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AUTHOR	Zakaluk, Beverley L.; Straw, Stanley B.
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ABSTRACT

This report documents the efficacy of the full- and three-quarter-day kindergarten options instituted in economically disadvantaged areas in the St. James-Assiniboia School Division (Manitoba, Canada) for the school years 1999-2000 and 2000-2001. The report describes findings from a comprehensive set of data analyses covering the literacy performance of students in both kindergarten options for each of the years 1999-2000 and 2000-2001. The emergent literacy performance of students in each option was first compared to the performance of students in 1997-1998, before implementation of the extended-day project (cohort group) and then to divisional norms in each year of implementation. Next, performance in each year was compared to the performance of a control group and, at the same time, to the performance of students in the regular half-day program. The final comparisons, and perhaps the most corroborative, examined literacy task gains from the beginning to the end of the 2000-2001 school year, the year in which complete pretest/posttest control and division-wide data sets were available. Since complete pre- and posttest control and division-wide data for numeracy were not available, evaluation of numeracy development in 1999-2000 was based on a comparison of the full-day option and the three-quarter-day option only. Results indicated that, in terms of literacy development, attending full-day kindergarten is superior to attending three-quarter or half day kindergarten. Regarding numeracy, across two years of the study, no firm conclusions can be drawn about the effectiveness of the extended day programs except that in year 2 the full-day students appeared to grow more rapidly on all the numeracy measures. Recommendations include: consider eliminating the three-quarter-day kindergarten option; continue to monitor early literacy and numeracy performance of kindergarten students; and provide ongoing support for kindergarten school staff. Contains 42 references and numerous unnumbered tables, graphs, and figures. Five tables are appended. (NKA)

THE EFFICACY OF AN EXTENDED-DAY KINDERGARTEN PROGRAM

A REPORT FOR THE ST. JAMES SCHOOL DIVISION

1999-2000, 2000-2001

Beverley L. Zakaluk, Ph.D.

and

Stanley B. Straw, Ph.D.

Faculty of Education

University of Manitoba

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EXECUTIVE SUMMARY

The institution of the full- and three-quarter-day kindergarten options in the St. James-Assiniboia School Division is based on the belief that the early years are critical in terms of stemming illiteracy. "Learning to *read* is, without question, the top priority in elementary education" (Boyer, 1995, p. 69). The same case can be made for numeracy development. When children are unsuccessful in learning to read and to think in mathematical terms, school failure is the result, often with severe consequences that parallel later income disparities. As indicated by Braunger and Lewis (1998, p. 1), "Literacy [and numeracy] is key to success in school and beyond, for effective participation in the workforce, the community, and the body politic. This was true in the past - - even more in the future." But low family income and residence in poor neighbourhoods places some groups of children at risk, although "teasing apart the various aspects of the environment associated with low [socio-economic] status is virtually impossible" (Snow, Burns & Griffin, 1998, p.125). The extended-day kindergarten project in economically disadvantaged neighbourhoods in the St. James-Assiniboia school division, with increased emphasis on academics, is an effort to place more resources into preventing illiteracy and, ultimately, reduce the influence of such demographics.

This report documents the efficacy of the full- and three-quarter-day kindergarten options instituted in economically disadvantaged areas in the St. James-Assiniboia School Division for the school years 1999-2000 and 2000-2001. The project began with the implementation of one full-day kindergarten in one school in 1998-1999, and was expanded in 1999-2000 when the full-day kindergarten option was extended to a second school site. At the same time, a three-quarter-day option was implemented in a third school. In the three-quarter-day option, students in one class attended kindergarten for full-days until February and then changed to a half-day pattern. In contrast, the second group of students, who started the school year attending kindergarten half-time, attended for full days beginning in February. In 2000-2001, the number of three-quarter-day option schools was extended from one to three.

