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Introduction
Recent sociological research in the United States reveals a widening academic achievement gap by socioeconomic status, whereby education and income are stronger predictors of achievement among recent cohorts than among those born several decades earlier (Reardon 2011; Reardon, Robinson and Weathers, forthcoming). Existing among possible explanations for the strengthening relationship between parental resources and children’s development is a growing degree of inequality in children’s home environments, whereby parenting behavior is increasingly a marker for socioeconomic status. Evidence in several countries highlights the ways in which highly educated parents are disproportionately likely to invest resources and developmentally targeted time toward their children (Hao and Yeung 2015; Kalil, Ryan and Corey 2012; Pensiero 2011). Moreover, some evidence suggests that education is becoming an increasingly strong predictor of the quantity and content of resource and time investment in children (Sandberg and Hofferth 2001), whereby “parenting for cognitive development” (Schaub 2010) is becoming more common among all parents, but especially those with higher levels of education.

While existing research offers substantial insight into trends in the relationship between socioeconomic resources and parenting, as well as the implications of trends for the achievement gap, our understanding to date is confined to a relatively short time span. Most existing research covers the period between the late 1980s and the early 2000s, when increases in the achievement gap were well underway (Reardon 2011). Using three nationally representative surveys from the United Kingdom that span birth cohorts ranging from 1958 through 2000, I will examine trends in the relationship between parental education and parenting practices, as well as the contribution of trends to the achievement gap among children.

Background
Socioeconomic inequalities in children’s learning are present at the beginning of the school years, a troubling fact given strong correlations among achievement, completed schooling and economic status (Duncan, Ziol-Guest and Kalil 2010). Childhood is a key period of development when skills are the most sensitive to social and biological environments, and when circumstances have far-reaching effects that track into adulthood (Hayward and Gorman 2004; Heckman 2006). It is striking, therefore, that socioeconomic gaps in children’s cognitive and academic development have increased across historical time (Reardon, Robinson and Weathers, forthcoming).

Several macro-level trends may contribute meaningfully to the growing relationship between parental resources and children’s development, including increases in economic inequality over the last several decades (Piketty and Saez 2003) and the increasingly bundled nature of economic status, education and family structure (McLanahan 2004). At a more micro level, there is compelling evidence for increasingly stratified patterns of consumption and time use with children across socioeconomic groups, suggesting that inequality in children’s early home environments may contribute to widening achievement gaps. Parental income, education, and occupational status are all correlated with child-specific spending on school performance, extracurricular activities and
status-based belongings, with maternal education acting as a particularly strong predictor of child-specific spending (Hao and Yeung 2015). Beyond consumption, highly educated parents are more likely to tailor their time use with children in age-specific ways, spending more time engaging in play and cognitive stimulation that is important for the development of toddlers and young children (Kalil, Ryan and Corey 2012; Michael 2011; Pensiero 2011). Though all parents, on average, now spend more time focusing on their children’s cognitive development (Hofferth and Sandberg 2001; Schaub 2010), there is some evidence that the size of educational differences has increased over time, as more highly educated mothers are increasingly disproportionately likely to spend time encouraging their children’s participation in reading and in both structured and unstructured skill-based activities (Hofferth and Sandberg 2001). These differences are meaningful to the extent that patterns of parents’ consumption and behavior indicate expectations for children’s activities and achievements, and to the extent that they differentially prepare children for success in social institutions (i.e., schools) that have increasingly high stakes in the labor market (Hao and Yeung; Lareau 2002). The increasingly graded relationship of parental involvement by education, therefore, suggests that variation in the practice of “parenting for cognitive development” (Schaub 2010) may have consequences for the degree to which all children are well-prepared to succeed in school.

The substantial contributions of existing research notwithstanding, our understanding to date of 1) trends in the association between education and parenting behavior, and 2) the importance of those trends for understanding the growing achievement gap, is confined to a relatively short time span. The limited existing work documenting the growing importance of family income for children’s achievement establishes a takeoff well underway by the late 1980s, when most existing research begins its examination (Reardon 2011). Moreover, because of the difficulty of obtaining comparable samples across historical time, it is often necessary to measure cognitive development and academic achievement at developmentally distinct ages (e.g., age 5 vs. 15), making it difficult to know whether achievement gaps reflect parenting behavior or developmental processes that reflect children’s changing contexts. Using three nationally representative surveys from the United Kingdom that span birth cohorts ranging from 1958 through 2000, and that measure parenting and children’s development at similar ages, I will examine trends in the relationship between parental education and parenting practices, as well as the contribution of trends to the achievement gap among children.

