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Early Academic Achievement Among American Low-Income Black Students from Immigrant and Non-Immigrant Families

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Abstract

At least half of the well-documented achievement gap for low-income Black children is already present in kindergarten, due in part to limited opportunities for acquiring foundational skills necessary for school success. There is some evidence that low-income minority children from immigrant families have more positive outcomes than their non-immigrant counterparts, although little is known about how the *immigrant paradox* may manifest in young children. This study examines foundational school readiness skills (academic and social-emotional learning) at entry into pre-kindergarten (pre-k) and achievement in kindergarten and second grade among Black children from low-income immigrant and non-immigrant families ($N=299$). Immigrant and non-immigrant children entered pre-k with comparable readiness scores; in both groups, reading scores decreased significantly from kindergarten to second grade and math scores decreased significantly for non-immigrant children and marginally for immigrant children. Regardless of immigrant status, pre-k school readiness and pre-k classroom quality were associated with elementary school achievement. However, declines in achievement scores were not as steep for immigrant children and several predictive associations were moderated by immigrant status, such that among those with lower pre-k school readiness or in lower quality classrooms, immigrant children had higher achievement test scores than children from non-immigrant families. Findings suggest that immigrant status provides young Black students with some protection against individual- and classroom-level risk factors for early underachievement in elementary school.

Keywords

School readiness; Immigrant; Black; Academic achievement

In the USA, children's social and economic background predicts academic success. Students who live in poverty are almost twice as likely to drop out of high school, and Black students, regardless of poverty status, are significantly more likely to drop out than White students (Hernandez 2011). Despite recent improvements in high school completion rates across racial groups, less than 70 % of Black students and less than half of Black boys graduate high school in 4 years (Balfanz et al. 2013).

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The well-documented Black-White achievement gap obscures heterogeneity within the low-income Black student population in the USA. Approximately 12 % of Black children in the USA (born since 2000) have immigrant (i.e., foreign-born) parents (primarily from Africa and the Caribbean; Crosby and Dunbar 2012), and there is some evidence that children of immigrants are more likely to succeed than their peers, even when they experience comparable or greater socioeconomic disadvantage. As an example of this phenomenon, labeled the *immigrant paradox*, high school dropout rates are three times higher for Black students of US-born parents than for those of immigrant parents (Ruiz-de-Velasco et al. 2000). Despite emerging evidence that immigrant status is an important factor to consider in understanding achievement among Black and other minority groups, little is known about whether and how the paradox manifests during the early years of schooling.

In the context of a randomized controlled trial of an early childhood, family-centered, school-based intervention (Brotman et al. 2013), the present study examined school readiness skills and achievement from pre-kindergarten (pre-k; age 4) through the end of second grade in low-income Black students with immigrant and US-born parents. Among students enrolled in schools randomly assigned to the control condition (business-as-usual), the aim of the present study was to characterize academic performance by immigrant status [children from immigrant families (i.e., who had an immigrant parent) relative to children from non-immigrant families (i.e., who had US-born parents)] to identify differences in the course and predictors of early achievement. Support for the immigrant paradox would suggest the presence of unique risk and protective factors that may be important to consider in efforts to improve educational outcomes among Black students of diverse backgrounds.

Early Academic Achievement and Immigrant Status

The first years of schooling are critical in shaping academic outcomes. Lower school readiness and early difficulties with reading, math, and behavior portend later academic problems and grade retention (Winsler et al. 2012). There is a clear and sizable Black-White achievement gap by kindergarten (KG) entry (Fryer and Levitt 2004). The gap grows with each year of early schooling (Burchinal et al. 2011) and is considered relatively intractable by the end of elementary school (Grissmer and Eiseman 2008). There has been increased focus on understanding early development among children from immigrant families—a large and growing portion of the US population (i.e., at least 25 % of all children born since 2000 had an immigrant parent). Most studies, however, have focused on Latino and Asian families, and relatively little is known about children of Black immigrants.

One notable exception is a recent study by Crosby and Dunbar (2012), which characterizes early development (up to age 5) among Black children of immigrant parents relative to children of other immigrant groups and Black children of US-born parents. At age 2, children of Black immigrants scored lower on a test of cognitive functioning than many of their peer groups, but by KG, Black children of immigrants were achieving relatively well in both reading and math (average >50th percentile), outperforming Black children of US-born parents and Latino children from immigrant and non-immigrant families. These findings were held when controlling for demographic factors. Interestingly, Black immigrant parents ranked highest on measures of orientation toward education for their young children, a

protective factor that may become especially salient when children enter school. This informative study, however, did not extend beyond KG.