Literacy. This report describes findings from a comprehensive set of data analyses covering the literacy performance of students in both kindergarten options (full- and three-quarter-day) for each of the years 1999-2000 and 2000-2001. The emergent literacy performance of students in each option was first compared to the performance of students in 1997-1998, before the implementation of the extended-day project (cohort group), and then to divisional norms in each year of implementation. Next, performance in each year was compared to the performance of a control group and, at the same time, to the performance of students in the regular half-day program. The final comparisons, and perhaps the most corroborative, examined literacy task gains from the beginning to the end of the 2000-2001 school year, the year in which complete pre-test/post-test control and division-wide data sets were available.

Numeracy. Since complete pre- and post-test control and division-wide data for numeracy were not available, the evaluation of numeracy development in 1999-2000 was based on a comparison of the full-day option and the three-quarter-day option only. In 2000-20001, numeracy data were not available division-wide. Only pre- post-test performance for students in the two extended-day options (full- and three-quarter-day) and control groups was compared.

Findings for Literacy

Full-Day Option

1999-2000

The pattern that evolved from the evaluation of Year I of the program for full-day option students when the performance of the full-day kindergarten students was compared to that of the 1997-1998 cohort group, in which attendance at kindergarten was only half-time, was characterized by statistically significant gains on all measures (letter and word identification, concepts about print, writing vocabulary , dictation and book level). Further comparisons to division-wide norms suggested that the full-day students were performing above divisional norms on all literacy measures except for concepts about print, which was slightly below divisional norms. Consequently, with the possible exception of performance on the concepts about print task, the 1999-2000 comparisons with the 1997-1998 cohort group support the efficacy of the full-day kindergarten program.

2000-2001

Findings from the 1997-1998 cohort analysis of the performance of full-day students in Year II of the project (2000-2001) were even more positive. Effect size calculations, that compared the performance of the full-day students with 2000-2001 divisional norms, indicated that the performance of students in the full-day option was equal to (word identification) or surpassed division-wide performance by a range of 4 to 9 percentile points, except for dictation (hearing sounds in words), in which case the performance of those in the full-day option exceeded that of the peer group by 20 percentile points. Students in the full-day option also excelled in reading. As indicated by book level, the reading achievement of the full-day students surpassed that of students in the regular half-day program by 20 percentile points. The comparison with divisional norms indicated that the full-day students were performing at or above divisional norms on all literacy measures. This indicates that the students participating in the full-day program were able to meet the standards set by those students from more affluent neighbourhoods.

Control Group Comparisons across Both Years

Three general statements can be made from the comparisons among the full-day, three-quarter-day, and control groups across the years 1999-2000 and 2000-2001. Overall, these analyses indicated further support for the efficacy of the full-day kindergarten option. The most predominate pattern to emerge over both 1999-2000 and 2000-20001, when the performance of students in the target options was compared to control group performance, was that the full-day students surpassed the performance of both control group students and students in the three-quarter-day option, the performance of students in the later two groups being relatively similar. This held true for writing vocabulary, dictation, and book level in both years.

The second predominate pattern to emerge from the full-day, three-quarter-day, and control group comparisons indicated a significant difference in performance of the full-day program over the three-quarter-day program, with both being superior to the control group. This pattern was evident in both years for letter identification, and in the 2000-2001 year for concepts about print.

The third pattern to emerge was only evident for word identification in both years, in which case the performance of full- and three-quarter-day groups was equal, and both were superior to that of the control group.

Comparisons with Regular Half-Day Students across Both Years

Although the 1999-2000 findings were based on post-test analyses only, the results of the comparisons between the performance of students in the target options compared to the performance of both control group students and students in the regular-half-day program upheld the previous outcomes. The performance of students in the full-day kindergarten option in 1999-2000 was superior to the performance of students in the regular program on letter identification, writing vocabulary, dictation and book level and equal to the performance of students in the three-quarter-day option on word identification, the performance of students in both of these target option being superior to that of students in the regular program and the control group. There were no performance differences for concepts about print in 1999-2000.

This advantageous pattern was replicated in 2000-2001 for full-day option students on all tasks, including concepts about print. Performance equalled that of norms established by more advantaged peers in the regular-half-day program on the letter and word identification, concepts about print and writing vocabulary tasks, and exceeded the performance of the regular half-day students in less disadvantaged neighbourhoods for both dictation and book level. In the case of word identification, the performance of full-day students equalled regular student performance, but on this task, so also did the performance of students in the three-quarter-day option. These across target option differences suggest, conceivably that, in addition to time on task variables, there were instructional variables operating within target group classrooms.

