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Maternal Education, Early Child Care and the Reproduction of Advantage

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Abstract

The social and human capital that educational attainment provides women enables them to better navigate their children's passages through school. In this study, we examine a key mechanism in this intergenerational process: mothers' selection of early child care. Analyses of the NICHD Study of Early Child Care and Youth Development revealed that maternal education was positively associated with configurations of child-care characteristics (i.e., type, quality, quantity) most closely linked to children's school readiness. This association was not solely a function of mother's income or employment status, persisted despite controls for many observable confounds (e.g., maternal cognitive and psychological skills, paternal characteristics), and, according to post-hoc indices, was fairly robust in terms of unobservable confounds.

Rates of educational attainment among American women are increasing dramatically, with women now more likely than men to graduate from high school and college and pursue advanced degrees (Buchmann and DiPrete 2006; Nevill and Chen 2007). The intergenerational implications of this trend are profound (Kalmijn 1994). In short, educational attainment enhances the economic position of women and helps mothers establish a storehouse of skills, knowledge and resources that they can leverage to bestow instrumental and socioeconomic advantages on their children. These children, in turn, are better positioned to use the educational system to enhance their own social mobility (Baker and Stevenson 1986; Lareau 1989). This intergenerational phenomenon is often viewed as a social class issue that plays out as children move through formal schooling (Sirin 2005). We argue that this class perspective can be complemented by viewing this phenomenon as a human and social capital process that plays out before children even start school.

With this goal in mind, this study examines one *early* mechanism through which the educational attainment of mothers helps to secure long-lasting advantages for children: selection into early child-care situations that promote children's school readiness. Not only does educational attainment affect whom women marry, it makes them prime consumers in the child-care market by strengthening their attachment to the labor force and increasing their ability to afford the high costs of child care (NICHD Early Child Care Research Network 1997). At the same time, by enhancing social networks, cognitive skills and

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¹See the study website at <http://secc.rti.org/> for information.

psychological capacities (Coleman 1988; Davis-Kean 2005; Kingston et al. 2004; Mirowsky and Ross 2003), education provides mothers of all income and employment statuses with more knowledge about what is needed for their children to succeed in the long run (e.g., pre-school enrichment), more skill at assessing how to meet these needs, and more opportunity to turn these assessments into reality. As such, the early academic advantages of maternal education for children can be realized regardless of the potential employment or financial effects of mothers' educational trajectories.

Following this logic, we expect that maternal education—above and beyond employment status and income—will be associated with the pre-school child-care arrangements that research has clearly identified as most conducive to children's readiness for school, namely regular but limited time in high-quality child-care centers (NICHD ECCRN 2005). This expectation will be tested with intergenerational data drawn from the NICHD Study of Early Child Care and Youth Development, which has been the data source for much of what is known about the developmental consequences of non-Head Start child care in the United States. In sum, this research builds on the substantial literature on social class differences in parental investment (e.g., Coleman 1988; Lareau 2004) by highlighting the role of maternal education in the social class matrix, shifting the focus to early childhood, taking steps to promote causal inference and reconceptualizing early child care as an opportunity, not just a necessity.

Educational Attainment and the Intergenerational Transmission of Status

As noted, paid employment and income are fundamental to the link between maternal education and the intergenerational transmission of socioeconomic advantage. Rising rates of educational attainment have selected women into higher-paying, higher-status segments of the labor force, altering the distribution of family income in the process (Karoly and Burtless 1995). When married or single women earn more money, they set in motion the well-documented effects of income on children (Raver, Gershoff and Aber 2007). At the same time, ample evidence has revealed that work has direct implications for women's own life/family management, both of which are significant for child development (Menaghan and Parcel 1995; Muller 1995).

Importantly, however, education advantages women in ways that extend beyond jobs and money. It enhances their critical thinking skills, personal efficacy and social networking. These benefits are not just realized at the high end of the educational system—not only do college graduates have measurable advantages in psychosocial skills and resources over high school dropouts, high school graduates do too. In other words, *any* persistence in the educational system matters (Kingston et al. 2004; Mirowsky and Ross 2003). Because women are the primary caregivers in most families, the acquisition of such resources affects how children are reared. For example, maternal education has been linked to increased levels of prenatal care, authoritative parenting, positive mother-child interaction and parental management/advocacy (Lareau 1989; Raver et al. 2007; Schneider and Coleman 1993; Useem 1992; Young et al. 1990). These practices are not only associated with women's preexisting education levels, but also improve as mothers acquire more education (Gennetian, Magnuson and Morris 2008).

For the most part, research on this process focuses on three mechanisms. First, as women gain education, they are more likely to use complex language with their children, read with and provide home learning activities for their children, accompany their children on intellectual activities (e.g., museum), and enroll their children in lessons (Chin and Phillips 2004; Hofferth and Sandberg 2001; Walker et al. 1994). Second, education promotes mothers' participation in school activities, partnering with school personnel to promote

children's learning and intervening at school to advance children's interests (McNeil 1999; Lareau 1989; Raver et al. 2007; Useem 1992). Third, educational attainment cultivates values about social mobility and standards of success, which directly motivate mothers' pro-academic behaviors and indirectly engender higher aspirations among children (Davis-Kean 2005; Sewell, Haller and Ohlendorf 1970). These home-, school- and community-based activities promote the future educational prospects of children by facilitating their cognitive *and* social development.

Today, in an era in which non-maternal care in early childhood is the norm and variability in such care sharply differentiates children on school readiness, the ways in which parents select and manage early child-care arrangements is also an important element in the management of their children's education (Clarke-Stewart and Allhusen 2005). In this study, we focus on that element as a mechanism by which education helps women bestow advantages on their children.

Maternal Education and Early Child Care

Figure 1 depicts the conceptual model underlying this study. According to this model, child-care arrangements represent one pathway connecting maternal education to children's school readiness.

Beginning with Path A, ample evidence supports the link between maternal education and a variety of child outcomes, such as cognitive and social skills, upon entry into schooling. Importantly, this literature encompasses studies with both community-based and national-level samples that use a variety of methods (e.g., experimental design, instrumental variable analysis, fixed effects modeling) to promote causal inference (Bornstein and Bradley 2003; Gennetian 2008; Zaslow et al. 2002).

Turning to Path B, the SECCYD was designed specifically to gauge the implications of early child care for child outcomes. Its findings on the links between child-care type, quality and quantity on one hand and school readiness on the other are clear and consistent and have been supported by numerous other studies. First, center care has the greatest impact on cognitive development. Compared to more informal, home-based arrangements, centers offer more structured, stimulating and developmentally appropriate curricula led by better-trained staff, all of which promote language development, reading proficiency and other skills (NICHD ECCRN 2005; Vandell 2004). Second, high-quality care – whether center-based or not – encompasses warmer, more sensitive, more responsive caregiver-child interactions. Children who switch from low- to high-quality care often post increases in scores on cognitive tests (NICHD ECCRN 2003). When coupled with the stimulating activities that are more common in center care, this high-quality interaction can substantially boost children's cognitive skills. Third, even the benefits of high-quality center care follow a law of diminishing returns, with longer hours associated with child behavioral problems that can reduce school readiness (ECCRN 2003; Loeb et al. 2007; Raver 2002). Thus, the general consensus of the SECCYD and other important studies is that limited hours in high-quality, center care provide children the best preparation for formal schooling.

Given this broad empirical support in sociology, psychology and economics, paths A and B serve as “givens” in this study. Our focus is on Path C. This path has also been studied by social and behavioral scientists, albeit less extensively than paths A and B, and significant gaps in our knowledge about this path remain. A review of the relevant literatures, however, does provide a clear conceptual motivation for linking maternal education to early child-care arrangements as well as empirical evidence that maternal education is indeed linked to *specific* dimensions of early child care. Our aim is to coalesce and further develop the various strands in this knowledge base.

Just as mothers rely on human capital to select specific schools and courses for school-aged youth (Useem 1992), they likely do the same when selecting care for young children. For most mothers, cost, convenience and availability are primary determinants of early care arrangements (Clarke-Stewart and Allhusen 2005). As maternal education increases, however, perceptions about the educational component of child care become more important (Johansen, Leibowitz and Waite 1996). What educated mothers are searching for is an academic advantage for their children before school starts. In this way, mothers' human capital selects children into the "school preparatory" kinds of early child care identified by the SECCYD and other studies, regardless of the employment and income correlates of educational attainment that make early child care more necessary and more economically feasible.

