that fathers influence child development, directly and indirectly, regardless of their biological relatedness or residency status. Cohabiting fathers reported significantly higher levels of involvement in nurturing, caregiving, and cognitive stimulation than resident married fathers, and married and cohabiting fathers engaged in more physical play and socialization than other father types (Cabrera et al., 2004). Nonresident fathers must work through the child's mother to obtain interaction time, sometimes making it difficult to be involved (Lugo-Gil & Tamis-LeMonda, 2008). Because of this, mothers' boyfriends often have more potential to be involved in the child's life than fathers who have no relationship with the mother (Cabrera et al., 2004). Nonresident and nonbiological fathers may influence child development, in more indirect ways than resident fathers, such as by providing financial or social support (Cabrera, Mitchell, Ryan, Shannon, & Tamis-LeMonda, 2008; Cabrera et al., 2004).

Rates of father residency and biological relatedness vary among ethnic groups. Latino American families have the highest rates of cohabitation with over 20% of children living with an unmarried biological mother and father at age 2, but Latino American mothers who were cohabiting scored lower than married mothers on cognitive stimulation and showed more negative and intrusive behaviors with their children (Gibson-Davis & Gassman-Pines, 2010). These high rates of cohabitation imply that many Latino American males may or may not be biologically related to the child they reside with, which may determine rates of father involvement within this ethnic group.

Among African American families, only one third consist of a married mother and father (Gibson-Davis & Gassman-Pines, 2010), and African American children are twice as likely as European American children to live with a nonbiological father (Hofferth, 2003). Because marital rates are low among African Americans, father figures may be important for these children (Black, Dubowitz, & Starr, 1999), but biological resident fathers, although they are a small percentage, report being highly engaged with their infants, challenging the prevalent perception of noninvolvement (Cabrera et al., 2011). Among nonresident fathers, European American fathers are less involved with their children than African American and Latino American nonresident fathers, perhaps because European American fathers are less likely to maintain a romantic relationship with the child's mother following separation (Cabrera et al., 2008).

This research indicates that many factors influence the level of father involvement, and each family has its own set of influences from child characteristics, educational attainment, parental relationship status, and cultural background. Father

involvement directly and indirectly affects child outcomes and behaviors due to variations in fathers' accessibility, engagement, and responsibility. Child development outcomes are further influenced by quality teaching behaviors during father-child interactions.

Father Teaching Interactions

Cognitively stimulating activities include teaching behaviors that stimulate cognitive and language development. Fathers provide cognitively stimulating teaching interactions with their children in various ways, by engaging in pretend play, encouraging play with toys, asking questions, labeling objects, describing the characteristics of objects and the surrounding environment, going out in the community, reading, and singing songs and nursery rhymes (MPR, 2000, 2002; Palm & Fagan, 2008; Roggman, 2004; Roggman et al., 2009). Perhaps because these teaching activities in early childhood have been linked to later cognitive and language outcomes for children, father teaching interactions in a low income sample reduced the likelihood of cognitive delay in early childhood (Bronte-Tinkew et al., 2008). Although singing songs to children is consistently included as a teaching behavior, it has not been extensively researched as an individual contributor to child developmental outcomes. The following reviews available research on parental singing.

The effect of parental singing on children is rarely studied, and even less with fathers. Singing seems to be an intuitive parenting behavior when children are in infancy, perhaps because infants seem to have an inborn capacity for musical cognitive processes

at birth that may encourage parents to expose their children to music (Hefer, Weintraub, & Cohen, 2009). Rates of parent singing typically drop as children enter toddlerhood (Custodero, Britto, & Brooks-Gunn, 2003), perhaps due to the lack of time, lack of parental knowledge about music, or a reliance upon CDs and DVDs (de Vries, 2009). Mothers tend to sing simpler, more child-oriented songs while fathers are more likely to alter popular songs or make up their own (Trehub et al., 1997). Fathers and mothers sing to their children most often during play and caregiving activities (Trehub et al., 1997), and parents with more than a high school education are more likely to sing to their children than parents with less education (Custodero et al., 2003). Among young parents, fathers sing more playfully for their infant sons but more soothingly for their infant daughters (Trehub et al., 1997).

Singing may be important to cognitive and language development because listening to music may improve cognitive task performance by acting as an independent cognitive stimulant (Rauscher et al., 1995; Schellenberg, 2005). One observational study found that infants were highly engaged while fathers were singing (O'Neill et al., 2001), which could improve the potential for cognitive development. The cognitive effects of music listening are rarely studied for young children, but studies have found that infants respond best when singing is infant directed, which means singing in a slower, higher, exaggerated pitch and repeating syllables, often labeled "motherese" (Trainor, 1996; Trehub, 2003; Trehub & Trainor, 1998). A study conducted with Mandarin-speaking mothers and their infants found that, when compared to speaking to adults, mothers modify their speech when conversing with their infants. This modification was correlated

with the infants' performance on a speech perception test (Liu, Kuhl, & Tsao, 2003). Although this study does not specifically refer to motherese in singing, it suggests that speech modifications encourage language development in infancy, and supports previous studies suggesting that infants respond best with modified infant-directed singing.

In spite of these studies suggesting that parent singing is frequent and potentially stimulating, the direct effects of singing on cognitive and language outcomes are rarely studied. Nevertheless, singing is routinely included as a cognitively stimulating parenting activity (Bronte-Tinkew et al., 2006; Rodriguez et al., 2009). Fathers' singing and general teaching interactions are therefore expected to be associated with children's cognitive and language development.

Conclusion

Research on parenting has mainly focused on mothers, although fathers play an important role in the lives of their children. Research on fathering has evolved in recent decades although there is still much to do. Available research indicates that father involvement has direct and indirect effects on child development and that father teaching interactions in the early years predicts later child cognitive and language development outcomes. Fathers provide teaching interactions for their children in many ways, including using complex language, providing quality play, and encouraging exploration. Singing songs to children is routinely included as a cognitively stimulating teaching activity, but has not been studied as a specific predictor of cognitive or language development, which is one of the purposes of this study.

