

EDMONTON PUBLIC SCHOOLS

May 27, 2008

TO: Board of Trustees

FROM: E. Schmidt, Superintendent of Schools

SUBJECT: Longitudinal Effects of Full-day Kindergarten Through to Grade Six

ORIGINATOR: D. Barrett, Assistant Superintendent

RESOURCE

STAFF: Gloria Chalmers, Jose da Costa, Mike Falk, Shannon Gentilini,
Heather Raymond, Stuart Wachowicz

INFORMATION

The *Longitudinal Effects of Full-day Kindergarten Through to Grade Six* report (Appendix I) provides an update of the longitudinal research regarding the impact of full-day kindergarten undertaken by Dr. Jose da Costa as part of his partnership work with Edmonton Public Schools

Background: With the introduction of full-day kindergarten (FDK) at Norwood School in 1998-1999, a partnership was formed with Dr. Jose da Costa, Professor of Educational Policy Studies at the University of Alberta, to research the strategy. Subsequently, full-day kindergarten was expanded to two schools and then, with the assistance of AISI funding, to 15 and ultimately 18 schools. Dr. da Costa, with assistance of various central services personnel, agreed to conduct a longitudinal study of the effects of full-day kindergarten programming using three cohort groups involving all 18 schools. The attached report provides an update of this work.

With the end of the AISI cycle, the Board of Trustees approved sustained funding for full-day kindergarten for the 18 formerly involved schools and for an additional seven high needs schools. In collaboration with EPS, Dr. da Costa has agreed to study the longitudinal effects of full-day kindergarten with a fourth cohort of children who are currently (2007/08 school year) in FDK classrooms in the 25 schools.

The Longitudinal Study: The current report, based on the years 2001 to 2007, presents data from three cohort groups. The data provides comparisons between students attending either full-day or half-day kindergarten programs in district schools. For cohort one, the longitudinal comparison is through grade six. The study focused on the following two questions:

1. What are the longitudinal reading and writing effects of FDK on students from all socio-economic status (SES) backgrounds at the end of grades one, two, three, four, five and six?

2. What are the longitudinal reading and writing effects of FDK on students from low SES backgrounds at the end of grades one, two, three, four, five and six?

Findings and Implications of the Longitudinal Study: The primary finding of the longitudinal study indicates that full-day kindergarten for children from educationally deprived communities enables them to maintain reading and writing levels at par with children from the rest of the district until the end of grade three. Additional findings include:

- The beneficial effects of the FDK experience appear to diminish over time. As with any single educational experience, FDK cannot be expected to support children throughout their educational career.
- The Highest Level of Achievement Tests (HLAT) results show that children from mid-SES backgrounds do not demonstrate, in the long-term, academic benefits with respect to reading and writing from having experienced FDK.
- It is also clear that the proportion of children from low SES communities who experienced FDK were able to very closely match their mid-SES peers' levels of reading and writing up until grade five.

In addition to findings, the report provides recommendations for researchers, practitioners and policy makers. The following represents a sample of the recommendations in terms of programming and supports needed for students who are at risk of school failure.

- Provide to all children living in low SES communities FDK experiences which are play-based and child focused.
- Support teachers to meet regularly in cross school groups to share information about curriculum and instruction issues and approaches; through this approach teachers can work to support the needs of their students, particularly students who are English language learners, First Nations, Métis, Inuit (FNMI) or have special needs.
- Learn more about the cultural backgrounds of students who are English language learners bringing forth the value of the students' culture by sharing insight regarding world views, other than Eurocentric ones, held by many educators.
- Help parents, in a culturally appropriate and respectful manner, to develop their own literacy skills and understanding of their role in supporting their children's literacy.
- Explore the role of student learning efficacy further with respect to its place in "casting the mold" for students tenacity to learn challenging concepts.
- Given the HLAT and English Language Arts (ELA) 3 and ELA 6 Provincial Achievement Test findings, provide students from low SES backgrounds additional supports to enable them to maintain the reading and writing benefits gained through FDK experience.

ES: ee

APPENDIX I: Longitudinal Effects of Full-day Kindergarten Through to Grade Six

Longitudinal Effects of Full-Day Kindergarten through to Grade Six

by:

Jose da Costa, Ed.D.,
Department of Educational Policy Studies,
Faculty of Education,
University of Alberta
780-492-5868
jose.da.costa@ualberta.ca

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Longitudinal Effects of Full-Day Kindergarten through to Grade Six

Existing Research

West, Denton, and Germino-Hausken (2000) asserted that of the approximately 4 million children attending kindergarten in the United States in the 1998/99 school year, 55% were enrolled in all-day programs. While 40 states mandated school systems to offer kindergarten programs in 2005, only 9 states required school jurisdictions to offer full-day kindergarten experiences to children (Kauerz, 2005). In Canada, all ten provinces and three territories require publicly funded school jurisdictions to offer kindergarten programming (although attendance is optional in all but one province). As of 2008, only the provinces of Quebec and New Brunswick require school jurisdictions to offer full-day kindergarten programming, and only the later mandates that all children must attend. In both Canada and the United States, regardless of legislation, individual jurisdictions and even schools within jurisdictions offer full-day kindergarten programs to their students, these are often funded by community donors, limited duration operating grants, or by shifting resources from other programs and grade levels to support full-day kindergarten. These full-day programs are often put into place to address the needs of children from socially and economically impoverished backgrounds often referred to as low socio-economic status (SES); these same children are also, often, the children of immigrant or refugee families who must learn English after having acquired another first language at home.

Considerable research has been conducted on kindergarten programs both nationally and internationally since the 1970s; unfortunately much of this work has resulted in mixed findings. Puleo (1988), Fusaro (1997), and Coladarci and Ervin (2000)

have all argued that the early research from the 1970s and 1980s suffered from inadequate methodological standards with poor internal and external validity. Although still mixed, research conducted in the 1990s does show more consistently that children attending full-day kindergarten programs outperform their half-day counterparts, particularly in the academic achievement of at-risk students (Clark, 2002; Cryan, Sheehan, Wichel, & Bandy-Hedden, 1992; Elicker & Mathur, 1997; Hough & Bryde, 1996, Koopmans, 1991). Walston, West, and Rathbun's (2005) research, which made use of the Kindergarten class of 1998/99 National Center for Education Statistics data set, further suggests that a full-day kindergarten experience is more likely to promote higher reading scores through the end of grade three "for children whose family primarily speaks a language other than English at home" (p. 16).

Purpose.

This study explores the longitudinal literacy effects of providing high needs, low SES students as well as average needs, mid-SES students with approximately 6 hours of kindergarten instructional time every day for the entire school year (approximately 1000 contact hours). The present study reports on longitudinal comparisons, through grade six, drawn between students who attended a full-day kindergarten program and a half-day kindergarten program both offered in the Edmonton Public Schools jurisdiction in Alberta, Canada. Both programs had literacy as their foci and were play-based and child centered; the only difference was the amount of time teachers were able to spend with their students (approximately 1000 hours for the full-day program and approximately 500 hours for the half-day program). This study primarily addressed two questions:

1. What are the longitudinal reading and writing effects of full-day kindergarten on students from *all socio-economic status* (SES) backgrounds at the end of grades one, two, three, four, five, and six?
2. What are the longitudinal reading and writing effects of full-day kindergarten on students from *low SES* backgrounds at the end of grades one, two, three, four, five, and six?