Findings from studies of older Black immigrant and US-born students are mixed. There is some evidence of a Black immigrant advantage in reading achievement in third grade (Palacios et al. 2008), yet other studies with school-aged children find no differences in achievement and indicate that *all* Black students, regardless of immigrant status, significantly underachieve relative to Whites (Glick and Hohmann-Marriott 2007). Of note, studies of older children typically focus on the immigrant status of the student rather than that of the parent (whereas parental immigrant status is typically examined in studies of younger children). In sum, the immigrant paradox in Black students may manifest differently depending on child age, and more longitudinal studies are needed to further explore these potential variations across developmental periods and context.

Predictors of Academic Achievement

Much of the Black-White achievement gap has been attributed to socioeconomic factors. A comparison study of poor Black and White children found that Black children were more likely to live in extreme poverty, to attend more disadvantaged schools, and to live in single-parent homes; these differences fully accounted for the Black-White gap in reading and largely accounted for the gap in math (Burchinal et al. 2011). The expectation is that poverty-related family, school, and neighborhood factors combine and jeopardize development. In New York City, where the current study takes place, more than half of Black students are low income. To consider factors beyond income, we focus on Black children from low-income families attending the same schools to explore two potentially malleable predictors of achievement: school readiness and classroom quality.

School Readiness

School readiness is broadly construed as the degree to which young children are prepared to meet the *academic* and *social-emotional* demands of school (Raver 2003). Readiness in both domains predicts later achievement (Duncan et al. 2007). The academic domain includes early language, understanding of concepts (e.g., letter recognition), and motor skills that serve as building blocks for emergent reading and math skills (NICHD Early Child Care Research Network 2000). The *social-emotional learning* (SEL) domain includes social skills such as interacting positively with adults and peers and regulating emotions, attention, and behavior. SEL promotes on-task behavior and executive functioning and reduces negative interactions with teachers and peers that distract from learning (e.g., Rhoades et al. 2011). Children without the requisite SEL skills are more likely to display behavior problems that interfere with later achievement (McEvoy and Welker 2000). Girls are 16 % more likely to be ready for school than boys (Isaacs 2012) and outperform boys by 12 % on reading in KG (Eliot 2010). Indeed, the gender gap in KG reading achievement has been attributed in part to under-developed SEL and higher rates of behavior problems in boys (Isaacs 2012).

Disparities in school readiness are increasingly recognized as key contributors to gaps in later achievement, explaining about 40 % of the Black-White gap in reading in KG (Grissmer and Eiseman 2008). Analyses of large national datasets have revealed a gap in

readiness skills of approximately 1.0 SD for low-income students (Jacobson-Chernoff et al. 2007) and 0.40 SD for Black students. Considerably less attention has been given to school readiness in Black children of immigrants. The aforementioned study by Crosby and Dunbar (2012) found that the academic readiness skills of Black children of immigrant parents were more advanced than those of Black children of US-born parents and comparable to those of White children of US-born parents. On the other hand, teacher ratings of behavior problems were comparable for Black children from immigrant families of Caribbean heritage and Black children from US-born parents; in contrast, Black children from immigrant families of African heritage were rated as having fewer behavior problems than the other groups (Crosby and Dunbar 2012).

Pre-K Classroom Quality

Rigorous studies find that high-quality pre-k programs can enhance early learning and development for low-income children (Barnett 2013). The nature and quality of interactions between teachers and students are key components of pre-k classroom quality and predict both learning and behavioral outcomes. Despite the potential of high-quality programming, a national study found that most pre-k programs were not of high quality, and quality was lowest for children whose parents had the least education (Barnett 2013). Compounding the limited access to quality programs by high-need students, teachers with a high proportion of low-income students have been observed to be less sensitive (Pianta et al. 2005) and as having lower quality relationships with boys relative to girls (Peisner-Feinberg et al. 2001), potentially exacerbating income and gender disparities.

The Present Study

The aim of the present study was to examine whether the well-established predictive associations between pre-k classroom quality and school readiness skills (i.e., academic and SEL readiness) and later achievement differ among Black children from immigrant families (who have at least one immigrant parent) and children from non-immigrant families (who have US-born parents). Past findings, albeit extremely limited, suggest an immigrant paradox at some ages but not others (e.g., Crosby and Dunbar 2012), highlighting the need for more longitudinal research across distinct developmental periods. By testing immigrant status as a moderator of associations between pre-k predictors and KG and second grade achievement outcomes, findings may inform future prevention efforts by identifying malleable risk and protective factors and by characterizing the course of development among subgroups (based on immigrant status and gender). To this end, we used a prospective longitudinal design and multi-method assessments to examine the course and predictors of achievement among Black students from pre-k through the end of second grade.

