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The Costly Consequences of not Being Socially and Behaviorally Ready to Learn by Kindergarten in Baltimore City

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Abstract Social, emotional, and behavioral skills are foundational to learning and long-term success. However, poverty and exposure to adverse childhood experiences reduce the chances of children entering kindergarten socially-behaviorally ready to learn. This study examined the unique impact of 5-year-old children ($N = 11,412$) entering kindergarten not socially-behaviorally ready on three costly school outcomes by fourth grade in Baltimore City Public Schools: being retained in grade, receiving services and supports through an IEP or 504 plan, and being suspended/expelled. Controlling for all other types of school readiness, students not identified as socially-behaviorally ready for kindergarten were more likely to experience all three school outcomes. Findings underscore the importance of early prevention and intervention strategies targeting parents and social-behavioral readiness skills during the first 5 years of life.

Introduction

Social, emotional, and behavioral difficulties are now among the top 5 chronic disabilities affecting children in the USA [1]. They are also more than twice as likely to occur among children living in poverty [2]. The rising prevalence of socioemotional and behavior problems, particularly among children growing up in poverty, has important implications for school success as they affect the skills essential for learning, such as the ability to follow directions, comply with rules, manage emotions, solve problems, organize and complete tasks, and get along with adults and peers. Moreover, these difficulties, which typically begin before children enter kindergarten, can have lasting impacts on their quality of life and economic self-sufficiency in adulthood [3].

How Children Acquire the Skills Needed for Social-Behavioral Readiness

Readiness to learn is largely a function of children's social, emotional, and behavioral skills. These social-behavioral skills include children's abilities to process, label, and respond to their own and other people's emotions (i.e., social information processing skills) [4]; attend to tasks, shift attention in response

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to expectations, inhibit socially inappropriate responses, and process, remember, and use information (i.e., executive functioning skills) [5]; and manage emotions, such as frustration, anger, and stress (i.e., emotion regulation skills) [6]. All of these skills are interrelated. For example, in order to comply with classroom rules, children need to process and remember the rules, attend to the rules at the appropriate time, and manage negative emotions they might experience in response to the rules. These social-behavioral skills are associated with children's ability to function in the school setting, establish healthy relationships with teachers and peers, and learn [7]. Children who exhibit disruptive behavior problems in early childhood, a sign of underdeveloped social-behavioral skills, are at greater risk for negative outcomes, including low levels of school achievement, rejection by peers, academic failure, and involvement in delinquency [8, 9].

Parenting is central to children's development of social-behavioral skills [10, 11]. Sensitive, consistent, and responsive parenting in the first 5 years of life is one of the strongest predictors of children's social-behavioral competence and developmental well-being and can serve as a critical buffer for children exposed to early adverse experiences [10, 12]. Specifically, positive parenting strategies, including establishing consistent routines, setting clear expectations, engaging in child-centered activities that promote learning, and using positive discipline strategies have been linked with children's social-behavioral skill development [10, 12–15]. In addition, parents' involvement in their children's preschool experiences have also been linked with improved social-behavioral readiness [16, 17]. However, raising young children can be extremely stressful when parents are also struggling with unstable housing, unsafe and underresourced neighborhoods, insufficient income to cover basic necessities, and their own emotional well-being. These circumstances can also make it difficult for parents to provide a safe, positive, consistent, and nurturing home environment conducive to building their children's social-behavioral readiness [12, 18] and to be actively involved in their children's preschool experiences [19].

Impact of Social-Behavioral Readiness on Academic Outcomes

Many studies have documented associations between children's social-behavioral readiness and academic and behavioral outcomes. These include links between social-behavioral skills and subsequent math and reading achievement [20, 21] and the likelihood of being retained in grade [22, 23], receiving special education services [9, 24, 25], and being suspended or expelled [9]. Grade retention, receipt of special education services, and suspensions/expulsions are particularly important variables to study as they place children at heightened risk for a range of outcomes that are costly to students, families, school systems, and society. These include poorer academic performance [26, 27], failure to complete high school and enroll in postsecondary education [26, 27], criminal justice system involvement [26, 28], and failure to obtain and maintain employment [26].

However, there are limitations to these prior studies that underscore the need for additional research. First, most studies have not isolated the unique contribution of social-behavioral readiness to grade retention, receipt of special education services, and suspensions/expulsions. For example, we know that social-behavioral readiness is highly related to cognitive readiness [5]. Therefore, understanding the unique contribution of social-behavior readiness requires accounting for other indicators of cognitive school readiness (i.e., reading, math, science, general knowledge). This will highlight the extent to which early childhood investments should focus on programs targeting young children's cognitive skills versus those focused on strengthening social, emotional, and behavioral health and well-being.