Method

Participant schools. In the 2000/01, 2001/02, and the 2002/03 school years, 15 schools, predominantly situated in low SES communities were identified by Edmonton Public Schools to offer full-day kindergarten programming to their students. All elementary schools ranked, on the basis of community poverty and transience, by the district as being most needy (ranked between 1 and 14 out of 192 schools in 2000/01) were included (see table one for a breakdown of school district need ranking)¹.

Additionally, one school ranked between 21 and 30, a second ranked between 31 and 50, a third ranked between 51 and 90, and a fourth ranked over 90 were identified randomly within each strata to also offer full-day kindergarten programming. Due to school closures, in 2001/02, all elementary schools ranked between 1 and 12 were selected to offer full-day kindergarten programming. For the 2001/02 and the 2002/03 school years, the schools ranked between 15 and 190 (out of 190 schools) that had offered full-day kindergarten in the previous year were once again provided resources to offer the program.

¹ The school jurisdiction ranks all of its schools annually on the basis of need so that additional funding can be provided to the 50 highest needs schools in the district.

Comparison groups of schools offering half-day kindergarten were also identified for the three school years. Schools offering half-day kindergarten programming were chosen randomly and asked to volunteer by the school jurisdiction to form the comparison group. For the 2000/01 cohort (cohort 1), 13 comparison group schools participated in the study, while for the 2001/02 cohort (cohort 2), 12 schools with half-day kindergarten programming were included. One of the cohort 1 half-day kindergarten sites became a full-day kindergarten site in 2001/02 and a second of the cohort 1 half-day sites did not participate in the study starting in 2001/02. For 2002/03 all of the schools participating in the study the previous years continued to participate with the exception of one half-day kindergarten site which withdrew from the study. The data collected from the students in these comparison schools are most useful when assessing student literacy growth on an annual basis as district norms were not available.

Table 1. Number of schools, ranked by the jurisdiction for need, in sample offering full and half-day programming.

Need Ranking	2000/01		2001/02		2002/03	
	Full-day sample	Half-day sample	Full-day Sample	Half-day sample	Full-day Sample	Half-day sample
1 - 10	9		9		9	
11 - 20	2	1	3		3	
21 - 30	1	2	1	1	1	1
31 - 40	1	1				
41 - 50				2		1
51 - 60						
61 - 70			1	1	1	1
71 - 80	1	2				
81 - 90		3				
91 - 100			1	2	1	2
101 - 110	1					
111 - 120						
121 - 130						
131 - 140				1		1
141 - 150		1		2		2
151 - 160		1				
161 - 170		1		1		1
171 - 180						
181 +		1		2		2
Total	15	13	15	12	15	11

Sample group of students. As was mentioned above, three cohorts of students participated in this study. Data from the three cohorts were combined for the Highest Level of Achievement Test (HLAT) analyses presented in this report, while Provincial Achievement Test (PAT) data were analyzed by cohort. At the time of data collection, HLAT data were available for all participants up to and including grade four and PAT data were available for all participants for grade three. Grade five HLAT data were available for the students in cohorts one and two. Finally, grade six HLAT and PAT data were available for students in cohort one. Actual numbers of low SES and mid-SES

children who experienced a full-day of kindergarten and comparison group children who experienced a typical half-day kindergarten are provided by grade in table two.

Table 2. Combined cohort participants in the EPSB longitudinal kindergarten study (n)^a.

Grade:	K	1	2	3	4	5 ^b	6 ^c
Low SES Full-day K.	607	508	474	447	434	278	132
Mid-SES Full-day K.	223	179	171	157	146	101	47
Half-day K.	666	573	549	510	507	327	140
Total	1496	1260	1194	1114	1087	706	319

^a Actual numbers for specific test data collected each year may vary slightly because some children did not complete all tests (e.g., HLAT Reading, HLAT Writing, and ELA and MAT PATs).

^b Includes only cohorts 1 and 2; cohort 3 had only completed grade 4 at the time of data collection

^c Includes only cohort 1; cohort 2 had only completed grade 5 at the time of data collection

Students have been tracked within the jurisdiction and were only dropped from the study when they left the district entirely and did not return. Attrition rates, by the end of grade four, for the low SES full-day kindergarten, mid-SES full-day kindergarten, and the randomly selected half-day kindergarten groups were 28.5%, 34.5%, and 23.8% respectively. Given the workforce opportunities that have presented themselves in Alberta over the past decade, it is not entirely surprising to see the mid-SES group demonstrating the most mobility.

Kindergarten programming. Other than the number of contact hours and the fact that the majority of full-day day kindergarten schools served high needs, low SES communities, there were no differences between the two kindergarten programs in terms

of expectations. All classrooms followed the recommended kindergarten curriculum for the province of Alberta and all classrooms had the same district specialist resources available to them. Both the full-day and the half-day kindergarten programs adhered to the following principles of exemplary kindergarten practice:

1. underpinning the kindergarten program of studies should be a play-based child-centered philosophy²;
2. the focus of the program should be on the *whole* child;
3. the child should be placed in the social context;
4. parents and administrators should recognize and support the teacher;
5. all interest groups should work towards structured and balanced programs.

(Corter & Park, 1993)

Detailed descriptions of approaches used by teachers in these classrooms are provided in a previous paper by the author (see da Costa & Bell, 2000). Early research with this cohort (da Costa & Bell, 2003) found that by the end of the kindergarten year the students from low SES backgrounds attending full-day kindergarten programs were comparable in terms of their reading and writing abilities as measured with the Clay's Observation Survey sub-tests: (a) Letter Identification, (b) Concepts About Print, (c) Ready to Read Word Test, (d) Writing Vocabulary, (e) Hearing and Recording Sounds in Words, and (f) Book Reading Level.

Reading and writing data were collected by the school jurisdiction for all students in each cohort in June of each academic school year using district developed and locally

² A play-based philosophy was the intent of kindergarten programming when it was first conceived, however in some classrooms this philosophy may not have been consistently adhered to.

standardized, criterion referenced HLAT: the HLAT reading subtest consists of the Reading Comprehension sub-test of the Canadian Test of Basic Skills (CTBS) and the writing sub-test of the HLAT is a locally developed writing prompt with standardized scoring rubrics applied by two different raters. In grades three and six, data were also gathered on the English Language Arts (ELA) PAT.

Data analysis. The ordinal data collected in this study were analyzed using Chi-square (χ^2) Goodness-of-fit tests. The proportions of children achieving at grade level or below grade level who had attended full-day kindergarten were compared to the proportions of children, who had participated in the half-day kindergarten comparison group, achieving at grade level or below grade level from across the entire school jurisdiction. Chi-square comparisons were also conducted, by cohort, on the grade three and six ELA PATs.

