Early Childhood Environments and School Readiness Outcomes of Black and White Children with Same-Income Parents

ABSTRACT

Using data from the Early Childhood Longitudinal Study- Kindergarten Class of 2010-11 (ECLS-K: 2011), I investigate whether Black and White children whose parents have similarly low-, middle-, or high-incomes have comparable early childhood environments and fall kindergarten math and reading scores. Compared to same-income Whites, Black children's early environments are characterized by stronger parental beliefs about education, but lower access to developmentally advantageous resources, lower frequency of developmentally stimulating parental behaviors, and a less advantageous combination of demographic composition and parental work hours. In part as a result of these differences, Black children at most income percentiles begin kindergarten with significantly lower math scores than same-income Whites, and Black children at the lowest income percentiles also have significantly lower reading scores than their White peers. If Blacks had their parents' existing educational beliefs but same-income Whites' environments on other characteristics, math gaps would have been an average of three-quarters smaller across income percentiles, and Blacks would have had net advantages in reading at all percentiles. Racial differences in early environments and school readiness should be viewed as some of the early life course roots of Black-White differences in socioeconomic outcomes, such as educational attainment and income, between the children of same-income parents.

Keywords: race, income, early childhood environments, school readiness

Even when they are raised in families that report the same incomes, Blacks and Whites do not have equal socioeconomic opportunities and outcomes throughout their lives. Recent studies have provided examples of this pattern among both adolescents (Massey and Brodmann 2014) and adults (Chetty et al. 2018). For example, using data on 20 million adult members of the 1978-1983 birth cohorts (those currently aged 36-41), Chetty and colleagues (Chetty et al. 2018) found that the Black-White gap in adult income was 12.6 percentiles for those who had been raised in households at the 25th percentile of income and an even larger 15.7 percentiles for those who had been raised in households at the 75th percentile of income.

Compared to findings on adolescents and adults, much less is known about whether similar patterns are visible at younger ages, as measured by outcomes relevant to earlier periods in the life course. In this study, I investigate whether Black and White children with similarly low-, middle-, or high-income (i.e., *same-income*) parents experience comparable early childhood environments and, relatedly, begin kindergarten with equal math and reading test scores (i.e., *school readiness*).

Such an investigation brings needed attention to race to recent studies of income gaps in children's early environments and school readiness (Bassok et al. 2016; Garcia and Weiss 2017; Kalil et al. 2016; Reardon and Portilla 2016). Those studies have found that high-income children have greater access than their low-income peers to the characteristics of early environments that promote school readiness, such as parental beliefs about schooling, children's books, and frequency of parent-child reading, and, in part as a result, begin kindergarten with better math and reading scores. The research stream has also pointed out the implications of income gaps in early environments and school readiness for children's subsequent socioeconomic outcomes, such as educational attainment and income (Kalil et al. 2016; Reardon

2011). While these studies have detailed gaps in early environments and school readiness *between* income levels, they have not investigated racial gaps in environments and readiness *within* income levels.

To investigate these possibilities, I use data from the fall kindergarten wave of the Early Childhood Longitudinal Study, Kindergarten Class of 2010-11 (ECLS-K:2011). I focus on Black-White differences in early environments and school readiness between children whose parents are at the 10th, 50th, and 90th percentiles of the income distribution. To preview my results, I find that, compared to same-income Whites, Black children's early environments are characterized by stronger parental beliefs about education, but lower access to developmentally advantageous resources, lower frequency of developmentally stimulating parental behaviors, and a less advantageous combination of demographic composition and parental work hours. Black children at most income percentiles begin kindergarten with significantly lower math scores than same-income Whites, and Black children at the lowest income percentiles also have significantly lower reading scores than their White peers. Counterfactual predictions of readiness gaps reveal that if Blacks' had their parents' existing educational beliefs but same-income Whites' environments on other characteristics, math gaps would have been an average of three-quarters smaller across income percentiles, and Blacks would have net advantages over same-income Whites in reading at all income percentiles. These racial differences should be viewed as some of the early life course roots of differences in adolescent and adult socioeconomic outcomes between Blacks and Whites who are raised in same-income households (Chetty et al. 2018; Massey and Brodmann 2014).

BACKGROUND

Income Gaps in Children's Early Environments and School Readiness

A number of recent studies have detailed the striking increase, across birth cohorts since the mid-twentieth century, in gaps in educational opportunities (family and school characteristics) and outcomes (achievement and attainment) between children from high- versus low-income families (Bailey and Dynarski 2011; Bradbury, Waldfogel, and Washbrook 2019; Duncan, Kalil, and Ziol-Guest 2017; Hanushek et al. 2019; Reardon 2011). These studies complement other recent work on similar inequalities by parental SES operationalized as parental education (Bradbury et al. 2015; Linberg et al. 2019) or with composite measures that combine multiple SES indicators (Duncan and Magnuson 2011; Hanushek et al. 2019). Scholars' recent emphasis on income as the focal measure of SES acknowledges the fact that, since the mid-twentieth century, parental income's role as an axis of stratification in children's education has increased markedly relative to parental education's (still slightly larger) role (Reardon 2011). These patterns occur as the economic returns to educational attainment have increased, particularly for those who have completed postgraduate education (Autor, Katz, and Kearney 2008; Lemieux 2006, 2008). As such, income disparities in educational opportunities and outcomes in early childhood are a key part of schooling's increased role in the intergenerational correlation between parents' and children's incomes (Reardon 2011).

A subset of this research stream has called attention to how income gaps in educational opportunities and outcomes manifest early in children's lives, resulting in gaps in outcomes measured at later ages, such as educational attainment. These studies have documented income gaps, to the advantage of children from high-income families, in children's access to the characteristics of early environments that promote cognitive development and, in part as a result,

their academic readiness for school, as measured by their fall kindergarten math and reading scores. Below, I discuss previous research findings in both of these areas.

Early environments. Recent studies of income gaps in children's early environments (Bassok et al. 2016; Garcia and Weiss 2017; Kalil et al. 2016) have considered overlapping sets of environmental characteristics. Table 1 presents these, with related characteristics grouped together. Arrayed in this way, it can be seen that these characteristics include the parental "beliefs and behaviors" that the child development literature considers as mechanisms through which parental SES indirectly affects children's early achievement (see Davis-Kean 2005). The characteristics also include the resources, such as children's books, and other family characteristics that aid in the realization of the beliefs and consistent and effective engagement in the behaviors. The presence of two parents in the household, for example, results in more available units of parental time to engage in developmentally stimulating activities with children, while higher parental education (as a proxy for knowledge and skills) could result in parental time spent on developmental activities with children being more effective (Guryan, Hurst, and Kearney 2008).

