

Quality matters: Low-income fathers' engagement in learning activities in early childhood predict children's academic performance in fifth grade

Karen E. McFadden^{a*}, Catherine S. Tamis-LeMonda^a and Natasha J. Cabrera^b

^aCenter for Research on Culture, Development, and Education, New York University, New York, USA; ^bDepartment of Human Development, Institute for Child Study, University of Maryland, College Park, Maryland, USA

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In a prospective, longitudinal investigation we examined fathers' engagement in learning activities with their children in early childhood in relation to children academic performance in 5th grade. Participants were 602 low-income, ethnically diverse biological fathers and their children from the National Early Head Start evaluation study. Fathers reported on their engagement with children in learning activities as well as their residency when children were two years, three years, and of preschool age; children were assessed on receptive language, reading and math skills in 5th grade. Children also reported on the quality of their relationship with one to two caregivers of their choice in 5th grade; 62% of children chose to report on their biological father and an additional 16% of children reported on a father figure. Mothers reported on biological father residency when children were in 5th grade. Fathers' engagement with children in learning activities predicted children's 5th grade academic performance after controlling for early and later father residency and children's report of the quality of their relationship with fathers or father figures. Children who reported positive relationships with either fathers or father figures in 5th grade also scored higher on various performance indicators of academic achievement. In contrast, father residency did not predict children's performance or moderate the influence of early engagement on children's performance. Fathers' participation in learning activities with young children has long-lasting associations with children's academic achievement.

Keywords: father involvement; low-income families; children's academic performance

A large body of research has documented gaps in educational achievement along socioeconomic and racial/ethnic lines in the United States (Bradley & Corwyn, 2002; Brooks-Gunn & Duncan, 1997; Duncan & Brooks-Gunn, 1997; Jencks & Phillips, 1998). Poor and minority children are more likely to be at risk for deficits in school-related skills than their more advantaged peers, and these disparities exist already by the time most children enter formal schooling in kindergarten (Campbell, Pungello, Miller-Johnson, Burchinal, & Ramey, 2001; Duncan, Brooks-Gunn, & Klebanov, 1994; Entwisle & Alexander, 1993; Phillips, Crouse, & Ralph, 1998; Tamis-LeMonda, Baumwell, & Diaz, 2011; Zigler & Muenchow, 1992). However, within these overall trends of disadvantage, individual strengths and family-level resources may buffer systemic inequalities (Leventhal, Xue, & Brooks-Gunn, 2006; Lugo-Gil & Tamis-LeMonda, 2008; Rodriguez & Tamis-LeMonda, 2011).

In particular, father involvement predicts positive outcomes in low-income minority children, just as it does

children from more resourced backgrounds. For example, fathers can promote children's educational preparation (e.g., Fagan & Iglesias, 1999), and positive father-child interactions in low-income families are associated with toddlers' cognitive and language gains above the contributions of maternal engagement and children's earlier abilities (Tamis-LeMonda, Shannon, Cabrera, & Lamb, 2004). However little is known about whether the early benefits of positive fathering persist over more extended time frames.

This is particularly the case in low-income families. Few large-scale studies exist on the long-term involvement of fathers from ethnically diverse and low-income minority families. This sampling limitation typically exists because of difficulties in surveying men who are often not married to their children's mothers and/or do not reside with their children. Yet of the approximately 20% of US children who live in what have been characterized as "single mother homes," most (about 87%) have regular contact with their fathers (Federal Interagency Forum

*Corresponding author. Email: karen.mcfadden@nyu.edu

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on Child and Family Statistics, 2005; Flanagan & West, 2004; McLanahan, Garfinkel, Reichman, & Teitler, 2001). Additionally, important differences likely exist in children's experiences with their fathers across racial/ethnic groups. For example, in comparison to White children, about twice as many Hispanic children and six times as many Black children live in households without a resident father; yet among this group of children who do not live with their fathers, nearly all Black children have some contact with their fathers (94%) whereas children's rates of contact with non-resident fathers are somewhat lower among White and Hispanic children (82% and 79%, respectively) (Cabrera, Ryan, Mitchell, Shannon, & Tamis-LeMonda, 2008; Edin, 2000; Flanagan & West, 2004; Gibson-Davis, Edin, & McLanahan, 2005; Lichter, McLaughlin, Kephart, & Landry, 1992). Thus a greater percentage of minority children who do not live with their fathers nonetheless spend time with them. However, because the majority of research on father involvement is based on resident middle-class White fathers, much remains unclear about what father involvement looks like in different socioeconomic and racial/ethnic groups.

