

Racial and Socioeconomic Disparities in the Relationship Between Children's Early Literacy Skills and Third-Grade Outcomes: Lessons From a Kindergarten Readiness Assessment

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Federal accountability policy mandates that states administer standardized tests beginning in third grade. In turn, third-grade test scores are often viewed as a key indicator in policy and practice. Yet literacy struggles begin well before third grade, as do racial and socioeconomic disparities in children's literacy skills. Kindergarten readiness assessments provide a unique opportunity to better understand the emergence of literacy disparities. We use unique kindergarten literacy data from nearly every school division in Virginia to document the relationship between children's early literacy skills and their later reading proficiency. When comparing children with similar literacy skills at kindergarten entry, we find significant racial and socioeconomic differences in the likelihood that a child will be proficient on their third-grade reading assessment.

Keywords: achievement gap; literacy; assessment; disparities; elementary schools; descriptive analysis; early literacy; achievement gaps; early elementary grades; educational inequality; kindergarten readiness assessment

Third-grade literacy is often framed as a watershed moment, when children transition from “learning to read” to “reading to learn” (Annie E. Casey Foundation, 2010). Children who are not reading on grade level by third grade are four times more likely to drop out of high school than those who are reading on grade level. Due to longstanding socioeconomic and educational inequities, Black children, Hispanic children, and children whose families have lower incomes are especially likely to be reading below grade level in third grade (Annie E. Casey Foundation, 2010). For these reasons, policymakers and practitioners have focused heavily on children's reading skills in third grade through such initiatives as the federal “Reading First” program (Gamse et al., 2008) and such state legislation as “Read by Grade Three” laws that require schools to hold back children who are not reading on grade level by the end of third grade (National Conference of State Legislatures, 2019).

Of course, language and literacy skills—as well as specific literacy challenges—emerge much earlier than third grade (Fernald et al., 2013). However, federal law mandates that schools

administer standardized assessments starting in third grade and holds them accountable for students' test scores in grades 3–8.

The widespread availability of assessment data in the middle grades has enabled policymakers to track the development of test-score disparities at the state, district, and even school levels (e.g., Reardon et al., 2019). Armed with such information, stakeholders have identified which localities or campuses are in need of additional resources and worked to address these inequities in the upper elementary and middle grades. They have also used these data to test the effectiveness of a variety of policies and practices.

Until recently, the early elementary grades (K–2) were largely excluded from mandated educational assessments, and, because of data availability, policymakers and policy researchers often paid much more attention to grades 3 and up. The lack of systemwide assessment data in the early elementary grades has hampered stakeholders' ability to identify and address inequities

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in children's learning opportunities during the early grades, track changes in children's skills over time, or evaluate the impact of interventions in the early grades.

In an effort to better support learners in the early grades, policymakers in recent years have invested considerable resources in developing kindergarten readiness assessments (KRAs). Most notably, the Obama administration's Race to the Top Early Learning Challenge identified implementing KRAs as a priority for applicants for federal aid (Administration for Children and Families, 2019). The majority of states now employ some form of KRA, and a growing number offer the same assessment to all entering kindergarteners (Education Commission of the States, 2018).

KRAs can be used in multiple ways (Regenstein et al., 2017). Practitioners, for example, can use them to screen children for specific supports and to inform their teaching in the early grades. Researchers and policymakers can also leverage data from KRAs to substantially expand their understanding of literacy development: They can be used to track trends over time (e.g., are children arriving to school with stronger skills?), to better understand disparities between groups (e.g., are there differences in skills between children based on their families' incomes?), and to learn how children's skills at kindergarten entry relate to their future attainment on "high-stakes" assessments.

In this study, we use novel data from a KRA in Virginia to explore heterogeneity in the relationship between children's literacy skills at kindergarten entry and their third-grade reading outcomes. In doing so, our primary goal is to provide new evidence regarding disparities in children's early literacy trajectories. Ours is the first study that we know of to link results from a statewide KRA to results on a high-stakes assessment and explore how the association between school-entry and third-grade literacy skills varies by race and economically disadvantaged status. A secondary goal of the paper is to highlight the utility of KRAs for informing education policy.

Consistent with prior research, we find that Black, Hispanic, and economically disadvantaged children—who face a variety of systemic barriers, including racism—enter kindergarten with fewer literacy skills on average than do their peers. We also show that kindergarten literacy skills are strong predictors of third-grade reading scores. Our key finding is that the link between literacy skills at kindergarten entry and third-grade reading proficiency differs substantially based on race and economically disadvantaged status. That is, White and more economically advantaged children are far more likely to be proficient readers by third grade than are Black, Hispanic, and economically disadvantaged children starting kindergarten *with the same literacy skills*. The patterns highlight a critical need to identify factors at the classroom, school, and societal levels that contribute to these disparate learning trajectories in the early grades.

