The Developmental Gradient in Fathers' Time with Children

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Abstract

Using data from the 2003-2007 American Time Use Surveys, we compare fathers' (N = 9,339) time in four parenting activities across father education and child age subgroups to determine if highly-educated fathers spend more time in child care and alter the composition of their parenting time to suit children's developmental needs more so than less educated men. Results partially support this hypothesis: compared to less educated fathers, highly-educated fathers invest more time in basic care and play activities when youngest children are infants or toddlers and time differences across education groups in basic care and play are largest among fathers with infants or toddlers. Highly-educated fathers also spend more time in teaching and management activities than less educated fathers, but these differences do not vary by child age. This 'developmental gradient' suggests that highly-educated fathers' child care time reflects more intense and possibly more effective parental investments in young children.

The Developmental Gradient in Fathers' Time with Children

The study of how parents spend time with children is a useful way to understand parental investments in child development, including differences among parents in how they approach their parenting roles (Bianchi, Robinson, & Milkie, 2006). One of the most common findings from the parental time use literature is that fathers with higher education levels spend more time caring for and interacting with their children than their less educated counterparts, a pattern sometimes called the "education gradient" in paternal time (e.g., Guryan, Hurst, & Kearney 2008; Sayer, Gauthier, & Furstenberg 2004; Yeung, Sandberg, Davis-Kean, & Hofferth, 2001). For instance, a recent study found that fathers with college degrees spend over four additional hours per week in active child care than those without a high school degree (Guryan et al., 2008). Mounting evidence that the quality and quantity of father involvement is positively related to children's outcomes (see Lamb & Lewis, 2010; Pleck, 2010) suggests that by assuming more time-intensive parenting roles, highly-educated fathers also assume more developmentally-enriching roles than less-educated men (Lareau, 2003; McLanahan, 2004; Yeung et al., 2001). If so, this particular inequality may meaningfully contribute to socioeconomic differences in children's developmental trajectories.

However, the fact that highly-educated fathers spend more time with children does not necessarily mean that they spend that time in more developmentally-enriching ways. Recently, Kalil and colleagues (2011) posited that mothers use time to promote their children's development not simply by spending more time with them, but by altering the composition of their childrearing time in ways that may optimize developmental outcomes. They found that highly-educated mothers (relative to less-educated mothers) invested more time in childrearing activities most salient to their children's development stages, a pattern they called the

"developmental gradient" in maternal time. It is not necessarily so that fathers follow the same pattern; on average, men spend less time caring for and interacting with their children than women and prioritize a narrower range of activities during their parenting time (Yeung et al., 2001). However, if fathers do follow a developmental gradient such that highly-educated fathers tailor their childrearing time to children's development stages more so than less-educated men, it would mean children of two highly educated parents may be "doubly-advantaged," reinforcing socioeconomic inequalities in parental investments that may have important implications for long-term differences in children's outcomes.

The Education and Developmental Gradients in Parents' Time

The theories posited to explain the education gradient in parents' time with children come primarily from the fields of economics and sociology. Economic models of the family view child development, or "child quality," as an output of household production from which parents derive utility and which parents produce by investing time and money in children's well-being (Becker, 1965). The fact that highly-educated parents spend more time in child care than less-educated parents suggests that they view their time as more productive in terms of child quality than do less-educated parents and that they do not believe equally effective substitutes exist in the market (Guryan et al., 2008). Sociological theory posits that the education gradient exists because parents acquire values about social mobility and standards of success through educational attainment that motivate certain parental behaviors (Bianchi & Robinson, 1997; Sewell, Haller, & Ohlendorf, 1970). For example, the sociologist Annette Lareau (2003) argues in her qualitative study of family life that middle-class families (whose jobs by her definition require college-level skills) engage in a pattern of "concerted cultivation" to actively develop children's talents and skills because they see this cultivation as part of the parenting role. By contrast, in

poor and working-class families, Lareau identifies a pattern she calls "the accomplishment of natural growth" whereby parents attend to children's material and emotional needs but presume their talents and skills will develop without concerted parental intervention. Theories from both disciplines thus posit that highly-educated parents will adopt a more time-intensive, developmentally-enriching parenting style than their less-educated counterparts.

Although both theories imply that highly-educated parents invest time in childrearing to enhance their children's development, neither specifies the kinds of activities parents should do during their child time to accomplish that goal. Typically, studies examine parental time, and the education gradient in parental time, by summing all time parents spend in child care as their primary activity (e.g., Bianchi, 2000; Guryan et al., 2008) or disaggregating child care time into minutes spent in routine care, such as feeding and bathing, versus interactive care, such as playing and reading (e.g., Sayer et al., 2004; Yeung et al., 2001). According to developmental theory, however, assessing parents' time investments in child development requires making finer distinctions among several different types of parenting activities because different activities foster child development in unique ways. For example, an hour spent nursing or soothing an infant presumably has a different impact on a child's well-being than an hour spent reading a book or doing a puzzle with a toddler because these activities respond to different immediate needs (hunger and comfort versus cognitive stimulation). In this view, efficiently investing in child quality, or concertedly cultivating children's development, means not simply spending more time interacting with children but tailoring the composition of interaction time to children's developmental needs.