Second, most studies have relied on data collected prior to the passage of the 2001 No Child Left Behind Act (NCLB) [29]. Passage of NCLB placed added emphasis on instructional learning and achievement in kindergarten [30, 31]. Kindergarten readiness took on new meaning, placing added pressures on teachers to teach literacy and numeracy skills to children still struggling to focus attention, follow instructions, manage emotions, and maintain positive relationships with adults and classmates. Indeed, teachers comment that students entering kindergarten struggling to meet academic standards in math or literacy are far less challenging for them to teach than the students who lack the social-behavioral skills needed to learn [32]. Isolating the specific contribution of social-behavioral readiness to children's later school success will inform the extent to which the heightened academic rigor of kindergarten is compatible with children's social-behavioral capacities.

With the advent of NCLB came the opportunity to examine the impact of social-behavioral readiness using measures that are aligned with state educational standards and specifically designed to assess students' readiness to learn at the onset of kindergarten. Prior studies, which used data collected before NCLB, often used measures designed primarily for researcher purposes to tap select aspects of child behavior (e.g., aggression or disruptive behavior problems) and examined indicators of social-behavior readiness after kindergarten when scores are more likely to reflect children's elementary school experience rather than their readiness to learn at kindergarten entry [9, 24]. The opportunity to assess the impact of children's social-behavioral readiness at the beginning of kindergarten using measures specifically designed for use by schools [33] provides an important opportunity to understand what social-behavioral skills children have developed prior to kindergarten entry primarily within the context of the family, and to focus on skills tied specifically to functioning in the classroom setting.

Finally, those studies that examined the association between kindergarten readiness and special education service use did not also include receipt of accommodations through Section 504 of the Rehabilitation Act of 1973 or a "504 plan" [34, 35]. A 504 plan provides accommodations for students who do not meet eligibility criteria for special education services (e.g., seating changes for a student whose attention and behavioral difficulties do not meet criteria for a disability). National estimates indicate that 1.5% of students in grades K-12 receive services and supports through a 504 plan [36]. Only including students receiving special education services misses a small but potentially important population of children needing accommodations in the school setting but who have either not received an individualized education plan (IEP), who do not meet criteria for a disability under IDEA, or who no longer require an IEP but still require accommodations. In light of the fact that children can move between receiving accommodations through a 504 plan and receiving special education services, we have combined these outcomes in the present study.

The present study addresses these limitations by (a) controlling for all other types of school readiness to isolate the unique impact of social-behavioral readiness on outcomes, (b) examining these relations using data collected after the passage of No Child Left Behind, (c)

including receipt of a 504 plan in conjunction with receipt of services through an IEP as an outcome, and (d) taking advantage of administrative data from a districtwide school readiness assessment aligned to state educational standards to examine these relationships in an urban high-risk population of students. The findings from this study will inform early intervention efforts targeting low-income students, teachers, and families to strengthen children's early social-behavioral skills prior to and during the transition to kindergarten to lay the foundation for children's long-term success in school and in life.

Impact of Poverty and Exposure to Adverse Childhood Experiences

Less than 50% of children from low-income families enter school with the essential skills needed to be successful, compared to 75% of their higher income peers [37]. Exposure to economic disadvantage, parent stress, and adverse childhood experiences (ACEs) can hamper children's acquisition of social-behavioral skills [5]. Moreover, children who have experienced two or more ACEs are nearly three times more likely to repeat at least one grade in school and approximately two times more likely to be diagnosed with ADHD or other behavior-related problems compared to children with no ACEs [38]. These data underscore the importance of reducing children's exposure to poverty and other early life adversities in order to provide opportunities for children to develop the social-behavioral skills necessary for success in kindergarten and beyond.

Boys appear to be particularly vulnerable to social-behavioral skill difficulties. A significant body of research has documented gender differences in self-regulation skills [21, 39] that may help explain why boys exhibit social-behavioral skill deficits, including attention difficulties, disruptive behavior problems, and developmental delays, at higher rates than girls [40, 41]. Boys' greater risk for these difficulties contributes to a number of challenges in the school setting. In particular, boys are overrepresented in referrals for special education services [25, 40], with national estimates indicating they are 1.3 to 3.4 times more likely to receive such services as girls [42]. They are also more likely to be retained in grade beginning as early as kindergarten [43], and suspended or expelled as early as preschool [44, 45].

Present Study

The present study focuses on one urban city whose children have experienced significant adversities. In Baltimore City, 86% of public school children live in poverty [46] and over 30% have experienced two or more ACEs [47]. However, those numbers belie the continuous trauma exposures occurring in these children's lives. One recent survey showed that 43% of Baltimore City high school students had witnessed violence at least once a week, and 39% had known someone who was killed before reaching adulthood [48]. Of the nation's 100 largest jurisdictions, children raised in Baltimore City, especially boys, have the lowest odds of escaping poverty by adulthood [49]. For these children who have been exposed to significant disadvantage and adversity, achieving success in school provides an important pathway out of poverty.