Another purpose of this study is to examine father behaviors in multiple ethnic groups. Cultural practices and values shape parenting, but most research on fathers is conducted on small, White, middle socioeconomic status samples, which limits generalizability to more diverse populations. Much of the research cited in this document was conducted on White, middle class families rather than families of other ethnicities and economic levels. This unfortunate lack of ethnically diverse study samples highlights the need for this study to explore variations in father involvement among ethnic groups. The composition of the United States is rapidly changing with the high rates of immigration, increasing numbers of families living in poverty, and relatively high birthrates among ethnic minority and poor families (Cabrera et al., 2000; U. S. Census Bureau, 2012). To understand what "fatherhood" really means, this study will examine variability in fathers' parenting behaviors in relation to children's development across multiple ethnic groups in a low income sample.

Hypotheses

Based on the reviewed literature, I expect to find the following answers to the research questions.

1. Do father-child teaching interactions and singing practices in toddlerhood predict child cognitive and language development outcomes at prekindergarten? It is expected that observed father-child teaching interactions in toddlerhood will predict higher child cognitive and language vocabulary scores at prekindergarten.

2. Do fathers who report singing to their children also provide more teaching

interactions at 24 and 36 months than fathers who report not singing to their children? It is expected that if father singing is related to father teaching interactions, then children of fathers who report singing will score higher on cognitive and language development tests than children whose fathers report not singing, suggesting that fathers who sing provide additional teaching interactions.

3. How do fathers' early teaching interactions and singing practices in toddlerhood vary among African American, European American, and Latino American fathers? It is expected that teaching interactions and singing will vary among ethnic groups. No hypothesis is suggested by the research literature for specific differences in teaching interactions and singing among ethnic groups.

4. How do the associations between fathers' early teaching interactions and singing practices in toddlerhood and child cognitive and language development at prekindergarten vary among African American, European American, and Latino American families? No hypothesis is suggested by the literature for the differences between ethnicities in associations for fathers' teaching interactions and singing with child outcomes.

CHAPTER III

METHODS

The purpose of this study was to explore father-child teaching interactions with toddlers in relation to child cognitive and language development outcomes at prekindergarten. Also, this study examined father singing, a possible component of teaching, in relation to both teaching interactions and child outcomes. Finally, this study explored variations in the results across three major ethnic groups: African American, European American, and Latino American.

A longitudinal correlational design was appropriate for this study, as the overarching goal was prediction from the independent variables (father-child teaching interactions and father singing) measured at an earlier age point to the dependent variable (child cognitive and language development) measured at a later age point. Secondary data from the Early Head Start Research and Evaluation Project were used. Children qualify for Early Head Start (EHS) if the family is below the federal poverty guidelines, which defines poverty for a family of three as an annual income of less than $18,530. Children may also qualify for EHS if the child has a developmental disability.

Participants

Early Head Start Research and Evaluation Project participants were recruited from 17 Early Head Start (EHS) program sites in the United States as families applied at their local EHS sites. Nine of the EHS sites participated in the video portion of the father study at 24 and 36 months, and prekindergarten. Fathers of the child were contacted, with

permission from the mother during a previous interview, and asked to participate. Approximately 550 fathers agreed to participate in interviews and video observations. Participating families were identified as African American, European American, or Latino American based on the father's self-reported ethnicity in the initial interview (Administration for Children and Families [ACF], 2002; Boller et al., 2006). A small number of fathers (4%) were of other ethnicities (e.g., Asian American, Native American, mixed ethnicity), but were not included in this study because the groups were too small to include in analyses.

Participants were randomly assigned to participate in EHS or a control group. The control group was not allowed access to EHS services but could access other community resources. Both the EHS group and the control group were interviewed and assessed at all three time points. Each parent received an incentive of approximately $50 for each interview and assessment set to reduce attrition (ACF, 2002; Boller et al., 2006). A control group was not necessary for this correlational study, so data from both groups were used.

Demographic information for the sample is reported in Table 1. Of the fathers who agreed to participate, 347 had interview and observational data at child age 24 and/or 36 months, and child developmental outcome data at prekindergarten. Fathers whose data were used to examine change between 24 and 36 months were required to be the same father at both time points. Participating fathers were classified as either a biological resident father (64.4%) or other father type (biological nonresident (17.6%), nonbiological resident (15.9%), or nonbiological nonresident (2%). Nonbiological

Table 1

Demographics of the Sample

	All			African American			European American			Latino American		
Demographics	*n*	*M*	*SD*	*n*	*M*	*SD*	*n*	*M*	*SD*	*n*	*M*	*SD*
Child is male (%)	166	47.8		57	50.0		86	46.7		23	46.9	
Child is female (%)	181	52.2		57	50.0		98	53.3		26	53.1	
Same father at both times (%)	159	45.8		34	29.8		106	57.6		19	38.8	
Biological resident (%)	224	64.6		48	42.1		141	76.6		35	71.4	
Biological nonresident (%)	61	17.6		36	31.6		19	10.3		6	12.2	
Nonbiological resident (%)	55	15.9		25	21.9		23	12.5		7	14.3	
Nonbiological nonresident (%)	7	2.0		5	4.4		1	0.5		1	2.0	
Mother age	344	23.8	6.1	112	22.9	6.2	183	24.2	6.1	49	24.1	6.4
Mother highest grade	347	12.3	2.0	114	12.1	1.7	184	12.5	2.0	49	11.6	2.6
Father age	338	30.2	7.9	113	30.9	9.0	178	29.9	7.0	47	29.4	8.1
Father highest grade	343	12.5	2.4	114	12.0	1.7	181	12.9	2.4	48	1.5	3.5

resident fathers included step-fathers or the mother's cohabiting partner, and nonbiological resident father figures included uncles, grandfathers, close friends, and neighbors (ACF, 2002).

Because father residence and relatedness may influence both father-child interactions and child outcomes (Cabrera et al., 2004, 2008), biological residency status was included in the analyses.

Procedures

This study used extant data from the Early Head Start Research and Evaluation Project which was initiated in 1996. Data collectors were required to attend training sessions lasting 3-5 days, conducted by the national Early Head Start Evaluation Project team, prior to collecting the data for research. Potential data collectors became certified by reaching reliability standards for all the instruments they would be using. Continued reliability and procedural fidelity was monitored by sampling scale ratings, interviews, and videotaping sessions (ACF, 2002).

Demographic information and verbal informed consent was acquired in a baseline interview with the mother when the family was enrolled in the study. Fathers were later interviewed separately from the child's mother. Demographic information for each parent included age at child's birth, years of school completed, and ethnicity. Additional in-home and telephone interviews, cognitive development assessments, videotaped semistructured interaction ratings, and coded free-choice sessions collected at 24 months, 36 months, and prekindergarten were examined as the key data for addressing the research questions.