Pre- Post-Test Data (2000-2001)

Perhaps the most convincing evidence attesting to the efficacy of the full-day kindergarten option resulted from the 2000-20001 comparison of pre- and post-test emergent literacy data. These comparisons were not carried out in 1999-2000 due to the unavailability of pre-test scores. In keeping with expectations that students in economically disadvantaged areas would score low, pre-test data on measures administered at the beginning of the school year indicated that the performance of students in the full-day option was significantly below that of students in either the three-quarter-day option or the control group, except on writing vocabulary in which the performance of students in the three-quarter-day option was also low. The analyses of end-of-year scores comparing the achievement of students in the full-day option with the performance of students in the regular half-day program showed, however, that students in the full-day option made the most gains and reached levels of performance that were equal to (letter and word identification, concepts about print and writing vocabulary) or better than (dictation and book level, the measure of reading achievement) the performance of their more affluent peers in the regular half-day kindergarten program.

Summary of Results for the Full-Day Option

When compared to cohort groups and divisional norms, the 1999-2000 full-day group outperformed the 1987-1998 cohort group on all measures, except for concepts about print. Performance in 2000-20001 on the concepts about print task exceeded expectations, however. The results from the across-the -years analyses, as well as the examination of pre- and post-test performance in 2000-20001, upheld this finding, sustaining the efficacy of the full-day kindergarten option based on performance that was equal to or exceeded that of more advantaged students.

Three-Quarter-Day Option

1999-2000

Compared to the results of the evaluation of the full-day option, findings from the 1999-2000 analysis of the data from the three-quarter-day option were not so clear-cut. Students in this group outperformed the 1997-1998 cohort on all measures except concepts about print, but when effect sizes using divisional norms were examined, students in the three-quarter-day option performed below expectations on all measures except word identification, although performance met expectations on the concepts about print task.

2000-2001

Findings from the 2000-2001 cohort analysis for the three-quarter day option were similar, indicating that students outperformed the cohort on all measures, with the 2000-2001 performance on the concepts about print task being approximately equal to that of students in 1997-1998. When performance was compared to divisional norms,

however, students in the three-quarter-day option performed below expectations on all measures. In addition, findings established in the 1999-2000 report showed that the pattern of attendance in the three-quarter-day option made a difference. Those who attended kindergarten full-days beginning in February performed better than those who began the year attending kindergarten full-days and then shifted to half-days.

Control Group Comparisons Across Both Years

Findings from the 1999-2000 control group comparisons were similar to the findings from the cohort group analysis. The performance of the three-quarter-day students was significantly below that of the control group on letter identification, writing vocabulary, and dictation. Performance on concepts about print was similar to control group performance, but on word identification and book level, the three-quarter-day students outperformed the control group students.

Findings for the 2000-2001 school year suggested that when the performance of students in the three-quarter-day option was compared to the control group, the three-quarter-day option was statistically superior to the control group on only two measures, letter identification and word identification. On all other literacy measures, the performance of the three-quarter-day group did not differ statistically from the control group.

Findings from the pre-test to post-test comparisons in the 2000-2001 year showed that the three-quarter-day group scored significantly below the control group on the pre-test measures of word identification, writing vocabulary, and dictation and were equal to the control group on letter identification and concepts about print. At the post-test, three-quarter-day students outperformed the control group on only letter and word identification. The performance of the three-quarter-day students was statistically equal to the control group on all other measures of literacy. When compared to the full-day students, it was found that at the time of the post-test, the performance of the three-quarter-day students was statistically below that of the full-day students on letter identification, concepts about print, and writing vocabulary, and was statistically equal to the performance of full-day group on word identification and dictation.