Table 1. Characteristics Included in Previous Research on Income Gaps in Children's Early Environments (Bassok et al. [2016], Garcia and Weiss [2017], Kalil et al. [2016])

Parental Educational Beliefs

Parental Beliefs About Skills Necessary for Kindergarten

Parental Expectations for Children's Educational Attainment

Parental Behaviors and Resources

Maternal Education (Years)

Center-Based Preschool Care

Number of Children's Books in Household

Home Literacy Activities (e.g., Parent-Child Reading)

Home Learning Activities (e.g., Parent-Child Science Projects)

Family Demographic Characteristics and Parental Work

Two-Parent Household

Number of Children in Household

Mother Reported Working 35+ Hours Per Week

Using numerous data sources, these studies have shown that, for at least the past three decades, high-income children have consistently had greater access than low-income children to these characteristics of their early environments. Bassok et al.'s (2016) descriptive study using data from ECLS-K:2011, covering the cohort of students who began kindergarten in the fall of 2010, illustrated these differences on many of the factors listed in Table 1. Compared to families at the 10th income percentile, families at the 90th percentile reported higher scores on scales of beliefs about the skills children need for kindergarten, home literacy activities, and home learning activities; were more likely to enroll children in center-based preschool care; owned an average of 79 more children's books; were significantly more likely to have mothers who were married at the child's birth; were significantly less likely to have mothers and fathers who were out of the labor force; and had parents with significantly higher levels of educational attainment.

School readiness outcomes. Studies of income gaps in children's school readiness have consistently shown that high-income children begin school in the fall of kindergarten with better math and reading scores than low-income children. Using data from ECLS-K:2011, Reardon and Portilla (2016) found gaps at kindergarten entry of over one standard deviation (SD) in math and reading between the children of parents at the 90th versus the 10th percentile of the income distribution. Using the same data, Garcia and Weiss (2017) found gaps of similar sizes between children whose parents were in the top versus bottom quintile of the income distribution. School readiness gaps by parental income signal a high probability that, on average, children from high-income families will remain on more successful academic trajectories than their low-income peers throughout their educational careers, due to the strong correlation between children's early math and reading scores and those measured in subsequent years (e.g., Duncan et al., 2007).

Differences between high- and low-income families in characteristics of children's early environments account for large shares of school readiness gaps by parental income. Garcia and Weiss (2017) demonstrated this pattern using data on school readiness outcomes and early environments from the earlier ECLS-K cohort, who began kindergarten in 1998 (ECLS-K:1998). Income gaps in children's books, type of preschool care, literacy activities and other educational activities at home, parental educational attainment expectations for children, and family demographic characteristics accounted for approximately two-thirds of math and reading achievement gaps at school entry between children in the top versus bottom quintiles of parental income (Garcia and Weiss 2017).

Research Questions

While this prior research has detailed gaps in early environments and school readiness outcomes *between* income levels, they have not investigated racial gaps in environments and readiness *within* income levels. If these racial differences are present, they should be seen as some of the early life course roots of differences in adolescent and adult socioeconomic outcomes between Blacks and Whites who are raised in same-income households (Chetty et al. 2018; Massey and Brodmann 2014). To investigate these possibilities, I address the following research questions:

1. Do Black and White children whose parents have similarly low, middle, or high incomes have differential access to the characteristics of early environments that promote school readiness?

2. In the same comparisons, were there Black-White differences in school readiness outcomes?

3. To what extent would school readiness gaps between Blacks and same-income Whites be reduced if Blacks' had early environments that were comparable to those of same-income Whites?

Hypotheses (by Research Question)

I expect that, compared to same-income Whites, Black children's early environments will differ across all three domains arrayed in Table 1: parental educational beliefs, parental behaviors and resources, and family demographics and parental work. Expectations for these domains, respectively, form Hypotheses 1a, 1b, and 1c. Compared to same-income White children, I expect Black children will be exposed to weaker parental beliefs about the skills they need for kindergarten, but stronger parental expectations about their eventual educational attainment (*Hypothesis 1a*). I derive this hypothesis by extrapolating from Mickelson's (1990) research on Black-White differences in educational beliefs between same-SES high school students. Using a measure of parental SES that included students' parents' education and occupation, Mickelson (1990) found that, compared to same-SES Whites, Black high school seniors had weaker concrete educational beliefs, but stronger abstract educational beliefs. Hypothesis 1a considers parents' beliefs about the skills children need for kindergarten to be a concrete belief (on which Blacks will have weaker beliefs than Whites), since one of the opportunity structures that parents of young children are most immediately attentive to is the ways teachers and peers treat their children during their early days in school. It considers parents' expectations for their children's eventual educational attainment to be an abstract belief (on which Blacks will have stronger beliefs than Whites), since it represents a distal outcome in children's life courses.

Compared to same-income White children, I also expect Black children to have lower access to the developmentally stimulating parental resources, such as children's books, and developmentally advantageous behaviors, such as parent-child reading, that characterize advantageous early childhood environments (*Hypothesis 1b*). Since the 1970s, parental spending on children's early childhood development has increased, and inequalities in this spending between high- and low-income families have grown (Kornrich and Furstenberg 2013). Even though I compare children whose parents have the same incomes, it is important to briefly consider factors that may lead same-income Black and White families to allocate their household incomes differently. This could potentially leave Black families with less available income for developmental resources than same-income Whites. Blacks' higher likelihood of obligations related to kin support (Heflin and Pattillo 2006) and educational debt (Houle and Addo 2018) are two such potential explanations, among many others. After attending to these and other obligations, Black households with children may begin with a smaller pot of money than same-income Whites with which to realize their goals for their children's early development.

Parent-child reading provides a clear example of the hypothesized patterns for parental behaviors. Studies of that behavior have found that, net of income, Black parents report lower frequencies of reading to children (e.g., Chen, Pisani, White, & Soroui, 2012). Fewer resources in the home could also contribute to lower engagement in developmental activities if, for example, parents, children, or both tire of reading the same few books over and over and instead opt to do a less developmentally advantageous activity. A lack of books in the household could be particularly detrimental to Black children's families relative to those of same-income Whites because Black children's families can be expected to live in less socioeconomically advantaged neighborhoods than same-income White families (Reardon, Fox, and Townsend 2015).

Disparities in neighborhood advantage could result in Black children's families having fewer ways to access resources to bring home in order to engage in activities. For example, disadvantaged neighborhoods are more likely to be "book deserts" with fewer ways to acquire books for children than are available in more advantaged neighborhoods (Neuman and Moland 2016).

I also expect that, compared to same-income Whites, Black children's families will have a less advantageous combination of demographic composition and parental work hours (*Hypothesis 1c*). If Black-White differences in family structure at a given income level follow those within maternal education groups (McLanahan and Percheski 2008), Black children's households should be less likely than same-income White children's households to include two parents, meaning there is only one parent in such households to engage in developmental activities with children. Further, in both two- and single-parent households, Black women may work more hours than White women, consistent with Black women's historically higher rates of labor force attachment, particularly among the highly educated (e.g., DiPrete & Buchmann, 2013). But, if mothers of Black children work more hours than same-income mothers of White children, it would also contribute to fewer units of parental time to engage in developmental activities – particularly if Black mothers are more likely than same-income White mothers to be single parents. These fewer available units of parental time may also be spread across larger numbers of children in Black families (e.g., Yang & Morgan, 2003). If Black children's households contain larger numbers of children than same-income Whites' households, their lower access to developmentally stimulating behaviors could therefore be a partial result of a resource dilution mechanism (Downey 1995).