Background

Literacy Skills at Kindergarten Entry

Children enter kindergarten with widely divergent literacy skills. National data sets, such as the Early Childhood Longitudinal Study (ECLS), show that Black children, Hispanic children, and

children from families with lower incomes enter kindergarten with substantially lower reading skills than do their White and higher-income peers (Fryer & Levitt, 2004; Quinn, 2015; Reardon & Portilla, 2016; von Hippel & Hamrock, 2019). Using data from 2010, Reardon and Portilla (2016) estimate the Black-White reading readiness gap to be nearly one-third of a standard deviation. The Hispanic-White reading readiness gap is comparatively larger (0.56 standard deviation), although this figure likely masks considerable heterogeneity based on English-language proficiency (Reardon & Galindo, 2009). Along lines of family income, Reardon and Portilla (2016) estimate the disparity in reading test scores at kindergarten entry among children at the 90th percentile of income and those at the 50th percentile to be 0.58 standard deviation.

Kindergarten Skills and Future Outcomes

These early disparities are important because children's skills at kindergarten entry predict their future outcomes. A meta-analysis of more than 30 studies documented a moderately strong correlation between children's academic skills in kindergarten and their skills in first and second grade ($r = 0.48$; La Paro & Pianta, 2000). More recent work has corroborated these conclusions. For example, Justice et al. (2019) find a very similar relationship between children's early skills and their later standardized test results ($r = 0.46$). Some studies have also shown that early literacy skills are correlated with much more distal adult outcomes: Chetty et al. (2011), for example, find a correlation between children's kindergarten test scores and their earnings at age 27.

The racial and socioeconomic disparities in literacy skills observed at kindergarten entry also persist. For instance, data from the 1998 cohort of ECLS-K show that the Black-White disparity in average reading skills remains relatively stable during the early elementary grades and begins to expand more rapidly beginning around third grade (Reardon, 2011; Reardon et al., 2015). The same pattern holds for children in the top and bottom quintiles of the income distribution (Reardon et al., 2015).

Disparities in the Relationship Between Early Skills and Later Outcomes

Although research demonstrates that children's early literacy skills are associated with their future outcomes, we know little about whether the relationship between school-entry skills and later outcomes varies across subgroups. There are, however, theoretical and empirical reasons to hypothesize that such differences may exist. Put another way, it may be that even among children who enter school with the same skills, the likelihood of becoming proficient readers may differ by race or socioeconomic status (SES). Broadly, these reasons can be categorized as inequities *between* schools, *within* schools, or *outside* schools.

First, racial and socioeconomic disparities in learning outcomes might be driven by differences in instructional quality or resource availability between schools that children attend. For example, White and economically advantaged children are more likely to attend schools that are better funded or have more experienced and effective teachers than those of their peers (Goldhaber et al., 2015; Hanushek & Rivkin, 2006). These inequitable experiences

suggest that White and economically advantaged children may have higher test scores in the upper elementary grades than their peers with similar skills in kindergarten because they attend schools that are better able to support their reading growth.

Second, research points to a number of considerations that might lead to inequities in children's reading outcomes, even when comparing children who attend the same school. These within-school factors include academic tracking practices (Lucas & Berends, 2007), differences in teachers' expectations (Papageorge et al., 2019), and inequities in ability grouping (Lleras & Rangel, 2009) and gifted-program placement (Grissom & Redding, 2016).

Lastly, outside-school factors could also contribute to disparities in reading outcomes for children who enter kindergarten with similar skills. As Merolla and Jackson (2019) convincingly argue, the within- and between-school mechanisms highlighted above cannot fully account for disparities in children's academic outcomes. Rather, these school-based inequities are only symptoms of the deeper societal issues of structural racism and economic bias. These structural inequalities, which influence many facets of society beyond education, in turn contribute to disparate academic outcomes across subgroups of children.

Although there are many reasons to believe that children entering kindergarten with similar literacy skills could have different trajectories, depending on their race or SES, almost no studies have directly addressed this issue. Claessens et al. (2009) is the only study we know of that uses ECLS or similar data to examine differences in the relationship between early literacy skills and later-grade outcomes across subgroups. That study does not find evidence that this relationship varies by race or SES. A recent analysis of ECLS-K data by Vinopal and Morrissey (2020) does find disparities in literacy growth rates in the early elementary grades along lines of neighborhood SES, but that study does not examine whether children with the same skills at kindergarten entry experience differential growth.