Recent work based on a few key studies of fathers in low-income families has contributed to growing knowledge on the involvement of fathers from socio-economically disadvantaged families (Cabrera et al., 2004; Carlson & McLanahan, 2010). However, it remains unknown whether the benefits of father involvement in early childhood are sustained as children progress through school. Additionally, it is not clear whether in such "fragile families," where family structure transitions may be frequent, these early benefits are moderated by father residency status early or later in development. An earlier longitudinal study indicated that when fathers do not continue to live with children in adolescence, children are seriously disadvantaged in regards to their school achievement (Furstenberg, Brooks-Gunn, & Morgan, 1987), but the study used only a "presence/absence" measure of fathers' influence and did not differentiate fathers who engaged directly and positively with children from those who did not. It remains unclear whether measures that capture variation in the quality of father involvement early in childhood would be related to later child outcomes over a long-term. Additionally, research has not clarified whether the effects of early engagement on children's later outcomes are unique and independent from father residency over time.

In the current study, we focus on a specific aspect of father involvement – fathers' engagement in learning activities with young children. We examine the lagged association between fathers' engagement in learning activities with their young children and children's later school performance. We addressed these questions in a racially/ethnically diverse sample of low-income fathers and their children, as these children are known to be at risk for low levels of academic achievement. There are few studies

that have explored the long-term implications of fathers' early engagement in learning activities for developmental outcomes years later in low-income families. To address identified gaps in the literature, we examine associations in the context of father residency (in early childhood and in middle childhood) and children's reports of the quality of their relationships with their biological fathers, and control for the involvement of father-figures in cases where children reported a primary parenting relationship with another man who was not their biological father.

Fathers' engagement in learning with young children from low-income families

The vast majority of studies on parent engagement in learning activities are based on mothers' activities in relation to children's development. For example, mother-child book-reading predicts children's language, cognitive development, and school readiness skills (Bus, van Ijzendoorn, & Pelligrini, 1995; Dickinson & Tabors, 1991; Lyytinen, Laasko, & Poikkeus, 1998; Raikes et al., 2006; Rodriguez & Tamis-LeMonda, 2011; Snow & Dickinson, 1990). Although studies suggest that children in low-income households are exposed to lower amounts of adult language and bookreading (e.g., Feitelson & Goldstein, 1986; Hart & Risley, 1995; McCormick & Mason, 1986), over half of mothers in the Early Head Start National Evaluation sample reported reading daily to their children during the early childhood years (in this study, when children were 14-, 24- and 36-months-of-age) (Raikes et al., 2006).

Although the role of fathers' in child development has received increased attention over the past several decades (Lamb, 2010; Tamis-LeMonda & Cabrera, 2002), relatively few studies examine what fathers actually *do* with children (in contrast to whether fathers are present or absent) in relation to children's cognitive outcomes. This is particularly the case for children living in low-income households. Notable exceptions exist however. For example, in one study (Shannon, Tamis-LeMonda, London, & Cabrera, 2002), low-income fathers' responsiveness and teaching behaviors (such as achievement orientation and amount of language) during play with their 24-month-old children predicted children's cognitive status on the Bayley Mental Development Index (Bayley, 1993). Similarly, among children from low-income African-American homes, no differences in children's cognition or language were due to father presence/absence, but fathers' nurturant behaviors during play with 36-month-old children predicted children's cognitive and language competencies (Black, Dubowitz, & Starr, 1999). Additionally, the quality of father-child interactions, including fathers' cognitively stimulating behaviors, predicted children's cognition and language at both 24- and 36-months-of-age, even above and beyond mothers' engagement in these same high-quality behaviors (Tamis-LeMonda et al., 2004).