I also expect Black children to begin kindergarten with lower scores on academic indicators of school readiness than same-income White children, and that these gaps will be larger at lower income levels than at higher ones (*Hypothesis 2*). Leveraging the correlation between children's early and subsequent educational outcomes (Duncan et al. 2007), I base this hypothesis on previous research findings of Black-White gaps in same-income adolescents' cognitive test scores, and variation in such gaps across the distribution of parental income. Using data on adolescents and young adults aged 12 to 24 from the Adolescent Health Survey, Massey and Brodmann (2014) found that the Black-White gap, to Blacks' disadvantage in Peabody Picture Vocabulary Test (PPVT) score was approximately 14 points in the bottom parental income quartile and a smaller, but still notable 11 points in the top parental income quartile.

I expect that Black-White gaps in school readiness between children with same-income parents will be at least partially explained by racial gaps in early environments (*Hypothesis 3*). Such a pattern would be consistent with previous studies that have found income gaps in school readiness are partially accounted for by income gaps in early environments (Garcia and Weiss 2017).

Data and Methods

Data

Data come from the Early Childhood Longitudinal Study: Kindergarten Class of 2010-2011 (ECLS-K:2011), sponsored by the National Center for Education Statistics (NCES; for more information, see Tourangeau et al. 2015). In the fall of 2010, based on a multistage stratified cluster sampling design, the study began with a nationally representative sample of 18,170 children who started kindergarten in that year and followed them through fifth grade in 2015-

2016. ECLS-K:2011 contains information on children, their families, and their home and other

developmental environments, as well as assessments of children's reading and math skills and

teachers' ratings of their academic and behavioral skills. This analysis uses data from the fall

kindergarten survey wave.[1] All results are based on estimates that employ the base-year child-

level weight and cluster-robust standard errors to account for the study's complex sampling

design. Sample sizes are rounded to the nearest ten, consistent with NCES guidelines for

restricted-use data.

Analytic samples and multiple imputation. For the math and reading test outcomes, the

analytic samples include non-Hispanic Black and non-Hispanic White students with a non-

missing score on that outcome and non-missing data on parental income.[2] The resulting analytic

samples were 7,530 for math and 7,550 for reading. Some of these students were missing data on

other covariates. Missing data on these other covariates was imputed with the *ice* commands in

Stata 15.1, using multivariate imputation using chained equations (MICE) with 25 iterations (see

Royston 2005). The imputation model included children's race, gender, age, and parental

income; all other explanatory variables detailed below; children's scores on two measures of

teacher-rated behavior in the fall of kindergarten (approaches to learning and externalizing

problem behavior); and the fall kindergarten math and reading outcome variables (see Von

Hippel 2007). The model also included children's school ID variable and was weighted by the

base-year sampling weight. I ran the model on the sample of all Black and White children in the

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[1] The weighted base year response rates were 63 percent for sampled schools and 87 percent for sampled students (https://nces.ed.gov/statprog/handbook/ecls_dataquality.asp).
[2] Children with missing outcome scores were more likely to be Black, had mothers with less education, and lower incomes. Children with missing values for parental income were more likely to be Black, had mothers with less education, and lower math and reading scores. The limitations section of the Discussion and Conclusion notes implications for generalizability.

ECLS-K:2011 cohort, including those with missing data on the outcomes and on parental income (later dropped from the sample), and separately by race to allow for relations between the variables to differ for Blacks and Whites (White, Royston, and Wood 2010), consistent with this study's motivation.

Explanatory Variables: Parental Income and Early Environments

Parental income. In the fall of children's kindergarten year, parents reported their household incomes from the previous year in 18 categories. The first 15 categories were $5,000 increments up to $75,000, followed by categories for $75,001 to $100,000; $100,001 to $200,000; and $200,001 or more. Following established conventions in the literature for using the ECLS-K:2011 to estimate income gaps in early environments and outcomes (Bassok et al. 2016; Reardon and Portilla 2016), I converted these categories to weighted income percentiles in order to use the cubic regression method (described below). In analyses that employ a measurement error adjustment for parental income (also described below), I use a reliability of .96 (Reardon and Portilla 2016).

Early environments: parental educational beliefs, parental behaviors and resources, and *family demographics and parental work.* As previewed in the Background section, analyses include two measures of parents' educational beliefs and expectations that previous research on income gaps in school readiness has also included. The first is a scale of parents' beliefs about the skills important for kindergarten. The scale is a sum, across five items, of how necessary parents thought each one was for kindergarten. The skills were: count to 20, share with others, use a pencil, pay attention, and know letters. Parental responses ranged from not important (0) to essential (4), yielding a scale that ranged from 0 to 20. The second measure of beliefs is parents'

expectations for children's educational attainment, measured by the highest degree parents

expect the child to obtain. I enter parental educational attainment expectations for children into

models as a continuous variable indexing the years of schooling that correspond to the degree a

child's parents indicated (less than high school = 10 years; high school = 12; vocational or

technical = 14; two or more years of college = 14; four to five years of college = 16; master's

degree or equivalent = 18; Ph.D., M.D., or other advanced degree = 21). I also discus

supplemental analyses of this variable based on the original categorical measure of highest

degree expected.

      Analyses also include measures of children's exposure to developmentally advantageous

resources and parental behaviors. These measures include variables for mother's education (in

years), whether the child received center-based care in the year prior to kindergarten, the number

of children's books in the household, and scales for home literacy activities and home learning

activities. The activities scales combine parents' reports of the number of days per week in which

they typically engaged in a certain activity with children. Parents reported these frequencies in

categories. The categories were coded to mid-points to create continuous scales (none = 0; 1 or 2

days = 1.5; 3 to 6 days = 4.5; every day = 7). Therefore, these scales' units are activity-days per

week. For the home literacy activities scale, the activities were: child read picture books, parents

read books to the child, and parents told stories to the child, yielding a scale ranging from 0-21.

For the home learning activities scale, the activities were: sang songs together, played games

together, built things together, played sports together, helped the child with arts or crafts,

involved the child in household chores, and talked to the child about nature or did science

projects, yielding a scale ranging from 0-49.

Analyses also include, as measures of family demographic characteristics and parental work, variables for whether child lives in a two-parent household, number of children under 18 in the household, and whether the mother reported working 35 or more hours per week. I also include control variables for whether the child is a first-time kindergartner and child's gender.

School Readiness Outcomes

The outcome variables for this study are students' fall kindergarten math and reading assessment scores. The reading assessment tested children on basic skills (e.g., letter and word recognition and rhyming words), vocabulary, and reading comprehension. The math assessment tested children on number sense, properties, and operations; measurement; geometry and spatial sense; data analysis, statistics, and probability; and patterns, algebra, and functions. I prepared the outcome variables for analysis using procedures that have been established in the literature for handling these assessments (Reardon and Portilla 2016). I adjusted both outcomes for students' age at assessment and standardized them to have a mean of zero and SD of one, based on all non-missing scores on the given outcome in the full ECLS-K:2011 sample, including those not in the analytic samples for this study. For each outcome, a single standardization was conducted for all students, meaning that scores were not standardized separately by race or by income. Below, I report children's scores on the outcomes in SD units. I adjust math and reading gaps and cluster-robust standard errors for measurement error in parental income and the test instrument that constitutes that outcome. Following Reardon and Portilla (2016), those adjustments use instrument reliabilities of .92 for math and .95 for reading.