Understanding whether the relationship between early literacy skills and later reading outcomes varies by subgroup is critical to identifying the mechanisms underlying test-score disparities in the early elementary grades. However, stakeholders have traditionally lacked the systemwide early assessment data necessary to explore this relationship in the early grades at the local level.

The Utility of Kindergarten Readiness Assessments

To date, much of our understanding about differences in early learning trajectories across groups stems from large-scale data sets, such as the ECLS-K and similar data sets, such as the Measures of Academic Progress assessment data collected by NWEA. These data are useful for understanding overall trends but tend to rely on relatively small samples at the state, school, and classroom levels.

For educators and state and local policymakers, data that are representative of their own local context are more actionable and relevant. KRAs fill this need. The majority of states now require some form of readiness assessment in the early elementary years, with many states placing a particular focus on assessing children's literacy skills (Education Commission of the States, 2018). KRAs are not designed to hold schools, teachers, or children accountable

for their performance on these assessments (Regenstein et al., 2017). Rather, when reliable and valid, these assessments provide important data that can inform teachers' classroom instruction and policymakers' resource allocation (Regenstein et al., 2017).

In Maryland, for instance, sharing aggregated statewide readiness data with the state's general assembly led to increased state investment in early childhood programming (Regenstein et al., 2017). Researchers have used data from KRAs to highlight disparities in children's literacy skills at kindergarten entry across groups of children (Grodsky et al., 2017; Justice et al., 2019). This type of data was particularly useful during the pandemic, as there was widespread concern about the extent to which COVID affected young children's learning and exacerbated racial and socioeconomic disparities (Markowitz et al., 2021; McGinty et al., 2021; Weiland et al., 2021).

Although KRAs are increasingly used to inform policy and practice, very little work has linked these early assessments to states' high-stakes third-grade assessments. To date, KRAs have not been used to assess how racial and socioeconomic disparities in academic skills develop between kindergarten and third grade.

This study aims to fill this gap. We link nearly 70,000 children's scores on a statewide literacy readiness assessment to their later outcomes on a high-stakes reading assessment. These rich data allow us to provide a nearly statewide look at the relationship between children's literacy skills at kindergarten entry and their subsequent performance on a high-stakes reading assessment. In doing so, we add to the existing literature exploring the relationship between early literacy skills and future outcomes. We also highlight the utility of KRAs in informing policymaking in the early elementary grades.

Data

Virginia legislation requires that school divisions administer a state-approved literacy assessment to children during the fall of kindergarten [1]. All but one of Virginia's 132 public school divisions administer the Phonological Awareness Literacy Screening (PALS) assessment, accounting for roughly 85% of kindergarteners in the state [2]. PALS measures children's knowledge of literacy fundamentals, including phonological awareness, alphabet recognition, knowledge of letter sounds, and spelling. PALS is administered by the child's classroom teacher, usually in a one-on-one setting, with the exception of several subtasks that are conducted in small groups of children. The assessment has been validated, with Cronbach's alpha coefficients ranging from 0.79 to 0.89 and inter-rater reliability correlations ranging from 0.96 to 0.99 (Invernizzi et al., 2017).

Kindergarten and Third-Grade Literacy Skills

Phonological Awareness Literacy Screening. Each record in our data contains a child's score on the PALS assessment in the fall of kindergarten. For the purposes of this analysis, we focus on children's overall score across the various subtasks of the assessment. Scores on the fall kindergarten assessment range from 0 to 102. We operationalize children's literacy skills at kindergarten entry in three ways. First, in our main results, we divide children into quintiles based on their score on the PALS assessment. This

quintile approach provides a crude but easy-to-interpret way to highlight patterns across different parts of the early literacy distribution.

However, dividing children into quintiles might mask important “within-quintile” differences in literacy skills across race and economically disadvantaged status. For instance, it may be that even among the lowest quintile of kindergarteners, children from higher-income households systematically score higher on PALS than do children from lower-income households. To address these concerns, we also report results from a second set of analyses in which we consider children’s continuous PALS score at kindergarten entry (shown in Appendices A and B in the online supplementary materials). These results are consistent with the trends we identify using our quintile approach.