Informed consent for data collection was obtained at each data collection time point, and additional consent was provided for using the video recordings for research and training, thus providing Early Head Start researchers with access to both videotaped interactions and information from parent interviews and child assessments (ACF, 2002; Boller et al., 2006).

Father-child interactions were video recorded during a 10 minute semi-structured

"3-bag" observation when the child was 24 and 36 months old. All video recordings were performed in the child's home. For the 10 minute semi-structured observations, videocameras were set up in an area large enough for play and away from windows. Fathers were given three bags labeled 1, 2, and 3. Each bag had different objects and fathers were asked to play with their child, using the objects from each bag in order within the 10-minute limit, using the time as they liked. At 24 months, the first bag had The Very Busy Spider book, the second, a pizza, utensils, two plates and a phone, and the third, a set of farm animals and a barn. At 36 months, the first bag held The Very Busy Spider book, the second, a doctor kit and animal toy, and the third, Duplo blocks.

Measures

Both direct observation and self-report instruments were used to measure father behaviors. Child development outcomes were measured using standardized assessments of cognitive and language development.

Father-Child Teaching Interactions

Father-child teaching interactions were assessed from videotaped interactions conducted in the home and coded by trained undergraduates at Utah State University using items from the Dads' Parenting Interactions with Children-Checklist of Observations Linked to Outcomes (PICCOLO-D) instrument (Roggman, Anderson, & Cook, 2012). PICCOLO-D specifically measures father interactions and is based on the Parenting Interactions with Children-Checklist of Observations Linked to Outcomes (PICCOLO) instrument (Roggman et al., 2009).

PICCOLO-D measures affection, responsiveness, encouragement, and teaching behaviors in a 5- to 10-minute father-child observation. Each domain consists of five to six items and is coded on a 3-point scale, rating how much of the behavior was observed, with a score of 0 meaning none, 1 meaning some, and 2 meaning lots (Roggman et al., 2012). Teaching items include suggesting activities to extend what child is already doing, repeating or expanding the child's words or sounds, labeling objects or actions for the child, engaging in pretend play with the child, talking to the child about the characteristics of objects and asking the child for information (Roggman et al., 2012).

Father teaching interactions were assessed from the PICCOLO-D teaching domain in addition to three items that include encouraging the child to handle objects and verbally encouraging the child's efforts from the encouragement domain, and replying to the child's words or sounds from the responsiveness domain. These nine items demonstrate an internal consistency of alpha greater than .70. Scores on the 9 items are added together then divided by nine to obtain an average teaching score that is comparable to the original 3-point PICCOLO rating. Mothers' scores on the teaching domain of PICCOLO are correlated with children's cognitive and language outcomes, which is why PICCOLO-D was employed as a measure of father's teaching interactions in this study. Fathers who had observational data at either 24 or 36 months received one score and fathers who had data at both time points received a single score that was averaged between the two time points to reflect the father's general teaching behaviors over the toddler period and to increase the sample, thereby maximizing power.

Training for PICCOLO-D observation and coding is generally less than 10 hours.

Inter-rater reliability between observers for this sample was high (.96), with absolute agreement greater than 70% for each item across all three major ethnic groups (African American, European American, and Latino American). The percent agreement for all three-bag PICCOLO-D scores for the teaching items was .93. Internal consistency for all domains is alpha greater than .70 in all ethnic groups (Roggman et al., 2009). Practitioners rated PICCOLO items as important, providing content validity. Construct validity is supported by correlations between PICCOLO domain scores and independent established observational measures; predictive validity is supported by correlations between domain scores and child cognitive development, language and literacy development, and behavior outcomes at ages 3 and 5 (Roggman et al., 2009). The same content and construct validity is assumed for PICCOLO-D.

Father Singing

The frequency of fathers' self-reported singing to their children was assessed from the father interviews at child ages 24 and 36 months. Interviewers asked fathers how often they sing songs and nursery rhymes to their children based on a six-point Likert scale. Answer options were more than once a day (06), about once a day (05), a few times a week (04), a few times a month (03), rarely (02), or never (01). In this study, father singing was employed as a continuous variable for most of the analyses, as an interval/ratio level measure.

To answer the second research question in full, however, father singing was collapsed into a dichotomous variable where fathers who reported singing to their children a few times a month or more were considered singers and fathers who reported

singing rarely or never were not considered singers. The variable was split at "a few times a month or more" to assess if any amount of father singing influenced child cognitive and language development. This dichotomous variable is an ordinal measurement. Fathers' reports of singing to their children were linked to their PICCOLO-D teaching scores to explore an association between father singing and father teaching interactions.

Child Cognitive and Language Development

The Early Head Start Research and Evaluation Project conducted the Woodcock-Johnson Psycho-Educational Battery—Revised Applied Problems subtest (WJ-R; Woodcock & Johnson, 1989) to measure child cognitive development at prekindergarten. The Peabody Picture Vocabulary Test, Third Edition (PPVT-III; Dunn & Dunn, 1997) was used to measure child language development, also at prekindergarten. The WJ-R and the PPVT-III measure cognitive and language development, respectively, at the interval/ratio level.

The WJ-R is an individually administered test that measures cognitive achievement and demonstrates good internal consistency (.90) and construct validity (.60-.70). Test reliability for the applied problems subtest is .93. The applied problems subtest tested mathematics skills that include quantitative reasoning, math knowledge, and math achievement. Questions required the child to respond to quantity-related problems presented orally (Woodcock & Johnson, 1989).

The PPVT-III measures receptive language vocabulary. It includes 204 test items grouped into 17 sets of 12 items arranged with increasing difficulty. The examiner speaks

a word with a corresponding set of pictures and the test taker is asked to choose the picture that best represents the word's meaning. The PPVT-III tests the child until the basal and ceiling sets are found, so children are presented with only a small subtest of items. The test is appropriate for young children because it requires no reading or writing skills on the part of the test taker (Dunn & Dunn, 1997).

The Cronbach's alpha for internal consistency validity is high at .93 for ages 2 years 6 months, and 3 years. Test-retest reliability with a 1-month interval demonstrates a correlation coefficient of .91. Concurrent validity is available for children older than three years of age (Dunn & Dunn, 1997).