Comparisons with Regular Half-day Students Across Both Years

Unlike the full-day students who were able to exceed or equal the performance established by students in the regular half-day program in more advantaged neighbourhoods, the performance of students in the three-quarter-day option in 1999-2000 failed to measure up on letter identification, writing vocabulary, dictation, and book level. There were no 1999-2000 differences on concepts about print across the groups, although the performance of the three-quarter-day option students matched that of the full-day students on word identification.

This general pattern was repeated in 2000-20001, except for performance on word identification and book level. As in 1999-2000, the performance of three-quarter-

day option students on the word identification task matched that of students in both the full-day and regular programs. Although the book level performance of students in the three-quarter-day option did not equal that of full-day option students, the book level performance of these students was equal to that of students in the control group, which, in turn exceeded that of students in the regular half-day program. In all other cases the performance of the students in the three-quarter-day option failed to meet end-of-year expectations derived from the performance of the regular half-day students which was met by full-day students. This pattern of performance applied to performance on the letter identification, concepts about print, writing vocabulary and dictation tasks. While the performance of the three-quarter-day students was equal to that of control group students on concepts about print and dictation, their scores on these tasks failed to match the performance of more advantaged peers in the regular half-day program.

Summary of Results for the Three-Quarter-Day Option.

While the 1999-2000 performance of students in the three-quarter-day option matched that of students in the full-day option on concepts about print, except for word identification, the performance of students in this option failed to meet expectations. Findings for 2000-20001 were similar, with students in the three-quarter-day option equalling that of students in the regular half-day program for word identification, and exceeding the performance of control and regular students, but not the performance of full-day option students, on book level. On all other literacy measures, letter identification, concepts about print, writing vocabulary, and dictation, the 2000-20001 performance of students in the three-quarter-day option did not measure up to that of their counterparts division-wide, who attended half-day kindergartens only. Even though students in the three-quarter-day option began the 2000-20001 year with low scores relative to control group students, the overall findings suggest that attending the three-quarter-day option kindergartens was not a viable option.

Incidence of Low Performance

An additional analysis examined the benefits of the program options by comparing the frequency of low scores in 1997-1998, before program implementation, with the scores after implementation (1999-2000, 2000-2001). Clay's stanines were used as benchmarks for this analysis. All scores falling within the first and second stanines were judged to be of low performance. The data indicated that participating in the full-day option reduced the number of students in these two stanines by approximately 50% on letter identification, word identification, and writing vocabulary. The reduction was even greater for the two measures of concepts about print (43% compared to 13%) and dictation (53% compared to 5%).

For the three-quarter-day option, the reduction in the incidence of low performance was not as dramatic. Although there were reductions, they did not match those observed for the full-day program.

Overall Conclusions: Literacy

The conclusions to be gained from all the analyses is that in terms of literacy development, attending full-day kindergarten is superior to attending three-quarter or half-day kindergarten. The data were not so clear for students who received mixed full-day/half-day combinations (i.e., the three-quarter-day option). Findings do not show a pervasive advantage for the three-quarter day option as implemented in this study.

Findings for Numeracy

Only pre- and post-test data for the full- and three-quarter-day option students were available in 1999-2000. Both pre- and post-test results were available, however, for the target schools and for the control group in 2000-2001. Statistical comparisons were therefore restricted to repeated measures analysis of variance for the two groups (full-day vs three-quarter-day) for the 1999-2000 school year and for the three groups (full-day, three-quarter-day, and control), followed by the calculation of effect sizes, for the 2000-2001 school year.

The data on numeracy were not nearly as conclusive in terms of actual levels of achievement as the data derived from the literacy assessments. Student performance on all measures grew from September to June, as would be expected. In 1999-2000, the pattern over the sub-tests of the School Entry Assessment (SEA) were highly consistent. The growth patterns on all sub-tests from pre-test (September) to post-test (June) were virtually identical regardless of program option (full-day or three-quarter-day). If there were differences at the time of the pre-test, these were maintained at the end of the year.