For example, education increases knowledge about how the educational system works, so that more educated mothers express more desire for cognitive enrichment in early child care and, therefore, prefer formal arrangements. Women with less education, on the other hand, prefer family-based care for young children (Johansen et al. 1996). Echoing Lareau's (2004) concept of concerted cultivation in upper-class homes, educational attainment appears to increase the likelihood that early child care will be viewed as a competitive edge for children. Also important is what educational attainment does to social networks. Friends, acquaintances and associates provide valuable information to parents on a child-care search. Consequently, the contacts that parents have matter (Clarke-Stewart and Allhusen 2005; Fuqua and Labensohn 1986). As seen in school choice research (Schneider et al. 1997), the diffuse networks that educational attainment cultivates should allow mothers greater access to information about child-care options and more support for weighing those options. Finally, educational attainment is closely related to planfulness (Shanahan, Elder and Miech 1997), which, given the instability and ambiguity of the child-care market and the demands of family life (Hofferth 1996), is likely to be a major resource to mothers trying to secure care (and advantages) for their children.

The conceptual model, therefore, hypothesizes that maternal education will predict the type, quality and quantity of early child care. As noted above, evidence—from the SECCYD and other studies—has *already established* that more educated mothers are more likely to draw on center care, have higher quality care, and use less care, in part because of their work and financial circumstances (NICHD ECCRN 2005; Leibowitz, Waite and Witsberger 1988). This article contributes to the existing literature on Path C by investigating how educational attainment affects the ability of mothers in all employment statuses and income levels to target a *combination* of these three elements, procuring academic advantages for their children; in other words, how these three dimensions go together as steps in a decision-making/selection sequence. Following evidence that parents start with the type of care they want for their children and then go from there (see Clarke-Stewart and Allhusen 2005), this study focuses on how maternal education predicts child-care type and then, within types, how it predicts quality and quantity.

The Importance of Timing

As another layer, the processes in this model occur within a temporal context related to children's development. First, the benefits that children derive from child care evolve with age, as cognitively enriching, more structured activities become increasingly important as children approach the start of school (La Paro and Pianta 2000). Second, cultural norms about the purpose of early child care and the necessity of school readiness also evolve, with non-parental care becoming more acceptable and learning activities deemed more crucial as the start of formal schooling nears (Scarr 1998). These two age-related trends do not align perfectly. The middle portion of early childhood (ages 3–4) is a period in which children

could benefit from more structured learning but norms about the use of non-parental care—other than as necessity – are more ambivalent than they are in the years just prior to the school transition, when non-parental care becomes both normative and more valued (Clarke-Stewart and Allhusen 2005).

This disconnect has implications for the conceptual model. In the middle years of early childhood, the primary implications of maternal education will be seen in the entry of children into center care vs. other types, regardless of income or employment. More educated mothers will be more likely to discern the potential payoff of center care at a time when it is not a given. Nearing school entry, however, these implications will be best seen in the kind of center care used. Norms about the need for more structured, institutional experiences prior to school will carry many children into the center care market, but maternal education will help to determine whether children are carried into optimal or suboptimal segments of this market in terms of their preparation for school.

Methods

Data and Sample

The NICHD SECCYD is a birth cohort study designed to understand the developmental implications of child care. The families who participated in this study were recruited from hospitals in or near 10 locations: Little Rock, AR; Irvine, CA; Lawrence, KS; Boston, MA; Philadelphia, PA; Pittsburgh, PA; Charlottesville, VA; Morganton, NC; Seattle, WA; and Madison, WI. During selected sampling periods in 1991, 5,265 new mothers met the eligibility criteria for the study (at least 18 years old, conversant in English, with a healthy singleton child and no plans to move), and they agreed to be contacted after returning home from the hospital. When infants were 1 month old, 1,364 families (58 percent of those contacted) were enrolled in the study. Although the sample was not nationally representative and is weighted towards middle class, white families, it does have economic, geographic and racial diversity. These families participated in interviews, diagnostic tests, and observations in the home, the laboratory and in child care (and eventually school) at regular intervals from the target children's birth through their entry into high school.

Our analytical sample included the 1,127 families who participated in both the 36- and 54-month follow-ups. This sample was selected to cover the period immediately preceding the transition to formal schooling and, within this period, to capitalize on age-related variation in normative rates of early child-care use. When children were 36 months old, 70 percent of children were in two-parent families (68 percent at 54 months), and the average family income-to-needs was 3.64 (3.61 at 54 months). The race/ethnic makeup of the sample was 76 percent white (79 percent at 54 months). Table 1 provides more descriptive statistics for the study sample.

Measures

Early Child Care

The first child-care indicator was type. Information on who provided child care and where was obtained from mothers at 36 and 54 months. Following conventions in the SECCYD and other data sources (Hofferth 1996; NICHD ECCRN 2005), we focused on the primary arrangement where children spent the most time. The typology included categories for sole maternal care, center care, relative care (which includes father, mother's partner or grandparent), group care (which includes family day care center and other arrangements in the home of a non-relative), and in-home care (which includes babysitters and nannies hired to care for the child in the child's home).

The second indicator was child-care quality, which was measured by the Observational Rating of the Caregiving Environment. The ORCE, the first systematic national protocol for child-care evaluation, was developed based on widespread agreement among developmental researchers and child-care professionals as to what constituted quality care. At 36 months, quality assessments included six items: fostering exploration, sensitivity to nondistress, intrusion, detachment, stimulation of development and positive regard. At 54 months, the quality assessment included four items: sensitivity, intrusiveness, detachment and cognitive stimulation. Observations were conducted in the primary care arrangement for 44 minutes over two cycles, and trained observers rated specific interactions between study children and caregivers based on the appropriate assessment. All ratings had a four-point scale (1 = *not at all characteristic* to 4 = *highly characteristic*). The average of all ratings measured total quality ($\alpha = .83$ at 36 months, $\alpha = .72$ at 54 months). Post-hoc analyses of the ORCE ratings revealed that the specific ratings of quality care were accurately measuring the types of care best promoting child development. Furthermore, these analyses found that neither the quality of care nor the occurrence of certain caregiver behaviors were associated with the race or ethnicity of the caregiver (NICHD ECCRN 2001).

Finally, quantity was measured by maternal reports of the *amount of time* per week that children spent in their primary non-maternal care arrangement at 36 and 54 months. Like the quality measures, the measures of quantity at 36 and 54 months had low to adequate levels of skewness (< 1) and, therefore, can be used in analyses that assume normality.

Maternal Education

During the 1-month interview, mothers reported their total years of education and their highest degree attainment. For most cases, the value of maternal education directly corresponded with the number of years mothers spent in school. Exceptions include mothers with multiple postgraduate degrees (assigned a value of 21), those with some college education or vocational degree (14), and those with a GED (12). This quasi-continuous measurement strategy for educational attainment was chosen because of evidence that years of schooling matter more for psychosocial outcomes than degrees (Mirowsky and Ross 2003). Extensive re-estimation of our focal multivariate analyses with alternate strategies (e.g., dummy variables for degree statuses) yielded similar results. We also sought to account for increases in maternal education since the child's birth. However, the low level of additional school obtained over time and documented problems with the reports of additional schooling (collected at 24 and 36 months) prevented us from including this measure.

Maternal Socioeconomic Circumstances

Three important correlates of both educational attainment and child-care needs were measured. First, maternal work status was based on mothers' reports of their average number of hours per week in a job, summed to create three dummy variables: non-working (working less than 10 hours per week), part-time work (10–30 hours), and full-time work (more than 30 hours). Dummy variables for whether mothers worked standard eight-hour work days or non-standard evening hours at both time points were also created to control for work patterns with consequences for access to and availability of care (Han 2004). Second, an income-to-needs ratio was calculated for each family at both time points by dividing maternal reports of all sources of household income by the poverty threshold for that family size. Third, family structure was measured by a set of dummy variables (single parent, married stepparent, cohabiting stepparent/biological parent, married two-biological parent). Additionally, the number of children under 18 living at home was also measured with maternal reports because of the possible association between number of children and care

arrangement type (Leibowitz et al. 1988). Each of these variables was measured at both 36 and 54 months.