Fathers' engagement in book-reading in particular has been shown to be beneficial for young children in low-income homes. The extent to which low-income fathers engaged in book-reading with their 24- and 36-month-old children has been shown to predict children's cognitive development at both ages (Duursma, Pan, & Raikes, 2008), and fathers' communicative diversity during interactions with children relates to children's language skills at 24-months-of-age (Tamis-LeMonda, Baumwell, & Cristofaro, in press). Additionally, fathers' vocabulary during picture-book interactions with their six-month-olds predicted children's language skills at both 15- and 36-months of age (Pancsofar, Vernon-Feagans, & The Family Life Project Investigators, 2010).

As reviewed above, longitudinal studies on father-child associations are largely circumscribed to time frames spanning a few months to a year or so. It remains a question, therefore, whether early father engagement in learning activities predict children's cognitive skills over longer time frames, from early childhood until later in middle childhood. And, if so do these earlier engagements uniquely predict child outcomes after considering early and later father residency as well as the quality of fathers' later relationships with their children? Children who grow up without a father in the home are at risk for low-school achievement and dropping out of school in adolescence (Astone & McLanahan, 1991; Furstenberg & Harris, 1993; McLanahan & Sandefur, 1994). Such studies, however, do not speak to the long-term correlates of early father engagement in learning activities of when fathers *are* present children's later academic success in middle childhood.

Current study

In the present study we examine whether father engagement in learning activities with young children predicts children's academic performance in 5th grade in a diverse sample of 602 children from low-income households. We further examined whether father residency, in either early childhood or late middle childhood, *moderates* lagged associations between early father engagement in learning activities and children's academic performance in 5th grade. Finally, we asked whether the quality of children's relationships with their biological fathers in late middle childhood *mediates* associations between early father engagement in learning activities and children's academic performance in 5th grade. Additionally, because other men may take on a role as "father figure" to children by middle childhood, we also controlled for the possibility that the quality of these new relationships would be associated with children's academic performance concurrently.

Building on existing literature linking children's early learning experiences with later academic achievement, we first hypothesized that children whose fathers are highly engaged in learning activities with them during

early childhood are more likely to score higher on tests of academic performance (in receptive language, reading, and math) in 5th grade than fathers who were not highly engaged in learning activities during early childhood. Second, we hypothesized that associations between fathers' engagement in learning activities and children's later school performance would be stronger for children whose biological fathers continued to reside with them in 5th grade than for children who did not. Third, we hypothesized a mediation model that would support an underlying conceptual model in which children whose biological fathers were highly engaged in learning activities in early childhood would have better academic performance *because* they had a more positive relationship with their biological fathers in 5th grade.

This study examines whether there are distinct benefits of early learning experiences with fathers for children from low-income homes, who are at risk for school failure. Though longitudinal studies of low-income fathers and children that follow children as far as 5th grade are few, earlier studies have suggested that only children who continue to reside with their fathers will benefit from early learning experiences. If this is the case, then the influence of father engagement in learning activities would be stronger for resident versus non-resident fathers. Moreover, some scholars have suggested that it is the maintenance of positive father-child relationships, and not what fathers do early on, that accounts for associations between early father involvement and children's later academic outcomes. If so, the magnitude of associations between father engagement in learning activities and children's academic performance in 5th grade would attenuate after controlling for the later biological father-child relationship quality. The current study disentangles these relations by examining associations between early father engagement in learning activities and later child academic performance and testing whether associations maintain above father residency and children's reports of father-child relationship quality in 5th grade.

Method

Participants

Participants were 602 biological fathers and children drawn from the Early Head Start (EHS) national evaluation, a research project that evaluated the EHS program in the United States (see Raikes, Chazan-Cohen, Love, & Brooks-Gunn, 2010). Families were recruited into the EHS study when they applied for child care or other services at local agencies in 17 sites across the United States. All families met the EHS income eligibility criteria, as EHS is a federal program targeted to low-income families (see Administration for Children and Families, 2002). In 14 of the 17 sites, mothers were asked whether children's

biological fathers had seen them within the past three months, and if so permission was requested to contact children's fathers. Of the 80% families where children had contact with their biological fathers ($N = 1426$), 69% of mothers ($N = 984$) gave permission for fathers to be contacted, and 85% ($N = 838$) of these fathers completed at least 1 wave of data collection.