There were six children in the sample who were administered the Test de Vocabulario en Imagenes Peabody (TVIP; Dunn, Padilla, Lugo, & Dunn, 1986) in addition to the PPVT-III to measure language development outcomes. One child obtained a higher score on the PPVT-III than the TVIP so the higher score was employed in the language development analyses, but the TVIP score was used for the other 5 children. The TVIP measures language development for Spanish-speaking and bilingual preschool children and includes 125 translated items based on the Peabody Picture Vocabulary Test–Revised. Like the PPVT, the TVIP does not require reading or verbal skills. Basal and ceiling levels are found in the same way as the PPVT. Internal consistency reliability is .93. No information is available for test-retest reliability, inter-rater reliability, and predictive validity (Dunn et al., 1986).

Ethnicity

Father teaching interactions and singing and their associations with child

cognitive and language outcomes were compared across the three major ethnic groups (African American, European American, and Latino American) according to the father's ethnicity, which was reported by the father in the initial interview. Level of measurement was nominal.

This study used the information of father biological residency as a covariate. Additional demographic data of child gender and father level of education (highest grade completed) were examined in relation to the independent and dependent variables in the multiple linear regressions to increase predictive power. The level of measurement for biological residency and child gender were nominal and father level of education was interval/ratio.

Data Analysis

Descriptive analyses were used to define characteristics of the sample and research variables. Specific research questions accompany the corresponding hypotheses and guided the data analyses.

Research Question 1

Do father-child teaching interactions and singing practices in toddlerhood predict child cognitive and language development outcomes at prekindergarten? Linear multiple regression models were used to examine the association for the father teaching interactions and singing variables with child outcomes, covarying for child gender, father level of education, and biological residency. Based on research on mothers and fathers (Tamis-LeMonda et al., 2004) and the moderating effect that biological resident fathers

have on child cognitive and language outcomes (Cook et al., 2011), it was hypothesized that observed father-child teaching interactions in toddlerhood would predict higher child WJ-R applied problem subtest scores and PPVT-III vocabulary scores at prekindergarten. No hypothesis was offered regarding father singing, as there is little research literature on the developmental outcomes of fathers singing with their young children.

Research Question 2

Do fathers who report singing to their children also provide more teaching interactions at 24 and 36 months, than fathers who report not singing to their children? Frequency of father' reported singing was collapsed into a dichotomy of singers and non-singers (reported rarely or never singing to their children) and *t* tests compared the teaching score means of the two groups. The correlations between father singing and teaching interactions were also examined. It was expected that if father singing was related to teaching interactions, then children of fathers who reported singing would score higher on cognitive and language development tests than children whose fathers reported not singing, suggesting that fathers who sing present additional teaching behaviors in dyadic interactions.

Research Question 3

How do fathers' early teaching interactions and singing practices in toddlerhood vary among African American, European American, and Latino American fathers? Descriptive statistics and measures of variability described the variation among ethnic groups. Repeated-measures analysis of covariance (ANCOVA) with a between-group

factor representing ethnicity and covariates representing father biological residency, father level of education, and child gender tested whether there were ethnic differences in father teaching interactions. It was expected that father teaching interactions and singing would vary among ethnicity groups. No hypothesis was suggested by the research literature for specific ethnic differences in teaching interactions and singing practices.

Research Question 4

How do the associations between fathers' early teaching interactions and singing practices in toddlerhood and child cognitive development at prekindergarten vary among African American, European American, and Latino American families? Separate regression analyses explored the associations within each ethnic group. The pattern of results were compared to determine differences among ethnic groups. No hypothesis was suggested by available research for whether there would be differences among ethnic groups for the associations of fathers' teaching interactions and singing behaviors in toddlerhood with child outcomes at prekindergarten.

CHAPTER IV

RESULTS

Introduction

The primary purpose of this study was to examine fathers' teaching interactions and singing practices in toddlerhood in relation to child cognitive and language development outcomes at prekindergarten. The secondary purpose of this study was to assess variations in these interactions and their predictive associations with child outcomes among African American, European American, and Latino American families.

Information about father residency status, parent singing, and teaching interactions were obtained from independent parent interviews and observations at child ages 24 and 36 months. Teaching interactions were scored by at least two trained and reliable observers using relevant PICCOLO-D items (Roggman et al., 2012).

Each of the parenting variables, teaching interactions and singing, were averaged across the two age points to represent these aspects of parenting across toddler years and maximize the sample size to increase statistical power (McKelvey et al., 2011). Child outcomes were tested at prekindergarten in relation to the parenting variables using the Woodcock-Johnson Psycho-Educational Battery−Revised, applied problems subtest (Woodcock & Johnson, 1989) as a measure of child cognitive development, and the Peabody Picture Vocabulary Test, 3rd edition (Dunn & Dunn, 1997) as a measure of child language development.

Although research questions focus on father-child interactions, analyses

controlled for mother-child interactions to show the independent additive contribution of fathers' interactions with their young children. Unfortunately, teaching interaction scores were missing for 29 mothers who had missing or poor quality videorecordings that could not be coded. Rather than inserting the average teaching interaction score, missing cases were matched to other mothers in the sample, first by ethnicity, second by the Mathematica Policy Research parenting observation ratings available from the extant data set (Brady-Smith, Fauth, & Brooks-Gunn, 2005), third by level of education, and finally by age, as information was available. PICCOLO teaching interaction scores for the top five mothers who most closely matched the missing mother's demographics were averaged to give the mother the most accurate possible estimated teaching interaction score. Estimated teaching interaction scores were used in analyses for these 29 cases.

Correlations and multiple linear regressions were used to address the research questions. Table 2 shows the means and standard deviations for each of the key research variables used in the analyses to address the research questions.