Children's developmental needs shift as they grow older. During infancy (birth to 12 months), parents spend most of their child care time performing basic caregiving tasks to help

infants establish regular sleeping and eating routines, the two central challenges of infancy (Bornstein, 2002). According to attachment theory, it is also through warm, consistent, and contingent responses to infants' basic physical and emotional needs that parents establish secure emotional bonds, or attachments, with their infants, that serve as foundations for socioemotional development (Bowlby, 1969; Ainsworth, Blehar, Waters, & Wall, 1978). During toddlerhood (12 to 35 months), as babies become capable of initiating and maintaining social interactions and acquire the capacity for representational thought, they begin to engage in "symbolic" play (Piaget, 1952). According to sociocultural theory, toddlers learn most during play when a parent (or other adult) facilitates and structures their activities (Keren et al., 2005; Rogoff, 2003) in ways that help children explore their environment (Hubley & Trevarthen, 1979), grasp concepts (Sigel, 1986), and gain competence motivation. Thus, during infancy, basic care is the paramount parenting activity, whereas during toddlerhood, parents respond most contingently to children's developmental needs through child-directed play.

During the preschool period (ages three to five), children's advancing conversation and attention skills typically increase their appetite for didactic activities such as book-reading, puzzles, and problem-solving (Hoff, 2006), which in turn help children master many of cognitive skills that influence early academic outcomes (Snow, 2006). A large body of research has established that the frequency with which parents engage in these kinds of teaching activities is associated with language and literacy development (e.g., Bus, van Ijzendoorn, & Pellegrini, 1995; Roberts, Jurgens, & Burchinal, 2005) as well as early math and reading scores (e.g., Bradley, Caldwell, & Rock, 1988). In contrast, during middle childhood (ages six to 13), children's lives extend beyond the family to include schools, peers, and extracurricular activities. As children's worlds expand, parents spend less time interacting directly with them and more

time planning and monitoring their academic and social networks (Collins, Madsen, & Susman-Stillman, 2002). Through this management, parents insure that children form positive relationships, learn self-management, receive additional enrichment, and adopt a sense of personal responsibility (Collins et al., 2002). Thus, parents' time in teaching activities may be particularly important during the years just prior to school entry, whereas during middle childhood, parents respond contingently to children's needs by actively managing their increasingly complex lives.

According to the foregoing framework, if highly-educated parents invest efficiently in child quality, or concertedly cultivate their children's development, more so than less educated parents, they should maximize time in the most developmentally salient activities, minimize time in less salient activities, and do both more often than their less educated counterparts. Kalil et al. (2011) identified precisely this kind of "developmental gradient" in mothers' time. Highly educated mothers not only invested more time in basic care and play when youngest children were infants or toddlers than when children were older, but differences across education groups in basic care and play participation were largest among mothers with infants or toddlers; by contrast, highly educated mothers invested more time in teaching activities when children were preschool-aged and more time in management activities when children were six to 13 years old than when children were younger, and differences across education groups in teaching and management were largest among mothers with preschool- and school-aged children, respectively.

The Developmental Gradient in Fathers' Time

Although Kalil et al.'s findings indicate that the education gradient in mothers' child care time is characterized by a developmental gradient, existing research does not clarify whether highly educated fathers also use their additional child time in more developmentally sensitive ways than less educated fathers. Research on fathers' parenting styles and childrearing activities suggest three different hypotheses. The first builds on research comparing the quality of fathers' and mothers' parenting. Studies show that fathers are as capable as mothers of parenting in sensitive (contingently responsive, warm, positive) ways (Braungart-Rieker, Garwood, Powers, & Notaro, 1998; Notaro & Volling, 1999; Ryan, Martin, & Brooks-Gunn, 2006) and that sensitive fathering predicts children's developmental outcomes just as sensitive mothering does (Ryan et al. 2006; Tamis-LeMonda, Shannon, Cabrera, & Lamb, 2004; Van Ijendoorn & De Wolff, 1997). Moreover, just as maternal education predicts the quality of mothers' parenting, highly-educated fathers parent in more sensitive ways than less educated fathers (Davis-Kean, 2005; Hoff-Ginsberg & Tardiff, 1995). To the extent that more sensitive parents also respond more contingently to children's need for different types of parental time, these similarities in fathers' and mothers' parenting styles suggest that fathers' time with children should follow a "developmental gradient" similar to mothers'.

Nevertheless, studies comparing mothers' and fathers' time with children suggest two alternative hypotheses about the nature of the paternal educational gradient. First, even though highly-educated fathers spend more time with children overall than less educated men, they may not alter the composition of their time to suit children's developmental needs to any greater degree. This could be because mothers in two-parent families are more likely to be the primary caregivers (Sayer, Bianchi, & Robinson, 2004; Yeung et al., 2001). As primary caregivers, mothers may assume more responsibility for insuring that children's time is spent in

developmentally appropriate ways than fathers. In this case, one would predict that the variation in parenting styles across parents' education level is more apparent among mothers than among fathers and, more specifically, that a developmental gradient in parents' time may only emerge among mothers.

Alternatively, highly-educated fathers could adopt a developmentally-tailored parenting style, but only for certain activities and at certain child ages (versus the consistent developmental gradient displayed by highly-educated mothers; Kalil et al., 2011). Supporting this hypothesis, fathers spend a larger proportion of their parenting time in play and companionate activities like sports, games, and roughhousing than mothers, whereas mothers spend a larger proportion of their time in caregiving and nurturing (Pleck, 1997; Yeung et al., 2001). Fathers also spend far more time in play and basic care than teaching or management and far more time with infants and toddlers than with older children (Yeung et al., 2001). If fathers view play and basic care as central to their parenting role and focus their efforts on the youngest children, they may adopt, on average, a narrower and less flexible definition of the parenting role than mothers, one that would not necessarily shift as children develop. This pattern suggests that the developmental gradient may emerge only for those activities fathers do most: basic care and play – and not for those activities fathers do least: teaching and management.