Other Maternal Characteristics

Because both maternal education and child-care use may be related to intelligence and other cognitive capacities, we include mothers' scores on the Peabody Picture Vocabulary Test-Revised, an individually administered test of hearing vocabulary designed for persons 2½ to 40. Scores were standardized to a mean of 100 and a standard deviation of 15. Maternal depression was also included as an approximate estimate of mothers' attitudes toward parenting and overall sense of efficacy (Oyserman et al 2002). Depression was measured at 36 months and 54 months using a questionnaire developed directly from the Center of Epidemiologic Studies-Depression Scale. Mothers' responses were summed to create a scale ranging from 0 to 60. The inclusion of these measures was intended to address potential spuriousness in the association between maternal education and child care. Because maternal depression and intelligence also result from experience in the educational system, taking them into account could underestimate the true effect of maternal education.

Paternal Characteristics

Another set of potential confounds were important father characteristics, including: (1. a binary marker of whether the father (biological or adoptive) had a college degree *and* lived in the home and (2. a binary marker of whether the father worked fulltime *and* lived in the home. Mothers reported the total years of education of their children's fathers during the 1-month interview. Fathers with 16 years or more were considered to have a college degree. Fathers' employment status was based on mother reports of fathers'/partners' average hours worked per week, with 30 or more hours of paid work per week considered fulltime. Finally, mothers reported whether their child's father was living in the home. Because employment data were unavailable for fathers not living in the home, and because education data were unavailable for mothers' current partners, only the characteristics of fathers living in the home at the time of interview were considered. Similar to maternal depression and intelligence, controlling for such paternal characteristics could obscure some of the true effect of maternal education on child-care use because the strong correlations between paternal education/employment and maternal education could reflect assortative mating as much as (or more) than fathers' influences on mothers. Nevertheless, the very existence of these strong correlations necessitates controlling for such paternal characteristics in order to avoid the larger problem of selection bias.

Other Maternal, Child and Family Characteristics

To control for demographic/geographic differences in maternal education and child-care factors, we created a binary marker of child gender (1 = female), a set of dummy variables for child race/ethnicity (White, Black, Other), and a set of dummy variables for study site. Lastly, mother's age at the time of the child's birth was also measured.

Analytic Strategy

To begin, we looked at bivariate associations between categorical measures of maternal education and relevant sociodemographic and child-care variables. We then moved to multivariate analyses, which iteratively worked through the type, quality and quantity dimensions of early child care until reaching the intersection of all three in two different time periods. This approach was intended to simulate a theoretically grounded process by which mothers structure their children's care within different normative environments (Clarke-Stewart and Allhusen 2005).

The first step in the multivariate analyses was to assess associations between maternal education and child-care type. Multinomial logistic regressions were estimated in which 36- and 54-month type was predicted by maternal education and the full set of control variables (e.g., all maternal, paternal, child, and family characteristics and study site). We estimated each model with all possible reference categories, but our focus was on results with center care as the reference.

In the second step, OLS regressions examined the linkage between maternal education and child-care quality among children in non-maternal care. The first model regressed the quality measure on maternal education and the full set of controls. To this base model, we added maternal employment, child-care type and interactions between maternal education and child-care type. These interactions revealed whether the association between maternal education and care quality varied across care types. Our focus was on quality differences within the center care category. Again, these models were estimated for both the 36- and 54-month samples. To account for the possibility of bias related to selecting only children in non-maternal care, we also controlled for children's propensity to be in non-maternal care. The propensity score indexed a set of characteristics associated with non-maternal care and, therefore, tapped the degree to which children selected for our subsample resembled the average child in non-maternal care. These analyses revealed no substantial differences from the models presented here.

For the final set of analyses, we estimated a series of OLS regressions predicting the number of hours per week children spent in their primary non-maternal care arrangement. The base model measured the association between maternal education and hours with the full set of controls. To this model we added measures of child-care quality and type and then two-way interactions between quality and type, type and education, and education and quality. Finally, three-way interactions between arrangement type, quality and maternal education were tested. This final step revealed whether associations between maternal education and hours in the primary arrangement varied according to different combinations of care quality and type. Our focus was on quantity differences within centers of high and low quality.

Results

To gain a sense of the sociodemographic composition of different maternal education groups in the sample see Table 1, which presents descriptive statistics for three categories of maternal educational attainment in the 36-month data collection. On one hand, women with a college education were generally older, white, married to their children's fathers, and more financially secure. On the other, women with a high school degree or less were more commonly single, black, younger and less financially secure. Importantly, more educated women were less likely to work full time, but more likely to work parttime. Finally, as maternal education increased, children were more likely to be in center care and less likely to be in exclusive maternal care. Patterns at 54 months were similar except that more mothers, regardless of education level, worked fulltime and fewer were out of the labor force.

Along with increasing maternal education, therefore, came more human and social capital to promote children's success. These statistics serve as background for multivariate tests of the focal pathway in our conceptual model.

Early Child Care Type

The purpose of this research was to look at the sequence through which children end up in the care arrangements *already* identified by the SECCYD as conducive to school readiness. We begin with multinomial logistic models predicting the relative risk of being in group

home, relative, in-home or exclusive maternal care, compared to center care, at 36 and 54 months (see Table 2).

With each unit increase in maternal education, the relative risk of children being in relative care (vs. center care) at 36 months decreased by 12 percent, and the relative risk of being in sole maternal care (vs. center care) decreased by 14 percent. Education did not predict center care relative to other forms of *non-familial* care. When children were 54 months, the association between education and center care (vs. relative care) was not significant. At this stage, maternal education also did not predict differences between center and maternal care. Worth noting is that 30 percent of the sample was in center care at 36 months, compared to 56 percent at 54 months, meaning that maternal education made more of a difference when center care was less common. This model also revealed one marginal association – with each unit increase in education, the relative risk that a child was in in-home care (usually a nanny in this sample) compared to center care at 54 months increased by 21 percent. The increased likelihood that children of more highly educated mothers would be in in-home care over center was likely related to the fact that, at 54 months, children in in-home care spent the greatest amount of time in care. These children were likely the children of women with demanding careers who worked long hours.

Maternal employment and income are also associated with child-care use in the United States. Whether they explain away the link between maternal education and early child care is an important consideration. Several tests were conducted to explore this issue.

First, at 36 months, higher family income was associated with children being in center care more than maternal care and most non-maternal forms of care, but in in-home care more than center care. A similar pattern was found at 54 months except that the income differences between center care and maternal care increased while the income difference between center care and non-maternal arrangements decreased. At 36 months, mothers employed fulltime and parttime tended to use center care more than maternal care but less than other non-maternal care arrangements. Over time, the trend for mothers employed fulltime grew stronger. Mothers working parttime demonstrated a trend towards relative care as well as less differentiation between maternal and center care. Thus, income did more to differentiate child-care arrangements when children were younger, but maternal employment did more to differentiate child-care arrangements when children were older.

Second, to consider the extent that differences in income and maternal employment related to maternal education and accounted for the association between maternal education and child care, we compared the results from Table 2 to a prior model that did not control for family income or maternal employment (results from this earlier model available upon request). Importantly, adding maternal employment and family income to this baseline model (with all other controls) only marginally altered the initially observed associations between maternal education and child-care type. A similar pattern held at 54 months, except that controlling for income reduced to non-significance the initially observed associations between maternal education and center care (vs. maternal care) and controlling for parttime work generally attenuated the initially observed association between maternal education and center care (vs. other types). What these results imply is that employment and income were not strong mediators of the link between maternal education and child-care arrangements when children were young, but that the greater work scheduling flexibility of more highly educated mothers produced some mediation when children were older.

Third, Chow rests assessed whether the processes that underlie the association between maternal education and child care were structurally equivalent for working and non-working mothers and for high-income and low-income mothers. These tests did not reveal significant

differences in the education coefficient (and other coefficients) across groups in either time period, indicating that the factors (including maternal education) contributing to the selection of child-care arrangements did not differ meaningfully across employment and income categories.

