Five-Year Academic Outcomes for a Cohort of All-Day Kindergarten: What Policies Should Follow?

A Research Study by:
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Key findings:

- Students who attended full-day kindergarten met expectations on the third grade MCA-II at a higher rate than those who attended half-day kindergarten.
- In fourth grade, students who had attended universal full-day kindergarten far outsored their classmates who had attended kindergarten outside of the district on the MCA-II math and reading tests.
- The primary difference observed for students at risk (FRL, ELL) was between students who attended kindergarten outside of Beacham and those who started kindergarten in the district, with Beacham kindergarten students faring better on 3rd and 4th grade MCA-II tests.

Objectives

The purpose of this study was to examine the academic outcomes over a five-year period for a unique cohort of 834 kindergarten students in one school district, revealing possible long-term effects of their having attended a free, full-day kindergarten program.

Theoretical Framework

Although four decades of research have sought to substantiate once and for all the long-term effects of participation in early childhood programs, including kindergarten, very few studies have examined a single group of children over the course of their grade school years and beyond. A major exception to the lack of such research was conducted by Reynolds & Temple (1998), who studied 559 participants in the Chicago Child-Parent Center Program. They investigated the lingering effects of the program on student achievement up to seventh grade, for the children who participated in the kindergarten program and remained enrolled in the follow-on program through second or third grade. Reynolds & Temple found program participants to have significantly higher reading achievement through seventh grade, as well as fewer having been retained in a grade or being placed in special education. All of the program participants were purposely enrolled by their parents and were considered to be economically and
educationally disadvantaged. The researchers noted that such longitudinal studies are rare, particularly due to methodological issues such as random assignment of the treatment, bias of parents who choose such programs for their children, and the mobility of program participants.

Most of the research done on early childhood programs and kindergarten instruction examine model programs such as Head Start (Zigler & Styfco, 1994), the High/Scope Perry Preschool Program (Weikart & Schweinhart, 1997) and the Abecedarian Program (Campbell & Ramey, 1995). Other studies of longitudinal effects (Barnett, 1992 and 1995; Yoshikawa, 1995) found academic and social benefits of preschool, however those studies did not continue to follow those students after third grade since many of the positive early outcomes had disappeared by then. As a consequence of the mixed results, educational policies vary widely across the states with regard to their financial support of school-based preschool programs and all-day kindergarten (Pappano, 2001), and studies of leadership for school reform often include increasing academic exposure during Kindergarten for at-risk learners (Tyack & Cuban, 1995; Winfield, 1991; Desimone et al., 2004).

Even though quality early learning has been found to reduce the achievement gap in the short term, the long-term view has not yet emerged to justify or support the excess costs that school districts must bear if they provide district-funded preschool and/or all-day kindergarten. Superintendents and school boards are often divided about how or whether to fund such programs (Glass, 1992; Pianta et al., 2007; Cibulka, 1999). An investigative report by two Federal Reserve Bank economists, Rolnick & Grunewald (2003) argued that there is a strong economic return on the investment in early childhood education, in the form of less remediation, fewer referrals to special education, and more students remaining in high school through graduation. Still, the evidence for academic payoff is limited, with an insufficient corpus of research to boldly convince policy-makers that our limited financial resources of today would be well-spent on expanding preschool or kindergarten programming.

Methods

This was a quantitative study over a five-year period of time which followed a single cohort of children (N=834) who attended a full-day kindergarten program in a Midwestern school district during the 2003-04 school year. The all-day program was unique in that it was both free and universal, as it was only offered during that one school year of 2003-04 and all children who participated were required to attend all day (i.e., no half-day kindergarten classes were offered). All participating children were identified by researchers only with unique numerical ID codes, which enabled us to follow them over the course of five years. All appropriate data privacy measures have been followed with both university and district IRB procedures.

Data Sources
Students’ performance on the state’s Comprehensive Assessment (MCA-II) in reading and math was compared to the cohort of students who enrolled in kindergarten during the 2004-05 school year, as well as to all students who joined their class by transferring into the school district after kindergarten. The 2004-05 kindergarten group consisted of students who attended full-day kindergarten for a fee, and those who attended free half-day kindergarten. There are also a number of students who joined that class in the grades after kindergarten, and who are labeled in this report as “No Beacham K.” Various tables and graphs in the appendix of the paper portray the data that is reported in text in the findings below.

Results

Similar to the Reynolds & Temple study of 1998, we encountered attrition problems with student mobility. However, having begun this study with a large number of participants was of great benefit because the number of students still remaining in the Beacham district dropped from 834 to 480 over the course of five years.

On 3rd grade reading and math state achievement tests (the MCA-II), the mean score for the No Beacham K group fell significantly lower than the other groups. Full-day kindergarten groups scored significantly higher than the half-day kindergarten group on the state reading test. When the percentage of students who met or exceeded standards was taken into consideration, the differences between groups were reinforced. The percentage of students meeting 3rd grade reading and math expectations on the state tests was significantly greater for groups who attended full-day kindergarten than for those who attended half-day kindergarten or did not attend kindergarten in Beacham.