Method

Data

We test these hypotheses using data from the 2003-2007 American Time Use Survey (ATUS). The ATUS is an ongoing, monthly, national survey conducted by the U.S. Bureau of the Census for the Bureau of Labor Statistics fielded in conjunction with the Current Population Survey (CPS). Households are selected so that comparisons can be made across demographic

groups defined by marital status, children's age, or other criteria. Telephone interviews (aided by CATI technology) ask one randomly-selected person aged 15 or older within each household to recount their activities during the preceding day. The sample covers all days of the week and all months of the year. The ATUS collects information on the respondent's stated primary activity, which could be a child care activity, and whether he or she was performing child care as a secondary activity. We examine only "primary" activities that are child care, not "secondary" child care time, because only primary activity codes identify the specific developmentally enriching activity in which the parent is engaging.

The rich time use data in the ATUS is ideal for this inquiry. First, the survey's diary approach is a relatively flexible and accurate method for measuring time use, especially time devoted to caregiving. Few other U.S. nationally representative surveys have collected any information on caregiving, and not in as great detail as the ATUS. Second, the survey's large size and sampling methodology are designed to facilitate the types of comparisons between fathers with different levels of education as are proposed here. Third, the ATUS collects data on parents' demographic characteristics, such as paternal age and number of children in the household. These measures are likely associated with education and time in child care, thus their inclusion allows us to control for the influence of characteristics that distinguish parents of different education levels.

We define child age groups by the age of the youngest child in the household to insure that at least one child of the target developmental period lives in the household (this approach is also used in Aguiar and Hurst, 2009 and Kalil et al., 2011). We then compare all time fathers spend in each child care activity across the resulting age groups. Our classification means that if the youngest child in the household is in middle childhood, the father cannot report time with

infants, toddlers, or preschoolers. However, if the youngest child is an infant or toddler, the father may also report time with preschool or school age children. We address the implications of this ambiguity in the discussion. Another limitation is that the data are pooled from cross-sectional waves, thus obviating longitudinal analyses.

Sample

Our analytic sample is limited to fathers who live with their biological or non-biological children aged 13 or younger. The question of nonresident fathers' time with children is important but distinct from that of resident fathers'. Resident fathers have far greater opportunity to spend time with children by virtue of daily proximity, thus, the role they play as parents, reflected in their time investment, necessarily depends on their residency status. It may also be misleading to include nonresident fathers in analyses examining variation by paternal educational level because fathers with a college degree are far more likely than those with a high school degree or less to live with their children (Cabrera et al., 2000). This means that results from a sample that also included non-resident fathers could largely reflect differences in family structure rather than differences in fathers' conceptualization of the paternal role or choices about child time. Similar studies of fathers' time with children also restrict their samples to resident fathers (Guryan et al., 2008; Sayer et al., 2004; Wang & Bianchi, 2009; Yeung et al., 2001), which enhances our ability to compare our results to existing research. Note, however, that we do include single and cohabiting fathers in analyses, who represent 4% and 2% of the analytic sample, respectively.

Fathers interviewed on weekdays and weekend days are included in analyses. To account for differing responses by day of the week, all analyses are weighted using ATUS-provided weights that adjust for the stratified random sample (to the 2006 population) and the non-uniformity of the distribution across days of the week. The results thus estimate the effects of

fathers' education level and child age on time spent in each activity on an "average" day. However, because fathers may have greater flexibility in their weekend schedules and spend more time with children on weekend days (Yeung et al., 2001), we run sensitivity analyses using the sample interviewed on Saturdays and Sundays only ($N = 4373$). Results from these models are reported in the text.

Table 1 displays descriptive statistics for the analytic sample. Roughly 14% of fathers have less than a high school education (including those with a GED), 29% have a high school diploma, 24% have some college or an associate's degree, and 33% have a college degree. The fathers' average age is just over 38 years. The sample is predominately White/Asian/Other (71%), with 9% African-American and 20% Hispanic. The average father has two household children.

Over a third of the sample (34%) has a child under three years of age (birth to two years), while 23% has a youngest child older than two but younger than 6 (three – five years), and 43% has a youngest child six or older (six – 13 years). Although infancy and toddlerhood are distinguished theoretically (i.e., the first year of life from the second and third years), these groups are combined in analyses because distinguishing between households with youngest children in the first and second to third years of life yields prohibitively small age group by education cell sizes.

Measures

Child care time. The amount of time fathers spend in active child care per day is examined. This time is broken into four domains – basic care, play, teaching, and management – corresponding to our developmental hypothesis and following the coding scheme used by Kalil

et al. (2011). Basic care includes direct physical care of household children. Thus, if a father was feeding (including nursing), bathing, physically comforting, physically attending to health needs, or putting a child to sleep, as examples, he was coded as engaging in basic care. Play includes sports, arts and crafts, and general play with household children. If a father was playing a game, 'pretend playing', or using clay with a child, as examples, he was coded as playing. Teaching children includes reading, talking, helping with homework or any other educational activity directly related to children. Management of children includes attending events, traveling, and planning activities on children's behalf. Thus, for example, if fathers were attending a child's performance, driving a child to an activity, or arranging for a child to participate in an activity, they were coded as managing. We also examine a more global measure of primary child care time that records the amount of time spent in any of these activities.