Methods

Participants

Data were drawn from a randomized trial of a family-centered, school-based intervention to promote early learning that took place in ten public schools serving primarily low-income

Black students (Brotman et al. 2013). Inclusion criteria for schools included having a pre-k program with at least two classes and a student population that was >80 % Black and >70 % low income (eligible for free lunch). The schools were representative of the two districts from which they were drawn with respect to demographic characteristics of the student population and achievement test scores (nearly half of students scored *below* standards in third grade English Language Arts, and one third scored below in Math). The trial aimed to enroll all pre-k students in 4 years (2005–2008); the only inclusion criterion was having an English-speaking caregiver (7 % ineligible). The final sample included 1050 children, representing 88 % of eligible pre-k students. Students came from 99 pre-k classrooms, evenly split between half day (2.5 h) and full day (6.3 h). This study focuses on the non-Latino Black students in the five schools randomly assigned to the control condition ($N=417$, 85 % of study children in control schools). Given our interest in pre-k predictors of KG and second grade achievement, the sample was limited to the subset of students who had data on parent immigrant status and academic achievement in KG or second grade ($n=299$, 72 % of the eligible sample; 15 % of cases were excluded because immigrant status was missing, and 13 % were excluded because achievement data were missing at both time points). Consistent with district-wide patterns of enrollment, 22 % of students who were enrolled in the study schools for pre-k moved to a different school for KG. The 299 children in the analytic sample were from 50 pre-k classes; families resided within 71 census tracts, which were primarily Black, immigrant-dense neighborhoods (88 % Black, 49 % immigrant).

Measures

Demographics—Demographic data were obtained via parent report and census tract data. Immigrant status was determined based on the parents' nativity; in keeping with the widely accepted classification of children into immigrant versus non-immigrant family status (Borjas 2011), children with at least one foreign-born parent were classified as immigrant. By definition, children of immigrant parents may themselves have been foreign born (i.e., first generation) or US born (i.e., second generation), but the vast majority were US born. All children of US-born parents were US born like their parents (i.e., third generation or later). Addresses were geocoded and linked to census tract poverty data (defined as % of households in the tract living below 200 % of the poverty line) to yield an indicator of neighborhood poverty.

School Readiness: Academic Domain—The *Developmental Indicators for the Assessment of Learning-Third Edition* (DIAL-3; Mardell-Czudnowski and Goldenberg 1998) is an individually administered *screening* of pre-academic competencies for 3 to 6 year olds. The abbreviated version of the DIAL-3, the Speed DIAL, has well-established psychometric properties and assesses skills in three domains: motor (e.g., building, copying), concepts (e.g., naming colors, identifying body parts), and language (e.g., letters and sounds, naming actions). As per the manual, total raw scores (of 39) were converted to standardized scores with a mean of 100 ($SD=15$) based on age; students were also categorized as *at risk* or in need of further assessment if their score was 1 SD below the population mean.

School Readiness: Social-Emotional Learning—The *Behavior Assessment System for Children—Teacher Rating Scale* (BASC-TRS; Reynolds and Kamphaus 2004) measures social-emotional and behavioral functioning and has well-established psychometric properties. Teachers rate each item in terms of how often the child has engaged in a behavior during the past 4 weeks on a 4-point scale (0=never; 3=almost always). Two composites were used: *adaptive behavior* (i.e., social skills, adaptability, communication) and *externalizing problems* (i.e., aggression, hyperactivity). T-scores were standardized based on age ($M=50$, $SD=10$).

Pre-K Classroom Quality—The *Classroom Assessment Scoring System* (CLASS; Pianta et al. 2004), an observational instrument that assesses the quality of teacher-child interactions along three dimensions (emotional support, instructional support, and classroom organization), was completed by two independent raters during a 3-h period to obtain four 30-min cycles in each classroom. Across the dimensions [rated from 1 (minimally characteristic) to 7 (highly characteristic)], intraclass correlation coefficients (ICCs) ranged from 0.81 to 0.83 and alphas ranged from 0.77 to 0.89. Test-retest reliability showed moderate stability (range=0.43–0.77). The three subscales were highly interrelated ($r=0.63$ – 0.79), and the items were internally consistent ($\alpha=0.84$ for all items across the three subscales); therefore, a composite score of *pre-k classroom quality* was created.