Data
Data will come from three longitudinal, nationally representative birth cohort studies in the United Kingdom, which collectively consist of four cohorts: 1) the National Child Development Study (NCDS) of children born in 1958; 2) the British Cohort Study of children born in 1970 (BCS70); 3) the Child Supplement of the NCDS (NCDS-C), a random sample in 1991 of over 4,000 children born in the mid-1980s to the 1958 cohort; and 4) the Millennium Cohort Study (MCS) of children born in 2000. Together, these surveys provide comparable information on children born in 1958, 1970, the mid-1980s, and 2000.

The National Child Development Study (NCDS) is an ongoing survey that follows every baby who was born in England, Scotland and Wales on a particular week in 1958 (almost 17,500 children), with follow-ups every 5 years during childhood, and every 10 years thereafter. The NCDS includes information on educational attainment, income, family relationships, and the health and development of the cohort. A key feature of the study relevant to this work is the supplemental study of cohort members’ children in the 1991 wave. One third of cohort members’ children were randomly selected for participation, and mothers were interviewed about parenting behavior and
children’s development. Children ages 5 and older (over 2,500 children) also completed reading and math assessments.

In addition to NCDS data on cohorts born in 1958 and the mid-1980s, I will use two other surveys. The British Cohort Study collected information about over 17,000 babies born in April 1970, with follow-up interviews approximately every five years. Finally, the Millennium Cohort Study (MCS) is a nationally representative sample of births and is the fourth of Britain’s national birth cohort studies. The first wave (2001-2002) included 18,818 children (in 18,552 families) born in the U.K. between September 2000 and January 2002. Information was first collected from parents when children were nine months old, with follow-up interviews at ages three, five, seven and 11. All three surveys have been used extensively in prior research on children’s development, the transition to adulthood, and the life course effects of childhood environments (Case et al. 2005; Jackson 2015; Kiernan and Cherlin 1999).

Mid-late twentieth century Great Britain provides a useful context in which to describe trends in the relationship among socioeconomic status, parenting behavior and children’s skill development and learning. While the educational system became steadily less structured during that period, tracking remains pronounced, making learning assessments an important gate keeping mechanism for eventual educational attainment, and meaning that early learning differences had strong consequences for educational progression. The United Kingdom exhibits broadly similar patterns of family formation (Platt 2009) and income inequality (Banks et al. 2003; Wilkinson and Pickett 2009) to the United States, the site of much existing research in this area, despite very different health care and social welfare systems.

Measures

Parental Education. I focus on parental education as the key marker of socioeconomic status because of compelling evidence that education predicts the knowledge, time use, and goals associated with parenting, and that it is strongly correlated with parents’ skill qualifications around the time of children’s birth. In each survey I will measure education using the U.K. National Vocation Qualification (NVQ) scheme. NVQ levels denote the degree of competence required by an employee to perform a particular job and are an important indicator of education and socioeconomic status in this context (Jackson 2010; Steedman 1998). Higher levels indicate a more complex occupational skill set, and differing NVQ levels across adulthood ages largely indicate advancements in qualifications during the working career, rather than changes in educational attainment. I use the same NVQ scheme as Makepeace et al. (2003), where levels range from the lowest level of low-scoring O-level grades and the lowest vocational certificates to the highest level of university diplomas, teaching and nursing degrees and post-university education. In each sample I will use the sample-specific distribution of education to construct a measure of education that is not affected by changes in the distribution of education over time. To begin, I will compare among the 10th, 50th and 90th percentile of the educational distribution. I will also compare results using maternal education and the highest educational level of either parent.

Parenting Behaviors. Table 1 provides a summary of all measures to be used in each survey, as well as the ages at which they are measured. I measure several types of behavior relevant to children’s academic progress, as established by existing research (Cheadle 2008; Jackson 2015; Lareau 2002; Pensiero 2011). Specifically, I will measure direct stimulation (reading with children and TV
viewing); parental educational expectations; children’s participation in organized, skill-based activities; children’s participation in organized leisure activities; and parents’ health behaviors.

**Academic Achievement.** In each survey reading and math achievement assessments were administered or linked for all children at comparable ages. In the MCS, children’s achievement scores from the National Pupil Database were linked at age 11. In the NCDS, BCS, and NCDS-C, every child took a standardized math and reading test (ages 11 and 16 in both the NCDS and BCS, and ages 5+ in the NCDS-C). In the NCDS-C, I will restrict the sample to children in a similar age range to NCDS/BCS/MCS children. In each sample, I will use $z$-scores to measure performance relative to the sample mean at each age, and I will examine the distributions of each assessment to ensure comparability.

**Other Measures.** In each survey I will measure children’s sex, mothers’ age at birth, family structure, maternal employment and family income. I will measure income using the sample-specific distribution of family income, separating the 10th, 50th and 90th percentile of the distribution. Because sociodemographic measures are available at multiple ages in each survey, I will use measures at comparable ages and will test the sensitivity of the results to measurement at different ages. Finally, in each survey I will also measure ethnicity using British Census categories. While the NCDS, NCDS-C, and BCS are overwhelmingly white samples, the MCS is more ethnically diverse because of its oversample of ethnic minority children.