Finally, PALS provides a “benchmark” threshold that is designed to identify children who are relatively behind in their acquisition of these fundamentals and may benefit from academic intervention. In Virginia, all children who score below this benchmark are eligible for early intervention. For this reason, we also run a final set of analyses considering children whose PALS scores fall above and below the PALS benchmark. These results are reported in online supplementary Appendix C and, again, are consistent with our main results.

Virginia Standards of Learning. We link children’s PALS scores to their scale scores on the third-grade Standards of Learning (SOL) reading assessment. The SOL, scored on a scale of 0 to 600, is Virginia’s high-stakes student achievement assessment. We focus on whether a child reached proficiency or advanced status in third grade. Children scoring 400 or higher on the SOL are considered proficient, and children scoring 500 or higher are classified as advanced. Children who score below proficient on the SOL assessment are required to attend some form of remediation program, often taking place during the summer. Results from the SOL are also used to determine schools’ accreditation status.

Student Covariates

Our data include child-level covariates provided by the Virginia Department of Education (VDOE), including an indicator for race and ethnicity (here classified as White, Black, Hispanic, and Other Race), English Learner (EL) status, and economically disadvantaged status [3]. The race and EL indicators are recorded in the fall of kindergarten when the child takes the PALS assessment. We use the earliest indicator of children’s economically disadvantaged status available in our data (usually collected annually between kindergarten and third grade).

Sample

Our data set consists of nearly 80,000 children who entered kindergarten for the first time in the fall of 2013 [4]. We reduce the sample to exclude children who leave our sample before taking the SOL exam in third grade and children who score 0 on the SOL, as VDOE considers this to be an invalid score. We also exclude children who take a modified version of the SOL assessment based on their language proficiency or disability status. These exclusions

leave us with a final analytic sample of 67,164 children. Most of our sample entered third grade during the 2016–2017 school year. We also include children who were once held back and took the third-grade reading exam in 2017–2018 ($n = 4,476$).

Attrition

Children for whom we do not have both a kindergarten PALS score and a third-grade SOL differ from children with both scores. For example, the children in our analytic sample are 5.3 percentage points more likely to be disadvantaged and 3.2 percentage points more likely to be EL than the students excluded. A full summary of attrition can be found in online supplementary Appendix D. Encouragingly, attrited children do not differ from our analytic sample with respect to PALS scores. Even so, this attrition should be kept in mind when interpreting the generalizability of the results we report below.

Descriptive Statistics

About half of the children in our sample are White, about a quarter are Black, and 14% are Hispanic. Half of all children are identified as economically disadvantaged. We divide the Hispanic subgroup into Hispanic children who are identified as ELs and those who are not identified as ELs in the fall of kindergarten, as we expect these two groups to have different literacy trajectories (Reardon & Galindo, 2009). Nearly 75% of children identified as ELs in kindergarten in our sample are Hispanic [5]. Appendix E in the online supplementary materials contains a table showing descriptive statistics for our sample, both overall and for each quintile of the PALS distribution.

Methodology

We assess the probability that a given child will meet proficiency or advanced standards on their third-grade SOL exam conditional on their literacy skills at kindergarten entry. We use the following ordinary least squares (OLS) model to quantify the probability that child i will be proficient (or advanced) on their SOL reading exam in third grade, conditional on their PALS quintile and their race or disadvantaged status:

$$SOL_i = \theta' \sum_q \sum_g \left(Quintile_i^q * Group_i^g \right) + \varepsilon_i \quad (1)$$

where SOL_i indicates whether child i is proficient (or advanced) on their third-grade reading SOL exam; $Quintile_i^q$ represents a vector of indicator variables for each quintile, q , of the kindergarten PALS distribution; and $Group_i^g$ indicates the racial or economically disadvantaged group, g , of child i . We estimate separate models for race/ethnicity and disadvantaged status.

Results

Consistent with prior studies, we find substantial racial and socioeconomic disparities in kindergarten literacy skills. Table F1 in online supplementary Appendix F shows standardized disparities in PALS scores along lines of race and SES for children in our