Academic Achievement: Reading and Math—The Kaufman Test of Educational Achievement (KTEA) Brief Form-Second Edition (Kaufman and Kaufman 2005) was used to assess achievement in KG and second grade. The KTEA is an individually administered test that provides reliable estimates of reading and math achievement ($M=100$, $SD=15$). As per the manual, we categorized students whose KTEA-standardized scores were one or more SD below the population mean as at risk for academic problems.

Procedure

Procedures for the trial are reported elsewhere (Brotman et al. 2013). Briefly, families were recruited from 99 pre-k classrooms in ten public elementary schools over four consecutive years. Parents provided consent for students to participate in individually administered tests at school and for pre-k through second grade teachers to complete ratings of student functioning; children were not asked to assent, given their age. The majority of parents (~80 %) also participated in phone interviews. Pre-k teachers provided consent for classroom observations. School readiness, classroom observations, and family demographic characteristics were assessed in the fall of the pre-k year. Academic achievement was assessed by trained, independent testers in the spring of KG and second grade. Study procedures were approved by the Institutional Review Boards of New York University School of Medicine and the NYC Department of Education (DOE).

Analytical Approach

The analytic sample was limited to 299 cases (72 % of those eligible; described above). The analytical sample did not differ from the excluded sample ($N=118$) on baseline school readiness (academic or social-emotional), child gender, or demographic characteristics, nor were there differences based on patterns of missing data (i.e., families who did not report on

immigrant status versus families with missing achievement data). Given these results, we assumed that the data are missing at random (Schafer and Graham 2002) and used multiple imputation to account for partially missing outcome data (of the 299 cases in the analytic sample, 98 and 73 % had achievement data at KG and second grade, respectively). Twenty imputations were generated, making use of the joint distribution of the study predictors, demographics, and outcome data. Imputation was conducted with SAS PROC MI and analyzed with PROC MIANALYZE (SAS Institute Inc. 2011).

To examine achievement from KG through second grade, we used multi-level analyses with SAS PROC MIXED (for continuous variables) and PROC GLIMMIX (for dichotomized variables), accounting for nesting at the classroom level (students nested within classrooms) as well as multiple observations within an individual. For the test scores, we examined whether the slope from KG to second grade for reading and math was significantly different from zero by regressing outcomes on time (coded as 0, 1). We also tested whether slopes were different by immigrant status or gender by including terms for time, moderator, and time-by-moderator. Similarly, we tested whether the odds of being at risk were different by immigrant status or gender. Next, we used a similar mixed model approach to model achievement as a function of (1) child characteristics: (a) gender, (b) immigrant status, (c) school readiness-academic, and (d) school readiness-SEL; and (2) pre-k classroom quality. Analyses were conducted separately for each set of predictors to examine: (1) main effects, (2) moderation by gender, and (3) moderation by immigrant status. To test moderation, we added the moderator and moderator-by-predictor interaction terms into the main effects model. In all models, we included classroom as a random effect. We also controlled for poverty (at the neighborhood level) because the immigrant paradox suggests differences based on immigrant status regardless of the presence of poverty. Finally, analyses evaluated classroom quality as a predictor over and above school readiness and controlled for half- or full-day class, given associations with quality (Dawson-McClure et al. 2015).

Results

Sample Characteristics

Table 1 presents the characteristics for the full sample, by gender (53 % female) and immigrant status (74 % from immigrant families). Children from immigrant families had parents who came from the Caribbean (96 %) or Africa (4 %). Compared to immigrant parents, US-born parents were more likely to head a single-parent home (58 versus 40 %); no other demographic differences were found. More than half of families were low income, and approximately one third lived in census tracts characterized by high levels of poverty.

School Readiness and Academic Achievement

As shown in Table 1, at pre-k entry, the sample was functioning within the average range on school readiness (normative $M=100$, $SD=15$), with 5–13 % considered at risk based on academic readiness scores. There were no differences in school readiness in either the academic or the socioemotional learning domains between children from immigrant and non-immigrant families. There were, however, expected gender differences on academic

readiness and teacher ratings of adaptive behavior (but not externalizing problems), with girls showing significant advantages over boys.

At the end of KG, reading and math achievement scores were at or above the population mean. However, reading scores decreased significantly from KG ($M=112.32$) to second grade ($M=102.11$) for the full sample ($p<0.001$) and for all subgroups (Table 2, model 1). Immigrant status was a significant moderator of change in reading scores ($p=0.002$; Table 2, model 2); although scores decreased for both groups, children from immigrant families showed an 8-point decrease ($p<0.001$; $\sim 1/2$ SD), whereas children from non-immigrant families showed a 16-point decrease ($p<0.001$; >1 SD over a 2-year period; Table 2, model 1). Gender was not a significant moderator of change in reading scores over time ($p=0.46$), and both boys and girls showed a similar 10-point decrease.