Independent variables. The main independent variable is paternal education. Education level is calculated based on fathers' highest degree attained. Four mutually exclusive levels of education are distinguished: less than a high school degree (including GED recipients), high school degree, some college (including Associate of Arts recipients), and college degree or higher. In models, three dummy variables are entered with high school education as the reference category.

The other main independent variable is age of youngest child, as it is central to testing our hypothesis that fathers alter their time with children by child age, and that this modulation may vary by fathers' education level. Models are run on the full sample with two dummy variables for child age group and either birth to two, three to five, or six to 13 as the reference category depending on which activity is under examination.

Covariates. We control for a set of characteristics that may predict paternal education level and covary with paternal time with children but could not plausibly be influenced by fathers' child care time. We do this because we are interested in the total effect of fathers' education on their time use. Thus, characteristics such as household income, paternal employment status, and family structure are excluded because conditioning on these endogenous covariates could remove variation by education level that we aim to identify. Accordingly, fathers' race/ethnicity is entered to control for any possible cultural differences in parenting styles (two dummy variables for Black and Hispanic with White as the reference category). We also control for fathers' age at the time of the interview (it is mean-centered to ease interpretation of the intercept). Whether the father has more household children than own children is controlled as a proxy for being a stepfather to account for differential time allocation among biological and non-biological fathers (Hofferth & Anderson, 2003).

Finally, we enter the number of children in the household in these models, even though paternal education level arguably affects family size. Because we cannot consistently identify which child the father is interacting with, fathers with more children in the household should report more time with children, all else equal. If family size varies by age of youngest child, or by fathers' education level, then family size will confound the basic patterns we aim to investigate. Having multiple children could also change the nature of time spent with the youngest children as the oldest could do some child care, especially play. The number of children in the household is centered at one.

Analytic Strategy

First, unadjusted differences in fathers' time with children by education level, age of youngest child, and activity type are examined. The mean minutes for each subgroup will

indicate whether, unadjusted for any other characteristics, child time patterns are characterized by both education and developmental gradients.

Next, using OLS models, we regress time in each activity type, as well as the global measure of all types of child care time, on dummy variables for paternal education level and child age group controlling for paternal race, age, family size, and household versus own children. OLS models are used rather than tobit models, despite substantial left censoring of fathers' time, because OLS models have been shown to yield less biased estimates when modeling time use (Stewart, 2009). Six variables interacting paternal education and child age are entered to determine if differences by education level vary significantly across age groups. The reference categories in these models are high school education and *the child age group for which the activity is most important developmentally*. Thus, in models predicting participation in basic care and play, birth to two is the reference category because basic care and play are the primary parenting activities when children are infants and toddlers. In the model predicting participation in teaching, ages three to five is the reference because teaching becomes paramount during the preschool years, and in the model predicting management, ages six to 13 is the reference because management becomes paramount during middle childhood. Because the hypothesis predicts that educational differences will be largest in the age group for which each activity is most important, and that group is always the reference, significant negative regression coefficients for the interactions between college education (and some college) and both non-omitted age groups would indicate that educational differences are indeed largest for the omitted age group. All models include weights adjusted to the 2006 weighting level.

To ease interpretation of the interactions, we generate predicted mean minutes in each child care activity from the OLS regression models. For each model, values for paternal

education and child age group are rotated to generate probabilities for each education by age subgroup.

Results

Bivariate Results

Table 2 displays the mean minutes fathers spend in each of the four activities, and in all care, by paternal education level and child age groups. Consistent with previous literature, a clear education gradient emerges at all ages in terms of participation in total care as well as participation in specific activities. However, the magnitude of the gradient varies by child age and activity type. In terms of total care time, the largest differences by fathers' education emerge in the two youngest age groups. College educated fathers of 0 – 2 year olds spend 26 more minutes in total care than those with a high school degree and more than twice the time of fathers without a high school degree. Likewise, college educated fathers of 3 – 5 year olds spend 19 more minutes in total care than high school educated fathers. By contrast, college educated fathers of 6 – 13 year olds spend only 8 more minutes in total care than high school educated fathers.

The overall gradient masks important variations in the pattern by activity type that suggest a partial "developmental gradient" in fathers' time. For basic care and play, fathers in all education groups spend the most time when children are infants and toddlers and decrease their time as youngest children age. More importantly, however, the largest gaps among education groups emerge when youngest children are 0 – 2, with college educated fathers spending about twice the time in basic care (24 more minutes) and nearly triple the time in play (28 more minutes) of the least educated fathers. By contrast, when youngest children are ages 6 – 13, college educated fathers spend only 2 more minutes in basic care and 2 more minutes in play

than the least educated fathers, much smaller differences. The differences between fathers of 3 – 5 year olds with a college degree and those with only a high school or less than high school degree in basic care and play fall in between those with the youngest versus oldest children. In sum, these patterns suggest a developmental gradient in fathers' time with children for basic care and play.

For time spent in teaching, however, differences by paternal education and child age do not suggest a developmental gradient as clearly. College educated fathers spend somewhat more time teaching than less educated fathers across age groups, a pattern consistent with an education gradient. Fathers in all education groups also increase their teaching time when youngest children are 3 – 5 years old versus 0 – 2, as developmental theory would predict. However, the gaps among education groups are relatively equivalent across age groups in terms of raw minutes (2 – 4 minute differences between college and high school educated fathers). Because the education differences are similar across child ages, fathers' time in teaching does not appear to follow a developmental gradient.