Analytic Strategy

Previous studies on income gaps in early environments and school readiness outcomes (Bassok et al. 2016; Reardon and Portilla 2016) have relied on the cubic regression method originally developed by Reardon (2011). By regressing a variable for a given early childhood environment characteristic (e.g., number of children's books) or school readiness outcome (e.g., fall kindergarten reading score) on variables for income, income squared, and income cubed, one can predict values on the variable at specified income percentiles, as well as differences in values between income percentiles (e.g., 90th vs. 10th percentile gap). I adapt this established method to assess Black-White differences in early environments and school readiness outcomes between children whose parents are at the *same* income percentile. To do so, I interact an indicator variable for race with the three income terms in the cubic regression specification, as shown in Equation 1, below:

$$Outcome_i = \beta_0 + \beta_1(Black_i) + \beta_2(IncPct_i) + \beta_3(IncPct_i^2) + \beta_4(IncPct_i^3) +$$

$$\beta_5(Black_i * IncPct_i) + \beta_6(Black_i * IncPct_i^2) + \beta_7(Black_i * IncPct_i^3) + \varepsilon_i$$

(1),

where $Outcome_i$ is a variable for a given early environment characteristic or school readiness outcome for student i; β_0 is an intercept term; β_1 is the main effect for race (Black = 1, White = 0); βs 2-4 are the cubic specification of income; βs 5 through 7 are interaction terms of race and income; and ε is an error term. From this model, I predict the Black-White gaps in early environment characteristics (Research Question 1) and school readiness outcomes (Research Question 2) at specified income percentiles. The gaps are the marginal effects of race at representative values of income percentile (MERs; see Williams 2012). I obtain the effects using the *margins* command in Stata/SE 14.1.

In answering Research Questions 1 and 2, below, I will demonstrate that, compared to same-income Whites, Blacks' early environments are characterized by stronger parental beliefs about education on both relevant variables, but lower access to developmentally advantageous resources, lower frequency of developmentally stimulating parental behaviors, and a less advantageous combination of demographic composition and parental work hours. Further, Black children in many cases begin school with lower readiness scores, particularly in math. The most relevant question related to accounting for the math and reading gaps (Research Question 3) is not, 'What if Blacks had the same early environments as same-income Whites on all of the factors considered here?' This scenario would take away Blacks' advantages based on their stronger parental beliefs about education. Instead, the relevant question is 'What if Blacks had their parents' existing educational beliefs, but same-income Whites' parental resources, behaviors, and family demographic characteristics and parental work hours?'

I estimate adjusted fall kindergarten math and reading gaps between Blacks and same-income Whites under this scenario. For each school readiness outcome (math and reading), I regress the outcome on the income specification given in Equation 1 plus the full set of covariates for early environments *for Blacks only*. Based on these coefficients, I re-predict Blacks' scores at each income level by substituting same-income Whites' values (from Research Question 2) for maternal education, number of children's books in the household, center-based preschool care attendance, home literacy activities, home learning activities, two-parent household, number of children in the household, and mother's work hours. Blacks retain their own mean values at that income level for the two variables for parental educational beliefs (skills necessary for kindergarten and desired educational attainment) as well as on the control variables for first-time kindergartener and gender. I re-calculate the gaps at each income level by taking

the difference between Blacks' adjusted score and Whites' original score (from Research

Question 2).

Table 2. Characteristics of Early Childhood Environments, by Race and Parental Income Percentile (Reading Sample, *N* = 7,550)

	10th Percentile				50th Percentile				90th Percentile			
Variable	Blacks	Whites	Difference	*p*	Blacks	Whites	Difference	*p*	Blacks	Whites	Difference	*p*
Parental Educational Beliefs												
Parents' Beliefs about Skills Necessary for Kindergarten (0-20)	16.120	15.611	0.509	***	16.649	15.578	1.071	***a	17.446	15.468	1.978	***bc
Parents' Expectations for Child's Educational Attainment (Years)	17.054	15.707	1.347	***	17.735	16.005	1.730	***	18.309	17.045	1.264	***
Parental Resources and Behaviors												
Mother's Education (Years)	12.613	12.607	0.005		14.003	14.129	-0.126		15.714	16.255	-0.541	*
Child Attended Center-Based Preschool Care	0.533	0.512	0.021		0.600	0.544	0.056		0.624	0.735	-0.111	c
Number of Children's Books in Household	36.442	79.109	-42.667	***	51.316	106.984	-55.667	***	75.933	144.373	-68.440	***b
Home Literacy Activities Scale (0-21)	14.141	15.153	-1.012	**	14.507	16.097	-1.590	***	16.519	16.721	-0.202	c
Home Learning Activities Scale (0-49)	27.339	27.600	-0.261		25.578	27.034	-1.456	**	28.396	26.908	1.488	c
Family Demographics and Parental Work												
Two-Parent Household	0.252	0.515	-0.263	***	0.608	0.868	-0.260	***	0.924	0.980	-0.056	bc
Number of Children in Household	1.663	1.318	0.346	***	1.466	1.447	0.019	a	1.543	1.473	0.070	
Mother Reported Working 35+ Hours Per Week	0.338	0.297	0.041		0.717	0.447	0.270	***a	0.645	0.423	0.222	**b
Controls												
First-Time Kindergartner	0.896	0.912	-0.016		0.943	0.958	-0.015		0.969	0.971	-0.001	
Female	0.455	0.502	-0.047		0.502	0.481	0.021		0.550	0.476	0.074	

* *p* < .05; ** *p* < .01; *** *p* < .001 (two-tailed tests, based on robust standard errors, not shown)

Notes: Results are for children with non-missing information on race, gender, parental income, and the reading test score instrument. For those in this sample, missing data on any other covariates was imputed (*M* = 25). Significance tests for differences between percentile differences: a10-50; b10-90; c50-90. Letter indicates significant difference at p < .05 or lower.

RESULTS

Early Environments of Black and White Children with Same-Income Parents

Parental educational beliefs. Table 2 presents descriptive statistics for characteristics of

children's early environments for children in the reading sample, by race and parental income

percentile. Compared to same-income parents of White children, parents of Black children had

significantly stronger beliefs about their children's education, as measured by the two types of

beliefs considered here. At each income level, parents of Black children reported stronger beliefs

on the 20-point scale of beliefs about skills necessary for kindergarten. This pattern disconfirms

the part of Hypothesis 1a about concrete beliefs, which held that Blacks would have weaker

scores on such measures than same-income Whites. The difference on this measure, to the

advantage of Blacks, is 0.523 ($p < .001$) at the 10th income percentile and steadily increases with

income (1.064, $p <.001$ at the 50th income percentile; 1.956, $p < .001$ at the 90th income

percentile). Blacks' advantage on this measure at the 50th percentile is significantly larger than

the one at the 10th percentile, and their advantage at the 90th percentile is significantly larger than

the ones at both the 50th and 10th percentiles. Therefore, not only to Blacks' parents have

significantly stronger beliefs about the skills they need for kindergarten than same-income

Whites, Blacks' net advantage gets significantly larger as income increases. Inspection of the

mean scores on the scale by race and income (also presented in Table 2) reveal that the beliefs of

parents of Black children increase as income increases, from 16.128 at the 10th percentile to

17.426 at the 90th percentile. In contrast, the beliefs of parents of White children decrease as

income increases, from 15.605 at the 10th percentile to 15.470 at the 90th percentile.