In the 2000-2001, the pattern of growth was different for different groups. The least amount of growth was shown overall by the control group, whereas, the slope of the growth patterns for the two target groups was steep The pattern of growth for the full-day program was steepest in all cases supporting the efficacy of the full-day option. In all cases the groups were significantly different at the beginning of the school year with the performance of the full-day group being the lowest, and the performance of the three-quarter-day option somewhat higher. However, on the post-test measures, the performance of the three groups was equal on all but number patterns and sequencing forwards and backwards (before and after).

Across the two years of the study, no firm conclusions can be drawn about the effectiveness of the extended day programs except that, in year II (2000-2001), the full-day students appeared to grow more rapidly on all the numeracy measures. In all cases, the control group grew the least rapidly; this may be because the controls came into the study with higher scores than either the full-day or the three-quarter-day options. The performance of the three-quarter-day group fell between the full-day group and the control group in terms of growth patterns. Although the data from 2000-2001 would support the efficacy of the full-day program over either the three-quarter-day program or the half-day program, this conclusion was not supported by the data from 1999-2000.

Conclusions

As highlighted both by the statistical analyses and by observational data, committing financial resources to full-time kindergartens seems to be an appropriate way to ensure that children from economically disadvantaged homes develop a deeper understanding of literacy and numeracy.

Extended-day kindergarten in Canada, unlike much of the United States, is rare. In the United States, as of 1997, twelve states and the District of Columbia require full-day kindergarten availability. In Canada, it has only been in the last few years that school divisions and provincial ministries of education have begun to realize the cost-recovery advantages of having students attend kindergarten for a full day. This study indicates that, in a Canadian context, a developmentally appropriate full-day kindergarten, held every day of the week, can have a positive effect on children's literacy behaviors, so much so that we can "beat the odds" and help close the gap in academic performance between students from high and low income neighborhoods. Furthermore, our data suggest that, not only do students profit *on average,* but the incidence of low-achievement and "at-risk" behavior is also reduced. The combination of the reduced need for crossing guards and similar supports, as well as the lowered incidence of "at-risk" behavior, can make full-day kindergarten a much more affordable option for school divisions.

But it must be made clear that merely extending the day is not enough. More is not necessarily better unless the activities in which students engage are developmentally appropriate and focused on early literacy behaviors. Simply having students at school for an extended period of time without academically and socially challenging activities is not enough. The study reported here is a snapshot of the advances that students can make, compared to their peers, when exposed to a high-quality, well-delivered full-day program. More research is in order, however, to determine the long-term benefits of such endeavours. We intend to seek funding to follow these students through to grade 5 in order to assess the longer-term effect of full-day kindergarten programs and, in particular, examine the incidence of students requiring more intensive, remedial work after completing an extended kindergarten program.

Recommendations

- Consider eliminating the three-quarter-day kindergarten option in economically disadvantaged schools, replacing this option with full-day kindergartens.
- Continue to monitor the early literacy and numeracy performance of kindergarten students, ensuring that both beginning and end of the year data are gathered.
- Replace the School Entry Assessment (SEA) Test with a set of numeracy measures more sensitive to upper levels of achievement.
- Follow-up this evaluation with long-term research to establish whether the performance gains made by these economically disadvantaged students are

sustained at upper elementary levels.

- Conduct more classroom observations to establish the most effective instructional practices at the kindergarten level. How does one teach concepts about print, for example?

- Provide ongoing support for kindergarten school staff, especially those new to teaching full-day kindergartens.

- Ensure that school level and division-wide collaborative staff meetings are sustained.

THE EFFICACY OF AN EXTENDED-DAY KINDERGARTEN PROGRAM
A REPORT FOR THE ST. JAMES SCHOOL DIVISION
1999-2000, 2000-2001

The need to be literate and numerate in the new, information-based economy is becoming more and more apparent, yet many adults cannot read and write well enough to function effectively in their daily lives (IALS, 1996), One must reason, think critically, problem solve and be able to absorb information from a continually developing knowledge base (Braunger & Lewis, 1998). While previously verbal communication, either in person or by telephone, was sufficient, communication by electronic mail, facsimile and the Internet now dominate (IRA/NAEYC, 1998), placing inordinate demands on literacy.