These three analyses, then, suggest that maternal education was related to certain early child-care arrangements. This relation persisted above and beyond the economic resources or employment-related child-care needs of mothers, and was most pronounced when children were 36 months and the frequency of center care was less common.

Early Child-Care Quality

Turning to the second dimension of early child care, Table 3 presents the results of OLS regression models predicting the quality of non-maternal child care arrangements at 36 months. Table 4 presents the corresponding results for 54 months (recall that controlling for propensity to be in non-maternal care did not affect the results in these analyses).

At 36 months, maternal education did not predict child-care quality either in the absence of maternal employment (Model 1 in Table 3) or when it was controlled (Model 2). Full-time work did predict lower quality care ($b = -.15, p < .01$). Adding the child-care type dummy variables (Model 3) did not alter the association between maternal education and quality, although the significant coefficients for center, group and in-home care suggested that quality varied by arrangement type. Model 4 added the maternal education \times child-care type interaction terms. Significant interactions were found for group care and center care (vs. in-home care), although the relative magnitude and statistical significance of the interactions depended upon the reference category. To assess these interaction terms, we calculated predicted quality levels—based on model coefficients—for different combinations of maternal education and child-care type (with all other model variables held to their sample means/modes). Doing so indicated that maternal education was more positively related to quality of care for children in group care and in-home care than for children in center care.

The 54-month results were somewhat different (Table 4). First, in this period, maternal education was marginally associated with child-care quality even after maternal employment, income and child-care type were taken into account. Net of these factors, a unit increase in maternal education was associated with an improvement in the average quality of care by 5 percent of a standard deviation in the quality measure. Second, significant interactions between maternal education and child-care type (which arose from different modeling iterations with various types as the reference) indicated that, on average, the associations between maternal education and child-care quality were strongest for children in center care, followed by group care and relative care. In-home care quality did not significantly vary by education.

Thus, during developmental periods in which non-maternal care was normative but not universal, maternal education mattered most to child-care quality when children were in care types that—from the perspective of school readiness—were less ideal, and it mattered less when they were in care types (e.g., center care) most associated with school readiness. During the developmental stage when non-maternal care became more common, however, maternal education had a slight tendency to select children into higher-quality care regardless of other maternal circumstances, with this tendency growing stronger when children were already in care types most likely to promote school readiness.

Early Child-Care Quantity

As for the third dimension of early child care, we analyzed the association between maternal education and the quantity of time children spent per week in their primary arrangement. At

36 months (Table 5), Model 1 revealed a marginally significant association between maternal education and time in care ($b = -.45, p < .10$) that became significant after adding indicators for child-care type and quality in Model 2 ($b = -.48, p < .05$). The effect size equaled a half-hour reduction in time spent in non-maternal child care, net of type and quality of care, with each additional year of maternal education. Model 3 added two-way interactions between maternal education and child-care quality, quality and child-care type, and education and type. The first two sets of interactions were not statistically significant, but interactions between maternal education and child-care type were, although their strength depended on which category was used as the reference. Within relative care, increases in maternal education were most strongly associated with decreases in the number of hours children spent in care. In Model 4, we added three-way interactions between type, quality and maternal education. The addition of the three-way interactions revealed a much stronger main effect of education on hours within center care and a significant interaction between maternal education, quality and type for children in center care (which again arose from different modeling iterations with various types as the reference). The three-way interaction taken with the significant two-way interaction between maternal education and center care (not shown), suggests that women with more education had their children spend less time in center care overall, but extended their time in such care when it was of high quality. In other words, during a time when center care was less normative and high quality center care harder to access, more highly educated mothers limited their children's time in care unless the arrangement was the arrangement most conducive to school readiness—high-quality center care.

At 54 months, each unit increase in mother's education was associated with slightly less than a half hour reduction in the number of hours children spent in child care (Model 1 in Table 6). Adding type and quality to the model did not attenuate this association (Model 2). High quality care was associated with less time in non-maternal care at all levels of maternal education. Adding the two-way and three-way interaction terms (models 3 and 4) revealed that this general link between child-care quality and quantity was marginally stronger for center care but that maternal education did not condition this link for center care or any other care type. Thus, when the majority of children were in center care, time in care was closely linked to quality of care, particularly for center care.

In each step of this analysis, family income was not significantly associated with time in non-maternal care at 36 months, although it was associated with time at 54 months. Parttime maternal employment demonstrated the exact opposite effect. Not surprisingly, full-time work persisted as a significant predictor across models at both time points. Overall, then, employment status and income appeared to be less important to quantity of care at 36 months than they were at 54 months.

A Closer Look at Selection

The tendency for selection to complicate observational research is evident when studying the parenting correlates of maternal education and the predictors of child-care usage (Gennetian et al. 2008; Duncan, Magnuson and Ludwig 2004). Mothers who pursue different levels of education likely differ in other important ways that could conceivably account for their observed differences in child-care usage. If these other factors are not controlled, then maternal education coefficients are misleading. Absent experimental designs, this problem cannot be solved completely, but steps can be taken to mitigate the threat to causal inference. In this spirit, we attempted to control for theoretically identified potential confounds, and then assessed the robustness of our findings with a class of post-hoc indices.

First, obvious confounds concern mothers' cognitive capacities and psychological resources, which are related to women's educational attainment and various forms of parenting (Gennetian et al. 2008; Oyserman et al 2002). Thus, as already noted, all models controlled for mothers' own PPVT and depression scores (as well as age at the child's birth) and fathers' education and employment statuses. This strategy was conservative because both maternal intelligence and mental health could have spurious effects (e.g., driving the link between educational attainment and child-care usage) and/or mediating effects (e.g., products of educational attainment that affect child-care usage). Because both factors were measured *after* the focal years of schooling were completed by mothers, we could not adjudicate between these two pathways. Moreover, paternal characteristics might be correlated with maternal education without causing or influencing them, but, again, the measurement of these characteristics in the SECCYD disallowed any attempt to sort this out. Consequently, we likely had to sacrifice some of the "real" causal association between maternal education and child-care characteristics to parcel out the spurious component.

Second, a specific post-hoc robustness index—the Impact Threshold for Confounding Variables—was calculated. This calculation did nothing to control for the impact of any unobserved confounds on our focal associations between maternal education and early child care. What it did was quantify just how powerful such confounds would have to be to negate the causal inferences we have made based on our maternal education coefficients. In a sense, it estimated a sort of confidence interval for the inference (for a complete description of the ITCV, see Frank 2000).

The equation for the ITCV is: $r_{xy} - r_{xy}^{\#}/1 - r_{xy}^{\#}$, where $r_{xy}^{\#} = t/\text{SQRT}[(n - q - 1) + t^2]$, t is the critical t -value (usually 1.96), n is the sample size, and q refers to the number of model parameters (excluding the intercept). When covariates are included in the model, the equation becomes: $\text{ITCV}_{\text{no covariates}} \times [\text{SQRT}(1 - R_{xg}^2)(1 - R_{yg}^2)]$, where g is the set of covariates, R_{xg}^2 is the R^2 value from a regression predicting the focal independent variable by the covariates, and R_{yg}^2 is the R^2 value from a regression predicting the outcome by the covariates. The ITCV gauges the minimum product of the correlation between the predictor and confound and the correlation between the outcome and the confound ($r_{xc} \times r_{yc}$) needed to make the association between maternal education and child-care factors just statistically significant. If the actual (if unknown) product of these two correlations—which represents the impact of the unobserved confound on the regression equation—is bigger than this threshold, including that confound in the regression would very likely alter the causal inference. Thus, high ITCV values indicate that the inference would likely be robust to the control of potential confounds *if* they could be measured.