Parents of Black children also had significantly higher expectations for their children's

educational attainment than parents of same-income White children. This pattern confirms the

part of Hypothesis 1a concerning abstract beliefs, which held that Blacks would have stronger reports on such measures than same-income Whites. The parents of Black children's expectations increased from 17.060 years at the 10th percentile, to 17.730 years at the 50th percentile, to 18.294 years at the 90th percentile. The parents of White children's expectations increased by similar amount as income increased, but from a lower starting point: 15.703 years at the 10th percentile, to 16.005 years at the 50th percentile, to 17.046 years at the 90th percentile. These patterns resulted in significant differences, to the advantage of Blacks, of approximately one and one-half years of expected schooling at each income level ($p < .001$ at all three percentiles). Unlike parental beliefs about skills necessary for kindergarten, Blacks' net advantages relative to same-income Whites on educational attainment expectations were of statistically indistinguishable size across income percentiles.

I also conducted supplemental analyses of attainment expectations in the original metric of the degree parents expected their child to obtain. At the 10th income percentile, Blacks' advantage in average expected years of schooling was drawn from significantly lower shares, compared to Whites, of parents who expected children to complete high school or two or more years of college, and significantly higher shares of parents who expected children to complete a master's degree or equivalent or a Ph.D., M.D., or other advanced degree. At the 50th and 90th income percentiles, Blacks' advantages were driven by some of these same patterns, but also by significantly lower shares of parents who expected children to complete four to five years of college and even larger advantages in terms of higher shares of parents who expected children to complete a master's degree or equivalent or a Ph.D., M.D., or other advanced degree.

Parental resources and behaviors. Compared to same-income parents of White children, parents of Black children reported significantly lower developmental resources and significantly

less frequent engagement in developmentally stimulating activities, confirming Hypothesis 1b. Both Black and White children's access to children's books increased with income. However, at each income level, parents of Black children reported owning roughly half the number of children's books as same-income parents of White children, with Black-White differences increasing with income (42.827 at the 10th income percentile, 55.594 at the 50th income percentile, 68.189 at the 90th income percentile; $p < .001$ for all). Blacks' large and significant disadvantages on this measure likely spell disparities on other resources not included in this study, as the number of children's books in the household is an established proxy measure for other developmentally advantageous tangible characteristics of children's early environments (Fryer and Levitt 2004). Blacks' disadvantage at the 90th income percentile was significantly larger than the (also significant) disadvantage at the 50th income percentile, meaning that, at least in the top half of the parental income distribution, Blacks' disadvantages of this type increase with parental income.

Parents of Black children also reported significantly less frequent engagement in home literacy activities, such as parent-child reading, than same-income parents of White children, also in line with Hypothesis 1b. Both Black and White children were exposed to more home literacy activity-days per week as their parents' incomes increased. But, at each income level, parents of Black children reported fewer home literacy activity-days per week than same-income Whites. These differences were significant at the 10th (14.166 vs. 15.137, $p < .001$) and 50th (14.490 vs. 16.099, $p < .001$) income percentiles, but not at the 90th percentile (16.469 vs. 16.727).

Black-White differences on the home literacy activities scale varied substantially across income percentiles. Blacks' small disadvantage on the 0-49 scale at the 10th income percentile (.266) was not significant, but their larger disadvantage at the 50th income percentile was

significant (-1.454, $p < .01$). Blacks had an advantage on this measure relative to same-income Whites at the 90th income percentile (1.495) that was equivalent in absolute value to their disadvantage at the 50th income percentile. While the net advantage at the 90th percentile was not significant due to a larger standard error (not shown), it was significantly distinguishable from Blacks' disadvantage at the 10th income percentile. Therefore, how Black children fare relative to same-income Whites on home learning activities, such as parents and children doing arts and crafts together, differs markedly depending on where in the parental income distribution one is making the racial comparison.

Black children's mothers attained a comparable amount of schooling to White children's mothers at all focal income percentiles expect the 90th. Among such high-income families, Black children's mothers' average years of schooling (15.714) fell under the amount traditionally corresponding to a bachelor's degree by the same amount that White children's mothers' attainment exceeded it (16.255). This results in a significant disadvantage ($p < .05$) that should be kept in mind, along with other disadvantages noted above, when comparing high-income Black children's early environments to those of similarly high-income White children.

Family demographics and parental work. Relative to same-income Whites, Black children grew up in early environments that had a less advantageous combination of family demographic characteristics and parental work hours – consistent with Hypothesis 1c. At each of the focal income percentiles, Black children were less likely than same-income Whites to live in two-parent households, and these differences were significant at the 10th and 50th percentiles (25.3% vs. 51.5% at the 10th percentile, $p < .001$; 60.8% vs. 86.8% at the 50th percentile, $p < .001$; and 92.3% vs. 98.0% at the 90th percentile, *NS*). These Black-White disparities also beg the question of why the model predicts such households to be at the same income percentile. The