Research Question 1

The first research question asked whether father-child teaching interactions and singing practices during toddlerhood predict child cognitive and language development outcomes at prekindergarten. Based on available research, it was hypothesized that observed father-child teaching interactions during toddlerhood would predict child cognitive and language outcome scores at prekindergarten. No hypotheses was offered regarding father singing, since there is very little research conducted on the outcomes of

Table 2

Means and Standard Deviations of Variables and Outcomes

	All			African American			European American			Latino American		
Variable	*N*	*M*	*SD*	*n*	*M*	*SD*	*n*	*M*	*SD*	*n*	*M*	*SD*
Woodcock-Johnson, applied problems	347	91.04	19.31	114	84.51	17.53	184	95.97	18.14	49	87.71	22.47
Peabody Picture Vocabulary Test-III	347	95.40	16.76	114	85.84	14.06	184	100.03	15.72	49	93.96	17.93
Father teaching interactions	347	1.46	0.30	114	1.39	0.33	184	1.50	0.26	49	1.50	0.31
at 24 months	247	1.49	0.29	71	1.41	0.29	138	1.52	0.29	38	1.52	0.30
at 36 months	235	1.44	0.32	79	1.36	0.37	128	1.49	0.27	28	1.47	0.36
Mother teaching interactions	347	1.36	0.27	114	1.32	0.26	184	1.39	0.28	49	1.33	0.27
at 24 months	293	1.37	0.33	97	1.30	0.31	158	1.42	0.34	38	1.37	0.36
at 36 months	287	1.36	0.29	99	1.33	0.26	153	1.38	0.31	35	1.32	0.30
Father sings	326	93.9%		107	93.9%		172	93.5%		47	95.9%	
Father doesn't sing	21	6.1%		7	6.1%		12	6.5%		2	4.1%	
Father sings songs and nursery rhymes	347	3.83	1.11	114	3.89	1.12	184	3.68	1.11	49	4.25	1.05
at 24 months	273	3.55	1.30	83	3.52	1.27	149	3.36	1.28	41	4.29	1.14
at 36 months	266	4.06	1.01	87	4.20	1.01	150	3.97	0.99	29	4.16	1.08
Mother sings songs and nursery rhymes	347	4.51	1.01	114	4.49	0.98	184	4.48	1.01	49	4.65	1.11
at 24 months	326	4.78	1.05	108	4.69	1.04	173	4.79	1.07	45	4.92	1.00
at 36 months	326	4.22	1.30	108	4.23	1.33	174	4.17	1.28	44	4.41	1.30

fathers singing with their young children.

Analyses controlled for mother teaching interactions and singing to assess fathers' independent additive contributions to child cognitive and language outcomes. Separate multiple regression models were tested to predict children's cognitive and language outcomes. Covariates of father relatedness and residency status, father education, and child gender were included in the first block. Dummy-coded ethnicities for African American and Latino American families were included in the second block. Mother variables of singing and teaching interactions were included as covariates in the third block, and father singing and father teaching interactions were tested as predictors in the last block of each model.

Cognitive Outcome

The regression model (Table 3) showed that father teaching interactions were statistically significant in predicting child cognitive outcomes at prekindergarten. Several covariates also made statistically significant contributions to the model: father level of education and mother teaching interactions predicted better cognitive test scores, but African American and Latino American ethnicity predicted poorer scores. Parental singing and father relatedness and residency did not predict cognitive outcomes.

Language Outcome

The regression model (Table 3) showed that father teaching interactions and father singing in toddlerhood were both statistically significant for predictors of children's prekindergarten language outcomes. Father level of education and mother

Table 3

Regression Model for Child Outcomes at Prekindergarten

	Woodcock-Johnson			PPVT-III		
Predictor	*B*	*SE*	*β*	*B*	*SE*	*β*
Biological resident father	2.78	2.14	.07	-0.79	1.68	-.02
Father level of education	0.91	0.41	.12*	1.41	0.32	.21***
Child is male	0.01	1.92	.00	2.90	1.51	.09†
African American	-7.01	2.28	-.17**	-11.32	1.79	-.32***
Latino American	-6.22	2.95	-.11*	-4.32	2.32	-.09†
Mother singing	0.81	0.96	.04	0.92	0.75	.06
Mother teaching interactions	14.87	3.65	.21***	14.34	2.87	.23***
Father singing	-0.40	0.89	-.02	1.67	0.70	.11*
Father teaching interactions	13.63	3.35	.21***	11.57	2.64	.20***

Note. Woodcock-Johnson, $R = .47$, $F = 10.18$***; PPVT-III, $R = .60$, $F = 20.54$***
† $p < .10$.
* $p \leq .05$.
** $p \leq .01$.
*** $p \leq .001$.

teaching interactions predicted better language test scores, and African American ethnicity predicted poorer outcomes at prekindergarten. Child gender and Latino American ethnicity approached significance as covariates, although the effects were small.

These results suggest that father teaching interactions and singing practices in toddlerhood predict child development outcomes at prekindergarten. Mothers' teaching interactions also predicted child outcomes, suggesting that both mothers and fathers make additive independent contributions to their children's early development. Although parental singing did not contribute to child cognitive development outcomes, father singing uniquely contributed to language development, even though mother singing was not a statistically significant predictor. Overall, the hypothesis was supported by the data.

Research Question 2

The second research question asked whether fathers who reported singing also provided more teaching interactions at 24 and 36 months than fathers who reported not singing. This research question examined the variation in teaching interactions between fathers who reported singing and fathers who reported not singing to their children. It was expected that fathers who reported singing to their children would have higher observed teaching interaction scores and that children of the fathers who reported singing would have higher scores on cognitive and language assessments at prekindergarten than children of fathers who reported not singing.

This question was partly addressed in the previously reported analyses, in which father singing was included as a continuous predictor in regression models that included a set of covariates, mother singing, and both mother and father teaching interactions. In those models, father singing made independent contributions to children's language outcomes, but not to their cognitive outcomes at prekindergarten.

Considered as a continuous variable (Table 4), father singing was statistically significantly correlated with father teaching interactions at 24 months, $r = .22$, $p < .001$, but not at 36 months, $r = .03$, *ns*. Father singing averaged across the two ages and father teaching interactions averaged across the two ages, the variable used for all other analyses, were also significantly correlated, $r = .13$, $p < .05$, presumably due to the correlation between the 24-month variables. Fathers who reported singing data at both time points ($n = 192$) showed statistically significantly increases in their singing frequency from 24 months, $M = 3.49$, $SD = 1.22$ to 36 months, $M = 4.01$, $SD = 0.99$,

Table 4

Correlations for Father Teaching Interactions and Singing Practices

Variables	1	2	3	4	5
1. Teaching interactions at 24 m					
2. Teaching interactions at 36 m	.43***				
3. Mean teaching interactions	.92***	.93***			
4. Singing at 24 m	.22***	.20**	.23***		
5. Singing at 36 m	-.01	.03	.01	.45***	
6. Mean singing	.19**	.06	.13*	.92***	.87***

* $p \leq .05$.
** $p \leq .01$.
*** $p \leq .001$.