Fathers' time in management also does not reflect a clear developmental gradient. Again, college educated fathers spend more time in management than those with only a high school or less than high school education, reflecting an education gradient, particularly between fathers with a less than high school education and all other groups. Fathers at every education level also increase management time as children age, particularly when youngest children are between 6 and 13 years old, as developmental theory would predict. However, the magnitude of the education gradient is similar across child ages both in terms of raw minutes (1 – 3 minutes) and percent differences (i.e., college educated fathers spend approximately 127% more time than

high school educated fathers at all ages). This consistency suggests an education gradient in fathers' management time (as has been shown in prior research), but not a developmental one.

Multivariate Results

The bivariate results support the hypothesis that highly-educated fathers tailor their childrearing time to children's developmental needs, and that they do so to a greater degree than less educated fathers, but, interestingly, only for those activities in which fathers tend to specialize (i.e., basic care and play [Pleck, 1997; Yeung et al., 2001]). To determine if these patterns hold when demographic differences are controlled and if education differences are statistically significant and different across age groups, OLS models for time spent in total care and each of the four types of care were run separately for each activity, including total care, controlling for fathers' race, age, family size, and household versus own children. Results are displayed in Table 3 and predicted means generated from these models are plotted in Figures 1 through 4.

As in the bivariate analyses, differences between fathers with a college and high school education in total child care time are larger when youngest children are 0 – 2 years old than school-age, as the significant negative interaction between college educated and child age 6 – 13 indicates. Notably, the difference between time fathers with a high school degree spend in total care versus those with less is also significantly larger when children are 0 – 2 than when they are 3 – 5 and 6 – 13, as the significant positive interactions between less than high school and both ages groups indicate. The developmental gradient thus emerges not only between high school and college educated fathers but also between high school and less than high school educated fathers.

A similar pattern of results emerges for time fathers spend in basic care and play. In models predicting time in both activities, interactions between college education and child ages 6 – 13, (with 0 – 2 as the reference category), and between less than high school and both age groups, are significant at the 99% confidence level, indicating that time differences in basic care and play between fathers in these two education groups and fathers with a high school education are larger in the 0 – 2 age group than in the older age groups. Predicted means plotted in Figures 1 and 2 clearly depict this developmental gradient (Figure 2).

As the bivariate results suggest, a clear education gradient emerges for fathers' time spent teaching. However, no significant interactions emerge between father education level and child age groups, indicating that differences by education are similar across child age groups. Predicted means plotted in Figure 3 clearly depict these patterns. Likewise, for fathers' time spent in management, neither a strong education nor developmental gradient emerges. That is, fathers increase their management time when children are school-aged to similar degrees across education levels (Figure 4).

Identical models were run predicting time fathers spend on weekends only ($N = 4743$). The sign and significance of all main effects of fathers' education level, child age, and education by age interactions were unchanged, with one exception: on weekends, college educated fathers spend significantly more time in management than high school educated fathers, an education gradient not apparent on weekdays. Moreover, the magnitudes of all significant father education by child age interactions were greater in the weekend sample, suggesting a stronger developmental gradient in fathers' time on weekends.

Discussion

Over the past 40 years, the role of fathers in children's lives, and the meaning of fatherhood itself, has changed substantially. Rising rates of maternal employment and greater appreciation of fathers' role in child development have popularized a more time-intensive fatherhood ideal (Cabrera et al., 2000; Daly, 2001), one that prescribes more "nurturing" parenting roles than the traditional father-as-breadwinner or -disciplinarian (Pruett, 1987). Highly educated fathers' adherence to a developmental gradient in paternal time may reflect, in part, their embrace of this more nurturing paternal role. It may also reflect, more broadly, a growing divergence in the destinies of children born to the most and least educated parents. McLanahan (2004) argued that children born to the most educated parents are gaining resources, in terms of parents' money *and* time, whereas children born to the least-educated parents are losing resources. The present study bolsters this notion of diverging destinies, especially given that highly-educated mothers display an even stronger developmental gradient than the one identified here (Kalil et al., 2011), and that highly educated men tend to partner with highly educated women (Mare, 1991). In other words, children of highly-educated parents appear doubly advantaged relative to their socio-economically disadvantaged peers in terms of parents' time, an advantage that may contribute meaningfully to socioeconomic differences in children's developmental outcomes. Unfortunately, our data do not include the time use of mothers and fathers in the same family to explicitly test this hypothesis.

The developmental gradient for fathers is not as strong as that for mothers insofar as it is limited to fathers' time in basic care and play (whereas Kalil et al. found that the developmental gradient for mothers also extended to teaching and management activities). Highly-educated fathers spend the most time in basic care and play when children are infants and toddlers – precisely when children most require parents' time on such basic activities as bathing and

feeding and also precisely when parent-child play is at its most developmentally-appropriate. Moreover, they tailor their time in this way much more so than their less educated counterparts. These results suggest that fathers, even highly educated ones, may still define their parenting roles more narrowly than mothers, choosing to specialize in caregiving and play over teaching and management. It also suggests that fathers choose to focus their child time, and their active parenting, during the first three years of children's lives. This focus may benefit the children of highly educated fathers more than a focus on the later years, however. The home serves as infants' and toddlers' primary development context (Shonkoff & Phillips, 2000), whereas schools and peers become more important as children age (Collins, Madsen, & Susman-Stillman, 2002). Moreover, during infancy and toddlerhood children undergo crucial brain and behavioral development that is influenced by the environment and establishes developmental trajectories that are mutable but increasingly difficult to change over time (Carnegie Corporation, 1994; Knudsen, Heckman, Cameron, & Shonkoff, 2006; Shonkoff & Phillips, 2000). Therefore, highly educated fathers may have a more pronounced developmental impact by maximizing their parenting time during the early years than they would if they maximized time later on.