But literacy and numeracy learning is a difficult task, the early years being especially critical. When children struggle with early reading, school failure is often the result (Slavin, Karweit, & Wasik, 1992). Disparities in mathematical knowledge at school entry have also been noted and seem to perpetuate on the basis of social class, race, ethnicity, language and gender (Secada, 1992). Negative attitudes to learning associated with low achievement seem to continue throughout schooling, having a cumulative effect on knowledge acquisition (Neuman, 2001). These tend to parallel income disparities (Gaziano, 1997).

Current evidence indicates, however, that the literacy and knowledge acquisition of many adolescents and adults can be resolved if we increase the effectiveness of beginning reading instruction. We can also foster mathematical development by providing rich language environments and by challenging young children to explore their world and engage in problem solving (NCTM, 2000). A common solution in American communities is to extend learning opportunities by instituting full-day kindergartens, thereby assigning resources to preventative rather than to remedial programs (Tatum, 1999). More kindergartens, 54 percent in the United States (Rothenberg, 1995), have become full, rather than half-time, and incorporate an increased emphasis on academics (Morrow, Strickland, & Woo, 1998).

Full-day kindergartens are a welcome innovation because they address a critical problem for working parents, that of making alternative child-care arrangements. In addition to educational and family considerations, full-day kindergartens speak to important social issues involving economically disadvantaged and minority groups (Gullo, 1990). In fact, many all day kindergarten programs operate in poverty-ridden areas (Fromberg, 1992; Housden & Kam, 1992; Rothenberg, 1995) where children at-risk for school failure often reside (Snow, Burns, & Griffin, 1998). Economic disparities have widened over the last 20 years, with up to 40% of American children in jeopardy because they are not proficient readers (Fischer, Hout, Jankowski, Lucas, Swidler, & Vos, 1996). Similar conditions exist in Canada. Low literacy rates perpetuate the vicious cycle of poverty and exacerbate issues related to employability, income, nutrition and health. While economically disadvantaged families may value schooling, they often lack the physical and social supports required to sustain it.

Additional realities include increases in teen-age pregnancy and divorce rates that have led to an upsurge in single parent families. The high incidence of working mothers and grandmothers has also changed the experiences of preschool and kindergarten-age children. With the disintegration of extended families and the complex work schedules of parents as well as grandparents, many children attend kindergarten for half of the day and are placed, for the remainder of the day, in child care facilities. The consistency of being in one classroom under the tutelage of one teacher would appear to be an improvement over such multiple arrangements, not only socially and emotionally, but also academically (Gullo, 1990).

Keeping developmentally appropriate practices in mind, it is evident that we need to stop the real "brain drain". Policy makers must become more responsive to the needs of young students, especially those from disadvantaged backgrounds.

What is heartening is that the risk factors related to literacy development in low-socio-economic areas are not inherent, but rooted within the social contexts of learning and are, therefore, amenable to change through education. New evidence (Entwisle & Alexander, 1998; McCain & Mustard, 1999; Tatum, 1999) stresses the importance of the early years as a foundation for future learning in the sense that early, stimulating and positive interactions with adults and more knowledgeable peers are important for cognitive development. Unfortunately, as Neuman (1999) and others indicate, "both gradual and linear declines in cognition" are linked to impoverishment. Patterns once established seem persistent and resistant to change (p.286). Full-day kindergartens are seen as one way to counteract these negative trends. There are further indications that kindergarten can also enhance school adjustment through socialization and role rehearsal (Entwisle, Alexander, Cadigan, & Phallas, 1987). But still, the benefits and costs associated with full-day kindergartens require further, comprehensive research carried out over time (Elicker & Mathur, 1997).