$t(191) = -6.11$, $p < .001$. Fathers who had teaching interaction scores at both time points ($n = 135$), however, decreased their scores slightly from 24 months, $M = 1.49$, $SD = 0.29$, to 36 months, $M = 1.44$, $SD = 0.30$; a change in teaching interactions between ages 24 and 36 months that only approached statistical significance, $t(134) = 1.85$, $p = .07$. This may offer a further explanation of the lack of correlation between singing and teaching interactions at 36 months.

To examine the data more directly in relation to the research question and to be consistent with other analyses, father singing was collapsed into a dichotomous variable consisting of fathers who self-reported singing to their children a few times a month or more ($n = 326$) or rarely or never ($n = 21$), as averaged across the two age points. The variable was split at this point in order to determine if father singing, even if only a few times a month, contributes to observed father teaching interactions and child scores on developmental measures. Fathers who reported singing also provided more teaching interactions during observations, $M = 1.47$, $SD = 0.29$, than fathers who reported not

singing, $M = 1.36$, $SD = 0.33$, but these difference in teaching interactions between fathers who sang and fathers who did not sing only approached statistical significance, $t(345) = -1.69$, $p = .09$.

Perhaps because father singing was not consistently related to teaching interactions, cognitive outcomes did not differ between groups of children of fathers who reported singing versus not singing; language outcomes, however, did differ, $t = -2.33$, $p = .03$. Children whose fathers reported singing achieved higher language outcome means at prekindergarten ($M = 94.98$, $SD = 16.80$) than children whose fathers reported singing rarely or never ($M = 87.24$, $SD = 14.61$).

Research Question 3

The third research question asked how fathers' early teaching interactions and singing practices in toddlerhood vary among African American, European American, and Latino American fathers. Descriptive statistics show ethnic group differences in father teaching interactions and singing with their toddlers (refer to Table 2 for means and standard deviations for variables), and results of analysis of variance show that these differences are statistically significant $F(2, 346) = 5.72$, $p < .01$, with *partial* $\eta^2 = .03$, indicating a small effect of ethnicity on fathers' teaching interactions with their toddlers. Compared with African American fathers, teaching interaction scores were statistically significantly higher for European American fathers, contrast difference $p < .01$, and Latino American fathers, contrast difference $p < .05$.

Results for the father singing variable also showed statistically significant ethnic

group differences $F(2, 346) = 5.51$, $p < .01$, with *partial* $\eta^2 = .03$, again indicating a small effect of ethnicity on fathers' singing to their toddlers. Compared with African American fathers, contrast difference $p = .05$, and European American fathers, contrast difference $p \leq .001$, father singing was statistically significantly more frequent for Latino American fathers.

Research Question 4

The final research questions asked how the associations between fathers' early teaching interactions and singing practices in toddlerhood and child cognitive and language development at prekindergarten vary among African American, European American, and Latino American families. Multiple regression models were tested separately for each ethnic group. Similarly to the multiple regression models tested for the first research question, the model for this research question included covariates of father relatedness and residency status, father education, and child gender in the first block. The ethnicity variables were omitted for the second block and replaced with the mother variables of singing and teaching interactions as covariates. Father singing and father teaching interactions were tested as predictors in the last block of each model. At prekindergarten, the Woodcock-Johnson applied problems subtest was used to test child cognitive outcomes and the PPVT-III was used to test child language outcomes.

African American Families

The regression model for African American children (Table 5) showed father teaching interactions were statistically significant in predicting child cognitive outcomes,

Table 5

Prekindergarten Cognitive and Language Outcomes for African American Participants

	Woodcock-Johnson			PPVT-III		
Predictor	*B*	*SE*	*β*	*B*	*SE*	*β*
Biological resident father	2.51	3.33	.07	-0.65	2.59	-.02
Father level of education	-0.24	0.97	-.02	1.05	0.76	.13
Child is male	1.70	3.17	.05	1.47	2.47	.05
Mother singing	-0.56	1.72	-.03	0.60	1.34	.04
Mother teaching interactions	16.06	6.84	.24*	16.09	5.32	.30**
Father singing	-1.40	1.51	-.09	0.15	1.18	.01
Father teaching interactions	13.13	5.09	.25**	7.55	3.96	.18†

Note. Woodcock-Johnson, $R = .38$, $F = 2.53$**; PPVT-III, $R = .44$, $F = 3.65$***
† $p < .10$.
* $p \leq .05$.
** $p \leq .01$.
*** $p \leq .001$.

indicating an independent additive contribution to what mothers contribute in toddlerhood. Mother teaching interactions in toddlerhood were statistically significant as a covariate in predicting child cognitive outcomes at prekindergarten. Mother teaching interactions in toddlerhood were the only statistically significant covariate in predicting cognitive outcomes at prekindergarten among African American children.

At prekindergarten (Table 5), father teaching interactions in toddlerhood approached statistical significance in predicting language outcomes for African American children. Parental singing in toddlerhood did not statistically contribute to child cognitive or language outcomes at prekindergarten for African American children.

European American Families

The regression model for European American children (Table 6) showed that

father teaching interactions in toddlerhood positively predicted cognitive outcomes at prekindergarten. As covariates, mother teaching interactions were statistically significant in predicting cognitive outcomes at prekindergarten and father level of education approached significance in predicting cognitive outcomes in European American children. Parental singing did not statistically predict cognitive outcomes for European American children.

Father teaching interactions were statistically significant in predicting language outcomes for European American children at prekindergarten while father singing approached statistical significance (Table 6). As covariates, father level of education and mother teaching interactions were statistically significant in predicting language outcomes for European American children.

Table 6

Prekindergarten Cognitive and Language Outcomes for European American Participants

	Woodcock-Johnson			PPVT-III		
Predictor	*B*	*SE*	*β*	*B*	*SE*	*β*
Biological resident father	3.78	3.14	.09	0.98	2.51	.03
Father level of education	0.92	0.54	.12†	1.39	0.44	.21**
Child is male	-1.75	2.67	-.05	2.51	2.14	.08
Mother singing	1.50	1.32	.08	1.38	1.06	.09
Mother teaching interactions	12.66	4.72	.20**	13.15	3.77	.23***
Father singing	-0.02	1.21	-.00	1.89	0.97	.13†
Father teaching interactions	14.82	5.06	.21**	17.15	4.05	.28***

Note. Woodcock-Johnson, $R = .38$, $F = 4.10$***; PPVT-III, $R = .52$, $F = 9.18$***
† $p < .10$.
* $p \leq .05$.
** $p \leq .01$.
*** $p \leq .001$.