Using multilevel modeling, we examine the relationships between Baltimore City Public Schools (BCPS) children's social-behavioral readiness at kindergarten and the likelihood they will experience three school outcomes by fourth grade that can have lasting effects on quality of life and economic self-sufficiency: (1) being retained in grade, (2) receiving services and supports through an IEP or 504 plan, and (3) being suspended/expelled. We hypothesize that students entering kindergarten not socially-behaviorally ready for school will be more likely to experience each of the three school outcomes at least once before reaching fourth grade. In light of prior evidence that boys are at greater risk for social-behavioral difficulties and for the outcomes examined in this study [23–25], we further hypothesize that gender will moderate the relations between social-behavioral readiness and the three academic outcomes.

Methods

Study Design and Data Source

This secondary analysis uses administrative data from two cohorts of students entering BCPS kindergarten in fall 2007 and fall 2009. The original cohorts included 6357 and 6514 students (total $N = 12,871$), respectively. However, only students that received an assessment of their kindergarten readiness during fall of kindergarten in BCPS were included, reducing the analyzable sample

by 11.33%. There were statistically significant differences between those included and excluded from the study. Specifically, groups differed by race ($\chi^2(4) = 52.9$, $p < 0.001$) with those excluded more likely to be White or Asian/Pacific Islander and less likely to be African American. Those excluded were also less likely to qualify for free or reduced price meals in kindergarten ($\chi^2(1) = 169.8$, $p < 0.001$), and more likely to be chronically absent in kindergarten ($\chi^2(1) = 37.2$, $p = 0.01$), have attended formal schooling prior to kindergarten (e.g., Pre-K, Head Start, Child Care Center) ($\chi^2(1) = 118.4$, $p < 0.001$), and be from the fall 2009 cohort ($\chi^2(1) = 8.9$, $p < 0.01$). The final sample consisted of 11,412 five-year-old children and 42,635 observations as data were obtained for four school years. The final sample was 51% male, 84.8% African American, and 82.9% qualified for the free or reduced price meals program, a proxy for socioeconomic status. Information on study outcomes, school readiness, and covariates are drawn from BCPS administrative data systems. These data are routinely collected on all students by BCPS and shared annually with the Baltimore Education Research Consortium through a Memorandum of Understanding. The University's Institutional Review Board determined this study to be exempt.

Outcomes

Grade Retention Data on a student's grade progression from kindergarten through the fifth year enrolled (fourth grade for on-time students) were used to determine whether the child was retained in their grade at any time during this period. Separate variables were created for each school year indicating whether a child was retained that year.

Academic Support Services Data on student's use of academic support services were used to determine whether the child received no services, 504 plan services, or services through an IEP in each school year. Students can move between receiving accommodations through a 504 plan and receiving services and supports through an IEP over the course of their schooling. Therefore, these data were combined to create a single outcome for each year of the study that indicated whether a student received accommodations through a 504 plan or services and supports through an IEP during that year. It should be noted that in the

present study, 2.7% of students received accommodations through a 504 plan at some point between kindergarten and the fourth year of school, which is higher than both the state (2.5%) and national (1.5%) averages for all students in K-12 [36].

Suspensions/Expulsions If a student received an out-of-school suspension or expulsion during the school year, they were designated as such in this analysis. A student only needed to have the outcome occur once to be designated as being suspended or expelled, and if a student had multiple suspensions or expulsions in a given year, they were still only counted as experiencing the outcome once in that school year.

All outcome variables were dichotomized into experiencing or not experiencing the outcome for each school year included in the study.

Kindergarten Readiness

Kindergarten readiness was assessed during the first 60 days of kindergarten using the Maryland Model for School Readiness (MMSR), a version of the Work Sampling System™ aligned to Maryland State Standards [50]. Teachers rate students' skills on 30 items, representing seven readiness domains, as "proficient," "in process," or "needs development." The seven readiness domains measure social-behavioral skills, language and literacy, mathematical thinking, social studies, scientific thinking, physical development, and the arts. Each domain includes four items, with the exception of the language and literacy domain, which included six items. The four items of the social-behavioral readiness domain, which is the focus for this study, measure the child's ability to show initiative and self-direction, follow classroom rules and routines, use classroom materials purposefully and respectfully, and interact cooperatively with others. Raw scores reflecting the sum of the items within a domain are converted into one of three categories (developing, approaching, fully ready) based on the total points obtained [50, 51]. Alpha reliabilities for the social-behavioral readiness scale for the present study are 0.87 for the fall 2007 cohort and 0.88 for the fall 2009 cohort. Alpha reliabilities for the two cohorts for the other six domains of the MMSR are as follows: language and literacy (0.92–0.93), mathematical thinking (0.89–0.90), social studies (0.87–0.88), scientific thinking (0.90–0.92), physical development (0.89 for both cohorts), and the arts (0.93–0.94). Validity has been supported in prior studies showing high concordance (0.50–0.75) with other student achievement measures [52–54]. In this study, school readiness scores were dichotomized such that students scoring as either developing or approaching on a given domain reflected one category (not ready) and students scoring as fully ready reflected a separate category that was used as the reference group.