dichotomous measure of whether or not mothers reported working 35 or more hours per week provides one answer to this query. At each of the focal income percentiles, mothers of Black children were more likely than mothers of White children to report work hours in this category. At the 50th and 90th percentiles, these differences were significant (and significantly larger than the difference at the 10th percentile; 71.7% vs. 44.7%, $p < .001$ at the 50th percentile; 64.5% vs. 42.3%, $p < .01$ at the 90th percentile). This combination of number of parents in the household and maternal work may result in families of Black children having fewer units of parental time available for engagement in developmental activities, compared to those of same-income Whites. Descriptive results also indicate that, among low-income households at the 10th percentile, Blacks' fewer units of parental time are spread across significantly larger average numbers of children in the household (1.663 vs. 1.318, $p < .001$).
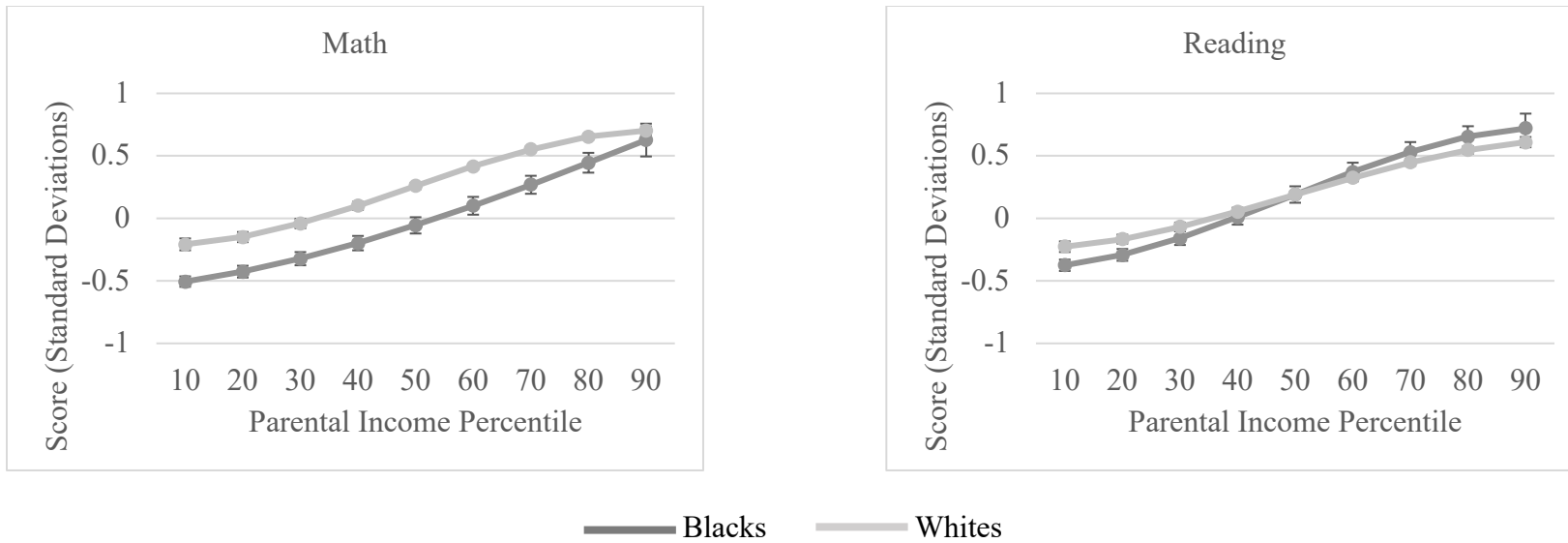
Figure 1. Fall Kindergarten Math and Reading Assessment Scores, by Race and Parental Income Percentile

Notes: Numbers of observations: Math = 7,530; Reading = 7,550. Error bars represent robust standard errors. For each outcome, analytic sample includes children with non-missing data on race, parental income, and the test instrument for the given outcome.

Table 3. Black-White Gaps (Standard Deviations) in Fall Kindergarten Math and Reading Assessment Scores, by Parental Income Percentile

	Math (N = 7,530)			Reading (N = 7,550)		
	Gap	SE	p	Gap	SE	p
10th Percentile	-0.297	0.063	***	-0.141	0.061	*
50th Percentile	-0.315	0.069	***	-0.002	0.071	
90th Percentile	-0.077	0.134		0.098	0.121	b

* $p < .05$; ** $p < .01$; *** $p < .001$ (two-tailed tests)

Significance tests for differences between percentile gaps: [a]10-50; [b]10-90; [c]50-90. Letter indicates significant difference at $p < .05$ or lower.

School Readiness of Black and White Children with Same-Income Parents

Math. Across income percentiles, Black children in this cohort often began school with significantly worse math assessment scores than same-income Whites. At the focal income percentiles, as shown in Table 3, gaps in math readiness between Blacks and same-income Whites were larger at the 10th and 50th income percentiles, where Black students began kindergarten with reading scores approximately one-third of an SD worse than those of same-income Whites, (-0.297 SDs, $p < .001$ at the 10th percentile; -0.315 SDs, $p < .001$ at the 50th percentile), than at the 90th percentile, where Blacks' and Whites' scores were indistinguishable (-0.077 SDs, *NS*). This lends support to Hypothesis 2, although, as Table 3 also shows, math gaps at the 10th, 50th, and 90th percentiles were statistically indistinguishable from each other, due in part to a large standard error on the gap measurement at the 90th percentile.

Reading. Results for reading readiness present a contrast to those for math. Among the focal income percentiles, Black children at the 10th income percentile were the only group that began school with significantly worse reading scores than same-income Whites (-0.141 SDs, $p < .05$), again lending support to Hypothesis 2. However, unlike math readiness, disparities in reading readiness were not visible in other areas of the parental income distribution. Black and White children at the 50th income percentile began kindergarten with statistically indistinguishable average reading scores (-0.002 SDs, *NS* at the 50th percentile). Black children of parents at the 90th income percentile began kindergarten with average reading scores that were over one-tenth of a SD higher than those of same-income Whites, although the Black-White difference was again not statistically significant ($b = 0.122$, *NS* at the 90th percentile). These patterns resulted in the reading disadvantage facing low-income Black students relative to same-

income Whites being significantly different than the net advantage high-income Black students

had relative to their White peers.

Table 4. Coefficients from Linear Regressions of Fall Kindergarten Assessment Scores (Models Include Blacks Only)

Variable	Math				Reading		
	b	SE	*p*		*b*	SE	*p*
Income Percentile	-0.005	(0.007)			-0.012	(0.008)	
Income Percentile Squared	0.000	(0.000)			0.000	(0.000)	*
Income Percentile Cubed	0.000	(0.000)			0.000	(0.000)	
Parents' Beliefs about Skills Necessary for Kindergarten (0-20)	0.035	(0.013)	**		0.032	(0.011)	**
Parents' Expectations for Child's Educational Attainment (Years)	0.041	(0.010)	***		0.034	(0.010)	**
Mother's Education (Years)	0.084	(0.015)	***		0.093	(0.016)	***
Child Attended Center-Based Preschool Care	0.082	(0.051)			0.067	(0.051)	
Number of Children's Books in Household (Logged)	0.101	(0.033)	**		0.078	(0.028)	**
Home Literacy Activities Scale (0-21)	-0.004	(0.006)			0.001	(0.006)	
Home Learning Activities Scale (0-49)	0.000	(0.003)			0.000	(0.003)	
Two-Parent Household	0.244	(0.056)	***		0.209	(0.060)	**
Number of Siblings in Household	-0.040	(0.024)			-0.085	(0.022)	***
Mother Reported Working 35+ Hours Per Week	0.008	(0.061)			0.034	(0.056)	
First-Time Kindergartner	0.053	(0.100)			-0.064	(0.109)	
Female	-0.054	(0.052)			0.064	(0.053)	
Constant	-3.054	(0.298)	***		-2.709	(0.313)	***
Number of Observations		1,370				1,380	

* *p* < .05; ** *p* < .01; *** *p* < .001 (two-tailed tests)

Notes: Results are for children with non-missing information on race, parental income, and the given outcome. For those in this sample, missing data on any other covariates was imputed (*M* = 25). R-squared not provided because results are based on multiply imputed data.