Full-day kindergartens have being introduced into many American schools (Elicker & Mathur, 1997) and schools in some Canadian provinces (Johnson & Mathien, 1998; Zakaluk, Straw, & Haydey, 2001). A number of studies suggest that full-day kindergarten is more beneficial than half-day (Puleo, 1988). These findings apply to both literacy and math performance (Holmes & McConnell, as cited in Morrow, Strickland, & Woo, 1998; Wang & Whitcomb, 1999). Participation in full-day kindergartens is also positively related to subsequent performance at least through the end of first grade (Sheehan, Cryan, Wiechel, & Bandy, 1991; Cryan, Sheehan, Wiechel, & Bandy-Heddon, 1992) and up to grades 3 and 4 (Humphrey, 1980, 1983). Very few negative effects have been identified (Shubert, 1997). In fact, in a New York study, Peskin (1988) found the greatest gains were made by students who were academically at risk. Similar findings were made in an evaluation of the St, James full-day kindergarten project, Year I (Zakaluk, Straw, & Haydey, 2001). Using performance on Clay's (1993) observation tasks to evaluate literacy as well as language and numeracy, full-day kindergarten

students outperformed students in half-day cohort and control groups as well as students in a three-quarter day option. A cohort group comparison between the performance of half- and full-day kindergarten students showed dramatic reductions in low performance scores on all literacy measures, but especially on letter identification and dictation. There were no social and emotional ill-effects.

The Study

In this evaluative study there were three kindergarten options, half-day, three-quarter-day, and full-day. In the three-quarter day option, students in one class started the year attending kindergarten all day and, in February, began to attend half-days, while the students in the other class started the year attending half-days and attended full days beginning in February. The purpose of this study, therefore, was: (1) to determine which of these options was most beneficial in terms of early literacy and numeracy development, and (2) whether the findings from Year II of the project replicated the positive Year I findings. This report, therefore, is cumulative in that data from Year I of the study are also included. Cohort group comparisons are also made: with performance in 1997-1998, before the implementation of full-day kindergartens; with divisional norms once the extended-day kindergartens were in operation; and with the performance of students in control groups who attended kindergarten half-time.

Participants

As suggested in the Year I report, the school division instituted a full-day kindergarten in its most inner-city school in 1998-1999, which served as the pilot school for the full-day kindergarten project. The successful outcome of this initiative led to the continuation of the program in Brooklands, plus extension to two full-day classes at a second school site, and two, three-quarter or extended day kindergarten classes at a third school in 1999-2000. In the extended day kindergartens, students in one class attended all day until February of the school year and then attended half-time for the remainder of the year, while students in the second classroom did the reverse, attending half-days until February and then full days until June. This schedule resulted in cost benefits in terms of staffing, only one and one half teachers being required instead of two. This program configuration was continued in the school year 2000-2001, the primary focus year of this current evaluation, but the three-quarter-day option was also extended to Heritage and Buchanan Schools which had been control schools in 1999-2000. The number of extended-day kindergarten schools in 2000-2001 was therefore expanded to three with six rather than 2 classes. Lakewood School with two half-day kindergarten classes became the control school.

In keeping with findings from the literature review which suggests that academic achievement is linked to income level, the full- and extended-day program options were introduced in the division's most economically-disadvantaged areas. According to data obtained from the Manitoba Education and Training Schools' Finance Branch (1996), the schools in 1999-2000 ranked first, second, and third across the division in terms of low-income; while Heritage and Buchanan, the control schools in 1999-2000, ranked fourth and sixth. In 2000-2001, the schools implementing the two options ranked first, second, third, fourth, and sixth. Lakewood School, which served as a control, ranked seventh among the participating schools on the school division's income-factor scale. The fifth socially-economically ranked school was not included in the study because of the presence of more positive factors related to family and neighbourhood stability. The participating schools, program options and number of classrooms is summarized in the following Table.

Participants: 1999-2000 and 2000-2001

Year	200	2001	2000	2001	2000	2001	2000	2001	2000	2001	2000	2001
Sch	Site 1		Site 2		Site 3		Site 4		Site 5		Site 6	
Optn	Full		Full		3/4		Contr	3/4	Contr	3/4	--	Contr
N Cl	1	2	2	2	2	2	2	2	2	2	2	2

Measures

With the exception of the language development test, the evaluation measures used in the 2000-2001 evaluation were similar to those used in previous years. The Bracken test of language concepts was eliminated because it failed to discriminate among students. Findings were the least robust of all measures because of the lack of pre-test data, making it impossible to establish whether the groups were equivalent at the beginning of the school year. Critics of the Bracken test suggest that norms address socio-economic status only generically. That is, when the original norming study was conducted, students were not stratified except on a test site basis.