Covariates

A number of important baseline student-related characteristics known to influence social-behavioral readiness in kindergarten and the three academic outcomes were controlled for in all analyses. These variables included gender, African American (yes/no), whether the student attended formal schooling prior to kindergarten (e.g., Pre-K, Head Start, Child Care Center; determined using a combination of Pre-K enrollment files and data from a prior care survey completed by parents at kindergarten enrollment), whether they qualified for the free or reduced price meals program (a proxy for socioeconomic status) in kindergarten, whether they were an English language learner in kindergarten, whether they were chronically absent in kindergarten (defined as missing more than one ninth of school days enrolled [55], and students' performance on the other six MMSR domains in kindergarten (i.e., fully ready or not ready). An indicator of which cohort the student was part of (i.e., fall 2007, fall 2009) was also included to control for cohort effects.

Data Analytic Procedures

Descriptive statistics were used to describe the sample. Bivariate analyses were conducted to compare academic outcomes by social-behavioral readiness level. Multilevel modeling was used to examine predictive relations between social-behavioral readiness in kindergarten and the outcomes of suspensions/expulsions and receipt of services and supports through an IEP or 504 plan. The three-level logistic model had student year (i.e., kindergarten through third grade) at level 1, student at level 2, and school where they were assessed by the MMSR at level 3. The binary indicator of social-behavioral readiness, along with the covariates described above and an indicator for cohort (fall 2007 versus fall 2009), was entered in the second level (student level) of the model. To examine if the relationship

Table 1 Characteristics of kindergarteners enrolled in fall 2007 and 2009 who are and are not fully ready in the social-behavioral skills domain

	Social-behavioral skills		Chi-square	*p* value
	Not ready (%)	Fully ready (%)		
All participants (*N* = 11,412)	39.1	60.9		
Gender			249.2	< 0.001
Male	60.2	45.1		
Female	39.8	54.9		
Race/ethnicity			14.3	0.01
African American	85.4	84.4		
Hispanic	4.7	5.0		
White	9.2	9.2		
Other	0.8	1.3		
Services receipt in K				
FARMs	84.4	82.0	11.8	< 0.001
English language learner	4.4	4.6	0.1	0.72
Attended formal school prior to K	75.3	83.4	111.4	< 0.001
Chronically absent in K	23.4	18.1	47.5	< 0.001
Cohort			54.0	< 0.001
Fall 2007 cohort	54.2	47.1		
Fall 2009 cohort	45.8	52.9		

FARMs = free and reduced meals, *K* = kindergarten

between social-behavioral readiness and the outcomes was stronger for boys than girls, the interaction between gender and social-behavioral readiness was added at level 2 to the models. HLM 7 [56] was used to conduct the analysis.

Due to the dependent nature of the grade retention variables (i.e., once a student was retained, they did not experience the outcome again in subsequent years), a discrete time survival analysis (DTSA) [57] was used to model survival time to grade retention in elementary school, where the events were measured at 1-year intervals beginning at the end of kindergarten through the end of the fourth year of school (third grade for on-time students). This analysis includes students that stayed in the school system through at least the second year of school (*N* = 11,031). The outcome of grade retention was scored "1" if the student was retained in grade that year and "0" if they were not retained that year. Once the student was retained or left the district, the student was censored. This analysis provides a hazard probability reflecting the probability that a student was retained in that grade, provided that they were not retained in a prior grade. The model included social-behavioral readiness, the cohort indicator, and the covariates as predictors of being retained in grade. We also examined

whether gender moderated the effect of social-behavioral readiness on grade retention by including the gender by social-behavioral readiness interaction. Clustering within school was accounted for using sandwich estimators to calculate robust standard errors [58]. The DTSA was conducted in *Mplus*, version 7.4 using maximum likelihood estimation [58].

Results

Characteristics of Students not Ready and Fully Ready on Social-Behavioral Readiness

Table 1 compares characteristics of students rated as not ready and fully ready on their social-behavioral skills in kindergarten. Thirty-nine percent of kindergarten students enrolled in BCPS in fall 2007 or fall 2009 were rated as not ready on the social-behavioral skills domain of the MMSR. There were significant differences between students rated as not ready and fully ready in this domain (see Table 1). In particular, students rated as not ready were more likely to be male, African American, low income (i.e., qualify for free or reduced priced meals), from the fall 2007 cohort,

Table 2 Prevalence for grade retention, receipt of services and supports through IEP/504 Plan, and suspensions/expulsions by readiness level and academic year

	Kindergarten		Year 2		Year 3		Year 4	
	Not ready (%)	Fully ready (%)	Not ready (%)	Fully ready (%)	Not ready (%)	Fully ready (%)	Not ready (%)	Fully ready (%)
Grade retention	4.6	1.2	11.7	4.0	7.3	3.2	3.7	2.1
IEP or 504 Plan services	15.9	6.4	20.1	7.4	24.4	9.0	29.8	10.9
Suspensions/expulsions	2.4	0.4	4.1	1.6	6.1	2.3	7.1	3.2

chronically absent, and less likely to have attended formal schooling prior to kindergarten.