To provide a sense of the importance of the findings, Cohen's w (effect size statistic) was calculated and provided for each of the Chi-square Goodness-of-fit comparisons conducted. Cohen's w is calculated using the following equation:

$$\text{Cohen's } w = \sqrt{\frac{4(\chi^2)}{n - \chi^2}}$$

Lipsey's (1990) study of effect size distribution in just under 200 meta-analyses found that typical values used to represent "small," "medium," and "large" effect sizes (ES) in social sciences and educational research could be described. Effect size magnitude for Cohen's w can be interpreted as:

small: ES from 0.00 to 0.32 (with a mid-point of 0.15)
medium: ES from 0.32 to 0.56 (with a mid-point of 0.45)
large: ES greater than or equal to 0.56 (with a mid-point of 0.90)

The effect size should represent the smallest effect that is of practical or educational significance. The suggested values, provided above, for *small, medium, and large* effect size can be used as a reality-check for the researcher or policy analyst attempting to interpret and make sense of “the numbers.”

Findings

The findings in this study will be reported in three sub-sections. The first will report the HLAT reading (grade level) levels of achievement while the second will address the HLAT writing (grade level) levels of achievement at the end of each academic year from grade one through to the end of grade six. The third section of this report focuses on the ELA PAT results from grades three (all cohorts) and six (cohort 1 only) as compared to the district PAT levels of achievement in the data collection years.

HLAT reading results

All full-day vs. half-day kindergarten comparisons. When the proportions of students who had participated in full-day kindergarten were compared to those who participated in half-day kindergarten significant differences were found to exist between grades one and four while non-significant differences were found to exist in grades five and six (see table 3). This is very surprising given the very high literacy scores all of the full-day kindergarten children achieved relative to their half-day kindergarten peers at the end of the kindergarten year (da Costa, 2005/2006)³. From the graphic representation of these data in figure one, with the exception of the grade five full-day results, it is clear

³ This report was presented to the EPSB at its June 14, 2004 meeting.

that the proportions of all students achieving at grade level on the HLAT reading tests tended to decrease each year and that the proportion of children who had experienced full-day kindergarten tended to be approximately 5% to 7% lower than the comparison group. While one might speculate that these differences were actually due to the disadvantage posed by the influence of low SES which affected approximately two-thirds of the children who received full-day kindergarten programming, an analysis of the low-SES full-day (provided in the next subsection) kindergarten students' data casts doubt on the plausibility of this argument. However, before too much emphasis is placed on the significance of the differences between the two groups, we should return to the effect sizes of the observed differences. It should be noted that none of the effect sizes exceeded what can best be described as *small effects*.

Table 3. Comparison of all SES levels of full-day kindergarten students with mid-SES half-day kindergarten students on HLAT Reading achievement

		grd 1 n (%)	grd 2 n (%)	grd 3 n (%)	grd 4 n (%)	grd 5 n (%)	Grd 6 n (%)
Full-day K	achieved	620 (90.2)	555 (85.9)	514 (85.1)	464 (80.0)	314 (82.8)	135 (75.4)
	below	67 (9.8)	91 (14.1)	90 (14.9)	116 (20.0)	65 (17.2)	44 (24.6)
Half-day K	achieved	544 (94.9)	502 (91.6)	459 (90.0)	441 (87.0)	267 (81.7)	115 (82.1)
	below	29 (5.1)	46 (6.9)	51 (10.0)	66 (13.0)	60 (18.3)	25 (17.9)
$\chi^2 =$		14.557	14.673	9.659	15.448	.330	3.14
df =		1	1	1	1	1	1
p =		.000*	.000*	.002*	.000*	.565	.065
Effect size		0.22	0.22	0.19	0.24	0.04	0.20

* significantly different at the $\alpha = 0.05$ level

Examining the longitudinal pattern of the proportion of students achieving at grade level in the two groups reveals an interesting anomaly at the grade five level in that it is not clear why the proportion of children reading at or above grade level, who had

experienced full-day kindergarten, suddenly exceeded, although not significantly, the proportion of children who had experienced half-day kindergarten (see figure 1).

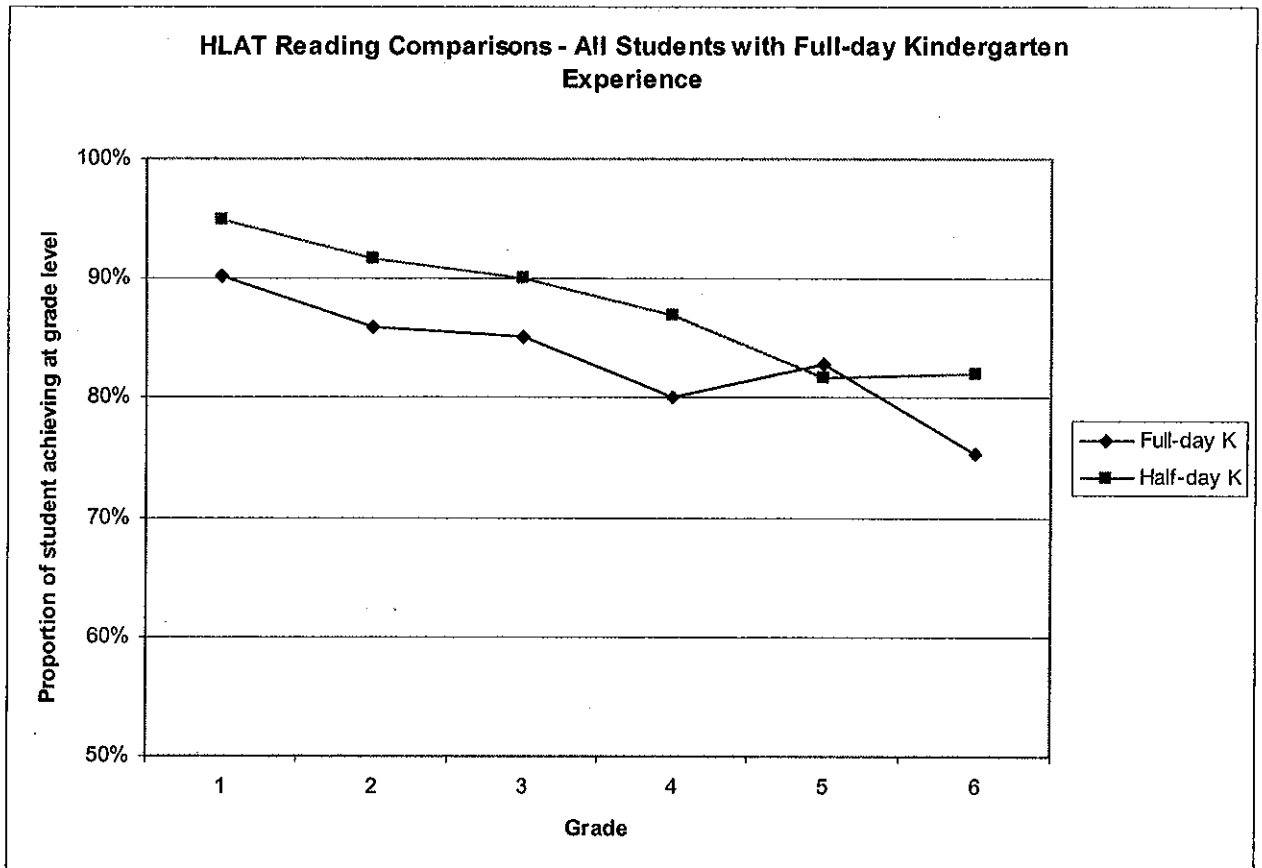


Figure 1. Percentage of full-day kindergarten vs. half-day kindergarten students achieving reading grade level.