Latino American Families

For Latino American children (Table 7), only mother teaching interactions were statistically significant in predicting cognitive development outcomes at prekindergarten. Father singing and teaching interactions did not significantly predict cognitive outcomes in Latino American children. For language development outcomes, father singing approached statistical significance in predicting language outcomes for Latino American children, but father teaching interactions did not predict language outcomes for these children. Father level of education and mother teaching interactions were statistically significant in predicting language outcomes at prekindergarten for Latino American children, and child gender approached statistical significance with males obtaining higher scores than females. These results suggest that there is variation among ethnic groups in father contributions to child development outcomes at prekindergarten.

Table 7

Prekindergarten Cognitive and Language Outcomes for Latino American Participants

	Woodcock-Johnson			PPVT-III		
Predictor	*B*	*SE*	*β*	*B*	*SE*	*β*
Biological resident father	-0.41	7.37	-.01	-7.25	5.38	-.18
Father level of education	1.22	1.00	.19	1.60	0.73	.31*
Child is male	4.54	6.54	.10	8.14	4.77	.23†
Mother singing	1.79	2.82	.09	1.24	2.06	.08
Mother teaching interactions	27.56	12.29	.33*	19.63	8.97	.30*
Father singing	0.72	3.04	.03	4.18	2.22	.24†
Father teaching interactions	13.62	11.24	.19	11.05	8.21	.19

Note. Woodcock-Johnson, $R = .53$, $F = 2.23$*; PPVT-III, $R = .64$, $F = 3.85$**
† $p < .10$.
* $p \leq .05$.
** $p \leq .01$.
*** $p \leq .001$.

Father teaching interactions significantly predicted cognitive outcomes for African American and European American children and language outcomes for European American children, but predicted neither outcome for Latino American children. Mother teaching interactions, however, consistently predicted child cognitive and language outcomes across all three ethnic groups examined. Father singing approached significance as a predictor of language outcomes for European American and Latino American children, but mother singing did not predict child outcomes for any of these three ethnic groups.

Summary

Results show that fathers uniquely contribute to child cognitive and language outcomes over time. Teaching interactions by fathers in toddlerhood consistently predicted child development outcomes at prekindergarten, over and above contribution by mothers, indicating that fathers provided an additive independent contribution to their children's development. Father singing practices varied among ethnic groups with Latino American fathers singing the most often in the toddler years. Although father singing in the early years did not significantly predict child cognitive outcomes, the practice by fathers statistically significantly predicted language development outcomes at prekindergarten even when mother singing did not statistically contribute to the prediction of child language outcomes. When examined in separate ethnic groups, however, father singing only approached statistical significance as a predictor of child language outcomes, and only for European American and Latino American children.

CHAPTER V

DISCUSSION

Summary of the Research

This study aimed to determine positive father behaviors in toddlerhood that predicted child cognitive and language development at prekindergarten. Results indicated that fathers provide an independent additive contribution to child development outcomes, above and beyond what mother provide. Additionally, father level of education contributed to cognitive and language outcomes, similar to other studies that have found father education associated with better child outcomes (Cabrera et al., 2007b; Duursma et al., 2008).

Teaching Interactions

Fathers in this sample decreased their teaching interactions from age 2 to 3 years, perhaps because fathers do less labeling and use less complex language with their older children, assuming they no longer need it as much as when they were younger. Despite the decrease in teaching interactions, fathers contributed to their children's cognitive and language development outcomes, although it varied by ethnic group. European American and Latino American fathers in this sample provided more teaching interactions when playing with their children than African American fathers. This may be due to processes that occur with fathers of varying ethnicities who are exposed to different parenting expectations within their macrosystem environment.

African American fathers have been found to have a less positive attitude toward

parenting than European American fathers, resulting in fewer warm interactions with their children (Hofferth, 2003). Further, African American fathers spend less time reading to their children than European American and Latino American fathers (Hofferth, 2003), suggesting less emphasis on teaching and stimulation in children by African American fathers, consistent with the results of the current study. Again, this may be due to a varied macrosystem environment that provides cultural parenting expectations, which influence individual fathering practices. Nevertheless, father teaching interactions predicted child cognitive and language development outcomes, above mother teaching interactions for children of African American and European American fathers, but not for children of Latino American fathers. Mother teaching interactions were significant in predicting child cognitive and language outcomes at prekindergarten for all three ethnic groups.

Father teaching interactions predicted language outcomes only for children of European American fathers, but approached significance for children of African American fathers, indicating that father involvement is important for children's early language development in these ethnic groups. Father level of education, as a covariate, predicted language development for children of European American and Latino American fathers. This finding is consistent with available literature, suggesting that fathers with more education engage in literacy activities more frequently (Duursma et al., 2008; Leavell et al., 2012), which contributes to better child cognitive and language development (Palm & Fagan, 2008).

Singing

Although parental singing has not been widely researched, and even less research

has been conducted on the child outcomes of parental singing, this study found that father singing in toddlerhood predicted language development outcomes at prekindergarten even though mother singing did not predict outcomes. One qualitative case study that observed only a mother and father with their child found that the mother sang more than the father, but she tended to overlap the child's verbalizations. The father imitated the child more and there was more turn taking and respect in the father-child dyad (Adessi, 2009), which may promote more language development. Another observational study found that infants were more highly engaged when their fathers were singing (O'Neill et al., 2001) perhaps due to the novelty of dad singing, rather than mom.

Fathers who sang to their children also provided more teaching interactions during play. Fathers who reported singing to their children a few times a month or more during the toddler years provided more teaching interactions in toddlerhood than fathers who reported singing rarely or never, especially at younger ages. Interestingly, father singing increased from child age 2 to 3, but fathers' teaching interactions decreased during the same time periods. This may offer a further explanation of the lack of a correlation between father singing and teaching interactions at 36 months.

The finding that fathers reported singing more as the children got older is contrary to a previous study that found that parental singing shows a sharp decline after age 2. The study consisted of over 800 African American and Latino American parents who participated in telephone interview asking how often they engaged in various activities with their child, including reading, playing, singing, hugging, or cuddling. The results indicated that parents sing less to toddlers than to infants, which may be due to the

competing demands of families having more than one child by the time the firstborn enters toddlerhood (Custodero et al., 2003). Perhaps fathers in the current study sang more at child age 3 because they become more comfortable singing songs and nursery rhymes when the child is more verbal and can better participate. Another possibility is that fathers take more responsibility for the older child when the mother is caring for younger children in the home, although birth order was not examined in this study. The Latino American fathers in this study actually decreased slightly in their frequency of singing after age 2, which is consistent with the previously cited study (Custodero et al., 2003), especially when compared to the African American and European American fathers. Perhaps the smaller proportion of Latino American fathers in this study also contributed to the contrary findings.