Prevalence of Academic Outcomes by Academic Year

Table 2 examines proportions of students who were retained in grade, received services and supports through an IEP or 504 plan, and were suspended/expelled at least once between kindergarten and the fifth year of school by social-behavioral readiness level (fully ready versus not ready). A larger proportion of those assessed as not ready experienced each outcome during kindergarten and each of the next 3 years of school compared to their fully ready peers.

Impact of Social-Behavioral Readiness on Student Outcomes

Results by school outcome, controlling for all covariates, are presented in Tables 3, 4, and 5. Social-behavioral readiness in kindergarten was a significant predictor of future grade retention. Kindergarteners rated as not ready were significantly more likely to be retained by the fifth year of school compared to their fully ready peers (OR 1.42, 95% CI 1.20–1.67). However, the gender by social-behavioral readiness interaction was not significant, indicating that the impact of social-behavioral readiness on future grade retention did not vary as a function of the student's gender. It should be noted that the sample used for the grade retention analysis was slightly smaller than the full sample ($N = 11,031$) due to additional missing data on grade retention variables.

Social-behavioral readiness in kindergarten was a significant predictor of receipt of services and supports through an IEP or 504 plan. Compared to their fully ready peers, students who were not socially and behaviorally ready were more likely to receive services

and supports through an IEP or 504 plan by the fifth year of school (OR 2.10, 95% CI 1.80–2.46). In addition, the gender by social-behavioral readiness interaction was significant for receiving services and supports through an IEP or 504 plan ($p < 0.001$). For girls, the rate of receiving such services and supports among those identified as not socially-behaviorally ready was 11.05% higher than among girls identified as fully ready. For boys, the rate was 13.91% higher. This suggests that not being socially-behaviorally ready had a slightly greater impact on the need for supports and services through an IEP or 504 plan for boys than for girls.

Social-behavioral readiness significantly predicted student suspensions/expulsions. In particular, those rated as not ready were more likely to be suspended/expelled at least once by the fifth year of school compared to their fully ready peers (OR 2.80, 95% CI 2.33–3.36). Moreover, the gender by social-behavioral readiness interaction was significant for suspensions/expulsions ($p = 0.005$). For girls, the rate of being suspended or expelled among those students identified as not ready was 1.43% higher than among those identified as fully ready. For boys, the rate was 3.44% higher suggesting that not being socially-behaviorally ready had a greater impact on being suspended or expelled for boys than girls.

Discussion

Over one third of BCPS students in this study entered kindergarten without the social-behavioral skills necessary for learning. Consistent with national trends linking poverty, gender, race/ethnicity, and early childhood education with indicators of social-behavioral readiness in kindergarten [45], students identified as not socially-behaviorally ready in this study were more likely to be

Table 3 Results for the final survival model predicting grade retention in kindergarten through grade 3

Independent variables	Est.	SE	p value	Hazard OR	95% CI
Cohort (cohort 2)	− 0.146	0.074	0.048	0.86	[0.76, 0.96]
Gender (male)	0.304	0.081	< 0.001	1.36	[1.19, 1.55]
African American	0.107	0.144	0.458	1.11	[0.88, 1.41]
Free and reduced price meals in K	0.302	0.105	0.004	1.35	[1.14, 1.61]
English language learner in K	− 0.104	0.207	0.615	0.90	[0.64, 1.27]
Attended formal school prior to K	− 0.426	0.059	< 0.001	0.65	[0.59, 0.72]
Chronically absent in K	0.552	0.067	< 0.001	1.74	[1.56, 1.94]
Language/literacy domain not ready	0.759	0.108	< 0.001	2.14	[1.79, 2.55]
Mathematical thinking domain not ready	0.737	0.097	< 0.001	2.09	[1.78, 2.45]
Scientific thinking domain not ready	− 0.028	0.121	0.819	0.97	[0.80, 1.19]
Social studies domain not ready	− 0.016	0.107	0.881	0.98	[0.83, 1.17]
The arts domain not ready	− 0.104	0.089	0.239	0.90	[0.78, 1.04]
Physical development domain not ready	− 0.098	0.08	0.221	0.91	[0.79, 1.03]
Social behavioral domain not ready	0.348	0.098	< 0.001	1.42	[1.20, 1.67]
Social behavioral domain × gender interaction	− 0.044	0.114	0.698	0.96	[0.79, 1.15]

Notes: For MMSR domains, students scoring as fully ready are the reference group for odds ratios. Not ready includes students who scored in the approaching and developing categories. Results account for nesting within the school in which the student took the MMSR. $N = 11,031$

K = kindergarten, OR = odds ratio, CI = confidence interval

male, African American, poor, chronically absent, and not to have attended formal preschool (e.g., Head Start, Pre-K). Our results extend those findings by demonstrating that even after controlling for these factors, social-behavioral readiness continues to exert significant effects on three school outcomes that are associated with lower academic achievement, and higher risk of school dropout, criminal justice system involvement, and difficulties obtaining or retaining employment [31, 34–36].