Table 5. Counterfactual Fall Kindergarten Math and Reading Assessment Gaps Between Blacks and Same-Income Whites if Blacks Had Same-Income Whites' Values on Indicated Variables, by Test Subject and Income Percentile

Test Subject	10th Percentile		50th Percentile		90th Percentile	
	Counterfactual Gap	Percentage of Observed Gap Accounted For	Counterfactual Gap	Percentage of Observed Gap Accounted For	Counterfactual Gap	Percentage of Observed Gap Accounted For
Math						
Blacks' Scores Predicted with Same-Income Whites' Value For:						
Number of Children's Books in Household (Logged)	-0.189	29.059	-0.202	28.197	-0.004	94.695
Home Literacy Activities Scale	-0.272	-2.277	-0.289	-2.919	-0.067	0.208
Home Learning Activities Scale	-0.268	-0.627	-0.282	-0.555	-0.066	2.058
Child Attended Center-Based Preschool Care	-0.269	-1.235	-0.286	-2.058	-0.057	14.936
Mother's Education (Yrs.)	-0.268	-0.763	-0.271	3.317	-0.021	68.553
Mother Reported Working 35+ Hours Per Week	-0.268	-0.723	-0.284	-1.163	-0.068	-0.983
Two-Parent Household	-0.203	23.524	-0.218	22.178	-0.053	21.619
Number of Siblings in Household	-0.254	4.595	-0.281	-0.157	-0.064	5.649
All of the Above	-0.118	55.779	-0.141	49.844	0.065	196.065
Reading						
Blacks' Scores Predicted with Same-Income Whites' Value For:						
Number of Children's Books in Household (Logged)	-0.074	45.345	**0.063**	**-5838.836**	**0.147**	**-46.788**
Home Literacy Activities Scale	-0.134	0.719	**0.002**	**-99.798**	**0.098**	**1.831**
Home Learning Activities Scale	-0.135	-0.066	**0.000**	**99.886**	**0.099**	**1.376**
Child Attended Center-Based Preschool Care	-0.136	-1.003	**-0.003**	**394.421**	**0.105**	**-5.415**
Mother's Education (Yrs.)	-0.135	-0.332	**0.012**	**-1062.931**	**0.148**	**-48.340**
Mother Reported Working 35+ Hours Per Week	-0.136	-1.019	**-0.008**	**901.092**	**0.090**	**9.520**
Two-Parent Household	-0.080	40.632	**0.055**	**-5074.324**	**0.109**	**-9.577**
Number of Siblings in Household	-0.105	21.802	**0.002**	**-112.972**	**0.104**	**-3.905**
All of the Above	0.008	105.952	**0.118**	**-11076.615**	**0.215**	**-115.436**

Notes: All predictions assume Blacks retain their own values for the following variables: parental beliefs about the skills necessary for kindergarten, parental educational attainment expectations, first-time kindergartner, female. Using this base model and the linear regression coefficients from Table 4, Blacks' scores are predicted as if they had same-income Whites' value on the indicated variable. Negative percentages of gap accounted for indicate that the predicted gap is larger (i.e., more to Blacks' disadvantage) than the observed gap. Bolded cells indicate comparisons in which Blacks had an advantage over Whites in the observed data; those cells should be given the opposite interpretation. Results are for children with non-missing information on race, parental income, and the given outcome. For those in this sample, missing data on any other covariates was imputed ($M = 25$).

Accounting for School Readiness Gaps Between Black and White Children with Same-Income

Parents

In most studies of Black-White achievement gaps, including those for school readiness (e.g., Fryer and Levitt 2004), the implied counterfactual is to what extent would gaps be reduced if Blacks had Whites' values on all characteristics included in the model. Table 4 – which presents Blacks' coefficients for linear regressions of the two readiness outcomes on the cubic function of income plus all of the variables for early environments – shows why this counterfactual is inappropriate in this case. Parents' beliefs about skills necessary for kindergarten ($b = 0.035$, $p < .01$ for math; $b = 0.032$, $p < .01$ for reading) and their expectations for children's educational attainment ($b = 0.041$, $p < .001$ for math; $b = 0.034$, $p < .01$ for reading) are both positively and significantly correlated with the readiness outcomes, net of the other variables in the model. Therefore, predicting Blacks' scores as if they had Whites' values on these two measures would artificially depress sources of readiness advantage (or of smaller disadvantage).

Results presented in Table 5 assess the extent to which readiness gaps would be reduced if Blacks' comparatively strong educational beliefs could function within a scenario where other racial disparities in a) parental resources and behaviors and b) family demographics and parental work, often to Blacks' disadvantage, were eliminated. Maintaining Blacks' values for parental educational beliefs (as well as the control variables of first-time kindergartner status and gender) and using the coefficients given in Table 4, I re-predict Black-White readiness gaps as if Blacks had same-income Whites' value on each indicated variable from these two domains. While results from this procedure are, of course, not causal estimates, they help determine which of the factors considered here play the largest roles in driving Black-White readiness gaps between

same-income children. Then, for each outcome, a final 'all of the above' prediction reveals what the gaps would be if all of the manipulated factors were changed at the same time.

    Math. At all three focal income percentiles, Blacks' families' lower numbers of children's books and lower likelihood of having two parents in the household disadvantages relative to same-income Whites are some of the largest drivers of their math readiness disadvantages (which are statistically significant at the 10th and 50th percentiles). If Blacks had the equivalent number of children's books as same-income Whites, with no other changes to their early environments, math readiness gaps would be reduced by a predicted 29 percent at the 10th income percentile, 28 percent at 50th percentile, and 95 percent at the 90th percentile (where the observed gap was smaller than the other two and not statistically significant). If Blacks had the equivalent likelihood of being raised in a two-parent household as same-income Whites, math readiness gaps would be reduced by a predicted between 22 and 24 percent across income percentiles.

    At the 90th income percentile, Blacks' already small and statistically insignificant math readiness disadvantages relative to same-income Whites would also be appreciably reduced if their disadvantages in center-based care attendance (11 percent, *NS*, see Table 2) and maternal education (discussed above) were eliminated. If these scenarios were the case, math readiness gaps would be reduced by 15 percent and 69 percent, respectively. The 'all of the above' counterfactual reveals that characteristics of early environments considered here account for a predicted 56 percent of the math readiness gap at the 10th income percentile (reducing it to -0.117 SDs), 50 percent of the gap at the 50th income percentile (-0.140 SDs), and 196 percent of the gap at the 90th percentile – meaning that Blacks at this income level would begin kindergarten with a net math readiness advantage of 0.065 SDs over same-income Whites.

Reading. Counterfacutal predictions for reading readiness reveal some of the same patterns. The 10th income percentile was the only focal percentile where Blacks began kindergarten with significantly lower reading scores than same-income Whites. At that income percentile, Blacks' disadvantages in number of children's books (45 percent of gap) and likelihood of being raised in a two-parent household (41 percent of gap) again were predicted to account for large shares of the readiness gap. Also at that income level, Blacks' significantly larger number of children in the household was predicted to account for 22 percent of the gap. This was approximately four times that factor's predicted share of math readiness gap accounted for at that income percentile – perhaps due its stronger negative relationship with reading readiness ($b = 0.085$, $p < .001$ for reading; $b = -0.040$, *NS* for math) and possibly indicating a subject-specific form of resource dilution due to larger sibship size (Downey 1995). The 'all the above' scenario reveals that, with comparable early environments, Blacks at the 10th income percentile would begin kindergarten at reading parity with same-income Whites (0.007 SDs), while Blacks at the 50th and 90th percentiles would have substantial reading readiness advantages over their White peers (0.117 SDs at the 50th percentile and 0.215 SDs at the 90th percentile).