The overall decline in the proportion of children achieving at grade level in general may be due to a phenomenon similar to what Wolgemuth, Cobb, Winokur, Leech, and Ellerby (2006) described in their longitudinal comparison of full and half day kindergarten programs. They preface their teacher generated explanation by stating “we are unclear why the rapid decline occurs...” (p. 267), then they provide the following teacher quote from their data as a possible explanation:

Teachers in the first few grades are so concerned with students who enter their classes [with] nonexistent reading and math skills that they spend the majority of their time bringing these students up to minimal math and reading criteria at the expense of working equally hard with students whose reading and math achievement are above average. Hence, the high achieving students' gains at the end of kindergarten gradually erode over the next few years with lack of attention. (pp. 267-268)

This coupled, potentially, with differences in teacher expectations in how reading is taught and learned at the transition from lower elementary to upper elementary school grades may account for the steady decline in the proportion of low SES students demonstrating grade appropriate reading abilities as they progress through elementary school. Having identified two potential education system related factors for the steadily decreasing proportions of students who achieve reading grade level, a home-related factor also may be at play in this steady decline. Colombo (2006) found that parents of English Language Learners⁴ (ELL) children recognized their own deficiencies in terms of being able to support their children in literacy skill development. When asked, these parents suggested that their school jurisdiction provide "...twice weekly literacy sessions [focused on] parent/child storytelling, shared reading in English and home language, ... and ESL classes for parents" (p. 319). Low SES parents, whose first language was not English, simply did not have the literacy tools to be able to read with their children to reinforce the reading skill development taking place at school.

⁴ The literature refers to children who are learning English for the first time as ELLs, this can also be used to describe English as a Second Language Learners (ESL).

Low SES full-day vs. half-day kindergarten comparisons. The question of full-day kindergarten effects on children living in low SES (or what can be described as educationally disadvantaged backgrounds) communities is of great interest. As policy makers, we are often faced with questions of allocating scarce resources. When the proportions of low SES children who experienced full-day kindergarten were compared to the mid-SES group of children who experienced half-day kindergarten significant differences were found to exist from grades one to four and in grade six while non-significant differences were found to exist in grade five (see table 4). Once again, before too much emphasis is placed on “statistical significance,” we need to carefully examine the effect size of these differences. In all cases, the effect size of the differences is considered *small*.

Table 4. Comparison of low SES full-day kindergarten students with mid-SES half-day kindergarten students on HLAAT Reading achievement

		grd 1 n (%)	grd 2 n (%)	grd 3 n (%)	grd 4 n (%)	grd 5 n (%)	Grd 6 n (%)
Full-day K	achieved	463 (91.1)	406 (85.5)	374 (83.7)	349 (80.4)	237 (85.3)	96 (72.7)
	below	45 (8.9)	69 (11.4)	73 (16.3)	85 (19.6)	41 (14.7)	36 (27.3)
Half-day K	achieved	544 (94.9)	502 (91.6)	459 (90.0)	441 (87.0)	267 (81.7)	115 (82.1)
	below	29 (5.1)	46 (6.9)	51 (10.0)	66 (13.0)	60 (18.3)	25 (17.9)
$\chi^2 =$		10.233	16.597	14.961	13.885	3.371	6.257
df =		1	1	1	1	1	1
p =		.001*	.000*	.000*	.000*	.066	.012*
Effect size		0.20	0.26	0.25	0.24	0.15	0.31
* significantly different at the $\alpha = 0.05$ level							

From the graphic demonstration of these data in figure two, with the exception of the anomalous grade five full-day results, it is clear that the proportions of all students achieving at grade level on the HLAAT reading tests tended to decrease each year and that the proportion of children who had experienced full-day kindergarten tended to be

approximately 5% to 10% lower than the comparison group. The pattern is quite similar, although the gap is slightly wider, to that found for the *entire group* of children who had participated in full-day kindergarten. What is of particular importance in these data is the fact that over 90% of low-SES children who attended full-day kindergarten programming were achieving at reading grade level at the end of grade one, yet by the end of grade six just over 70% of the cohort 1 children achieved at grade level.