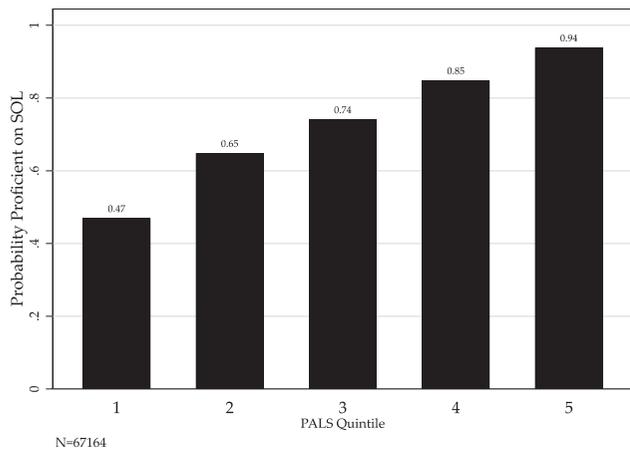


FIGURE 1. *Probability of proficiency on third-grade SOL by kindergarten PALS quintile (all children).*

sample. White and economically advantaged children in our sample enter kindergarten with higher literacy skills, on average, than do their Black, Hispanic, and economically disadvantaged peers.

Also consistent with earlier work, we find that children’s kindergarten literacy scores predict their third-grade outcomes. The Pearson’s correlation between children’s PALS sum score and their score on the third-grade SOL reading assessment is 0.47. The positive relationship between early skills and later reading outcomes is echoed in Figure 1, which displays the proportion of children in each PALS quintile who reach proficiency standards on their third-grade reading assessment. Less than half (47%) of children who enter kindergarten with literacy skills in the lowest quintile reach proficiency standards on their third-grade reading assessment, compared to 94% of children who enter kindergarten in the highest quintile.

The central question of this analysis is whether the relationship between children’s kindergarten skills and third-grade reading outcomes differs by race and disadvantaged status. We find large differences along these lines in the probability of passing the third-grade reading SOL among children whose PALS scores at kindergarten entry are in the same quintile (Figure 2).

For instance, 55% of White children who start kindergarten with literacy scores in the lowest quintile ultimately are proficient on the third-grade SOL. In contrast, this is only true for 35% of Black children. As another illustrative example, 72% of Black children who enter kindergarten with literacy skills in the fourth quintile (well above the median skill level) meet the proficiency standard in third grade. This is the same rate as White children whose kindergarten PALS scores are in the second quintile (well below the median). Disparities between Hispanic (non-EL) children and White children are comparatively small.

There are also substantial differences in third-grade outcomes between economically disadvantaged children and their more-advantaged counterparts (Figure 3). Among children who start kindergarten in the lowest quintile, economically disadvantaged children are 17 percentage points less likely to meet proficiency standards in third grade than are their peers who are not economically disadvantaged. Although we treat race and economically disadvantaged status separately in Figures 2 and 3, the patterns discussed are largely unchanged when we account for them simultaneously (see online supplementary Appendix B).

It could be the case that there are differences in the distribution of PALS scores across subgroups within each quintile. For example, Black children may enter kindergarten with relatively lower scores than White children on average within a given PALS quintile. Chi-squared analyses shown in online supplementary Appendix A confirm that there are racial and socioeconomic differences in scores within PALS quintile. These differences could explain any racial and socioeconomic differences in third-grade outcomes that we observe in Figures 2 and 3. To address this possibility, we present results from a model that accounts for children’s continuous PALS score within each quintile in online supplementary Appendix A. Results are similar to those we report based on Equation 1 with two notable exceptions: For children in the first quintile, holding PALS scores constant decreases the Hispanic EL and White disparity by 46% and the disadvantaged and non-disadvantaged disparity by 35%. In supplementary online Appendix B, we also present results from models that control for children’s continuous PALS score and allow the relationship to vary for each racial subgroup of children. Those results are also consistent with the main results presented in this paper.

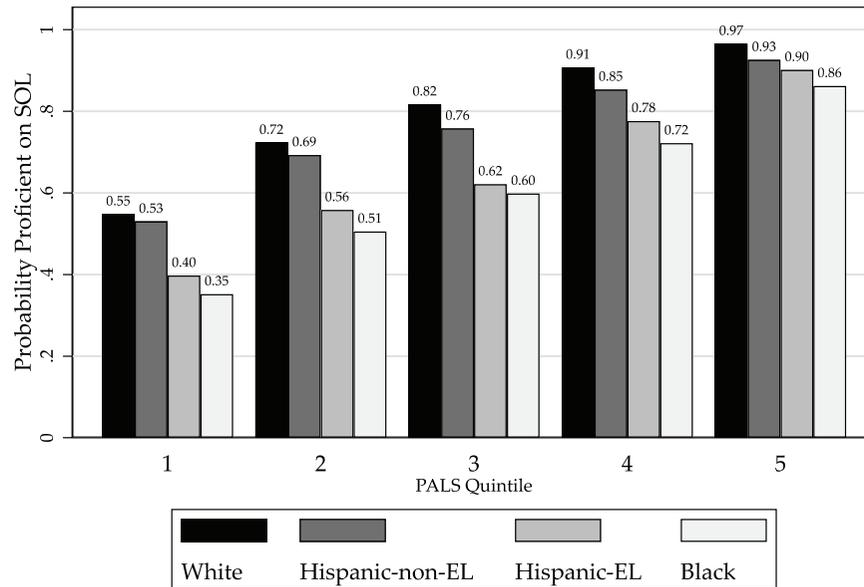
Another possibility is that the patterns we document are ameliorated among children who receive additional literacy supports in kindergarten. To test this, we explore whether the overall patterns we document are comparable among children who are and are not identified for literacy intervention in kindergarten. Virginia provides intervention funding for children who enter kindergarten with a score below 28 on PALS. This benchmark score falls roughly in the middle of the first quintile of the kindergarten PALS distribution. In online supplementary Appendix C, we document that, among children who are identified for this intervention, Black, Hispanic EL, and economically disadvantaged children remain considerably less likely to recover from early reading struggles than are their White and more-advantaged peers.