Data were collected from biological fathers when children were two years old, three years old, and of preschool age, and fathers who were contacted and interviewed during at least one of the three data-collection time points were included in the study. Thirty-eight percent of biological fathers completed all 3 waves of data collection, 29% completed 2 of the 3 waves, and 33% of fathers completed at least 1 wave of data collection. All children were interviewed when they were in 5th grade, and also assessed on measures of academic skills. An additional 236 children for whom biological father data were available during the earlier assessment waves were not seen at the 5th grade data collection time point and therefore are not included in any analyses.

Biological fathers in the study were 21% ($N = 127$) African American or Black, 47% ($N = 285$) White, 29% ($N = 174$) Hispanic/Latino, and 3% ($N = 16$) Other (Asian, Native American, and bi-racial fathers). Their ages ranged from 14 to 51 at the time of their child's birth ($M = 25.9$, $SD = 6.7$). Most fathers resided with their children in early childhood (83%, $N = 501$), but by the time children were in 5th grade, only a little more than half of their biological fathers resided in their households (55%, $N = 333$); however an additional 2% ($N = 11$) of all biological fathers resided with their children at 5th grade though they had been non-residents in early childhood. Children were between 9 and 11 years old in 5th grade ($M = 10.5$, $SD = 0.5$), and approximately half were male (52%).

Procedure

In cases where mothers had given written permission for the study to contact fathers, researchers contacted these men, described the purpose of the research project, and scheduled a time for a visit to their homes. Visits were conducted when children were two years-old, three years-old, and of preschool age. During visits, written consent was obtained from fathers, who were then administered face-to-face interviews. Surveys assessed various aspects of father involvement as well as other father characteristics. Fathers were given \$20 and a small gift for their children for participating. When children were in 5th grade, direct assessments of children's academic skills were conducted. At this time point, children's primary caretakers (in all cases but one, children's mothers) completed surveys and children also completed surveys that asked about their relationships with their caretakers.

Measures

Father engagement in learning activities in early childhood. Biological fathers were asked about the frequency within the past month with which they engaged in 5 different learning activities with children (singing nursery rhymes, singing songs, reading stories, telling stories, and taking child to a museum) on a 1–6 scale (1 = every day, 6 = never), when children were two years old, three years old, and of preschool age. Items were reverse-coded such that high numbers reflected high frequency. We created an average engagement in learning activities by taking the mean of items across time points in order to streamline analyses and maximize the sample size (i.e., fathers were included if they provided one or more waves of data from any age). This also was done because findings for engagement scores at each of the separate ages did not yield findings that differed from findings for the average score. The alpha coefficient for this scale was adequate (.78).

Father residency in early childhood. Fathers stated whether they resided with their children when they completed surveys when children were two years old, three years old, and of preschool age. Due to missing data across waves of data collection in early childhood, it was not possible to chart father residency across children's first years. Therefore fathers were considered residents during early childhood if they said they lived with their child during at least 1 wave of data collection. Data showed that only a small percentage of fathers for whom at least 2 waves of data were available (5%, $N = 32$) had changes in residency over children's first years. As other studies have used residency as a proxy for involvement, we classified fathers who ever lived with their children over their first years as resident fathers in early childhood.

Father residency when children were in 5th grade. Father residency in 5th grade was based on mothers' report of whether biological fathers resided with their children at the time of the assessment. Biological fathers who lived with their children in 5th grade were classified as resident fathers at the 5th grade data collection time point.

Father-child relationship quality in middle childhood. During the 5th grade assessment, children were asked to identify two caregivers (either parent(s) or the people who otherwise take care of them). After children identified a caregiver or caregivers, they were asked to report on the quality of their relationship to the caregiver(s). Children reported on the quality of their relationship with their primary caregiver and, if applicable, with a second caregiver, across 8 items. Examples of items include "He/she understands me," "I like him/her," "he/she likes me," and "we get along well." Children responded to items on a

1–4 scale (1 = “not at all true,” 2 = “a little bit true,” 3 = “mostly true,” 4 = “very true”). An average score was created by taking the mean across items.