Although Latino American fathers decreased slightly in their frequency of singing as the child aged, they reported the most overall singing with their children when compared to the other two ethnic groups. These differences likely reflect distinctions in father roles and values based on cultural norms and expectations. Another difference between the ethnic groups is that father singing in toddlerhood approached significance in predicting prekindergarten language outcomes for children of European American and Latino American fathers, but not for children of African American fathers. Perhaps children of African American fathers did not enjoy the benefit of positive language outcomes in regards to singing because mothers play such a large role in these families, or because the fathers were less likely to reside with the child.

Limitations

This study had a few limitations, including the use of extant data, father availability, the sample sizes within ethnic groups, and the split of the singing variable. The main limitation to this study was the use of extant data, which were collected over a decade ago, using research measures commonly used at the time. Because of the amount of time that has passed, information about the measures was hard to find and multiple data sets needed to be identified and merged. Missing data at both item and measure level and participant attrition limit the generalizability of the results. Attrition is a particular concern since those who did not participate may be uninterested or uninvolved in child development.

Another limitation with regards to the extant data was the availability of fathers in the sample. Fathers were recruited to the study only if the mother allowed it, meaning the sample consisted of fathers and father figures who had a reasonably good relationship with the mother (Lugo-Gil & Tamis-LeMonda, 2008). Fathers who participated were more likely to be biological resident fathers than other father types and more likely to be involved with the child consistently over time. Of the fathers identified by the child's mother, some chose not to participate in the study due to time constraints or lack of interest.

An additional limitation to this study was the sample size when testing among the three ethnic groups. European American fathers accounted for more than half of the sample (53%) with African American (33%) and Latino American fathers (14%) accounting for the rest. The Latino American sample was very small, making it more

difficult to obtain statistical power in the results.

A further limitation was the split of the singing variable into a dichotomous variable. The split was made at fathers reporting singing to their child “once a month or more” in order to assess the impact of any amount of singing on father teaching interactions and child developmental outcomes. Unfortunately, this caused the data groups to be disproportionate since most fathers reported singing once a month or more. Also, fathers may have reported singing to their child at least once a month in order to improve their parenting profile in response to their sense of what might be expected of them in their interactions with their children.

Recommendations

Future researchers may want to more fully explore the possible correlation between father level of education and teaching interactions, both in the diverse samples and within specific ethnic groups, to determine how large of a part father education plays in father-child teaching interactions. This may help identify indirect effects of fathers on their children’s cognitive and language development outcomes. Father education may also be studied in relation to fathers’ singing in teaching interactions with their children to test possible correlations between the two variables, since it has been established that father singing contributes to child language development outcomes.

Biological residency status may also need to be more fully examined within the diverse sample populations and within specific ethnic groups to determine whether relatedness or residence is associated with teaching interactions. Nonbiological or

nonresident fathers may provide different teaching interaction experiences than biological resident fathers while providing similar cognitive and language development benefits to their children. Also, analyzing father singing with a larger sample of Latino American fathers may provide more information about the associations between paternal singing and child development outcomes within that cultural group. Finally, perhaps father singing once a month should not be considered beneficial enough to label as "singing."

Future father research needs to address the ethnic variations that occur within minority families. Cultural values associated with ethnicity are likely to influence parenting roles and behaviors, but more research needs to be conducted in order to understand the variability across ethnic groups and better help fathers as well as mothers in minority ethnic groups support the development of their young children. Conducting research that focuses on one minority ethnic group at a time may provide opportunities for a deeper understanding of father roles and values within that culture. Also, researchers need to find more diverse ways to promote minority father participation in studies in order to better understand how father behaviors affect child developmental outcomes. This includes participation by both biological resident fathers and other father types.

Along with diversifying father participation, better parenting supports must be put in place for ethnic minorities. This may be achieved by identifying with parenting roles and expectations within the father's macrosystem environment and gearing programs to support those expectations. Despite ethnic group differences predicting patterns, individual fathers vary within ethnic groups, so observations of what a particular father

does or says is a good starting point for creating supportive parenting programs (Honig, 2008). This may include a father's input for a parenting program that includes the entire family, rather than just the father and the focus child, or gearing individual activities to father-child interactions that are already taking place, such as going on outings or having daily play time, and facilitating those parenting strengths to occur more often in the community.

Fathers need to know they have an individual additive effect on their children's development, and the key is quality interaction time that supports child development, such as the positive teaching interactions and singing practices examined in this study. Interventions and programs designed for fathers should be based on information that includes father input, so the curriculum can be tailored to the needs of the fathers in the families being served by the program (Honig, 2008), especially when working with ethnically diverse groups. Programs that emphasize father involvement can encourage healthy co-parenting relationships and promote positive parenting behaviors by fathers, such as conversing, singing, reading and playing with their children.

Fathers should be praised for the positive parenting behaviors they are already practicing with their children (Honig, 2008; Roggman, Boyce, & Innocenti, 2008), which will lead to more positive parenting. Positive parenting attitudes improve parent-child interactions, which in turn, improves child developmental outcomes, a dynamic interactional effect that has been observed in both fathers and mothers (Mahalik & Morrison, 2006; Ryan, Martin, & Brooks-Gunn, 2006; Shears & Robinson, 2005).

Conclusion

This low income, ethnically diverse sample found that, overall, father teaching interactions are related to positive child developmental outcomes. Although mothers provide teaching opportunities for their children, fathers provide independent opportunities for learning, especially when it comes to singing and language development outcomes. Fathers provide valuable teaching interactions in various ways including quality play, singing songs and nursery rhymes, and using complex language, which has been demonstrated in this study. Father singing specifically contributed to child language development, although mother singing did not significantly predict development for any of the three ethnic groups, again indicating that fathers contribute something to child development that mothers alone do not. Father teaching interactions and singing in a child's early years matter for cognitive and language development outcomes at prekindergarten, and fathers with high levels of educational attainment contribute more to child cognitive development than fathers with lower levels of education (Cabrera et al., 2007b). This study has furthered father research by demonstrating that fathers influence their children's development by providing quality teaching interactions and engaging in singing during the toddler years, and that those early engagements contribute to children's school readiness.

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