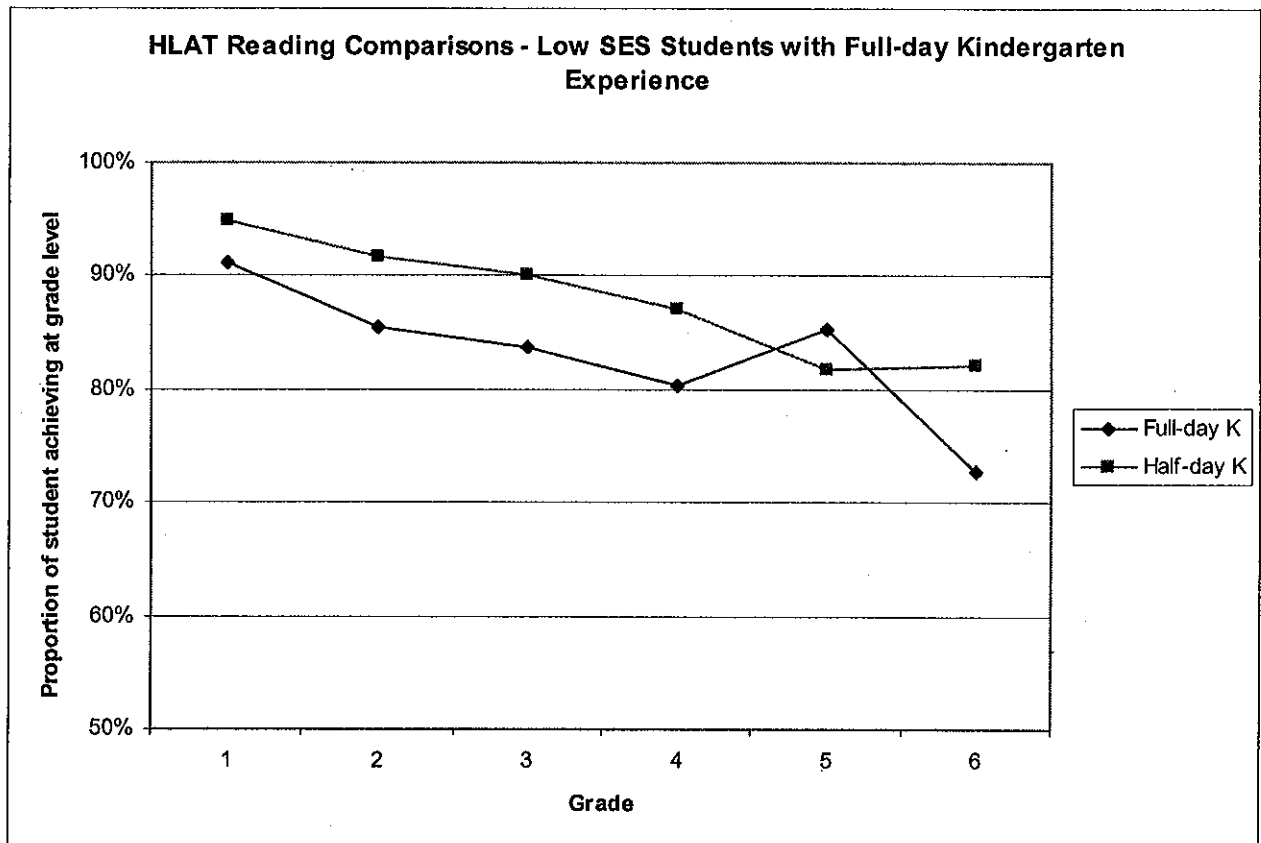


Figure 2. Percentage of low SES full-day kindergarten vs. half-day kindergarten students achieving reading grade level.

HLAT writing results

All full-day vs. half-day kindergarten comparisons. Examination of the HLAT writing results obtained from all children who participated in full-day kindergarten as

compared to those children in the comparison group who participated in half-day kindergarten shows three interesting outcomes. First, given the high levels of achievement at the end of their kindergarten year between all of students in full-day kindergarten group and the comparison half-day kindergarten group, the significant differences in proportions of achievement between the groups in grade one was not expected. One possible explanation, which will be further detailed below, may be related to the large proportion of low SES community children in the full-day kindergarten cohort. Low SES communities tend to have larger numbers of immigrant families whose children come to school as English as a Second Language learners. The grade one differences, however, were not repeated in grades two to five. In fact, starting in grade two, statistically similar proportions of students from both groups achieving at writing grade level or higher were observed (see table 5 for χ^2 values). However, once again, it is necessary to keep in mind the magnitude of the effect size, which is in the *small* category. While the difference between the two groups is statistically significant, it is not particularly large.

Table 5. Comparison of all SES levels of full-day kindergarten students with mid-SES half-day kindergarten students on HLAT Writing achievement

		grd 1 n (%)	grd 2 n (%)	grd 3 n (%)	grd 4 n (%)	grd 5 n (%)	Grd 6 n (%)
Full-day K	achieved	597 (86.9)	567 (88.6)	563 (91.7)	508 (88.2)	311 (82.5)	144 (80.9)
	below	90 (13.1)	73 (11.4)	51 (8.3)	68 (11.8)	66 (17.5)	34 (19.1)
Half-day K	achieved	531 (93.2)	497 (90.7)	482 (93.6)	464 (91.3)	266 (81.8)	128 (92.1)
	below	39 (6.8)	51 (9.3)	33 (6.4)	44 (8.7)	59 (18.2)	11 (7.9)
$\chi^2 =$		19.610	2.391	2.437	4.823	.094	11.258
df =		1	1	1	1	1	1
p =		.000*	.122	.119	.028*	.759	.001*
Effect size		0.25	0.09	0.09	0.13	0.02	0.38

* significantly different at the $\alpha = 0.05$ level

Second, the radical increase in the proportion of mid-SES students (half-day kindergarten programming) who achieved at writing grade level in grade six was not expected given the trend from grade three to grade four and from grade four to grade five (see Table 5 and Figure 3). This difference, observed in the grade six data, is not only statistically significant; it also represents a *medium* effect size, which should not be ignored.

Third, given the pattern presented in the HLAT reading data, the initial increase in proportions of students achieving at HLAT writing grade level through grade three followed by a steady decline through to grade six was not expected. This may be due to the manner in which writing is taught in the lower elementary grades as compared to the upper elementary grades.

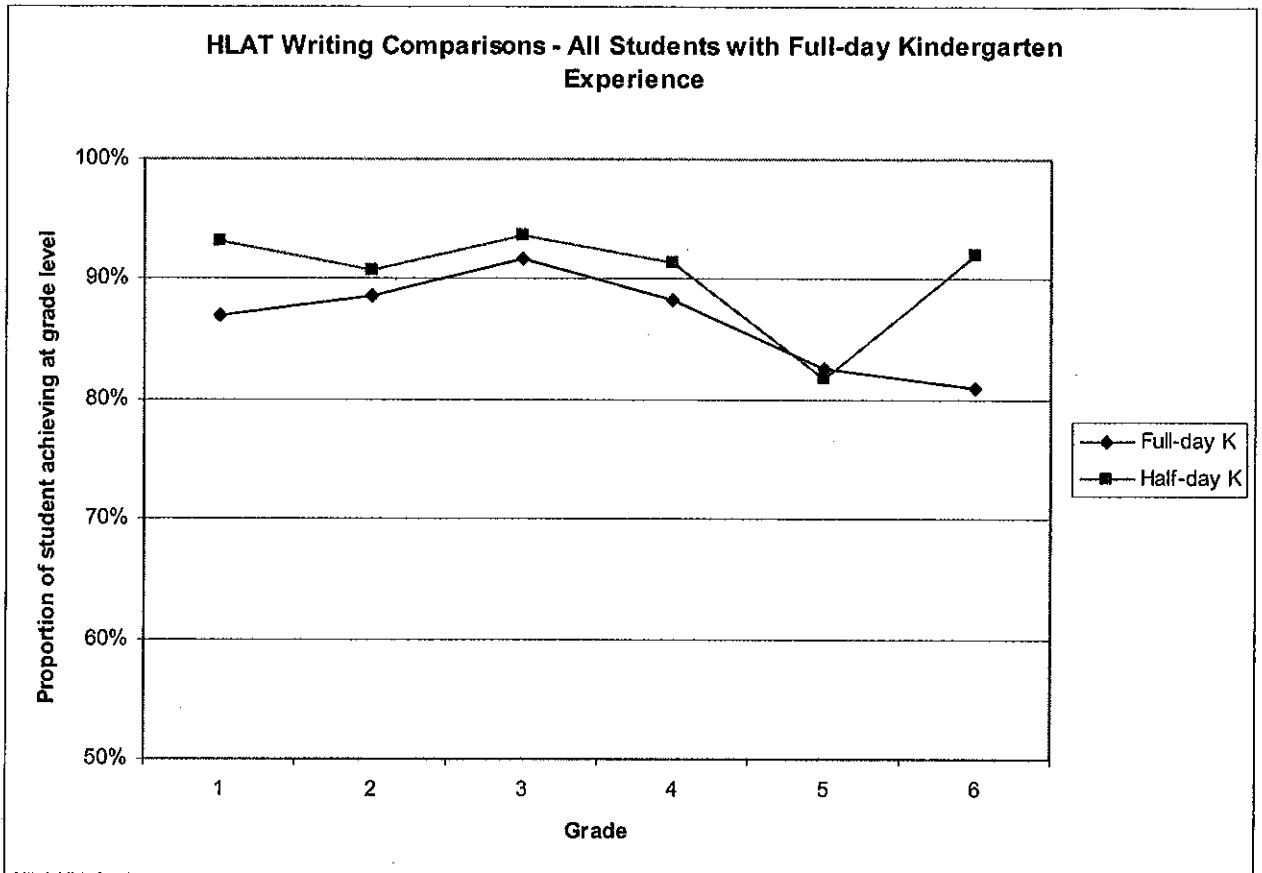


Figure 3. Percentage of full-day kindergarten vs. half-day kindergarten students achieving writing grade level.