Because a substantial percentage of children named men who were not their biological fathers as a father-figure and there was no overlap between children who reported on their biological fathers and children who reported these non-biological father-figures, the 5th grade data on the quality of children’s relationships with their fathers was used to create two dummy variables – (1) positive child relationships with biological fathers and (2) positive child relationships with father-figures, with children who reported a negative or no relationship with a father at all as the contrast group. Both variables (i.e., biological father-child relationship quality and father-figure-child relationship quality) were computed by averaging across the eight items for children who described a relationship with a father as one of their caregivers. Scores ranged from 1.5 to 4 ($M = 3.52$, $SD = .52$). Based on these data, children were given a 1 if they averaged between 2 and 4 (i.e., “a little bit true” to “very true”) when asked about the quality of their relationships with their biological father, or a 0 if they either described their relationship with their biological father as negative (average scores below 2) or did not mention a father at all (which served as the reference group in analyses). Scores of 2 were treated as cut points since they reflected children endorsing that their biological fathers shared a positive relationship with them to some extent, compared to not at all having a positive relationship. Because the number of children who chose to report on a biological father or father figure while also endorsing low ratings (not at all true) was very small, only 6%, they could not be analyzed separately. For this reason, this subset of children was combined with children who did not report on biological fathers or father figures at all.

Children’s academic skills. Trained researchers assessed children’s language, literacy, and math skills when children were in 5th grade. Children’s levels of receptive language vocabulary were assessed through administration of the Peabody Picture Vocabulary Test-III (PPVT-III; Dunn & Dunn, 1997), which is a norm-referenced test that has an overall reliability alpha ranging from .92 to .98. Children’s levels of reading and math skills were assessed using measures developed for use in the Early Childhood Longitudinal Study- Kindergarten Cohort (ECLS-K) (Hooper, Roberts, Sideris, Burchinal, & Zeisel, 2010), a nationally representative study of children’s school achievement from kindergarten to 8th grade. Specifically, the 5th grade measures were generated from the Woodcock Johnson WJ-R Reading and Math subtests, based on the Broad Reading and Broad Math clusters. The items selected were based on those demonstrating reliability and validity using item response theory (see National Center for Education Statistics, 2006).

Results

We first present descriptives on all variables and bivariate correlations among them. Next we present a series of regressions predicting children’s 5th grade academic performance outcomes, first entering early father residency and engagement in learning activities, and next entering later father residency and father-child relationship quality in 5th grade. These regressions address questions of whether father engagement in learning activities early on predicts children’s later academic performance after controlling for father residency and father-child relationship quality in 5th grade.

Descriptives on father engagement in learning activities

Fathers’ scores on their engagement in learning activities over the early childhood years were normally distributed and spanned the full range of 1 (not at all engaging in learning activities) to 6 (engaging in learning activities more than once a day on average). When averaging across the three ages and across the five forms of learning activities, scores averaged 3.19 ($SD = 0.81$) with a range of 1 to 5.5. Based on these composite scores, 6% of fathers reported never engaging in learning activities with their children (average scores of 1.0 to 1.9); 31% reported rarely doing so (average scores of 2.0 to 2.9); 46% reported engaging children in learning activities a few times a month on average (average scores of 3.0 to 3.9); 15% of fathers reported doing so weekly (average scores of 4.0 to 4.9), and 2% of fathers reported daily engagement in learning activities on average (scores of 5 or above).

Descriptives on children’s academic performance

Children were assessed on their language, reading and math skills in 5th grade. Children’s standardized receptive language vocabulary scores (i.e., PPVT-III) ranged from 40 to 135 with a mean of 95.35 ($SD = 16.61$), and 25% of children were considered language delayed based on their performance on this measure. Children’s standardized reading scores ranged from 31.51 to 178.87 with a mean of 128.7 ($SD = 29.21$) and their math scores ranged from 0 to 18 with a mean of 8.82 ($SD = 4.72$).

Descriptives on father-child relationships

When asked to identify a person who cared for them (i.e., a caregiver(s)), 62% of children reported on their biological father as either their first or second caregiver, and 16% of children reported on a father-figure as either their first or second caregiver (no children reported on both a biological father and a father-figure). Twenty-two percent of children did not mention any male figure as a caregiver. Within this 22% of children, the majority (74%) reported on only one caregiver (i.e., often mother or grandmother).

Of children who identified a biological father or father-figure as a caregiver, 95% of children who reported on their biological father (19 out of 353) and 85% of children who reported on a father-figure (79 out of 93) rated their relationships as high in quality, with averages of 3.0 (mostly true) to 4.0 (very true) on items asking about positive features of the relationship (e.g., closeness; time together). Nonetheless, 28% of children in the sample reported either a poor relationship or no relationship with their fathers/father-figures.