The ITCV was calculated for all significant maternal education coefficients in the quality and quantity models (it was not suitable for the multinomial care type model). The ITCV for maternal education in the two quantity models was quite high. The 36-month ITCV of .40, for example, indicates that the correlation between the unobserved confound and maternal education *and* the correlation between the unobserved confound and child-care quantity would each have to exceed .63 to create a scenario in which the control for that confound reduces the maternal education coefficient in that model to non-significance. Based on the ITCV of .23 at 54 months, these correlations would have to exceed .49. Given that correlations of either magnitude are rare in the SECCYD, these two maternal education coefficients appear quite robust. The ITCV for 54-month quality is much lower (.01), meaning that the two focal correlations (maternal education and confound, child-care quality and confound) would only need to be .10 or higher for the control of that confound (if it could be measured) to reduce the maternal education coefficient to non-significance. Inspection of correlations for both maternal education and child-care quality in the

SECCYD revealed few variables correlated with both at this magnitude, but, nevertheless, this level of robustness was lower than for the quantity models.

These steps could not prove causality, but they do improve causal inference. The associations of maternal education with aspects of early child care were robust to the control of key observable confounds and, especially when considering child-care quantity, were potentially robust to the potential control for unobservable confounds too.

Discussion

Prior research has indicated that time in the educational system provides women with a range of human and social capital that directly and indirectly affects how they manage and motivate their children's educational careers (Davis-Kean 2005; Useem 1992). This well-documented pattern goes beyond traditional social class perspectives to suggest that many non-economic resources can be accrued through education. In this article, we extended this line of inquiry by focusing on early childhood, a period in which non-maternal child care is the norm and can provide advantages to children as they move towards formal schooling.

Working from established patterns about the configurations of child-care type, quality and quantity that are most conducive to school readiness in the SECCYD, we sought to identify child-care arrangements used by women of different educational statuses. Around 3 years of age, the children of more educated women were in center care more often than familial care arrangements. When they were not in center care, they were in group care and relative care of higher quality. Finally, these children spent less time in child care overall, especially when they were not in high-quality child-care centers. When children were closer to the start of elementary school, maternal education was no longer related to an increased likelihood that they would be in center care over familial care arrangements, but it was associated with an increased likelihood that children would be in high-quality care, especially high-quality center care. At this time point, maternal education was also associated with a limited number of hours in care for most children.

The basic conclusion to be drawn from these findings is that children of more educated women were most likely to be found in child-care arrangements that, overall, were academically advantageous. This end result did not, however, *consistently* reflect the sequencing of child-care dimensions hypothesized by this study, moderated as it was by the age of the child, which served as a proxy for both the developmental needs of the child and the normative context about both non-maternal care and school readiness. At 36 months, maternal education mattered most for the ideal type of child care (with the ideal defined as center care by past research on school readiness). After children were in center care, however, maternal education did not affect quality. At the same time, high-quality child-care centers were the only arrangement in which maternal education was not associated with fewer hours in child care. Thus, at this age, the maternal education advantage was limited to the distinction between center care and other care types, and then to quality and quantity considerations when those other types were used. At 54 months, maternal education did little to get children into the ideal type—center care—from a school readiness perspective, but it did appear to “buy” quality when children were in center care. Moreover, while it did not reduce the hours in center care, high quality or otherwise, it did not increase it either (as was the case at 36 months). Thus, at this age, the maternal education advantage came after the type of care was selected. In line with past theory and research on this subject, our interpretation of this age-related pattern is that the advantage of maternal education becomes more fine-tuned as non-maternal child care (and center care in particular) becomes more normative, and the need for school readiness becomes more crucial.

These results identify *one* small piece in a long, complex chain of events fueling the intergenerational transmission of inequality. More educated mothers have children in early child-care arrangements that promote school readiness, which, according to the school transition model (Entwisle and Alexander 1993), lays the foundation for the increasingly cumulative nature of children's academic trajectories as they move through the educational system, ultimately factoring into long-term patterns of socioeconomic attainment. In this way, family status is re-established in the new generation. Indeed, this very logic underlies recent political discourse on school readiness and the increased attention to universal pre-kindergarten programs and high-quality child care as poverty intervention strategies (Karoly, Kilburn and Cannon 2005; King 2006). In the current climate, however, children from more privileged family backgrounds are more likely to gain this additional academic edge, fueling the cycle of cumulative advantage (Ceci and Papierno 2005).

What we should reiterate here is that the observed benefits of maternal education were not solely rooted in money or paid work. Although family income was generally related to type of care, it was not—after other family circumstances were taken into account—related to quality of care and only related to quantity of care when children were 54 months old and more mothers had moved into the paid labor force and likely needed to keep their children in care longer. While maternal education brings economic returns, these returns were related to child care only in specific ways. Maternal employment was, as expected, related to child care. For the most part, working mothers preferred non-center care, but maternal employment tended to factor into child-care quality and quantity considerations more when children were older and non-maternal child care was normative. This finding about maternal employment and non-center care likely reflects a sensibility among mothers that center care is ideally a part-time arrangement as well as the well-documented dearth of high-quality child-care centers (NICHD ECCRN 2000). Thus, when children needed to be in full-time care, mothers may have preferred a home environment in which they had more authority to direct caregivers to attend to their children's particular needs (Waldfoegel 2005). Mothers with less stringent work schedules, on the other hand, may have been less concerned with quality than with having their children regularly participate in a structured, interactional setting (Clarke-Stewart and Allhusen 2005). As important as these income and employment patterns are, they only partly explained why maternal education appeared to select children into early child care that prepared them for school.

Although we have demonstrated a linkage between maternal education and academically advantageous early child-care settings, we must again acknowledge the importance of selection. Besides utilizing a longitudinal framework, we addressed this problem by controlling for key observable confounds (e.g., maternal intelligence, depression, age at child's birth, the propensity to be in non-maternal care, paternal education and paternal employment) and calculating robustness indices to quantify the vulnerability of our results to the control of unmeasured confounds. Although not unequivocal, the results of these steps boosted confidence in our main findings about maternal education, especially in relation to child-care quantity. A necessary next step is to identify a useful instrumental variable for the SECCYD (Gennetian et al. 2008).

Furthermore, we have not sufficiently explored racial and ethnic differences in maternal employment, maternal education, family income and parenting that are certainly related to child-care use. For example, Latino/as are underrepresented in the SECCYD, which is particularly problematic given prior research suggesting that Latina mothers are reluctant to use non-familial child care (Crosnoe 2006). Moreover, one of the strongest predictors of child-care quality was the child's race, a pattern that could not be explained by the race/ethnicity of the caregiver (NICHD ECCRN 2001). Additional studies with other data sources will be needed to tease out the main and moderating effects of race and ethnicity.

We should note, however, that other available data sources with the ability to account for racial and ethnic variability will not provide the same depth and detail on early child care – and all of its dimensions – as the SECCYD.

In the past 30 years, organized child care has become the normative experience for young children in the United States., a dramatic trend that has co-occurred with a growing awareness that experiences in early, formal child care can help children succeed in school. Which children are getting this extra pre-academic boost? The results of this study suggest that children’s exposure to pre-school enrichment increases along with their mothers’ increasing educational attainment. Such patterns underscore the growing divergence in children’s life opportunities (McLanahan 2004), and highlight an increasingly salient mechanism in the continual perpetuation of class-level inequalities. These findings further demonstrate why, in the modern economy, maternal education matters so much for children’s well-being.

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References

- Baker, David P.; Stevenson, David L. Mothers’ Strategies for Children’s Achievement: Managing the Transition to High School. *Sociology of Education* 1986;59(3):156–66.
- Bornstein, Mark; Bradley, Robert. *Socioeconomic Status, Parenting, and Child Development*. Lawrence Erlbaum; 2003.
- Buchmann, Claudia; DiPrete, Thomas A. The Growing Female Advantage in College Completion: The Role of Family Background and Academic Achievement. *American Sociological Review* 2006;71(4):515–41.
- Ceci, Stephen; Papierno, Paul. The Rhetoric and Reality of Gap Closing: When the ‘Have Nots’ Gain but the ‘Haves’ Gain Even More. *American Psychologist* 2005;60(2):149–60. [PubMed: 15740447]
- Chin, Tiffani; Phillips, Meredith. Social Reproduction and Childrearing Practices: Social Class, Children’s Agency, and the Summer Activity Gap. *Sociology of Education* 2004;77(3):185–210.
- Clarke-Stewart, Allison; Allhusen, Virginia. *What We Know about Childcare*. Harvard University Press; 2005.
- Coleman, James. Social Capital and the Creation of Human Capital. *American Journal of Sociology* 1988;94(Supplement):S95–120.
- Crosnoe, Robert. *Mexican Roots, American Schools: Helping Immigrant Children Succeed*. Stanford University Press; 2006.
- Davis-Kean, Pamela. The Influence of Parent Education and Family Income on Child Achievement: The Indirect Role of Parent Expectations and the Home Environment. *Journal of Family Psychology* 2005;19(2):294–304. [PubMed: 15982107]
- Duncan, Greg J.; Magnuson, Katherine; Ludwig, Jens. The Endogeneity Problem in Developmental Studies. *Research in Human Development* 2004;1(1&2):59–80.
- Entwisle, Doris; Alexander, Karl L. Entry into School: The Beginning School Transition and Educational Stratification in the United States. *Annual Review of Sociology* 1993;19:401–23.
- Frank, Kenneth A. Impact of a Confounding Variable on a Regression Equation. *Sociological Methods and Research* 2000;29(2):147–94.
- Fuqua, Robert; Labensohn, Dorothy. Parents as Consumers of Child Care. *Family Relations* 1986;35(2):295–303.