DISCUSSION AND CONCLUSION

This study has investigated whether Black and White children whose parents have similarly low-, middle-, or high-incomes have comparable early childhood environments and fall kindergarten math and reading scores. I have sought to contribute a focus on early childhood to the growing research stream on the differential socioeconomic life course trajectories of Blacks and Whites who have same-income parents. To date, this work has focused primarily on adolescents and adults (Chetty et al. 2018; Massey and Brodmann 2014). In doing so, I have also extended work on income gaps in children's school readiness (Bassok et al. 2016; Garcia and Weiss 2017; Reardon and Portilla 2016) with needed attention to the intersection of race and income in early life course family and educational processes.

I have brought forward three main findings. First, compared to same-income Whites, Black children's early environments are characterized by stronger parental beliefs about education, but lower access to developmentally advantageous resources, lower frequency of developmentally stimulating parental behaviors, and a less advantageous combination of demographic composition and parental work hours. I have assessed these of differences through the developmental framework that holds that parental "beliefs and behaviors" are the mechanisms through which SES indirectly affects children's early achievement – alongside the resources, such as children's books, and family demographic characteristics, such as the presence of two-parents, that are correlated with those beliefs and behaviors and help support their realization (Davis-Kean 2005). Attending to the intersection of race and income has revealed that, at a given income level, parental beliefs and behaviors do not always hang together. Across the income distribution, parents of Black children had stronger beliefs and expectations about their children's education than same-income parents of White children. These findings are

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reminiscent of the careful watch Black parents keep on their children's education – a common theme in the qualitative literature on the Black middle class (e.g., Lareau, 2003), in this case shown to hold across income levels. Black children's families' stronger educational beliefs relative to same-income families of White children support the assumption that they want to engage in developmental activities with children and provide strong and direct evidence against a cultural interpretation of differences in parental behaviors. Other descriptive results point to some of the potential barriers families of Black children face in doing so, relative to same-income Whites – mainly, the disadvantageous combination of a lower likelihood of having two-parents in the household and a higher likelihood of having a mother who works 35 or more hours per week.

Second, Black children other than those from the highest income families began school with significantly lower math scores than same-income White children, and Black children from the lowest-income families also began school with significantly lower reading scores than comparable Whites. Across income levels, the differential size and significance of readiness gaps is part of what makes this study a useful complement to previous work that has accounted for average Black-White gaps in school readiness (e.g., Fryer & Levitt, 2004). Black-White gaps in children's school readiness vary across the distribution of economic (dis)advantage, in ways that are masked when analyses focus only on average disparities and the extent to which they are explained by average Black-White differences in income and other parental SES characteristics.

School readiness gaps between low-income Black and White children in both math and reading call particular attention, from yet another vantage point, to the developmental plight of Black children who spend their early years in low-income circumstances (e.g., Duncan, Brooks-Gunn, & Klebanov, 1994), in this case compared to Whites who also grow up in such

circumstances. In light of the gaps among low-income children in both subjects and among middle-income children in math, Black-White parity in reading readiness among middle- and high-income children is encouraging. However, it is important to note that children's early math skills are correlated with their later math skills, as well as their later reading skills, whereas early reading does not have the same crossover effects (Duncan et al. 2007). Blacks' early disadvantages relative to same-income Whites in math across the vast majority of the parental income distribution may therefore be related to subsequent disadvantages in that subject, as well as in reading. Early math gaps between Blacks and same-income Whites are also worrisome because they are an early signal of racial differences in preparation to succeed in STEM education and occupations (Penner and Paret 2008).

Given these patterns, a relevant counterfactual question was to what extent school readiness gaps between Black and same-income Whites would be reduced if Blacks were exposed to their parents' existing educational beliefs and expectations, but to same-income Whites' a) parental resources and behaviors and b) demographic characteristics and parental work. In this study's third main finding, results indicated that, if this were the case, math readiness gaps would be reduced by an average of three-quarters across income levels, and Black children at all income levels would enter kindergarten with net reading advantages relative to same-income Whites. Substantial roles, in accounting for readiness gaps, of early environmental characteristics such as number of children's books in the household are encouraging. They mean that, while these gaps are early indicators of same-income Black and White children's differential life chances, altering manipulable aspects of children's early environments may help reduce them. Less easily manipulable factors also shown to play large roles in accounting for the gaps, such as living in a two-parent household, still point towards alternative solutions, such as

push-in time from other adults in venues such as community programs. These factors' roles in accounting for readiness gaps across income levels justify expansive, both-and thinking about reducing racial inequalities in children's early environments that attends to the developmental needs of children living above and below the poverty line.

Findings should be considered in light of this study's limitations. Excluding children whose parents did not report an income in the base year of the ECLS-K:2011 means that some of the most socioeconomically disadvantaged and lowest-achieving children may not be included in the analyses. Further, the study focused only on Black and White children. Other research on differences, by race, in same-income children's socioeconomic life course trajectories in education and other areas (Chetty et al. 2018; Massey and Brodmann 2014) has found that patterns differ for Whites, Blacks, Hispanics, Asians, and American Indians and Alaska Natives. Future research on the intersection of race and income in early childhood family and educational processes could profitably incorporate these other racial groups.

This study also points to at least two more clear directions for future research. First, future work should investigate the role of Black-White differences in wealth, net of income, in gaps in early environments and outcomes between same-income Black and White children. At the same income level, Whites hold more wealth than Blacks (Conley 1999; Oliver and Shaprio 2006). White families may draw on these reserves to create early care environments that are particularly successful at preparing children for the academic demands of formal schooling. This mechanism could have a particularly strong effect on resources that cost money, such as children's books, toys, and games, or developmentally advantageous preschool care in highly rated centers or with well-credentialed in-home caregivers. Even if hypothetical wealth effects are larger at higher income levels, racial wealth disparities also contribute to the differential

living conditions of low- and middle-income Whites versus similar-income Blacks (Conley 1999) and may also be an explanation for racial differences at lower income levels.

Second, future work should extend the developmental outcomes under consideration beyond academic outcomes to include behavioral outcomes, such as kindergarten teachers' ratings of children's classroom behavior. This type of study could consider not only children's early childhood developmental contexts at home, as this study has done, but how this context interacts with their school context. The home-school junction in this case would include differences, between same-income Black and White children, in the racial and socioeconomic composition of their classmates and teachers, as well as, relatedly, in their potential exposure to racial bias in teachers' evaluations of them, relative to their classmates (Downey and Pribesh 2004). Children's academic and behavioral skills develop reciprocally with each other as children age (e.g., Magnuson et al. 2016; Owens 2016). Knowing whether and to what extent there are Black-White differences between same-income students in their (perceived) behavior in their early years in school will therefore contribute to a fuller understanding of potential disparities in these children's socioeconomic trajectories in K-12 schooling and beyond.

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