Although we document racial and socioeconomic disparities within every PALS quintile, the magnitude of these disparities diminishes in the higher quintiles. This pattern may be the result of a “ceiling” effect: Nearly all children in the top quintile of PALS (94%) are proficient in reading in third grade (Figure 1). To address this possibility, we also look at the likelihood of reaching advanced proficiency on the third-grade reading SOL conditional on children’s kindergarten literacy quintile and their race or disadvantaged status. Figures 4 and 5 document significant disparities along lines of both race and disadvantaged status in reaching advanced proficiency on the SOL.

Among children entering kindergarten with literacy skills in the top quintile, White children are more than twice as likely to meet advanced standards by the end of third grade relative to their Black peers (43% vs. 20%, respectively), a pattern that holds in every quintile of the PALS distribution. Online supplementary Appendix B documents that racial disparities in the likelihood of reaching advanced status increase considerably for children who enter kindergarten with relatively higher literacy skills.

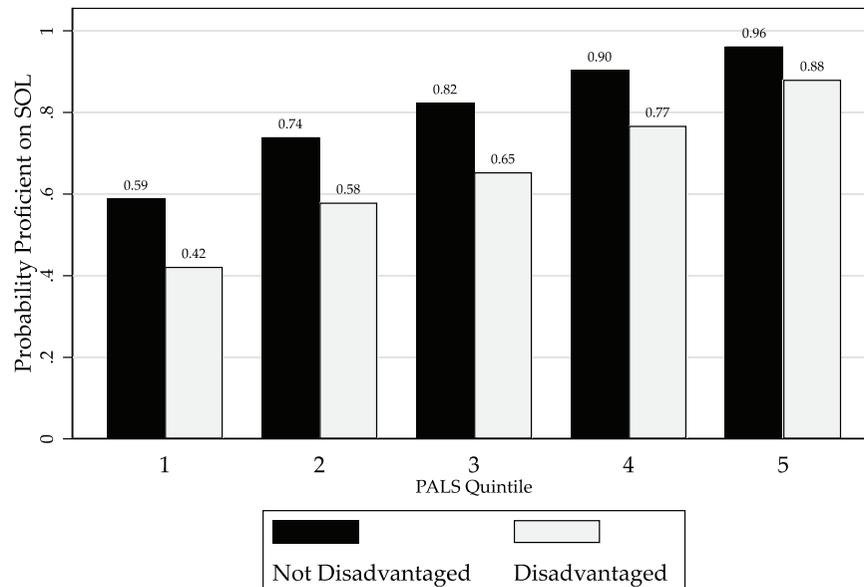
Discussion

Although the early elementary grades are a critical period in young children’s literacy development, until recently, few states



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FIGURE 2. *Probability of SOL proficiency by quintile and race/ethnicity.*