- Gennetian, Lisa; Maguson, Katherine; Morris, Pamela. From Statistical Associations to Causation: What Developmentalists Can Learn from Instrumental Variables Techniques Coupled with Experimental Data. *Developmental Psychology* 2008;44(2):381–94. [PubMed: 18331130]
- Han, Wei-Jui. Maternal Nonstandard Work Schedules and Child Cognitive Outcomes. *Child Development* 2005;76(1):137–54. [PubMed: 15693763]
- Hofferth, Sandra. Child Care in the United States Today. *The Future of Children* 1996;6(2):41–61. [PubMed: 8972127]
- Hofferth, Sandra; Sandberg, John F. How American Children Spend their Time. *Journal of Marriage and Family* 2001;63(2):295–308.
- Johansen, Anne S.; Leibowitz, Arlene; Waite, Linda JL. The Importance of Child-Care Characteristics to Choice of Care. *Journal of Marriage and the Family* 1996;58(3):759–72.
- Kalmijn, Matthijs. Mother's Occupational Status and Children's Schooling. *American Sociological Review* 1994;59(2):257–75.
- Karoly, Lynn; Burtless, Gary. Family Structure and Income Inequality in Families with Children, 1976 to 2000. *Demography* 1995;43(3):421–45.
- Karoly, Lynn; Kilburn, Rebecca; Cannon, Jill S. *Early Childhood Interventions: Proven Results, Future Promise*. Rand Corporation; 2005.
- King, Justin. Closing the Achievement Gap through Expanded Access to Quality Early Education in Grades PK-3. 2006. Available at: <http://www.newamerica.net/files/Closing%20the%20Achievement%20Gap.pdf>
- Kingston, Paul W.; Hubbard, Ryan; Lapp, Brent; Schroeder, Paul; Wilson, Julia. Why Education Matters. *Sociology of Education* 2003;76(1):53–70.
- La Paro, Karen; Pianta, Robert. Predicting Children's Competence in the Early School Years: A Meta-Analytic Review. *Review of Educational Research* 2000;70(4):443–84.
- Lareau, Annette. *Home Advantage: Social Class and Parental Intervention in Elementary Education*. The Falmer Press; 1989.
- Lareau, Annette. *Unequal Childhoods: Class, Race, and Family Life*. University of California Press; 2004.
- Leibowitz, Arlene; Waite, Linda J.; Witsberger, Christina. Child Care for Preschoolers: Differences by Child's Age. *Demography* 1988;25(2):205–20. [PubMed: 3396747]
- Loeb, Susanna; Bridges, Margaret; Bassok, Daphna; Fuller, Bruce; Rumberger, Russell W. How Much is too Much? The Influence of Preschool Centers on Children's Social and Cognitive Development. *Economics of Education Review* 2007;26(1):52–66.
- McLanahan, Sara. Diverging Destinies: How Children are Faring Under the Second Demographic Transition. *Demography* 2004;41(4):607–27. [PubMed: 15622946]
- McNeal, Ralph B. Parental Involvement as Social Capital: Differential Effectiveness on Science Achievement, Truancy, and Dropping Out. *Social Forces* 1999;78(1):117–44.
- Menaghan, Elizabeth G.; Parcel, Toby L. Social Sources of Change in Children's Home Environments: Effects of Parental Occupational Experiences and Family Conditions over Time. *Journal of Marriage and the Family* 1995;57(1):69–84.
- Mirowsky, John; Ross, Catherine E. *Education, Social Status, and Health*. Aldine de Gruyter; 2003.
- Muller, Chandra. Maternal Employment, Parent Involvement, and Mathematics Achievement Among Adolescents. *Journal of Marriage and the Family* 1995;57(1):85–100.
- Nevill, Stephanie C.; Chen, Xianglei. *The Path through Graduate School: A Longitudinal Examination 10 Years after Bachelor's Degree (NCES 2007–162)*. Washington, DC: National Center for Education Statistics; 2007.
- NICHD ECCRN. Familial Factors Associated with the Characteristics of Nonmaternal Care for Infants. *Journal of Marriage and the Family* 1997;59(2):389–408.
- NICHD ECCRN. Characteristics and Quality of Child Care for Toddlers and Preschoolers. *Applied Developmental Science* 2000;4(3):116–35.
- NICHD ECCRN. *A New Guide for Evaluating Child Care Quality. Zero to Three* 2001;21(5):40–47.

- NICHD ECCRN. Early Child care and Children's Development Prior to School Entry: Results from the NICHD Study of Early Child Care. *American Educational Research Journal* 2002;39(1):133–64.
- NICHD ECCRN. Does Amount of Time Spent in Child Care Predict Socioemotional Adjustment During the Transition to Kindergarten? *Child Development* 2003a;74(2):976–1005.
- NICHD ECCRN. Does Quality of Child Care Affect Child Outcomes at Age 4½? *Developmental Psychology* 2003b;39(3):451–69.
- NICHD ECCRN. Type of Child Care and Children's Development at 54 Months. *Early Childhood Research Quarterly* 2004;19(2):203–30.
- NICHD ECCRN. *Child Care and Child Development: Results from the NICHD's Study of Early Child Care and Youth Development*. Guilford Press; 2005.
- Oyserman, Daphna; Bybee, Deborah; Mowbray, Carol; MacFarlane, Peter. Positive Parenting among African American Mothers with a Serious Mental Illness. *Journal of Marriage and Family* 2002;64(1):65–77.
- Raver, C Cybele. Emotions Matter: Making the Case for the Role of Young Children's Emotional Development for Early School Readiness. *Social Policy Report* 2002;XVI(3):3–19.
- Raver, C Cybele; Gershoff, Elizabeth; Aber, J Lawrence. Testing Equivalence of Mediating Models of Income, Parenting, and School Readiness for White, Black, and Hispanic Children in a National Sample. *Child Development* 2007;78(1):96–115. [PubMed: 17328695]
- Scarr, Sandra. American Child Care Today. *American Psychologist* 1998;53(2):95–108. [PubMed: 9491741]
- Schneider, Barbara; James Coleman, J. *Parents, Their Children, and Schools*. Westview; 1993.
- Schneider, Mark; Teske, Paul; Roch, Christine; Marschall, Melissa. Networks to Nowhere: Segregation and Stratification in Networks of Information about Schools. *American Journal of Political Science* 1997;41(4):1201–23.
- Sewell, William; Haller, Archibald; Ohlendorf, George. The Educational and Early Occupational Status Attainment Process: Replication and Revision. *American Sociological Review* 1970;35(6):1014–27.
- Shanahan, Michael; Elder, Glen H., Jr; Miech, Richard A. History and Agency in Men's Lives: Pathways to Achievement in Cohort Perspective. *Sociology of Education* 1997;70(1):54–67.
- Sirin, Selcuk R. Socioeconomic Status and Academic Achievement: A Meta-Analytic Review of Research. *Review of Educational Research* 2005;75(3):417–53.
- Useem, Elizabeth. Middle Schools and Math Groups: Parents' Involvement in Children's Placement. *Sociology of Education* 1992;65(4):263–97.
- Vandell, Deborah. Early Child care: The Known and the Unknown. *Merrill-Palmer Quarterly* 2004;50(3):387–414.
- Waldfoegel, Jane. *What Children Need*. Harvard University Press; 2006.
- Walker, Dale; Greenwood, Charles. Prediction of School Outcomes Based on Early Language Production and Socioeconomic Factors. *Child Development* 1994;65(2):606–21. [PubMed: 8013242]
- Christine, Young; McMahon, Joan; Bowman, Virginia; Thompson, Douglass. Psychosocial Concerns of Women who Delay Prenatal Care. *Families in Society* 1990;71(7):408–14.
- Zaslow, Martha; Moore, Kristin A.; Brooks, Jennifer L.; Morris, Pamela A.; Tout, Kathryn; Redd, Zakia A.; Emig, Carol A. Experimental Studies of Welfare Reform and Children. *The Future of Children* 2002;12(1):78–95. [PubMed: 11980040]

