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School Readiness, Full-Day Kindergarten, and Student Achievement

An Empirical Investigation

Vi-Nhuan Le, Sheila Nataraj Kirby, Heather Barney,
Claude Messan Setodji, Daniel Gershwin

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1776 Main Street, P.O. Box 2138, Santa Monica, CA 90407-2138
1200 South Hayes Street, Arlington, VA 22202-5050
4570 Fifth Avenue, Suite 600, Pittsburgh, PA 15213-2665
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Summary

Background and Purpose

In recent years, there has been increased attention toward ensuring that children enter school “ready to learn.” While there is little consensus on the specific skills and knowledge that constitute school readiness, many educators, researchers, and policymakers adopt a broad perspective that extends beyond literacy and cognitive skills and includes social, emotional, and physical health. Despite the attention and focus on school readiness, recent research shows that large skill gaps exist even before children enter kindergarten. For example, on average, minority children come to kindergarten with lower literacy skills and poorer social development than do white students. This is an issue of serious concern for educators and policymakers because the skills and knowledge that children have upon entering school are predictive of later achievement.

In an attempt to address the differences in the school readiness of certain groups of children, some policymakers advocate the provision of full-day kindergarten. Proponents of full-day kindergarten argue that the extended time in these programs can be used to increase students’ readiness at first grade and beyond. They also point to studies that show academic benefits of full-day kindergarten participation through the end of first grade. However, critics point to the costs of implementing full-day kindergartens, and the uncertainty about the long-term benefits of full-day kindergarten.

This study uses data from the Early Childhood Longitudinal Study, Kindergarten Class of 1998–1999 (ECLS-K) to examine how children’s skills and knowledge at kindergarten entry predict their achievement in later grades. It extends previous research by examining longer-term achievement outcomes, namely test scores at the end of fifth grade, and gives an indication of how other nonacademic areas of school readiness (i.e., physical and socio-emotional development) may be related to test performance. This study addresses two research questions:

- What is the relationship between children’s school readiness skills at kindergarten entry and reading and mathematics achievement through the fifth grade?
- What kindergarten program factors predict the development of nonacademic school readiness skills? In particular, is attendance at a full-day program related to nonacademic school readiness?

Methods

We analyzed data from 7,897 students and their parents, teachers, and school leaders collected during five waves: fall of kindergarten and spring of kindergarten, first grade, third grade, and fifth grade. Children completed mathematics and reading assessments at each wave, as well as fine and gross motor skills' assessments at kindergarten entry. At each wave, their teachers provided information on teaching practices, experience, and class size. Teachers also provided information about children's attendance at full-day kindergarten program, and their nonacademic readiness skills along five dimensions: approaches to learning (i.e., disposition toward learning), self-control, interpersonal skills, and internalizing behaviors and externalizing behaviors (measured by a scale indicating acting-out behaviors such as getting angry, arguing, fighting, etc.) as students moved through school. Parents provided information about the child's home background, and school leaders provided information about school context variables, such as percent of minority students.

We conducted a longitudinal, cross-classified analysis in which students' outcomes over the five time points were modeled in relation to their school program characteristics, classroom and school context factors, school readiness skills at kindergarten entry, and other covariates. The model included both random and fixed effects for school- and student-level variables.

Findings

School Readiness and Reading and Mathematics Achievement

We found that both academic and nonacademic school readiness skills at entry to kindergarten were significantly related to eventual reading and mathematics achievement in fifth grade. Controlling for nonacademic readiness skills at kindergarten entry eliminated the black-white achievement gap in reading at the fifth grade, while attending a full-day kindergarten was unrelated to reading performance. Attendance in a full-day kindergarten program was not related to achievement in mathematics in fifth grade except when nonacademic school readiness factors were included in the model. When those factors were considered, full-day attendance was negatively related to math achievement. In other words, after controlling for nonacademic readiness at kindergarten, children who had attended a full-day program at kindergarten showed poorer mathematics performance in fifth grade than did children who had attended a part-day kindergarten program. This finding raises the possibility that earlier studies may have failed to find relationships between full-day kindergarten and outcomes because they omitted important information relating to nonacademic dimensions of readiness. Future studies should explore whether the inclusion of such variables changes interpretations about the effectiveness of full-day programs.

Kindergarten Program Factors and Nonacademic Readiness Skills

Attendance in a full-day kindergarten program was negatively associated with attitudes toward learning, self-control, and interpersonal skills, and was positively related toward internalizing (measured by a scale indicating presence of anxiety, loneliness, low self-esteem, and sadness)

and externalizing behaviors. With the exception of class size (the effect of which was counterintuitive), few kindergarten program features were related to nonacademic readiness skills. Instead, positive home background factors, such as higher income and higher parental involvement with the school, were associated with all five dimensions of nonacademic school readiness skills; higher income and more parental involvement were positively related to a child's attitudes toward learning, self-control, and interpersonal skills and negatively predictive of internalizing and externalizing actions.

Study Limitations

This study did not control for a number of variables. For example, this study did not attempt to address potential self-selection bias, where parents with certain characteristics are more likely to choose full-day kindergarten programs. The theoretical direction of the bias could reflect either positive or negative selection, although there is some evidence that suggests that lower-income parents are more likely to enroll their children in full-day programs. Regardless of the direction of the bias, future studies should consider statistical methods that control for self-selection.

A second limitation of our study concerns potential aggregation bias stemming from the school-level measures of kindergarten program characteristics. Due to computational limitations, we could not estimate a three-level model (i.e., students nested within teachers nested within schools), and instead we conducted a two-level model (i.e., children nested in schools). Additional research on whether teacher-level measures of kindergarten program characteristics would offer different interpretations is warranted.

Implications

Our analyses reinforce the findings of earlier studies that suggest that full-day kindergarten programs may not enhance achievement in the long term. Furthermore, our study raises the possibility that full-day kindergarten programs may actually be detrimental to mathematics performance and nonacademic readiness skills. However, these findings should be interpreted carefully because we have not accounted for potential self-selection bias or other nonobservable factors. It is possible that some of our findings are driven by unobserved characteristics.

Our results also suggest that investments in the development of nonacademic school readiness skills may not only raise overall achievement but may also narrow the achievement gap between minority and white students. Indeed, on average, white students enter kindergarten with better nonacademic skills than do blacks and Hispanics. Our findings indicate that racial/ethnic differences in achievement might be narrowed if we could enhance the nonacademic readiness skills of minority students, particularly black students, at an early age. Current full-day kindergarten programs do not affect nonacademic skills, but perhaps redesigned early education programs could improve nonacademic skills that ultimately translate into improved academic achievement.

Ultimately, the decision regarding where policymakers should direct funds needs to be guided by a cost-benefit analysis that compares investments in full-day kindergarten programs to investments in other potential interventions, such as those that promote nonacademic readi-

ness skills. While full-day kindergarten programs have been shown to have some initial positive effects on student achievement, it is unknown whether the apparent lack of enduring benefits merits the costs associated with their implementation. A program of research that involves a better understanding of how full-day programs and nonacademic skills may influence outcomes and the associated costs of each type of intervention would provide a strong foundation for future decisions about effective programs.