While the previous statement is very speculative, there does seem to be support for this notion in the literature. Drawing on Wolgemuth's et al (2006) explanation, offered earlier, this drop in the proportions of children in both groups achieving at expected writing grade level in grades four and five may be due to changing instructional expectations for how children learn to write and express themselves. As early as the late 1980s, Florio-Ruane and Dunn argued that this phenomenon could be due to:

Institutional forces including the complexity of the classroom environment, class size, time limitations, and the demands of school-based policies for instruction and evaluation shape the school day and the school curriculum in ways that make extended and meaningful school writing difficult to accomplish. (1987, p. 55)

Low SES full-day vs. half-day kindergarten comparisons. To explore the longitudinal effects on writing of the full-day kindergarten experience, comparisons of the proportions of low SES children who achieved at grade level and who participated in full-day kindergarten were made to proportions of mid-SES children who participated in half-day kindergarten. The general patterns exhibited by the data in this set of comparisons closely resemble those identified in the previous set of comparison involving all students who had completed full-day kindergarten. Once again, given the high levels of achievement at the end of their kindergarten year for the low-SES students in the full-day kindergarten group and the comparison half-day kindergarten group, the significant differences in proportions of achievement between the groups in grade one was not expected. This, coupled with the increase in the proportion of low SES students achieving at grade level in writing for grades two and three seem odd. Drawing on Gillett and Temple's (1990) stages of spelling, it is possible that the higher proportion of ELLs in the low SES full-day kindergarten cohort were simply delayed in their writing development which was reflected in the HLAT writing prompt as more of these children represented words with non-conventional spelling for a longer period of time – thus fewer students from this group were able to achieve at grade level by the end of grade one. As Gutierrez (2001) articulates, children who are learning English as a second language need time to develop a new “language tool kit” which will enable them to be as proficient in their “English only” classroom as their peers who learned English as their first language. By grade two, more of the children in the low SES full-day kindergarten group had developed their conventional spelling abilities to levels at par with their mid-SES peers.

The grade one differences, however, were not repeated in grades two to five. In fact, starting in grade two, statistically similar proportions of students from both groups achieving at writing grade level or higher were observed (see table 6 for X^2 values). The low-SES children who experienced full-day kindergarten were able to keep up with their mid-SES peers.

Table 6. Comparison of low SES full-day kindergarten students with mid-SES half-day kindergarten students on HLAT Writing achievement

		grd 1 n (%)	grd 2 n (%)	grd 3 n (%)	grd 4 n (%)	grd 5 n (%)	Grd 6 n (%)
Full-day K	achieved	434 (85.8)	422 (89.8)	417 (91.6)	382 (88.6)	234 (83.9)	104 (79.4)
	below	72 (14.2)	48 (10.2)	38 (8.4)	49 (11.4)	45 (16.1)	27 (20.6)
Half-day K	achieved	531 (93.2)	497 (90.7)	482 (93.6)	464 (91.3)	266 (81.8)	128 (92.1)
	below	39 (6.8)	51 (9.3)	33 (6.4)	44 (8.7)	59 (18.2)	11 (7.9)
	$\chi^2 =$	25.486	.491	2.542	3.696	.985	13.695
	df =	1	1	1	1	1	1
	p =	.000*	.484	.111	.055	.321	.000*
	Effect size	0.31	0.04	0.10	0.13	0.08	0.46

* significantly different at the $\alpha = 0.05$ level

As was the case in the previous analysis of the HLAT writing data, this current analysis also contains the worrisome trend in which proportions of children achieving at HLAT writing grade level climb slightly during the lower elementary school years and then begin to decline in the upper elementary years. This was consistent for the students from low SES backgrounds as well as the mid-SES comparison group. This worrisome trend of the equally decreasing proportions of students achieving at writing grade level which very closely parallel each other in grades four to five is clearly evident in figure 4. Perhaps, it can be speculated, that as educators, we leave our students more to their own writing devices in upper elementary school than is the case in lower elementary school.