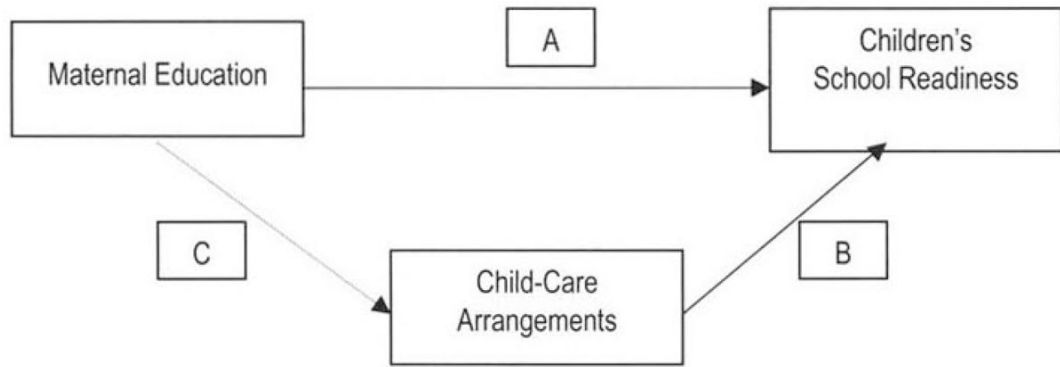


Figure 1.
Conceptual Model of Study

Table 1

Means of Key Variables by Maternal Education Group at 36 Months

	High School or Less	Some College	College or More
Child Characteristics			
Male	.55 ^a (.50)	.49 ^a (.50)	.49 ^a (.50)
White	.76 ^c (.43)	.83 ^b (.37)	.92 ^a (.27)
Black	.20 ^a (.40)	.14 ^b (.35)	.02 ^c (.15)
Other	.05 ^a (.21)	.03 ^a (.16)	.05 ^a (.22)
Family Characteristics			
Married	.49 ^c (.50)	.67 ^b (.47)	.88 ^a (.33)
Single	.27 ^a (.45)	.18 ^b (.39)	.05 ^c (.22)
Stepfamily	.10 ^a (.35)	.08 ^{ab} (.27)	.06 ^b (.23)
Cohabiting	.14 ^a (.34)	.07 ^b (.26)	.01 ^c (.10)
Income-to-Needs	2.02 ^c (1.60)	3.05 ^b (2.27)	5.37 ^a (3.58)
Mother's Age at Birth	24.74 ^c (5.61)	28.23 ^b (4.86)	31.58 ^a (4.01)
Maternal Employment			
Not Working	.40 ^a (.49)	.31 ^b (.46)	.32 ^b (.47)
Parttime	.13 ^b (.33)	.18 ^b (.38)	.26 ^a (.44)
Fulltime	.48 ^{ab} (.50)	.52 ^a (.50)	.41 ^b (.49)
Non-Standard Work Hours *	.14 ^a (.42)	.18 ^a (.38)	.16 ^a (.37)
Child-Care Characteristics			
Center Care	.24 ^b (.43)	.28 ^b (.45)	.38 ^a (.48)
Group Care	.15 ^b (.36)	.21 ^a (.41)	.21 ^a (.41)
Relative Care	.24 ^a (.43)	.25 ^a (.44)	.16 ^b (.37)
In-Home Care	.03 ^b (.18)	.05 ^b (.22)	.12 ^a (.32)
Exclusive Maternal Care	.34 ^a (.47)	.20 ^b (.40)	.13 ^c (.33)
Quality	2.67 ^c (.47)	2.78 ^b (.46)	2.91 ^a (.43)
Hours	34.45 ^a (14.77)	29.39 ^b (15.56)	27.11 ^b (16.01)
<i>N</i>	330	369	428

Source: NICHD Study of Early Child Care and Youth Development.

Notes: Different subscripts indicate significant difference in means ($p < .05$) across education groups, as determined by one-way ANOVA.

^a Represents the highest mean level, with

^{b, c} indicating means in descending order from highest. Coefficients with the same subscript do not significantly differ.

* Means reflect subsample of mothers who were working or in school. Means of some dummy variables may not sum to 1 due to rounding.

Table 2

Results from Multinomial Logistic Regressions Predicting Child-Care Arrangements

	Relative Risk Ratios for Child Care Type (vs. Center Care)			
	Group Care	Relative Care	In-Home Care	Maternal Care
36-Month Model				
Maternal Education	.99	.88*	1.00	.86**
Child Characteristics				
Male	1.07	1.15	1.19	1.10
Black	1.34	1.15	.96	.82
Other	.46*	1.12	.42+	.75
Family Characteristics				
Single	.42*	.26**	1.25	.54
Stepfamily	.55	.85	2.80*	1.85
Cohabiting	.95	.65	2.76	.72
Number of Children	.87	1.21+	2.17***	1.36**
Income	.90*	.82***	1.13*	.77***
Mother's Age at Birth	1.01	.98	1.03	.99
Maternal Employment				
Parttime	2.10*	2.69***	2.40*	.16***
Fulltime	2.89*	1.55+	1.10	.08***
Non-Standard Hours	2.03*	5.06***	1.25	1.48
54-Month Model				
Maternal Education	.99	.97	1.21+	.99
Child Characteristics				
Male	.96	1.04	1.69	1.19
Black	.95	.52+	.23*	.68
Other	.63	.85	.11**	1.57
Family Characteristics				
Single	.98	.21***	11.37**	.27*
Stepfamily	2.49*	1.13	8.71***	.87
Cohabiting	1.11	.76	2.51	.45
Number of Children	.86	1.01	1.96***	1.04
Income	.93	.86**	1.05	.66***
Mother's Age at Birth	1.01	.98	1.02	.98
Maternal Employment				
Parttime	2.03+	3.49***	2.40	.54+
Fulltime	3.45***	2.82***	8.74***	.11***
Non-Standard Hours	.67	3.95***	1.83	.66

Source: NICHD Study of Early Child Care and Youth Development

Notes: Models were estimated with each arrangement type as reference category.

Relative risk ratios presented above are for center care as reference. All models controlled for site, maternal PPVT-R score, maternal depression, resident fathers' college education and resident fathers' employment. N = 1,127.