Bivariate correlations

Fathers' residency in early childhood was associated with fathers' engagement in early learning activities, with the size being small in magnitude, $r(600) = .16, p < .001$. Early father residency predicted later father residency, $r(600) = .42, p < .001$. Biological fathers' early residency was associated with children reporting a positive relationship with their biological fathers in 5th grade, $r(600) = .37, p < .001$ (and inversely associated with children reporting a positive relationship with a father-figure, $r(600) = -.15, p < .001$, but the magnitude of the association between biological father's residency and children reporting a positive relationship with their biological fathers in 5th grade was much larger, $r(600) = .72, p < .001$ (an inverse association with children reporting a positive relationship with a father-figure, $r(600) = -.40, p < .001$. Fathers' engagement in early learning activities was associated with children's report of a positive later relationship with their biological fathers, $r(600) = .15, p < .001$ (and was not related to positive relationships with father-figures).

Predictors of children's 5th grade academic performance (i.e., father engagement in learning activities with young children; early and later father residency; and the quality of father-child relationships in 5th grade) are presented in Table 1. Fathers' engagement in learning activities with their young children predicted children's 5th grade language, reading, and math skills. Biological father-child relationship quality in 5th grade was associated with children's 5th grade math skills. Father-figure-child relationship quality in 5th grade was also associated with children's 5th grade reading and math skills. Biological father residency at neither time point predicted children's 5th grade performance.

Father engagement in learning activities and children's 5th grade outcomes

We next examined associations between fathers' earlier engagement in learning activities and the outcome of children's 5th grade performance together with biological fathers' residency at both ages, biological father-child relationship quality in 5th grade, and (where relevant) the quality of children's relationships with father-figures, as independent variables. These were tested in three regressions, one for each of the dependent variables of language, reading, and math performance. These analyses tested the unique effects of each of the predictors. Moreover, because father early engagement in learning activities predicted both 5th grade outcomes and biological father-child relationship quality in 5th grade, and biological father-child relationship quality was associated with 5th grade math performance, we asked whether biological father-child relationship quality mediated lagged regressions (Baron & Kenny, 1986) predicting 5th grade math. Finally, we asked whether the size of the associations between fathers' early engagement in learning activities and children's outcomes were heightened (or reduced) in the presence of either early or later biological father residency. Moderation was tested through interactions between early engagement in learning activities and (a) early residency and (b) later residency. Because father-figure-child relationship quality was associated with 5th grade reading and math performance, we control for this variable in all regression analyses.

Neither father residency in early childhood nor father residency at the 5th grade assessment predicted children's academic skills in the context of other variables (See Tables 2, 3, and 4). In contrast, fathers' engagement in learning activities and father-child relationship quality in 5th grade each uniquely predicted children's academic skills in 5th grade above father residency at both ages (and one another).¹ Biological father-child relationship quality in 5th grade did not mediate the effects of father engagement in learning activities, based on comparisons of coefficients across model steps. Specifically, the size of the coefficient for learning activities was not diminished when later biological father-child relationship quality or later father figure father-child relationship quality was included in the model. Finally, neither of the interaction terms were significant. Thus, neither father residency in the early years

Table 1. Associations between father variables and children's 5th grade academic skills.

Variables	Language	Reading	Math
Father Early Residency	-0.02	-0.01	-0.02
Father Early Learning Activities	0.14***	0.09*	0.16***
Father Residency Grade 5	0.01	0.02	0.03
Child Positive Relationship with Biological Father	0.08	0.04	0.09*
Child Positive Relationship a Father-Figure	0.04	0.09*	0.08*

Note: $N = 602$; $^+p < .05$; $^*p < .05$; $^{**}p < .01$; $^{***}p < .001$.

Table 2. Regression models predicting child language skills in 5th grade.