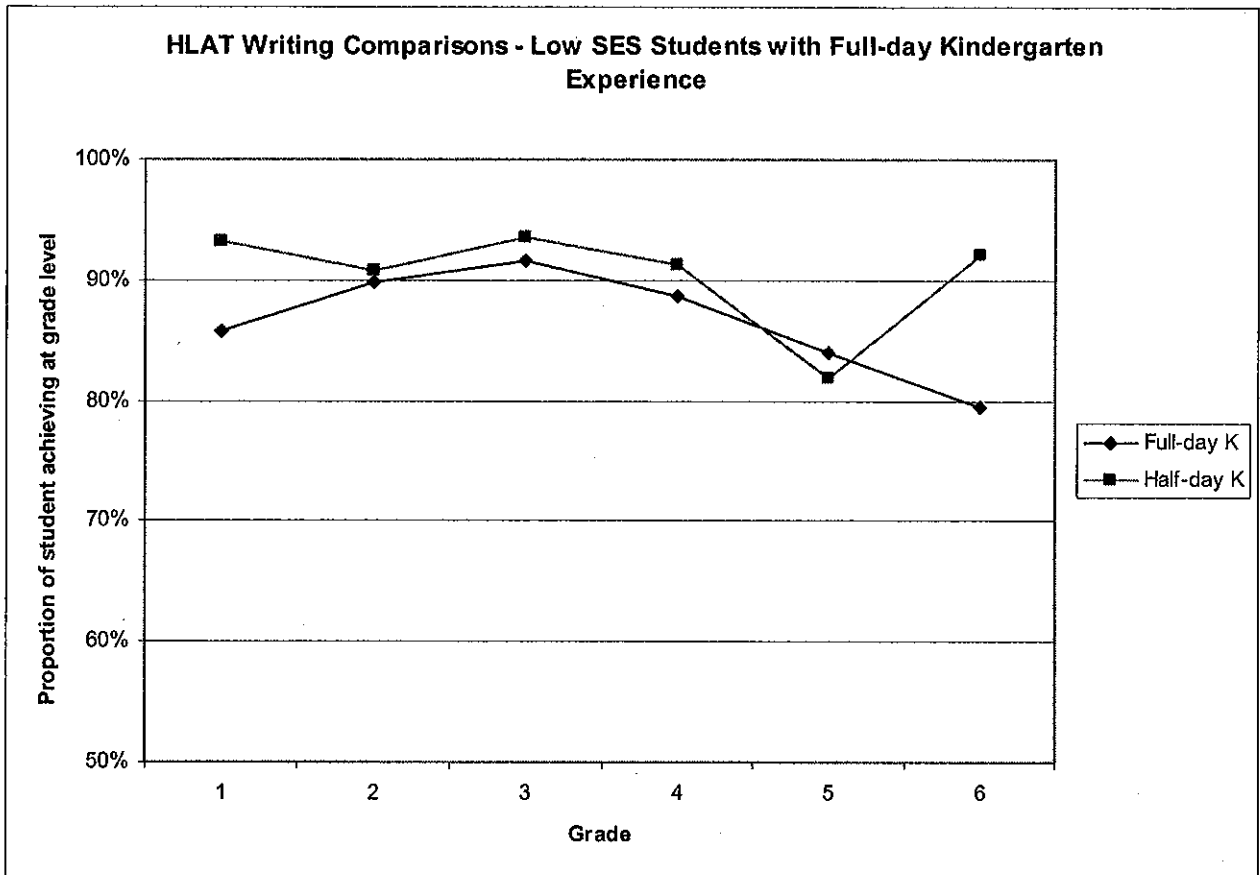


Figure 4. Percentage of low SES full-day kindergarten vs. half-day kindergarten students achieving writing grade level.

ELA PAT Results

Analysis in this subsection focuses on the PAT results in English Language Arts for students at the grades three and six levels. The reader is reminded that at the grade three level there were three cohorts for whom data have been gathered; each cohort is compared to its own district peer group of children achieving at or below grade level (i.e., district ELA3 results across three years – 2003/04, 2004/05, and 2005/06 – are not artificially combined). At the grade six level results are only available for cohort one who completed the ELA6 PAT in spring of 2007.

The same analyses are conducted twice below: the first analysis focuses on comparing the proportions of all children who experienced full-day kindergarten with the district, while the second analysis is focused on comparing the proportions of low-SES children who experienced full-day kindergarten with the district⁵.

Comparisons of all full-day kindergarten students by cohort with district outcomes at the grades three and six. English Language Arts PAT data were collected from each of the cohorts in the year in which they were in grade three and then again, for cohort 1, when those students were in grade six. Cohorts 2 and 3 showed non-significant differences between the proportions of children achieving at grade level on the grade three ELA PAT as compared to the proportions of grade three children achieving at grade level from throughout the EPSB in the 2004/05 and 2005/06 academic years (see Table 7). This was as expected given the grade 3 HLAT data analyzed earlier. Interestingly, the cohort one ELA3 data (2003/04 academic year) show a significant difference to exist between the proportions of children achieving grade level on this test when compared to the proportions of children from throughout the EPSB who achieved grade level that year. While the effect size (Cohen's $w = 0.07$) is small (see table 7), it does suggest that this group may be systematically different from the other full day kindergarten cohorts in that there are just a larger group of children who experience difficulty with reading and writing than in the other cohorts.

⁵ To obtain accurate comparisons, numbers of children achieving at or below grade level in the full day kindergarten groups were deducted from the overall reported district numbers of children achieving at or below grade level in order to obtain actual comparison numbers for the non-full day kindergarten district comparison groups.

Table 7. Comparison of cohorts 1, 2, and 3 full-day kindergarten students with proportions of students in district achieving grade level on the grade three and grade six English Language Arts Provincial Achievement Tests

		District		Cohort 1		Cohort 2		Cohort 3	
		n =	%	n =	%	n =	%	n =	%
ELA3	at or above grade	4340	89.0%	145	83.3%				
2003/04	below grade	534	11.0%	29	16.7%				
	χ^2				5.816				
	df				1				
	Sig				0.016*				
	Effect Size				0.07				
ELA3	at or above grade	4190	90.6%			181	91.0%		
2004/05	below grade	437	9.4%			18	9.0%		
	χ^2						0.037		
	df						1		
	Sig						0.847		
	Effect Size						0.01		
ELA3	at or above grade	4080	88.8%					178	90.8%
2005/06	below grade	516	11.2%					18	9.2%
	χ^2								0.821
	df								1
	Sig								0.365
	Effect Size								0.03
ELA6	at or above grade	4597	90.1%	114	83.2%				
2006/07	below grade	506	9.9%	23	16.8%				
	χ^2				7.244				
	df				1				
	Sig				0.007*				
	Effect Size				0.07				

* significantly different at the $\alpha = 0.05$ level

The comparison of the grade 6 ELA PAT results for 2006/07 also shows significant differences, although the effect size (Cohen's $w = 0.07$) is small, between the cohort 1 full day kindergarten group and the EPSB results. When this is put in context with the cohort one's ELA levels of achievement, this result is almost predictable. In fact, comparing the proportion of full day kindergarten children who achieved grade level on their grade 3 ELA PAT, 83.3%, with the proportion of full day kindergarten children who

achieved grade level on their grade 6 ELA PAT, 83.2%, shows virtually no change ($\chi^2 = 0.001$, $n = 311$, $df = 1$, $p = 0.970$).

Comparisons of low SES full-day kindergarten students by cohort with district outcomes at the grades three and six. To explore how the children who experienced full day kindergarten and who came from low SES communities performed relative to peers in the remainder of the district, comparisons based on the grade 3 ELA PATs for cohorts one, two, and three and the grade 6 ELA PAT for cohort 1 were conducted. While the trends were very similar to the comparisons just described in the previous subsection, there were no significant differences found to exist between the proportions of students achieving at grade level and those achieving below grade level between the low SES full day kindergarten children and the EPSB comparison groups for any of the grade 3 ELA PATs (see table 8). However, when comparing the proportion of low SES full day kindergarten children who achieved at grade level on the grade 6 ELA PAT with the EPSB proportions of children achieving at grade level, a significant difference was found to exist; however, the effect size associated with this difference was *small*. To explore how the low SES full day kindergarten children performed on the grade 6 ELA PAT (i.e., 80.2% achieving grade level and 19.8% below grade level) as compared to their performance on the grade 3 ELA PAT (i.e., 83.6% achieving grade level and 16.4% below grade level), a separate Chi-square comparison was conducted; this comparison shows that the grade 6 achievement levels were commensurate (i.e., non-significant) with those achieved by the group in grade 3 ($\chi^2 = 0.896$, $n = 234$, $df = 1$, $p = 0.344$).