Math scores also decreased significantly from KG ($M=100.03$) to second grade ($M=97.38$) for the full sample ($p=0.001$) and for boys, girls, and children from non-immigrant families (Table 2, model 1). Immigrant status was a significant moderator of change in math scores ($p=0.023$; Table 2, model 2); children from immigrant families showed a marginally significant decline, while children from non-immigrant families showed a significant decrease of 5 points ($p<0.001$; $\sim 1/3$ SD; Table 2, model 2). By the end of second grade, the portion of students who were substantially underachieving (at risk) differed significantly by immigrant status but not by gender. Among children from non-immigrant families, 22 and 26 % were underachieving in reading and math versus 8 and 12 % among children from immigrant families (reading: $p=0.003$; math: $p=0.021$).

Predictors of Academic Achievement in Kindergarten and Second Grade

As shown in Table 3 (model 1), in the full sample, pre-k academic readiness scores were associated with reading and math scores in KG and second grade; one indicator of SEL readiness, adaptive behavior, was also associated with achievement in both grades. For academic readiness (but not adaptive behavior), associations were moderated by immigrant status (Table 3, model 3). Post hoc analyses revealed similar patterns for achievement in both grades, so the pattern is shown for second grade only (Fig. 1a, b; reading and math). For children from immigrant and non-immigrant families, academic readiness scores were associated with reading and math scores (all $ps<0.001$), but the association was stronger among children from non-immigrant families. Another indicator of SEL readiness, externalizing behavior, was not associated with achievement for the full sample (Table 3, model 1); however, the association between externalizing behavior and achievement was moderated by immigrant status (Table 3, model 3). Post hoc analyses indicate that externalizing behavior was associated with second grade achievement for children from non-immigrant families (reading: $p=0.03$; math: $p=0.04$) but not for those from immigrant families. At low levels of externalizing problems, reading and math achievement was similar for the two groups, but at high levels, children from non-immigrant families scored 13 to 15 points (~ 1 SD) below their immigrant peers in reading (Fig. 1c) and math. Gender did not moderate any of the predictive associations (Table 3, model 2).

As shown in Table 4, pre-k classroom quality was associated with achievement. Specifically, there was a main effect of classroom quality on KG reading (model 1). The

predictive association from pre-k classroom quality to second grade math was moderated by immigrant status, such that quality predicted achievement for children from non-immigrant, but not immigrant, families (Table 4, model 3). As shown in Fig. 1d, math scores were similar for the two groups at higher levels of classroom quality, but at lower levels, there was a clear immigrant advantage. At 1 SD below the mean on quality, children from non-immigrant families had math scores that were nearly 12 points (3/4 SD) below their immigrant peers. Gender did not moderate any of the associations (model 2).

Discussion

This study examined the course and predictors of early academic achievement among Black children from low-income immigrant and non-immigrant families in schools with pre-k programs. Given the well-established Black-White achievement gap, the growing number of children of immigrants (including Black immigrants) in the USA, and national efforts to substantially expand public pre-k programs, findings from this study have important implications. Overall, children showed a significant decline in reading achievement from KG through second grade. Despite reading slightly above average in KG (which may reflect a positive impact of participation in pre-k the previous year; Barnett 2013), students lost ground over 2 years. For girls, the early advantage in academic readiness and adaptive behavior seen in pre-k was erased. Moreover, consistent with the immigrant paradox, the decline in reading was substantially less steep among children from immigrant families than among non-immigrants. This is notable given that children from immigrant and non-immigrant families entered pre-k with comparable skills. A similar pattern was found for math achievement, with all subgroups showing a decline over time.

Findings also showed predictive associations between school readiness and pre-k classroom quality with later achievement. Adaptive behavior (but not externalizing problems) and academic school readiness at pre-k entry were associated with achievement for all students, regardless of immigrant status or gender. For externalizing problems and pre-k classroom quality, associations were similar when examined by gender but distinct when examined by immigrant status. Students from non-immigrant families who entered school with higher levels of externalizing problems showed substantial deficits in reading and math achievement, relative to their immigrant peers with similarly high levels of pre-k externalizing problems. While pre-k classroom quality was associated with reading for all students, lower quality was a risk factor for math only for children from non-immigrant families.