Model				
Variables	1	2	3	4
Father Early Residency	-0.02	-0.04	-0.06	-0.07
Father Early Learning Activities		0.15***	0.15***	0.14***
Father Residency Grade 5			0.03	-0.04
Child Positive Relationship with Biological Father				0.16**
Child Positive Relationship a Father-Figure				0.09*
R ²	0.00	0.02***	0.02**	0.04***

Note: $N = 602$; Standardized β weights presented are from the final multiple linear regression equations.
⁺ $p < .05$; * $p < .05$; ** $p < .01$; *** $p < .001$.

Table 3. Regression models predicting child reading skills in 5th grade.

Model				
Variables	1	2	3	4
Father Early Residency	-0.01	-0.04	-0.06	-0.07
Father Early Learning Activities		0.16***	0.16***	0.15***
Father Residency Grade 5			0.05	-0.01
Child Positive Relationship with Biological Father				0.17**
Child Positive Relationship a Father-Figure				0.15***
R ²	0.00	0.03***	0.03***	0.05***

Note: $N = 602$; Standardized β weights presented are from the final multiple linear regression equations.
⁺ $p < .05$; * $p < .05$; ** $p < .01$; *** $p < .001$.

Table 4. Regression models predicting child math skills in 5th grade.

Model				
Variables	1	2	3	4
Father Early Residency	-0.01	-0.03	-0.04	-0.05
Father Early Learning Activities		0.10*	0.10*	0.09*
Father Residency Grade 5			0.03	0.02
Child Positive Relationship with Biological Father				0.10
Child Positive Relationship a Father-Figure				0.14**
R ²	0.00	0.01+	0.01	0.03**

Note: $N = 602$; Standardized β weights presented are from the final multiple linear regression equations.
⁺ $p < .05$; * $p < .05$; ** $p < .01$; *** $p < .001$.

nor in 5th grade moderated the association between early father engagement in learning activities and children's 5th grade academic performance.

Discussion

The goal of our study was to examine the long-term associations of father involvement in early childhood learning activities (e.g., reading books), father residency during early childhood and in 5th grade, and biological father-child relationship quality in 5th grade, with children's academic performance (on tests of receptive language, reading, and math) in 5th grade. In addition to examining direct associations within regression models, we also

sought to determine whether the quality of children's relationships with their biological fathers mediated the association between early father engagement and children's academic skills as well as whether links between early father engagement and later children's academic skills were stronger for children whose biological fathers continued to reside with them. Our results support our primary hypothesis and indicate that father engagement in learning activities with toddlers has long-lasting association with their children's academic performance later in middle childhood. Although the size of associations are small, these results are significant because they suggest that paternal investment during children's early years pays in dividends later on and might potentially shift

children's trajectories. These findings are consistent with past research showing that father engagement matters for children's achievement and cognitive development (Astone & McLanahan, 1991; Cooksey & Fondell, 1996; Gadsden & Ray, 2003; Howard, Lefever, Borkowski, & Whitman, 2006; McBride, Schoppe-Sullivan, & Ho, 2005; Snarey 1993). However, most of these studies are cross-sectional; our findings are one of the first to report long-term associations between early father engagement and later children's outcomes.

Contrary to our hypothesis, we also found that early and later father residency status did not moderate the association between early father engagement and children's academic skills. This suggests that children's early learning experiences with their fathers have a powerful long-lasting effect over time for all children and fathers, whether they live with children or not. The extent to which fathers read books and have other language-based interactions with children may help children's development of early cognitive skills, including growth in vocabularies. These findings are consistent with studies examining the effect of maternal book reading on children's outcomes (Raikes et al., 2006) and suggest that interventions targeted at improving children's literacy skills should also include fathers as a potential source of untapped support.

Another important finding worth highlighting is that the quality of children's concurrent relationships with fathers or father figures also predicted children's academic performance. This supports our hypothesis that children who feel close to their fathers are more likely to do well in school than children who do not. In our study, children who identified their biological father as a caregiver and rated that relationship as positive showed higher scores on 5th grade math, and those who identified their father figure as a caregiver and rated that relationship as positive showed higher scores on reading and math skills in 5th grade. Like early father engagement in learning activities, concurrent father-child relationship quality mattered uniquely, above father residency and early father engagement. These findings are consistent with past research showing that the quality of the father-child relationship is more predictive of children's functioning than residency per se (Flouri, 2007). In our study, father residency, whether in early or middle childhood, was not predictive of children's academic skills.