Our findings highlight how entering kindergarten behind in social-behavioral skills places children at significant risk for a cascade of negative outcomes. As expected, kindergarteners rated as not socially-behaviorally ready were significantly more likely to be retained in grade, receive services and supports through an IEP or 504 plan, and be suspended/expelled by the fifth year of school. Although similar results have been previously reported [22–25], this is the first study to use a districtwide assessment of school readiness aligned to state educational standards to pinpoint the unique contribution of social-behavioral skills [33] to these outcomes while accounting for all other school readiness domains and key child characteristics, use data collected after the passage

of NCLB, and examine these relations within a large sample of high-risk students at kindergarten entry.

Students who qualified for the free or reduced price meals program, an indicator of a family's low socioeconomic status, were more likely to be rated as not socially-behaviorally ready for kindergarten and to experience each of the outcomes explored in this study, suggesting that urban poverty may be a key driver of these relations. Many obstacles faced by low-income families—exposure to trauma, environmental toxins, housing and job instability, unsafe neighborhoods, limited public transportation, and poor access to health care—make it difficult for parents to provide safe, consistent, responsive, and nurturing home environments or reliable access to necessary resources to support their children's development of social-behavioral skills [18, 59–61]. Indeed, research shows that growing up in poverty, particularly when experienced in early childhood, has significant impacts on children's school success in the short and long term [62–64]. This is the reality for many families raising young children in cities like Baltimore, where 86% of public school children are growing up in poverty and many are exposed to multiple adversities that make it difficult to focus attention, process information, and learn [46–48].

Table 4 Results for the final hierarchical linear model predicting receipt of services and supports through an IEP or 504 Plan in kindergarten through grade 3

Independent Variables	Coef	SE	t ratio	p value	OR	95% CI
Intercept	−3.66	0.15	−25.15	<0.001	0.03	[0.02, 0.03]
Cohort (cohort 2)	0.24	0.06	4.05	<0.001	1.27	[1.13, 1.42]
Gender (male)	0.94	0.06	15.56	<0.001	2.56	[2.28, 2.89]
African American	−0.44	0.08	−5.43	<0.001	0.65	[0.55, 0.76]
Free and reduced price meals in K	0.12	0.06	2.03	0.04	1.13	[1.01, 1.28]
English language learner in K	−1.22	0.11	−11.41	<0.001	0.29	[0.24, 0.36]
Attended formal school prior to K	0.21	0.07	3.01	0.00	1.23	[1.08, 1.41]
Chronically absent in K	0.06	0.06	1.02	.31	1.06	[0.95, 1.19]
Language/literacy domain not ready	0.86	0.07	12.51	<0.001	2.36	[2.06, 2.70]
Mathematical thinking domain not ready	0.41	0.06	6.51	<0.001	1.51	[1.33, 1.70]
Scientific thinking domain not ready	0.12	0.09	1.30	0.19	1.13	[0.94, 1.35]
Social studies domain not ready	0.07	0.08	0.85	0.40	1.07	[0.92, 1.24]
The arts domain not ready	−0.04	0.07	−0.54	.59	0.96	[0.85, 1.10]
Physical development domain not ready	0.86	0.07	12.51	<0.001	2.36	[2.06, 2.70]
Social behavioral domain not ready	0.74	0.08	9.53	<0.001	2.10	[1.80, 2.46]
Social behavioral domain × gender interaction	−0.39	0.08	−4.70	<0.001	0.68	[0.58, 0.80]

Notes: For MMSR domains, students scoring as fully ready are the reference group for odds ratios. Not ready includes students who scored in the approaching and developing categories. Results account for nesting within the school in which the student took the MMSR. $N = 11,412$

K = kindergarten, OR = odds ratio, CI = confidence interval

Boys were significantly more likely than girls to be rated as not socially-behaviorally ready at kindergarten and to be retained in grade, receive services and supports through an IEP or 504 plan, and be suspended/expelled. Moreover, among children who were not socially-behaviorally ready at kindergarten, boys were receiving services and supports through an IEP or 504 plan and were being suspended or expelled at higher rates compared to girls. These findings are consistent with prior research indicating that boys are disproportionately identified as having disruptive behavior problems and overrepresented in special education referrals [9, 24, 25]. Similarly, research shows that boys are significantly more likely than girls to be retained in grade [22, 23] and suspended/expelled [24, 44, 45]. These findings are particularly troubling given that academic success provides an important pathway out of poverty and in light of evidence that children, particularly boys, raised in Baltimore City have among the nation's lowest odds of escaping poverty by adulthood [49].