Table 8. Comparison of cohorts 1, 2, and 3 low SES full-day kindergarten students (attended schools ranked 1 to 19 by need) with proportions of students in district achieving grade level on the grade three and grade six English Language Arts Provincial Achievement Tests

		District		Cohort 1		Cohort 2		Cohort 3	
		n =	%	n =	%	n =	%	n =	%
ELA3	at or above grade	4378	89.0%	107	83.6%				
2003/04	below grade	542	11.0%	21	16.4%				
	χ^2				3.794				
	df				1				
	Sig				0.051				
	Effect Size				0.05				

ELA3	at or above grade	4237	90.6%			134	91.2%		
2004/05	below grade	442	9.4%			13	8.8%		
	χ^2						0.062		
	df						1		
	Sig						0.803		
	Effect Size						0.01		

ELA3	at or above grade	4125	88.8%					133	90.5%
2005/06	below grade	520	11.2%					14	9.5%
	χ^2								0.413
	df								1
	Sig								0.521
	Effect Size								0.02

ELA6	at or above grade	4626	90.1%	85	80.2%				
2006/07	below grade	508	9.9%	21	19.8%				
	χ^2				11.691				
	df				1				
	Sig				0.001*				
	Effect Size				0.09				

* significantly different at the $\alpha = 0.05$ level

Conclusions

Based on the longitudinal data analyzed to date, the full-day kindergarten children appear to have kept pace with their higher SES counterparts with respect to the proportion of children achieving at grade level in their reading and writing abilities through their lower elementary school experience (i.e., grades K to 3). Starting with the grade four school year HLAT results, it is clear that any advantage offered to children by

their full day kindergarten experience was vastly reduced – as with any single educational experience, full day kindergarten cannot be expected to support children’s learning throughout their educational careers. The HLAT results also show, very clearly, that children from mid-SES backgrounds do not demonstrate in the long-term academic benefit, with respect to reading or writing, from having experienced full day kindergarten. Having said this, it is also quite clear that the proportions of children from low SES communities who experienced full day kindergarten were able to very closely match their mid-SES peers levels of reading and writing accomplishments up until grade five. Care must be taken in interpreting the grade six HLAT and PAT data since these represent only one cohort and, thus, these data are not as stable as those analyzed for the students from grades one to four.

It should be noted that the data very consistently show fewer children, regardless of their SES or their early childhood educational experience, who achieve at or above reading grade level as compared to the proportion of children who achieve at or above writing grade level. This is certainly evident in the HLAT reading and writing data that were analyzed and a quick perusal of the provincial ELA PAT multiyear reports, which provide a breakdown of the proportions of children achieving at grade level in reading and writing sub-components of the PATs, show a similar pattern at both grades three and six: this observation is not unique to the children in this study. It would be very useful to explore with teachers and reading and writing specialists the approaches to teaching and learning reading and writing in the lower elementary grades as compared to the upper elementary grades to determine if there are approaches which can be used to assist greater proportions of children to continue to achieve at grade level through grade 6.

Given the HLAT reading and writing findings as well as the ELA3 and ELA6 PAT findings, it seems prudent to provide students from low SES backgrounds additional supports to enable them to maintain the reading benefits gained through the full-day kindergarten experience. Examining the HLAT reading and writing performance of the half-day comparison group in grade six (2006/07 school year), it is prudent to explore with the schools and the teachers whose classes these children were in the reasons for the phenomenal increase in the proportion of children achieving at grade level on both tests. The appropriateness of these approaches can then be gauged and used to assist all children in the development of their reading and writing skills in the upper elementary grades.

Wolgemuth et al. (2006) and Florio-Ruane and Dunn (1987) explain the decline in the numbers of children who are judged to be achieving at grade level in reading and writing in terms of the increasing complexity of organizing classroom as children progress through elementary school. Means to address this decline include, but are not limited to the following:

1. Provide additional supports to children from low SES backgrounds throughout their lower and upper elementary school experience (e.g., including paying special attention to differentiated instruction and small class size which increases the amount of individual teacher time for learners).
2. The effective schools literature points to the importance of home support for student success (e.g., Colombo, 2006) particularly as it relates to the level of support for reading provided at home by pupils' families. While schools can choose to provide additional reading supports during class time, it is also critical

to help parents develop their own literacy skills and understand their roles in supporting their children's reading.

3. Examples from the literature do support the notion that low SES parents whose first language is not English require additional support in developing their own literacy skills, this is a pre-requisite to meaningfully involving families in supporting school efforts to enable students to develop reading and writing skills.

Recommendations

This work has ramifications for researchers, practitioners, and policy makers.

Many of the recommendations made here are already supported by the Edmonton Public School Board and the personnel in the EPS central office and schools. As an organization, EPSB should be applauded for its efforts. Given the present work, researchers should:

1. Further explore the complexities of the classroom from the points-of-view of teachers to gain further insights into the nuances of how to engage low SES families in their children's learning in culturally appropriate and respectful ways.
2. The role of student learning efficacy should be explored further with respect to its place in "casting the mold" for children's tenacity to learn challenging concepts.
3. Longitudinal examinations of the successes of low SES children who participated in play-based full-day kindergarten programs should be undertaken in a variety of contexts around the world.
4. Further research should be conducted into ways of enabling parents to develop the skills necessary to work with their children at home.

5. Explore how teachers who understand the nuances of the cultures of the ELL children they are teaching are able to meet the literacy needs of their students. Some literature (e.g., Araujo, 2002) suggests teachers who can draw on ELL's first language experiences to scaffold learning English are particularly effective in meeting these students needs – the question of whether this is the case, and, if so, under what circumstances?

Practitioners have a particularly difficult role to play in best meeting the literacy needs of children, particularly ELLs. Given the present study, practitioners would be advised to:

1. Provide full-day kindergarten experiences to all low SES children which are play-based and child centered as described by Corter and Park (1993).
2. Resist the temptation to measure student literacy growth for its own sake; assessment is a critical component of literacy development, if it is used systematically in formative ways to enable teachers to better meet the needs of their students.
3. Meet regularly in cross-grade groups whose focus is to share information about curriculum and instruction issues and approaches among teachers; through this sort of multi-grade professional community teachers can work to support the needs of their students, particularly ELL students.
4. Learn more about the cultural backgrounds of the ELL children they teach and to celebrate them in school; this means more than simply being able to identify national holidays or other superficial pieces of knowledge about students' cultures. Acknowledging and celebrating multiple cultures in a classroom requires

learning about and sharing insight regarding world views, other than Eurocentric ones, held by others.

Finally, policy makers at the district and provincial levels should consider:

1. Putting into place policies which provide school jurisdictions and schools with incentives to offer meaningful full-day kindergarten experiences in schools serving predominantly low SES communities; children who live in these communities who are not, individually, considered to be of low SES should be encouraged to also attend the same full-day kindergarten programs as their neighbourhood peers.
2. Creating opportunities for multiple agencies who meet the needs of low SES communities to work together, for example, schools, community libraries, early childhood health care organizations, adult literacy organizations, etc. should come together to cooperate and collaborate to better meet the needs of families and children.
3. Ensuring that additional student literacy supports are provided to low SES children. ELLs are particularly vulnerable and must not be allowed to “slip between the cracks.”

The diminishing academic “returns” of full-day kindergarten are not entirely surprising; it would be naïve to think that any one intervention, even one provided over an entire academic year, would suffice to support children in their learning indefinitely. Practitioners, researchers, and policy makers must keep in mind that every year brings

with it new challenges for students, particularly those students who come from low SES backgrounds. These children and their families often face a multitude of social issues including poverty, drug and alcohol abuse, physical abuse, high transience levels, to name a few, all working to mitigate students' chances of success socially and academically.

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