**Analytic Plan**
I will begin by restricting each sample to similar ages, given my interest in measuring academic achievement at a similar developmental period. As Table 1 shows, the analytic sample in each survey will consist of children at ages 10/11. In the NCDS-C, I will test the sensitivity of the results to several age ranges (e.g., 10-12, 7-11), aiming for as narrow a range as possible. I will use multiple imputation (chained equations, 10 imputations) to fill in missing values for non-response of survey items, but not survey waves.

The analysis will involve several steps: (1) describing trends in the relationship between parental education and parenting behavior; (2) describing trends in the relationship between parental education and children’s academic achievement; and 3) examining the contribution of differences in parenting behavior to the achievement gap across time. For steps (1) and (2) of the analysis, I will estimate linear regression models that control for children’s sociodemographic characteristics. In order to compare across time points, I will compare coefficients using t-tests, while being cautious in comparing MCS children to other samples because of its slightly different sample design.

For step (3) of the analysis, I will estimate linear regression models that control for parenting behavior, in order to understand the contribution of parenting behavior to the achievement gap in each cohort. To consider whether educational differences in the achievement gap are driven more by educational differences in the levels vs. the effects of parenting behavior, I will use Oaxaca-Binder decomposition methods. This method permits separation of educational differences in the means of parenting behaviors from educational differences in the effects of parenting behaviors. This approach will allow me to consider whether some educational groups are disproportionately likely to engage in particular behaviors over time, or whether the effects of parenting behavior on the achievement gap vary by education.

**Timeline**
I have completed data cleaning for two of the three surveys (NCDS, MCS) and am in the process of preparing BCS data. I have published with two of the three surveys in previous research (Jackson 2015; Jackson, McLanahan and Kiernan 2012), making me well-prepared to undertake this analysis. I expect to have a draft paper by early spring 2016.
References


Table 1: Ages at which key measures are observed, British Cohorts

<table>
<thead>
<tr>
<th>Measure</th>
<th>NCDS</th>
<th>BCS</th>
<th>NCDS-C</th>
<th>MCS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Parental Education</strong></td>
<td></td>
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<tr>
<td><em>Parenting Behavior</em></td>
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<tr>
<td><em>Direct Stimulation</em></td>
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<td></td>
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<tr>
<td>Mothers' frequency of reading to child</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Frequency of TV viewing</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td><strong>Parental Educational Expectations</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Expected age when child will leave school</td>
<td>10</td>
<td>10</td>
<td>5+</td>
<td>11</td>
</tr>
<tr>
<td><strong>Child Participation in Organized, Skill-Based Activities</strong></td>
<td></td>
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<td></td>
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<tr>
<td>Reading, playing instrument, going to museums and libraries</td>
<td>16</td>
<td>16</td>
<td>5+</td>
<td>11</td>
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<tr>
<td><strong>Child Participation in Organized Leisure Activities</strong></td>
<td></td>
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<tr>
<td>Dancing, volunteering, clubs, sports</td>
<td>16</td>
<td>16</td>
<td>5+</td>
<td>11</td>
</tr>
<tr>
<td><strong>Parental Health Behaviors</strong></td>
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<tr>
<td>Breastfeeding, prenatal smoking, immunizations</td>
<td>birth/5</td>
<td>birth/5</td>
<td>(retrosp</td>
<td>birth/5</td>
</tr>
<tr>
<td><strong>Academic Achievement</strong></td>
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<td></td>
<td></td>
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<tr>
<td>Reading and math achievement</td>
<td>11/16</td>
<td>10/16</td>
<td>5+</td>
<td>11</td>
</tr>
<tr>
<td><strong>Other Measures</strong></td>
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<tr>
<td>Sex</td>
<td>Birth</td>
<td>Birth</td>
<td>Birth</td>
<td>Birth</td>
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<tr>
<td>Family income</td>
<td>11/16</td>
<td>10</td>
<td>All ages</td>
<td>All ages</td>
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<td>Maternal employment</td>
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<td>All ages</td>
<td>All ages</td>
<td>All ages</td>
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<tr>
<td>Family structure</td>
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<td>All ages</td>
<td>All ages</td>
<td>All ages</td>
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<tr>
<td>Ethnicity</td>
<td>All ages</td>
<td>(retrosp</td>
<td>All ages</td>
<td>All ages</td>
</tr>
</tbody>
</table>

Note: The ages are indicated in the table, with specific ages such as All ages, birth/5, and 5+ included as appropriate.