Fourth grade state achievement test scores could only be compared between the 03-04 FDK and No Beacham K cohorts. In both reading and math, the 03-04 FDK group far outscored the No Beacham K group in terms of mean scores and percent of students meeting or exceeding expectations on the MCA-II.

Due to the consistent finding that the No Beacham K group scored lower than other groups, their scores were evaluated based on how long they had been in Beacham. Although 3rd grade assessment results appear to improve with length of time enrolled in Beacham schools, statistical analyses suggest that the main difference exists between those who had been in the district for one year (as of 07-08) and those who attended for more than one year. One important point seems to be that those students who transfer into the district appear to come in with more academic need than their peers who already attended Beacham schools.

Overall, it appears that academic gains for full-day kindergarten groups persist at least through 3rd grade, when the outcome variable is meeting standards on a statewide test in reading and math. Students who attended full-day kindergarten as a part of the universal cohort or during the following year’s fee-based full-day kindergarten class were more likely to “pass” the MCA-II
than those who attended half-day kindergarten and those who attended kindergarten outside of Beacham.

**Summary of results for at-risk students:**

Across assessments and kindergarten types, at-risk students scored lower than students of lower risk status. Additional analyses were conducted to determine if differences existed within subgroups when they attended different kindergarten types.

**Racial Groups:** When racial minority groups were compared, no significant full day vs. half-day cohort differences for 3rd grade reading or math (kindergarten type compared for each minority group) were found. In 4th grade, students of color in the 2003-04 FDK cohort scored higher on reading and math MCA-II than their peers in the No Beacham K group.

**Free or Reduced Lunch (FRL):** No significant differences were found for mean scores on 3rd grade MCA-II tests among groups for students receiving FRL ($p = .239$ reading and $.209$ math). However, when the percentage of students meeting or exceeding expectations was taken into account, several differences emerged. On the reading portion of the test, both full-day kindergarten groups had a significantly higher percentage of students who received FRL and met the expectations than did the No Beacham K group. In math, only the 2004-05 FDK cohort had significantly more students meeting expectations than the No Beacham K cohort. Fourth grade differences between FRL and non-FRL students were significant between kindergarten groups ($p \leq .001$). Students in the 03-04 full-day kindergarten group who received FRL were more likely to meet expectations on the reading and math MCA-II than were students in the No Beacham K group.

For students receiving FRL, it appears that full-day kindergarten may offer some benefit over attending kindergarten outside of Beacham. Although the results varied somewhat, full-day kindergarten FRL groups tended to have significantly more students who met expectations on the reading and math MCA-II in 3rd and 4th grade than did the No Beacham K groups.

**English Language Learners (ELL):** An analysis of mean MCA-II scores on the 3rd grade reading and math tests showed a similar pattern to the whole group. In both cases, differences by kindergarten type were observed (reading $F = 10.691$, $p < .001$; math $F = 8.857$, $p < .001$). In the area of reading, both full-day cohorts scored higher than the No Beacham K students at $p < .05$. There was no significant difference between full-day and half-day cohorts. In math, both full-day cohorts and the half-day cohort scored higher than the No Beacham K group ($p < .05$). Again, there were no significant differences between half-day and full-day cohorts. Differences between the mean scores of ELL students in the 03-04 full-day kindergarten cohort and their ELL peers who came to Beacham after kindergarten were significant for both reading and math.
MCA tests in 4th grade ($p < .001; F = 27.007$ reading, $F = 49.192$ math). The 03-04 full-day cohort scored higher in both cases.

The percentage of students who were identified as ELL and met or exceeded expectations on the MCA-II reading test in 3rd grade was significantly higher for the 03-04 FDK and 04-05 FDK groups than the No Beacham K cohort. In math, both 04-05 (half- and full-day) cohorts had significantly more “passing” scores than did the No Beacham K group. On 4th grade tests, the percent of ELL students who met or exceeded expectations was significantly higher for 03-04 FDK students than for their peers who did not attend kindergarten in Beacham.

**Significance of the Study**

The findings of the study are important because they add significant data to the limited amount of research-based information we have about the long-term benefits for certain sub-groups of children who have attended all-day kindergarten and remain stable, living in one district over most of their elementary years. For them, their being potentially part of the achievement gap was addressed and eliminated by providing free all-day kindergarten. In the discussion section of the paper, our conclusions, as a result, have rather strong implications for policy-makers who must decide if and how to mandate greater formal educational exposure to populations at risk of academic difficulties. As decision-makers parse out limited education funds, the decision to treat unequals unequally may, in fact, become a step towards reducing the achievement gap. The findings also point to a larger discussion that is needed about the importance of parents’ understanding that high mobility is a very significant factor in low student achievement.