N=66931

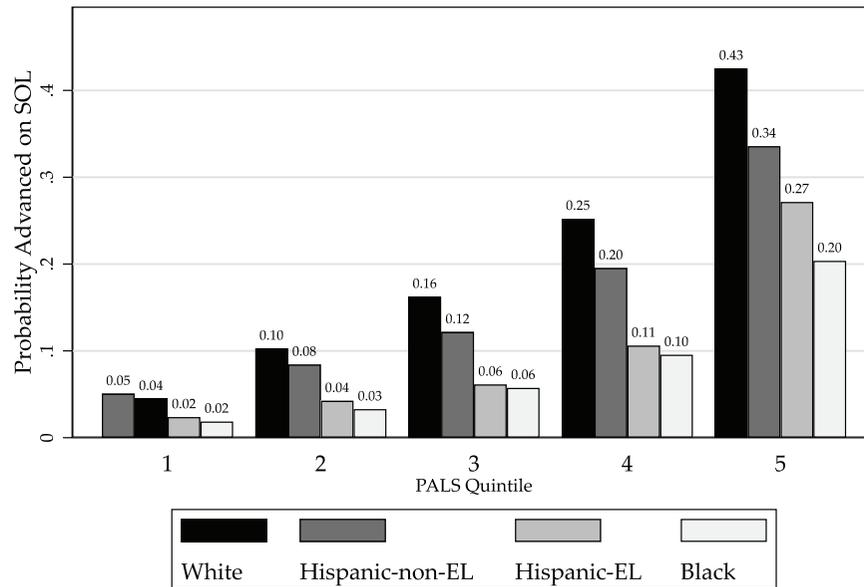
FIGURE 3. *Probability of SOL proficiency by quintile and disadvantaged status.*

systematically collected statewide assessment data in these grades. The lack of systemwide academic information in grades K–2 has hampered our ability to understand how achievement disparities along lines of race and SES develop prior to third grade, especially at the state and local levels. School readiness assessments, which are becoming common nationwide, create an opportunity to address this gap. In this paper, we use KRA data from Virginia to explore how the relationship between children’s literacy skills at kindergarten entry and their future reading outcomes varies across racial and socioeconomic subgroups.

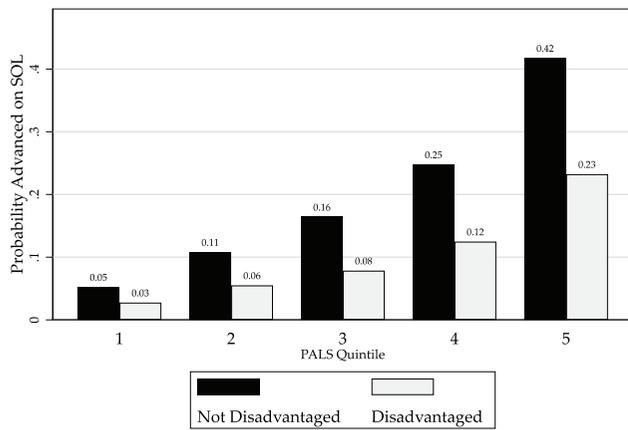
Consistent with prior literature, we document significant disparities in literacy skills at kindergarten entry along lines of race and SES. Like prior studies using the ECLS-K, we find that Black,

Hispanic, and economically disadvantaged children enter kindergarten with fewer literacy skills on average than do their White and economically advantaged peers (Fryer & Levitt, 2004; Reardon & Portilla, 2016). Our estimate of the relationship between children’s skills at kindergarten entry and their future reading outcomes in third grade is also consistent with prior studies. The correlation we report between kindergarten skills and third-grade scores is almost identical to the correlations that La Paro and Pianta (2000) and Justice et al. (2019) find in their examinations of the relationship between children’s early skills and their later outcomes.

Our key contribution is providing new evidence of heterogeneity in this relationship across race and SES. We find that Black children, Hispanic children classified as ELs, and children from



N=67164
 FIGURE 4. Probability of SOL advanced proficiency by quintile and race/ethnicity.



N=66931
 FIGURE 5. Probability of SOL advanced proficiency by quintile and disadvantaged status.

economically disadvantaged backgrounds are substantially less likely to reach proficiency standards on their third-grade reading assessment relative to their White and more-advantaged peers who enter kindergarten with similar literacy skills. These disparities are large for Black children and economically disadvantaged children. Children in these subgroups who enter kindergarten with literacy skills in the lowest quintile are roughly 20 percentage points less likely to reach reading proficiency in third grade than are White children and more economically advantaged children who enter kindergarten with skills in the same quintile. By contrast, we find much smaller disparities among non-EL Hispanic children and White children.

Limitations

Although our study provides the first systemwide look at racial and socioeconomic differences in the links between kindergarten readiness scores and third-grade outcomes, it has some notable

limitations. For one, our findings are based on the relationship between a specific measure of early literacy and children's future reading outcomes. It may be that the results we report here would be different if we employed a different early literacy measure or measures of children's non-literacy skills at kindergarten entry. For example, early math skills have been shown to be strong predictors of children's third-grade reading skills (Duncan et al., 2007). If economically disadvantaged and non-disadvantaged children who enter kindergarten with the same score on the PALS assessment systematically differ in their math skills, such differences might explain economically disadvantaged children's lower proficiency rates on their third-grade reading assessment. The sensitivity of our results to the specific assessments used is an important area for further research.