These findings are generally consistent with the literature highlighting the importance of school readiness and pre-k classroom quality for later achievement but suggest that Black children from non-immigrant families may be especially susceptible or uniquely vulnerable to specific risk factors, including early externalizing problems, that may influence academic performance. Black children from immigrant families were highly achieving over time, in part because achievement test scores seem to be relatively unrelated to their own early externalizing problems and experiences in lower quality pre-k classrooms (for math but not reading). Crosby and Dunbar's (2012) study of Black children from immigrant and non-immigrant families also found notable deterioration in achievement (between pre-k and KG)

among children of non-immigrant, but not immigrant, families. Together, these two studies provide consistent support for the immigrant paradox, manifested as protection against risk factors that undermine early learning in Black children. Importantly, all analyses accounted for neighborhood poverty; thus, any differences among immigrant and non-immigrant students are not explained by variation in neighborhood poverty.

Implications for Theory and Prevention

Numerous hypotheses have been offered to explain the immigrant paradox (e.g., the selective migration hypothesis, in which only the most resilient individuals immigrate; sample biases in epide-miological studies), but many scholars emphasize the role of cultural buffers or traditional values and beliefs that protect the first generation from the adverse effects of socioeconomic disadvantage. Research shows that immigrant parents place particular emphasis on hard work and education as a means for achievement and success (Glick and White 2004), and these socialization messages may become more prominent and relevant in the first years of formal schooling. This strong investment in education may prompt immigrant parents to provide relatively more enriching *academic* experiences at home, monitor and encourage homework completion, or seek help or additional resources for their children when difficulties at school arise (Roopnarine et al. 2006). The differential response of students from immigrant and non-immigrant Black families to early risk factors (e.g., externalizing problems, lower pre-k classroom quality) requires further investigation, including exploration of factors such as positive socialization messages from parent to child, home- and school-based parent involvement strategies, or potential forms of advocacy on behalf of parents for their children.

In addition, more research is needed to fully understand the implications of the paradox for prevention science. Longitudinal studies with large samples allowing for disaggregation by country of origin, in particular, are needed to explore how risk factors such as socioeconomic disadvantage, racism, and acculturative stress impact Black children from both immigrant and non-immigrant families over the course of development and across domains; how their effects may be mitigated by protective factors such as parent involvement and racial identity; and how these complex interactions may shift over the course of development as children reach middle childhood and adolescence. In the same way that early advantage faded for girls in the present study, it is possible that the downward trajectory for reading achievement persists over time for Black students from low-income families regardless of immigrant status, erasing the immigrant advantage observed in the first years of schooling. Indeed, the time spent in impoverished neighborhoods and schools and the growing awareness of interpersonal and structural racism have been associated with declining optimism about the future and academic performance among minority and immigrant children (Kao and Tienda 1998; Suárez -Orozco et al. 2010).

Still, findings indicating that this advantage is present in early childhood underscore the unique potential for prevention efforts during the first years of schooling to leverage these apparent family-based assets before their effects are offset by experiences of cumulative risk (e.g., chronic poverty, racism). By bringing together parents from diverse backgrounds (e.g., immigrant and non-immigrant) with a broad range of strengths (e.g., strong emphasis on

education), we aim to create opportunities for parents to reinforce, learn from, and build on each other's successes (see Brotman et al. 2013).

Limitations

We chose to limit our analytic sample to Black children with achievement data in either KG or second grade. This yielded a relatively small group of children from non-immigrant families, which may have increased the type II error rate such that small differences between groups (based on immigrant status and child gender) were not detected. The small sample size also precluded consideration of differences between immigrant Black families from Africa and those from the Caribbean; while both immigrant groups may share common factors that contribute to their academic performance (e.g., greater likelihood of two-parent household), differences between immigrant families from Africa and the Caribbean deserve attention in understanding the academic trajectories of these children (e.g., extended kin networks, racial identity, income trajectories; Hamilton 2014; Thomas 2012). Further, we were not able to examine differences between immigrant families with one versus two foreign-born parents, an important source of heterogeneity, especially with regard to academic outcomes (Thomas 2009; Thomas 2012). Nevertheless, important differences were found based on immigrant status that provide support for the possibility of the immigrant paradox in young Black students. The development and testing of more comprehensive models that include family characteristics and socialization practices (e.g., parenting practices, parent involvement) will also be important in identifying interactions within the home environment that may play a protective role for immigrant families. Also, given the relatively small number of pre-k classrooms (50), we considered an overall composite of classroom quality as a predictor of achievement; future work that examines whether multiple aspects of quality differentially predict achievement among young Black students would be informative for prevention efforts. Finally, caution should be taken in generalizing findings given that the study took place in only five schools, though schools were comparable on demographics and test scores to the other 29 schools in the districts.