It is also important to note, however, that fathers at all education levels tailored their parental time to children's developmental needs to some extent. That is, all groups maximized time in basic care and play in early years, increased time in teaching during preschool, and increased time in management by middle childhood. Indeed, time diary data from previous decades indicates that all fathers – college educated and non-college educated, married and unwed – have increased the amount of time they spend in active child care since the 1960s (Bianchi, 2000). Taken together, these findings suggest that most fathers use their child time to respond to their children's developmental needs and see this responsiveness as an essential part

of fatherhood. Our study indicates, however, that highly educated fathers exemplify the ideal of nurturing or developmentally-sensitive fatherhood to a greater extent than their less educated counterparts.

A question that remains is how meaningful the developmental gradient in fathers' time might be for children's developmental outcomes. Because our time use data do not contain child outcomes, we cannot test this important question here. But one way to answer this question is to compare the additional time children get from highly educated fathers to time spent in analogous activities known to enhance child development. Take time fathers spend in child-directed play as an example. If college-educated fathers spend 10 more minutes per day playing with toddlers than do high school educated fathers (and 28 more minutes per day than fathers without a high school degree), then their children spend roughly 182 (and 510) more hours in child-directed play between their first and third birthdays than their counterparts. Considering that children spend approximately 475 hours in free play in a year of half-day preschool (2.5 hours a day, 5 days a week for 38 weeks a year), then having a college-educated father is tantamount to spending three extra months (or over one extra year) in preschool versus having a high school educated father. These differences only reflect the additional time highly educated fathers spend with children. When we consider that highly educated men tend to marry highly educated women, and that the developmental gradient is even stronger among mothers (Kalil et al., 2011), these differences greatly underestimate the additional time investments that children of highly educated parents receive relative to those of less educated parents.

Before considering the implications of our results, it is important to note their limitations. Most notably, we do not identify which child, among all in the household, the father is interacting with during a particular activity. Thus, we cannot argue that fathers are spending

more time in basic care with infants and toddlers than they are with six to 13-year-olds, only that when an infant or toddler lives in the house, fathers are spending more time in basic care and play than they do when only six to 13-year-olds live in the house. However, if this ambiguity biased our estimates, we believe it could only have minimized the developmental gradient in fathers' time use that we identified. The inclusion of older children in the infant and toddler subgroup families theoretically dilutes age group variation, making differences in time use across age groups, and differences in the education gradient across age groups, harder to detect. Moreover, controlling for family size minimizes the influence of any possible bias.

Another limitation of the ATUS is one shared by all time diary surveys: child care time is self-reported. Thus, it is possible that college educated fathers emphasize different activities when reporting their time rather than actually spending their time differently. For instance, perhaps college educated fathers believe they "should" spend time engaging in enriching activities with their children, therefore, when talking to their children while doing other household tasks, they are likely to report their "primary" activity as "talking to children." In the same situation, high school educated fathers may report the household task as their "primary" activity, with talking to their children coded as "secondary" child care time. In the absence of observational data, it is difficult to determine the extent to which differences in reporting drive differences in child care time. However, observational studies comparing the quantity and quality of parents' language use with children by parent education (Hart & Risley, 1995), as well as parents' time spent in child-directed activities (Lareau, 2003), suggest the education gradient found in time diary data is not strongly biased by reporting differences.

Although the present study identified a developmental gradient in fathers' time that may have implications for child well-being, we cannot know whether the developmental gradient

arises directly or indirectly from paternal education. It is possible that fathers learn about child development during college, thus highly-educated fathers are consciously acting on knowledge attained in formal schooling, or that college alters fathers' goals for their children and thus their parenting values, as sociological theory would suggest (Sewell et al., 1970). Alternatively, fathers with parenting values that make them more responsive to children's emerging skills and abilities simply may select to receive more education or may progress educationally because of stronger academic ability. It is also possible that highly educated fathers learn from their highly educated partners about developmentally sensitive parenting and imitate them to some degree. If so, mothers' education could drive the developmental gradient in fathers' time as much as fathers' education.

In sum, the present study identified, for the first time, a developmental gradient in fathers' time, particularly during the earliest years of childhood. Its findings suggest that highly-educated fathers assume responsibility for children's development in ways similar to highly-educated mothers, albeit to a somewhat lesser degree. Most important, the developmental gradient we identified suggests that highly- educated fathers assume parenting roles that may be more developmentally-enriching than those of their less-educated counterparts, a difference that could contribute to the widening gap between the developmental outcomes of more and less advantaged children.

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Table 1. *Descriptive Statistics*

Variable	Mean	SD
All Child Care	55.62	87.89
Basic Care	22.97	50.51
Teaching	6.41	22.27
Play	18.91	53.55
Management	7.33	30.07
Less than HS (or GED)	0.14	--
High School	0.29	--
Some College	0.24	--
College Degree	0.33	--
Age	38.05	7.88
White	0.71	--
African American	0.09	--
Latino	0.20	--
# of Own Children in HH	2.03	0.95
# of Own Children < # all HH Children	0.07	--
Youngest Child Age 0 - 2	0.34	--
Youngest Child Age 3 - 5	0.23	--
Youngest Child Age 6 - 13	0.43	--

Note. All statistics are weighted.