Findings related to race/ethnicity in the present study were mixed. African American students were more likely to be identified as not socially-behaviorally ready for kindergarten and to be suspended/expelled, but no more likely to be retained in grade and less likely to receive services and supports through an IEP or 504 plan by fourth grade. While these findings are somewhat in line with prior research indicating that African American students are at greater risk of entering kindergarten not fully ready to learn and for experiencing increasing difficulties in school across time, including being suspended/expelled at disproportionately higher rates [45, 65, 66], they should be interpreted cautiously. In particular, it is problematic to consider racial/ethnic disparities without also considering the social context in which these disparities exist [67]. In fact, studies have found that once socioeconomic status is accounted for, the disparity between African American and White students' academic performance is generally reduced [68, 69]. It is possible that teachers' assessments of students' social-behavioral readiness on the MMSR may be biased by teachers' own cultural perspectives, and there is some evidence that teachers' ratings may systematically disadvantage African American and male students [23, 40, 70].

Table 5 Results for the final hierarchical linear model predicting suspensions or expulsions in kindergarten through grade 3

Independent variables	Coef	SE	t ratio	p value	OR	95% CI
Intercept	−5.70	0.18	−31.83	<0.001	0.00	[0.00, 0.01]
Cohort (cohort 2)	0.08	0.05	1.47	0.14	1.08	[0.97, 1.21]
Gender (male)	1.34	0.07	18.86	<0.001	3.81	[3.32, 4.38]
African American	0.56	0.12	4.47	<0.001	1.75	[1.37, 2.23]
Free and reduced price meals in K	0.35	0.07	5.06	<0.001	1.42	[1.24, 1.63]
English language learner in K	−1.00	0.14	−6.94	<0.001	0.37	[0.28, 0.49]
Attended formal school prior to K	0.05	0.06	0.92	0.36	1.05	[0.94, 1.18]
Chronically absent in K	0.16	0.05	2.88	0.00	1.17	[1.05, 1.30]
Language/literacy domain not ready	0.08	0.08	0.94	0.35	1.08	[0.92, 1.27]
Mathematical thinking domain not ready	−0.07	0.09	−0.75	0.45	0.93	[0.78, 1.12]
Scientific thinking domain not ready	−0.18	0.08	−2.41	0.02	0.83	[0.72, 0.97]
Social studies domain not ready	0.18	0.07	2.62	0.01	1.20	[1.05, 1.37]
The arts domain not ready	−0.01	0.08	−0.07	0.94	0.99	[0.85, 1.16]
Physical development domain not ready	0.08	0.08	0.94	0.35	1.08	[0.92, 1.27]
Social behavioral domain not ready	1.03	0.09	11.10	<0.001	2.80	[2.33, 3.36]
Social behavioral domain × gender interaction	−0.28	0.10	−2.83	0.01	0.76	[0.62, 0.92]

Notes: For MMSR domains, students scoring as fully ready are the reference group for odds ratios. Not ready includes students who scored in the approaching and developing categories. Results account for nesting within the school in which the student took the MMSR. $N = 11,412$

K = kindergarten, OR = odds ratio, CI = confidence interval

To account for some of this potential biases, we used multilevel modeling to nest students within their schools where they were assessed on the MMSR. Although a three-level analytic model accounting for students nested within teachers nested within schools would have been most appropriate, data connecting teachers to student's scores were not available. Moreover, isolating the unique impact of race/ethnicity on these outcomes was not the focus of this study. We also lacked information on teachers' characteristics (e.g., teachers' race/ ethnicity) and our sample was majority African American making racial/ethnic differences difficult to interpret. Nonetheless, the results presented here suggest that racial/ethnic and gender gaps found in academic achievement and educational attainment [23, 71] begin very early in children's lives. Future research should explore these relations in more ethnically and socioeconomically diverse samples.

Other study limitations should also be noted. It is likely that additional factors not controlled in this study also contributed to grade retention, receipt of additional services and supports through an IEP or 504 plan, and suspensions/expulsions. These factors include child age at kindergarten entry, limited parent education, family

and neighborhood stress, and child and family health problems. In addition, we only controlled for whether the child had received some kind of formal preschool experience; analyses did not differentiate among the different types of formal schooling prior to kindergarten (e.g., Pre-K, Head Start, Child Care Center, etc.) or the program dose (e.g., number of days in Pre-K, Head Start, or Child Care Center) as those data were not available. Future research should compare contributions of different types and amounts of preschool programs and care settings to children's social-behavioral readiness at kindergarten. Finally, students were counted as being suspended or expelled in the dataset if this outcome occurred at least once. It is possible that students suspended or expelled once differ in meaningful ways from those suspended or expelled multiple times. Future research should explore the association between social-behavioral readiness and the frequency with which a child is suspended or expelled to better inform intervention efforts.