This study contributes to the very limited literature on Black children from immigrant families and provides support for the importance of both social-emotional and academic school readiness and classroom quality as robust, longitudinal correlates of achievement among low-income Black students. National efforts to expand pre-k as a means of promoting achievement for low-income children should consider the possibility of multiple pathways to school success and differential susceptibility to risk and protective factors based on family characteristics, including parental immigrant status.

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Fig. 1. Pre-k school readiness and classroom quality and later reading and math achievement: moderation by immigrant status. School readiness and classroom quality are continuous; *high*=1 standard deviation above the mean, *low*=1 standard deviation below the mean. **a, b** The association between academic readiness and achievement is significant for both the non-immigrant and immigrant groups ($p<0.001$). **c** The association is significant for the non-immigrant group only (reading: $p=0.03$; pattern is similar for math, not shown, $p=0.04$). **d** The association between classroom quality and math is significant for the non-immigrant group only ($p=0.04$)

Table 1

Student and family characteristics in pre-kindergarten

	Full sample, <i>n</i> =299		Boys, <i>n</i> =140	Girls, <i>n</i> =159	Immigrant, <i>n</i> =222	Non-immigrant, <i>n</i> =77
Family						
Parent immigrant status ^a , %	74.2	81.4	67.9	–	–	–
Single-parent home ^b , %	44.0	40.8	47.0	39.9	39.9	57.6
Parent education high school, %	42.8	47.1	38.9	44.8	44.8	36.2
Low-income home, %	53.2	55.3	51.5	52.4	52.4	55.6
Low-income neighborhood, %	31.4	32.4	30.4	31.4	31.4	31.2
Student						
Male ^b	46.8	–	–	51.4	51.4	33.8
School readiness						
Adaptive behavior ^a , mean (SD)	47.72 (8.75)	46.36 (9.08)	48.93 (8.29)	47.56 (8.85)	47.56 (8.85)	48.20 (8.51)
Externalizing problems, mean (SD)	45.75 (6.23)	46.31 (6.07)	45.27 (6.34)	45.78 (6.05)	45.78 (6.05)	45.68 (6.76)
Academic readiness ^a , mean (SD)	100.73 (13.00)	98.38 (13.67)	102.80 (12.04)	101.18 (12.99)	101.18 (12.99)	102.34 (12.99)
Academic readiness, at-risk ^a , %	9.3	13.2	5.8	9.7	9.7	8.1

Immigrant status is defined according to parent's nativity (immigrant or US born). Low income is defined as below 200 % of the federal poverty threshold. Neighborhood is defined by census tract

^a Significant difference by gender, *p*<0.05^b Significant difference by immigrant status, *p*<0.05

Table 2
Academic achievement in pre-k, kindergarten, and second grade, moderated by student gender and immigrant status

	Kindergarten		2nd grade		Model 1 Change over time		Model 2 Time-by-moderator	
	Reading <i>M</i> (SE)	Math <i>M</i> (SE)	Reading <i>M</i> (SE)	Math <i>M</i> (SE)	Reading <i>p</i>	Math <i>p</i>	Reading <i>p</i>	Math <i>p</i>
Full sample	112.32 (1.20)	100.03 (0.76)	102.11 (1.00)	97.38 (0.94)	<0.001	0.001	–	–
Student gender								
Boys	110.11 (1.49)	99.30 (1.22)	100.75 (1.49)	96.68 (1.43)	<0.001	0.029	0.461	0.975
Girls	114.26 (1.57)	100.67 (0.94)	103.30 (1.35)	98.00 (1.21)	<0.001	0.010		
Immigrant status								
Immigrant	112.37 (1.37)	100.43 (0.85)	104.23 (1.04)	98.88 (1.00)	<0.001	0.098	0.002	0.023
Non-immigrant	112.16 (2.52)	98.87 (1.64)	95.99 (2.31)	93.07 (2.19)	<0.001	<0.001		

Mean (standardized score) and SE are based on imputed data. Results are consistent using non-imputed data, with the exception that the decline in math achievement from kindergarten to second grade is marginally significant for the non-immigrant subgroup. Model 1 and 2 analyses were based on SAS mixed models using kindergarten and second grade data. Model 1 tested whether scores changed over time (from kindergarten to second grade), by regressing outcomes on time for the full sample and stratified by gender and immigrant groups. Model 2 formally tested whether change over time (i.e., slope) for reading and math was moderated by gender or immigrant status. Time (0, 1), moderator, and time-by-moderator were included; only the *p* value for the time-by-moderator term is reported in the table