⁺ p < .10

* p < .05

** p < .01

*** p < .001

Table 3

Results from Linear Regressions Predicting 36-Month Child-Care Quality among Children in Non-Maternal Care

	B Coefficients (t-ratio)			
	Model 1	Model 2	Model 3	Model 4
Maternal Education	.01 (1.10)	.01 (1.21)	.01 (.83)	.05* (2.09)
Child Characteristics				
Male	-.02 (-.54)	-.01 (-.39)	-.01 (-.22)	-.01 (-.22)
Black	-.29*** (-4.40)	-.30*** (-4.50)	-.31*** (-4.70)	-.31*** (-4.75)
Other	.03 (.48)	.02 (.39)	.05 (.84)	.06 (.96)
Family Characteristics				
Single	.10 (1.30)	.10 (1.39)	.15+ (1.94)	.14+ (1.87)
Stepfamily	.10 (1.53)	.10 (1.61)	.10 (1.36)	.08 (1.13)
Cohabiting	-.10 (-1.15)	-.10 (-1.24)	-.10 (-1.32)	-.10 (-1.25)
Number of Children	-.02 (-1.25)	-.03+ (-1.65)	-.05* (-2.33)	-.04* (-2.27)
Income	.00 (.37)	.00 (.48)	.01 (.79)	.01 (.79)
Mother's Age at Birth	.00 (-1.03)	.00 (-.78)	.00 (-.64)	.00 (-.63)
Maternal Employment				
Parttime		-.05	-.08	-.07
Fulltime		-.15** (-2.78)	-.17** (-3.03)	-.16** (-2.84)
Non-Standard Hours		-.07 (1.24)	-.03 (.49)	-.00 (-.04)
Care Type (In-Home)				
Center			-.16* (-2.39)	.80* (2.00)
Group			-.13+ (-1.84)	.23 (.56)
Relative			.00 (.05)	.71+ (1.64)
Interaction Terms				
Center × Education				-.06** (-2.50)
Group × Education				-.02 (-.78)
Relative × Education				-.04 (-1.56)
<i>R</i> ²	.15	.17	.19	.19

Source: NICHD Study of Early Child Care and Youth Development

Notes: All models controlled for site, maternal PPVT-R score, maternal depression, resident fathers' college education, and resident fathers' employment. N = 624.

+ p < .10

* p < .05

** p < .01

*** p < .001

Table 4

Results from Linear Regressions Predicting 54-Month Child-Care Quality among Children in Non-Maternal Care

	B Coefficients (t-ratio)			
	Model 1	Model 2	Model 3	Model 4
Maternal Education	.01 (1.00)	.02 ⁺ (1.71)	.02 ⁺ (.1.73)	.02 (1.28)
Child Characteristics				
Male	-.03 (-.56)	-.02 (-.39)	-.02 (-.47)	-.06 (-1.40)
Black	-.04 (-.54)	-.06 (-.66)	-.05 (-.65)	-.09 (-1.06)
Other	.06 (.77)	.05 (1.02)	.08 (1.08)	.05 (.96)
Family Characteristics				
Single	-.22 [*] (-2.51)	-.21 [*] (-2.45)	-.24 ^{**} (-2.69)	-.20 [*] (-2.03)
Stepfamily	-.04 (-.43)	.03 (-.23)	-.03 (-.40)	-.04 (-.56)
Cohabiting	-.06 (-.62)	-.06 (-.55)	-.06 (-.60)	-.08 (-.81)
Number of Children	.00 (-.27)	-.02 (-.98)	-.02 (-1.00)	-.01 (-.37)
Income	.01 (.54)	.01 (.49)	(.00) (.37)	.00 (.18)
Mother's Age at Birth	.00 (-1.00)	-.00 (-.87)	.00 (-.93)	.00 (-.25)
Maternal Employment				
Parttime		-.14 [*] (-2.19)	-.13 [*] (-2.04)	-.10 [*] (-1.57)
Fulltime		-.23 ^{***} (-4.40)	-.21 ^{***} (-4.18)	-.20 ^{***} (-3.60)
Non-Standard Hours		-.03 (1.02)	.06 (1.45)	.04 (.56)
Care Type (In-Home)				
Center			-.06 (-.65)	.34 (.64)
Group			.03 (-.42)	-.51 (-.79)
Relative			-.12 (-1.50)	.13 (.22)
Interaction Terms				
Center × Education				-.01 (-.46)
Group × Education				.04 (.94)
Relative × Education				-.02 (-.43)
<i>R</i> ²	.12	.14	.16	.18

Source: NICHD Study of Early Child Care and Youth Development

Notes: All models controlled for site, maternal PPVT-R score, maternal depression, resident fathers' college education and resident fathers' employment. N = 818.

⁺ p < .10

^{*} p < .05

^{**} p < .01

^{***} p < .001

Table 5

Selected Results from Linear Regressions Predicting 36-Month Child-Care Hours among Children in Non-Maternal Care

	B Coefficients (t-ratio)			
	Model 1	Model 2	Model 3	Model 4
Maternal Education	-.45 ⁺ (-1.80)	-.48* (-2.07)	.64 (.48)	.34 (.10)
Income	.17 (1.03)	.19 (1.18)	.15 (.87)	.17 (.87)
Maternal Employment				
Parttime	-.92 (-.60)	-.34 (-.22)	-.32 (-.21)	-.33 (-.24)
Fulltime	15.11*** (10.87)	15.46*** (11.09)	15.41*** (11.04)	15.03*** (10.92)
Non-Standard Hours	-3.40*** (-2.88)	-2.77* (-2.30)	-2.91* (-2.40)	-3.17* (-2.44)
Care Type (In-Home)				
Center		2.96 ⁺ (1.84)	24.50* (2.10)	50.47 (.79)
Group		4.30** (2.50)	17.22 (1.40)	-53.55 (-.95)
Relative		.28 (.16)	36.64** (-1.10)	78.60 (.71)
Child-Care Quality		.83 (.82)	3.77 (.52)	2.45 (.10)
Two-Way Interactions				
Education × Quality			-.09 (-.21)	.04 (.03)
Quality × Center			-1.73 (-.51)	-11.49 (-.47)
Quality × Group			-.09 (-.25)	25.49 (1.21)
Quality × Relative			-4.00 (-1.10)	-17.52 (-.31)
Education × Center			-.92 (-1.37)	-2.72 (-.66)
Education × Group			-.62 (-.86)	4.54 (1.14)
Education × Relative			-1.59* (-2.11)	-4.45 (-.54)
Three-Way Interactions				
Education × Quality × Center				.63 (.42)
Education × Quality × Group				-1.89 (-1.32)
Education × Quality × Relative				.90 (.16)
<i>R</i> ²	.40	.41	.42	.42

Notes: All models controlled for child gender, race/ethnicity, family structure, number of children in home, maternal age at birth, site, maternal PPVT-R score, maternal depression, resident fathers' college education and resident fathers' employment. N = 624.

⁺ p < .10

* p < .05

** p < .01

*** p < .001.

Table 6

Selected Results from Linear Regressions Predicting 54-Month Child-Care Hours among Children in Non-Maternal Care

	B Coefficients (t-ratio)			
	Model 1	Model 2	Model 3	Model 4
Maternal Education	-.50* (-2.31)	-.44* (-2.04)	.00 (.00)	2.68 (.74)
Income	.26* (2.05)	.28* (2.23)	.27* (2.18)	.10 (2.06)
Maternal Employment				
Parttime	3.16** (2.99)	2.73** (2.55)	2.75** (2.57)	2.75** (2.57)
Fulltime	18.42*** (20.52)	17.77*** (19.19)	17.79*** (19.16)	17.77*** (19.13)
Non-Standard Hours	-1.41 ⁺ (-1.32)	-1.34 (-1.23)	-1.31 (-1.19)	-1.32 (-1.20)
Care Type (In-Home)				
Center		.29 (.17)	26.29* (2.16)	78.13 (1.36)
Group		2.65 (1.35)	25.71 ⁺ (1.82)	63.11 (.95)
Relative		.97 (.52)	35.79** (2.66)	49.82 (.81)
Child-Care Quality		-2.10** (-3.12)	1.66 (.32)	16.13 (.83)
Two-Way Interactions				
Education × Quality			.09 (.32)	-.84 (-.68)
Quality × Center			-5.42 ⁺ (-1.66)	-23.47 (-1.17)
Quality × Group			-6.00 (-1.64)	-19.17 (-.84)
Quality × Relative			-4.17 (-1.20)	-8.60 (-.40)
Education × Center			-.60 (-.90)	-4.00 (-1.08)
Education × Group			-.28 (-.35)	-2.68 (-.61)
Education × Relative			-1.49* (-1.98)	-2.22 (-.55)
Three-Way Interactions				
Education × Quality × Center				1.17 (.92)
Education × Quality × Group				.83 (.56)
Education × Quality × Relative				.21 (.15)
<i>R</i> ²	.49	.50	.51	.51

Notes: All models controlled for child gender, race/ethnicity, family structure, number of children in home, maternal age at birth, site, maternal PPVT-R score, maternal depression, resident fathers' college education and resident fathers' employment. N = 818.

⁺ p < .10

* p < .05

** p < .01

*** p < .001