Our hypothesis that the quality of children's relationships with their biological fathers in 5th grade mediated the association between early father engagement and children's academic performance in 5th grade was not supported. This finding suggests that the pathway between early father engagement and children's outcomes is mostly direct. It is also possible that other variables not included in this study might mediate this association. For example, children's language skills between early childhood and 5th grade might explain why early father reading is important

for later academic skills. These are important areas of future research.

The findings of this study should also be considered in light of several limitations. First, we were able to examine associations only between early father engagement in learning activities and children's academic performance in middle childhood for children who (a) had fathers who were present in toddlerhood and took part in the study, and (b) were still in the study when in 5th grade. Although the study was limited to low-income families, within this population fathers and children who took part in the study may have more resources than those who did not.

Second, the current study does not employ an experimental design; therefore assumptions about causal pathways are not warranted and mechanisms of influence remain unknown. We do not know the pathways through which early father-child learning activities as well as later relationship quality matter for children's academic performance. For instance, early father engagement in learning activities and later father-child relationship quality could both be related to children's outcomes through the same or different third variables. As one possibility, it may be that early father engagement in learning activities predicts children's skills in the preschool years, and it is these skills that account for later academic performance as well as positive father-child relationships. Similarly, although children who reported poor or no relationships with their fathers/father figures had lower average performance on all academic measures, it is unclear as to why that might be the case. Some children may have had poor relationships with fathers they chose not to speak of, whereas others might have lost contact with their fathers entirely. In either case, we don't know if it is the lack of a positive father-child relationship or a related variable that accounts for lower scores on academic performance measures for these children.

Third, measures of father engagement in learning activities were based only on interviews with fathers; future studies should aim to triangulate father report with other measures, such as time diary methods, mother report, or observations of direct father-child interactions. However, obtaining reports from fathers is preferable to using mothers as proxies in assessing father engagement in learning activities, as mothers cannot always be aware of the activities that fathers share with young children, particularly if they are not always around when they occur.

Fourth, we did not obtain measures of father engagement in learning activities during the 5th grade wave of data collection. Although children's report of the quality of their relationships with their fathers served as a proxy for father involvement at that time point, positive relationship quality is unlikely the same as engagement in learning activities. Although children may have positive relationships with their fathers, they may or may not also engage in learning activities with them in middle childhood.

A final limitation is the method used for assessing the quality of children's relationships with their fathers. Children were not directly asked to talk about their biological fathers, but were asked to report on two people they considered to be their primary caregivers. These interviews revealed that most children (78%) had a father or father-figure in their lives. Further the vast majority of children spoke fondly of these men, and also performed better on academic assessments than children who did not report on a father or father-figure. Perhaps children are more likely to talk about fathers/father-figures who are more salient in their lives. Indeed, when we analyzed the data separately for children who reported on fathers/father figures to those who did not, findings remained. Thus, the phenomenon of recognizing a father/father figure as a central caregiver, as reflected in the child's decision to talk about him, might capture a core aspect of the father-child relationship. Perhaps, fathers "being there" is what matters to children.

Nonetheless, we cannot draw any conclusions about the relationships between children and fathers for the 22% of children who chose not to report on a father during the 5th grade interviews. Interestingly, the bulk of these children (approximately three quarters) did *not* report on a second caregiver, even when given the opportunity. Therefore, the expectation that other individuals (such as uncles, aunts, grandparents) are salient to children and taking the place of fathers was not seen. Although other caregivers may be able to compensate for the absence of father involvement in children's lives, this may not be the case for many children.

As a whole, our findings demonstrate that the interactions around early learning that take place between fathers and young children are foundational to children's later academic performance for children who experience economic disadvantage, whether they live with their fathers or not. Although the quality of children's relationships with their biological fathers or father figures is also associated with children's 5th grade academic skills, positive relationships with biological fathers in late middle childhood does not mediate the lagged associations we identified. Thus, for children in low-income families – and likely for all children – fathers' engagement in learning activities early on appears to be foundational for children's school success across the span of childhood.

Note

1. Children's report of the father-child relationship remained a significant correlate of children's performance as well after dropping the 6% of children who chose to report on a father/father figure and rated the relationship as low in quality. This separate analysis therefore compared children reporting positive relationships with father/father figure with those who did not report on a father/father figure at all.

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