Approximately one in seven students identified as behind in their social-behavioral skills in this study received services through an IEP or 504 plan in kindergarten, and this number increased to almost a

third by the time students in this sample reached the fifth year of school. Approximately 1% of the kindergarteners identified as not socially-behaviorally ready at school entry received accommodations through a 504 plan. However, by the fifth year of school, the rate of 504 plan use in this group rose to 3.8%, more than double the national average of children served through a 504 plan at any age [36]. This suggests that many children not receiving IEPs or not meeting eligibility criteria for a disability are still needing additional services and supports. There are many reasons why children need additional services and supports through an IEP, including learning disabilities (35%) and speech or language impairment (21%); nationally, only 5–8% of students receiving services and supports through an IEP have a behavioral, emotional, or developmental disability [71]. However, these behavioral, emotional, and developmental disabilities that comprise such a small portion of the special education population are now the most chronic disabilities affecting children in the USA [1].

By the fifth year of school, 8.5% of children identified as not socially-behaviorally ready had been suspended or expelled at least once. While suspending or expelling a kindergarten child with social-behavioral difficulties may make the classroom environment more manageable for the teacher, it is a highly problematic decision for the struggling child who desperately needs the structure and supports of the classroom to catch up to their peers [44]. Indeed, many states and school districts are examining alternatives to suspensions and expulsions including those targeting school and classroom cultures and environments (e.g., PBIS, restorative justice), strengthening teachers' behavioral management skills, and providing stress and emotion regulation skills (e.g., meditation) to students. There is some evidence that these alternatives have led to reductions in suspensions and expulsions [72–75].

Social-behavioral readiness skills develop before children enter kindergarten, primarily in the context of the family. The strongest evidence of the long-term effects of early childhood programs for low-income populations on later achievement originates from studies that mandated and achieved a high degree of parent involvement [76–78]. In fact, most federally supported early childhood programs, such as Head Start and Pre-Kindergarten programs, highlight parent involvement as an essential component of their mission. However, while over $20 billion was allocated in 2015 by federal and state governments to support early care and education [79, 80], there are no available estimates for federal or state spending to strengthen parenting and parenting practices during these early years [10]. Consistent with the recent National Academies of Science [10] recommendations, stronger policies promoting investments in two generation programs that strengthen parenting capacities in early childhood, particularly for families living in poverty, are needed.

Our findings highlight the need for a comprehensive and sustainable strategy for (1) supporting parents and strengthening parenting skills during the earliest years, (2) providing professional development and mental health consultation to early childhood educators and staff working with children and families who are experiencing emotional and behavioral challenges, and (3) providing instructional experiences for all children aimed at strengthening their social-behavioral skills. There are numerous evidence-based interventions that provide these types of support [81–85]. However, to date, there is no financially sustainable model for scaling and monitoring the quality of these interventions in early childhood settings [10, 86].

Conclusions

The number of children living in deep poverty has grown over the last two decades [87] and a disproportionate number are children of color [88]. In urban cities like Baltimore, where poverty is concentrated in hypersegregated neighborhoods affected by violence and substance use, lack of safe and affordable housing, high unemployment, and limited opportunity, young students are exposed to high levels of environmental stress and adversity. According to Anderson [67], the data presented here do not reflect an "achievement gap" as much as a "risk gap." This is an important distinction. Framing the problem solely as an achievement gap focuses solutions on education policies, cognitive enrichment programs, and strengthening the education workforce. Framing the problem as a "risk gap" focuses solutions on urban policies; social, emotional, and behavioral health; and strengthening families.

Being retained in grade, receiving additional services and supports through an IEP or 504 plan, and being suspended/expelled can come at significant cost to the

child and family, schools, and society. Although the downstream societal costs of school failure are well documented [89], the more immediate costs to families, school districts, and society are also quite substantial. For example, more than one quarter of the children in this study identified as not socially-behaviorally ready had been retained in grade by their fifth year of school. Previous economic valuations estimate the cost of grade retention (in 2013 dollars) to be $11,153 per student per year retained in school [90]. The cost of special education, which varies across needs and disabilities, has been estimated to be an additional $10,000 per student per year [91]. Specific data on the costs of suspensions and expulsions also vary and include those linked to school staff time to address the behavioral incident, lost school funding due to the student's absence, and lost instructional time that occurs when the teacher must address the incident that results in the suspension or expulsion and when the student spends time outside of school as a result of being suspended/expelled. Parents also incur costs from suspensions and expulsions in the form of lost wages due to missed work or paying others to supervise their children who have been suspended/expelled from school.

These findings underscore the need for a comprehensive strategy that cuts across systems serving children and families to increase the likelihood that children enter kindergarten socially-behaviorally ready. Programs supporting young children's social-behavioral readiness can be expensive. However, the cost of not addressing the growing problem of children entering kindergarten without a strong social-behavioral foundation, particularly for children living in poverty, may be far greater.

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