Table 3

Pre-k student characteristics as predictors of academic achievement in kindergarten and second grade

	Kindergarten				2nd grade			
	Reading achievement		Math achievement		Reading achievement		Math achievement	
	<i>B</i> (SE)	<i>p</i>	<i>B</i> (SE)	<i>p</i>	<i>B</i> (SE)	<i>p</i>	<i>B</i> (SE)	<i>p</i>
Model 1: main effects								
Student gender (male)	-1.15 (2.12)	0.586	1.30 (1.29)	0.312	-0.93 (1.82)	0.612	0.43 (1.64)	0.796
Immigrant status	2.62 (2.34)	0.263	2.83 (1.44)	0.049	9.78 (2.04)	<0.001	7.10 (1.96)	<0.001
Academic school readiness	0.46 (0.10)	<0.001	0.50 (0.06)	<0.001	0.47 (0.08)	<0.001	0.50 (0.08)	<0.001
Externalizing problems	-0.07 (0.18)	0.712	-0.13 (0.11)	0.215	-0.10 (0.16)	0.542	-0.05 (0.15)	0.713
Adaptive behavior	0.49 (0.16)	0.002	0.22 (0.09)	0.011	0.30 (0.12)	0.011	0.22 (0.12)	0.071
Model 2: student gender ×								
Academic school readiness	0.07 (0.18)	0.678	-0.03 (0.11)	0.813	0.03 (0.15)	0.827	-0.01 (0.15)	0.970
Externalizing problems	-0.01 (0.35)	0.973	0.17 (0.21)	0.431	-0.05 (0.31)	0.870	0.17 (0.27)	0.533
Adaptive behavior	0.07 (0.27)	0.797	0.21 (0.16)	0.194	-0.13 (0.24)	0.590	0.10 (0.22)	0.654
Model 3: immigrant status ×								
Academic school readiness	-0.44 (0.21)	0.037	-0.23 (0.13)	0.066	-0.41 (0.17)	0.018	-0.45 (0.16)	0.005
Externalizing problems	0.66 (0.37)	0.075	0.68 (0.22)	0.002	0.77 (0.34)	0.026	0.72 (0.31)	0.021
Adaptive behavior	-0.00 (0.31)	0.997	0.04 (0.19)	0.842	-0.09 (0.27)	0.735	-0.01 (0.26)	0.971
Student gender	-4.883 (4.96)	0.330	-1.66 (3.01)	0.581	0.60 (4.08)	0.883	-1.31 (3.96)	0.741

Results are based on imputed data ($N=299$). All three models control for neighborhood poverty (which was not a significant predictor of achievement). Models 2 and 3 (interaction models) also include the main effects, although estimates of these effects are not shown in the table

Pre-k classroom characteristics as predictors of academic achievement in kindergarten and second grade

Table 4

	<u>Kindergarten reading</u>			<u>Kindergarten math</u>			<u>G2 reading</u>			<u>G2 math</u>		
	<i>B</i>	(SE)	<i>p</i>	<i>B</i>	(SE)	<i>p</i>	<i>B</i>	(SE)	<i>p</i>	<i>B</i>	(SE)	<i>p</i>
Model 1												
Classroom quality	5.93	(2.19)	0.007	1.28	(1.10)	0.243	1.29	(1.39)	0.355	0.24	(1.36)	0.862
Model 2: student gender ×												
Classroom quality	2.36	(2.80)	0.400	0.69	(1.73)	0.690	-0.49	(2.35)	0.835	-3.63	(2.18)	0.096
Model 3: immigrant status ×												
Classroom quality	-1.89	(3.24)	0.559	-2.55	(2.01)	0.204	-2.64	(2.67)	0.322	-6.17	(2.66)	0.021

Results are based on imputed data ($N=299$). All models control for neighborhood poverty and student gender (0=female, 1=male), immigrant status, and school readiness (academic and SEL) though estimates are not shown. Models 2 and 3 include the main effects of classroom quality, student gender, and immigrant status (estimates not shown). Fifty pre-k classrooms were included in the analyses. Analyses were also conducted separately for the three CLASS subscales (described in the “Measures” section); results were similar to the patterns presented in this table [e.g., the interaction with immigrant status reached significance for both the emotional support and organization subscales ($p<0.05$) and was marginally significant for instructional support ($p<0.10$)]