Table 2. *Average Minutes in Child Care Activities, by Child Age*

	Age 0 - 2	Age 3-5	Age 6-13	Total
Education Level		All Care		
< HS	43.05	50.55	28.45	39.16
HS	74.76	51.46	31.50	50.08
Some College	78.06	67.19	33.40	55.28
College or Beyond	101.43	71.01	39.38	68.39
Total	78.95	61.47	34.10	55.62
Education Level		Basic Care		
< HS	23.41	21.67	10.16	17.83
HS	34.69	18.79	9.83	19.92
Some College	35.60	27.59	9.44	21.88
College or Beyond	47.05	29.96	12.68	28.70
Total	37.12	25.05	10.71	22.97
Education Level		Play		
< HS	14.87	17.85	6.09	12.17
HS	33.01	20.58	6.25	18.21
Some College	31.10	23.48	7.28	18.53
College or Beyond	42.83	22.01	7.21	23.10
Total	32.67	21.28	6.80	18.91
Education Level		Teaching		
< HS	2.21	6.96	7.30	5.33

HS	2.58	5.23	6.60	4.99
Some College	5.37	8.39	7.10	6.85
College or Beyond	5.72	9.75	8.35	7.74
Total	4.23	7.76	7.40	6.41

Education Level	Management			
< HS	2.57	4.06	4.90	3.83
HS	4.47	6.85	8.82	6.96
Some College	5.97	7.73	9.58	8.01
College or Beyond	5.82	9.29	11.14	8.85
Total	4.93	7.38	9.18	7.33

Note. All statistics are weighted.

Table 3. *OLS Regression Model Results for Fathers' Time Spent in Each Activity*

	(1) Full	(2) Basic	(3) Play	(4) Teach	(5) Mgmt
Less than HS	-24.549**	-7.972**	-15.329**	2.345	-3.454*
	[4.789]	[2.769]	[2.949]	[1.503]	[1.548]
Some College	1.409	0.085	-2.407	3.061*	0.485
	[4.382]	[2.533]	[2.698]	[1.346]	[1.309]
College	21.867**	10.551**	7.944**	4.149**	1.424
	[4.012]	[2.320]	[2.471]	[1.259]	[1.249]
YC Age 3-5	-24.170**	-16.144**	-12.301**		-1.430
	[4.692]	[2.713]	[2.889]		[1.574]
YC Age 6-12	-45.144**	-25.472**	-26.877**	1.500	
	[4.162]	[2.406]	[2.562]	[1.166]	
YC Age 0-2				-2.540*	-3.165*
				[1.233]	[1.477]
<HS * 3-5	30.703**	13.978**	15.240**		1.347
	[7.297]	[4.219]	[4.493]		[2.513]
<HS * 6-13	26.692**	10.839**	16.770**	-1.056	
	[6.332]	[3.661]	[3.899]	[1.861]	
Some Coll * 3-5	13.145+	8.224*	4.767		0.339
	[6.732]	[3.893]	[4.145]		[2.239]
Some Coll * 6-12	-0.976	-0.979	2.849	-2.66	
	[5.720]	[3.307]	[3.522]	[1.658]	
College * 3-5	-6.831	-1.22	-7.962*		0.149
	[6.181]	[3.574]	[3.806]		[2.088]

College * 6-12	-17.459**	-9.090**	-7.935*	-2.636	
	[5.268]	[3.046]	[3.244]	[1.547]	
<HS * 0-2				-2.152	2.013
				[1.918]	[2.247]
Some Coll * 0-2				-0.524	0.710
				[1.769]	[2.030]
College * 0-2				-1.347	-0.855
				[1.624]	[1.869]
Age Centered Mean (38)	0.137	0.066	-0.07	-0.013	0.154**
	[0.134]	[0.078]	[0.083]	[0.035]	[0.048]
African American	-17.082**	-4.625**	-10.526**	-0.553	-1.379
	[3.104]	[1.795]	[1.912]	[0.816]	[1.102]
Latino	-20.384**	-9.565**	-6.349**	-2.196**	-2.274*
	[2.532]	[1.464]	[1.559]	[0.666]	[0.899]
Number of Kids > 1	2.870**	1.974**	-1.526**	1.045**	1.376**
	[0.938]	[0.542]	[0.578]	[0.247]	[0.333]
HH > Own Kids	4.634	5.641**	-5.488*	1.172	3.308**
	[3.476]	[2.010]	[2.140]	[0.913]	[1.233]
Constant	78.584**	35.000**	37.470**	4.513**	7.307**
	[3.337]	[1.930]	[2.055]	[0.990]	[1.000]
Adjusted R^2	0.08	0.07	0.06	0.01	0.01
N	9339	9339	9339	9339	9339

Note. Standard errors displayed in brackets below OLS model coefficients. * $p < .05$, ** $p < .01$

Figure 1. Predicted mean minutes fathers spend in basic care by child age and paternal education.