In addition, although our findings reveal important differences in children's opportunities to learn in the early elementary grades, we do not pinpoint the mechanisms underlying these disparities based on these analyses alone. We view decomposing these disparities into within- and between-school components as a critical avenue for future research, albeit one that presents a number of empirical challenges (e.g., Page et al., 2008; Reardon, 2008). Similarly, exploring how specific policies and practices influence these types of patterns is critical.

Implications

More research is needed to further unpack the descriptive patterns documented here, but our findings do have a number of important implications for policy. First, the disparities we find in third-grade proficiency rates among children who enter kindergarten with similar literacy skills suggest that the well-documented test score differences across subgroups in the upper elementary grades are not simply the product of differences in children's skills at kindergarten entry. This implies that investments in early childhood interventions, which are intended to boost children's skills at kindergarten and narrow disparities in

these skills across racial and socioeconomic groups, are unlikely to fully eliminate test score disparities in later grades: Even children who enter kindergarten with the same literacy skills have very different odds of being proficient or advanced readers in third grade, depending on their race or SES. Targeted investments during the early elementary grades, whether they happen at the school or district level, are likely needed to address these patterns (e.g., Stipek et al., 2017). This is consistent with research suggesting that investments in interventions in the elementary grades are critical to sustaining the benefits of preschool attendance (e.g., Mattera et al., 2021; Zhai et al., 2012).

A second implication of our study is that policymakers can use KRAs and other formative assessments in the early elementary years to help motivate investment in the early grades and guide resource-allocation decisions (Regenstein et al., 2017). Aggregating and analyzing data from KRAs as we do here can provide important visibility to trends and disparities in the early grades that could encourage policymakers to shift their attention to these critical years in children's development. Calling stakeholders' attention to trends in the early elementary grades will become even more important in the wake of the COVID-19 pandemic: Alerting policymakers to disparities in children's early literacy outcomes will enable them to intervene in the early grades at a time when these interventions are most impactful (Cunha & Heckman, 2007; McGinty et al., 2021).

In this vein, stakeholders could leverage data from KRAs in several ways to improve outcomes for children in the early elementary grades. For example, by using data from KRAs and third-grade reading assessments, stakeholders can highlight schools and communities that demonstrate particularly stark disparities in the relationship between early skills and later outcomes to target school- or district-level literacy supports.

Another promising means by which stakeholders could leverage information from KRAs to inform decision making is through intervention policy. Providing struggling readers with early intervention is a key lever by which policymakers can greatly improve children's reading skills (Torgesen, 2009). However, our findings suggest that, among children identified for intervention, Black and economically disadvantaged children are much more likely to fall below proficiency standards than are their peers. Using early data to evaluate Virginia's intervention policy could provide important insight into how the state could improve its approach to intervention to better support Black children and children from economically disadvantaged backgrounds who enter kindergarten with low literacy skills.

More research is needed to understand the reasons for such large racial and socioeconomic disparities in third-grade outcomes among children who enter school with the same skills. However, by documenting these disparities, this study highlights the urgent need to examine these issues and the importance of leveraging early assessment data to provide visibility into children's learning in the critically important early grades.

NOTES

This research was prepared using data provided under a contract with the VDOE. The content does not necessarily reflect the views or policies of the VDOE, the Virginia Board of Education, or the Commonwealth of Virginia. Consequently, the VDOE, the Virginia

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¹Although most states refer to public education entities over which a school board has jurisdiction as "school districts," these entities are referred to as "school divisions" in Virginia.

²Fairfax County is the lone division in the state that uses a different literacy readiness assessment.

³The VDOE identifies students as economically disadvantaged if they (1) are eligible for free/reduced-price meals, (2) receive Temporary Assistance for Needy Families, (3) are eligible for Medicaid, or (4) are identified as migrant or experiencing homelessness.

⁴These data do not include a subset of children with disabilities whose Individualized Education Plans specifically require them to take a modified version of the PALS assessment. A relatively small number of children in this sample are missing data on the economically disadvantaged indicator but are included in all analyses not involving disadvantaged status (275 observations).

⁵We do not divide other racial subgroups into similar EL and non-EL groups because ELs make up a very small proportion of other racial subgroups in our data.

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