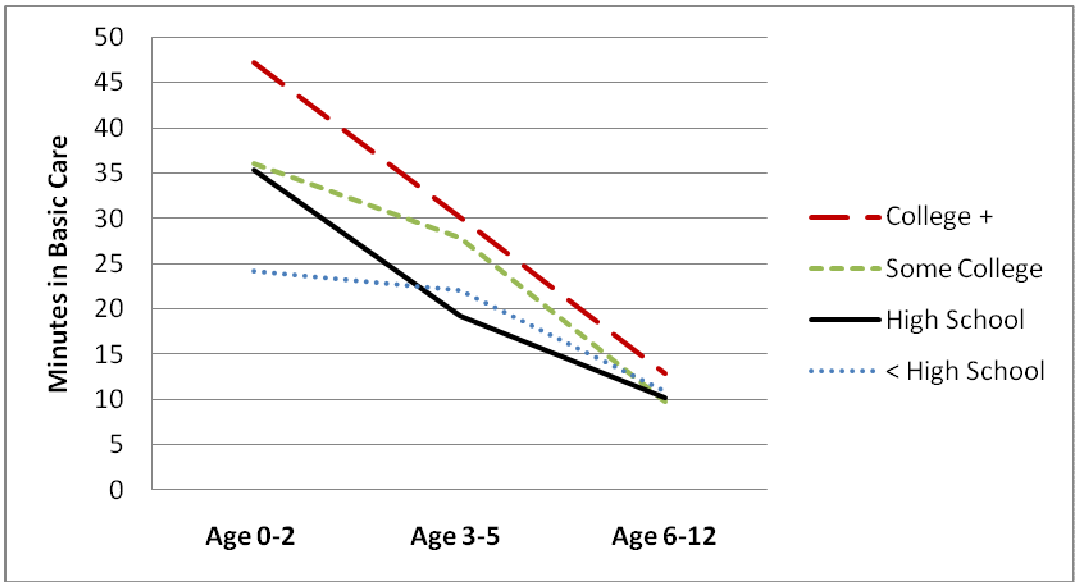

Figure 2. Predicted mean minutes fathers spend in play by child age and paternal education.

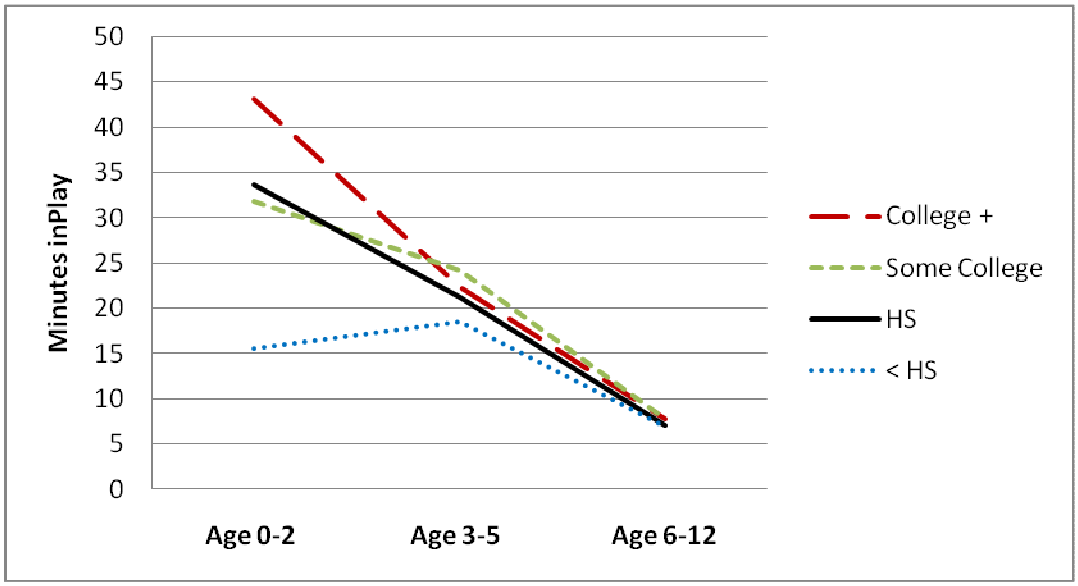

Figure 3. Predicted mean minutes fathers spend in teaching by child age and paternal education.

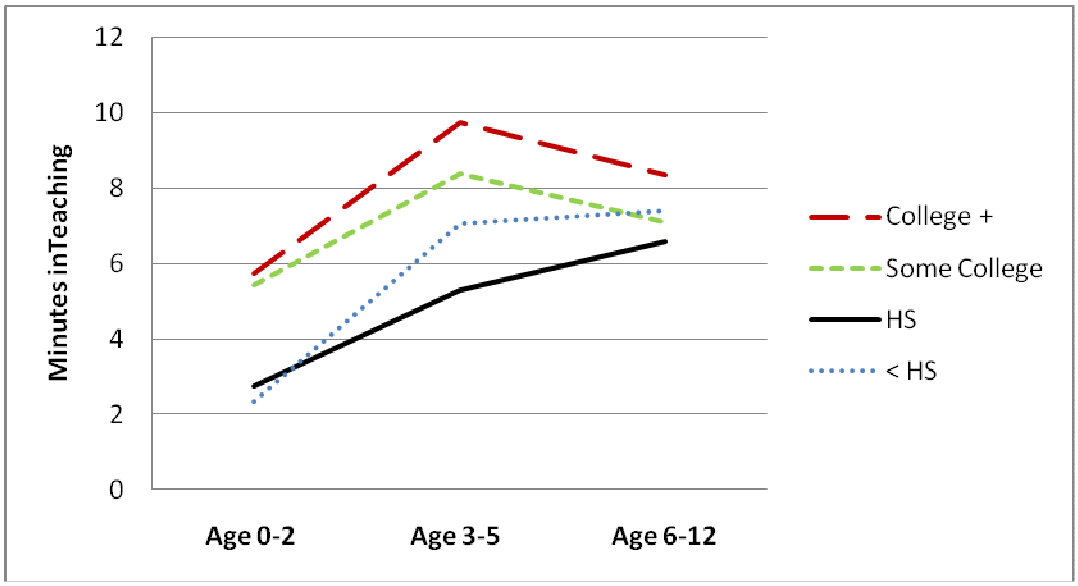

Figure 4. Predicted mean minutes fathers spend in management by child age and paternal education.