Emergent Literacy Development

Marie Clay (1993) developed a number of tasks for the systematic observation of early readers and writers that were used to evaluate literacy performance gains in this program evaluation. Tasks, administered individually, included: (1) *letter identification* in which children were asked to name both upper and lower case letters, 54 in all counting two forms of the letters *a* and *g*, and given credit for naming either the letter, the

sound, or a word beginning with that letter, (2) *concepts about print* in which, provided with a small book, children were asked a set of 24 questions to evaluate (a) their understanding of conventions related to print - - that it is the print, not the pictures that tell the story, (b) their knowledge of the language of instruction - - concepts of what a word is, a letter, a sentence ... , (c) the use of punctuation marks - - a comma, a period, a quotation, and (d) their sense of the directionality of English print -- from left to right and making a return sweep from left to right again on the next line, (3) *words in isolation* in which shown a list of 20 (Ohio) or 15 (New Zealand) most commonly-occurring words, children were asked to identify them, (4) *writing vocabulary* - - where children were required to write all the words they could within a ten-minute limit, beginning with their own name, (5) *dictation* in which two sentences were dictated, one word at a time, with points being awarded for every sound represented correctly, the ceiling level for this task being 37. A sixth measure to evaluate reading achievement *(Book Level)* in which, after a brief introduction, children read aloud from a levelled book (from 1 to 20 to represent the range of grade one levels) was also obtained. In taking this *running record* the teacher codes the words omitted, the words added, the words substituted, the words repeated and the words self-corrected. If 90% of the words are read correctly, the selection is said to be at the child's instructional reading level. Raw scores and not stanine levels were used to analyze performance on all of these Clay measures.

Numeracy Development

The School Entry Assessment Test (SEA,1999), was used to measure numeracy. The five, individually-administered sub-tests include: *numeral* and *pattern recognition, forming groups, number sequence knowledge* (rote counting) *and mental operations* (before/after and adding and subtracting). The test is hands-on and has a game-like format based on the use of "supermarket bins" which contain objects such as carrots, bananas, sausages, birthday cards, candles, sponges, pegs, and buttons that have different properties in regard to shape, colour, size, texture, and weight. There is a "shopping guide" and in response to directions, students are required to take the objects from the "supermarket bins" and place them in the "shopping basket". The test yields information about children's understanding of mathematical concepts and identifies areas that require further instructional emphasis.

Research Questions

Given a full- and three-quarter-day kindergarten option for children in impoverished schools, based on the new English Language Arts Curriculum for Manitoba, the major questions for research were organized into: the cohort analyses that focused first on emergent literacy performance before the implementation of the project and second with division-wide performance in the years in which the options were implemented-- the

cohort analyses and analyses with division-wide norms examining literacy performance across both implementation years, 1999-2000 and 2000-2001. The final literacy analyses compared the performance of students in the extended-day programs with a control group from a similar socio-economic area, on the one hand, and, on the other, with the literacy achievement of all other students in the division, that is of students from more advantaged neighbourhoods who received instruction for only half-days. These analyses entailed end-of-the-year achievement in emergent literacy for both 1999-2000 and 2000-2001, as well as an analysis of growth patterns from the beginning to the end of the year in 2000-2001. A similar end-of-year analysis and an analysis of growth patterns was carried out for the data from the numeracy instrument. The following research questions were posed.

Cohort Analysis

Emergent Literacy

Full-Day. What is the effect of full-day kindergarten attendance when compared with cohorts from the year/s immediately preceding the implementation of the full-day program? The overall analysis was carried out by comparing 1997-1998 data (half-day) first, with the 1999-2000 full-day data, then with the 2000-2001 full-day data.

A second major question in determining the efficacy of the full-day kindergarten option concerned the effect of full-day kindergarten attendance when compared with division-wide norms in 1999-2000 and 2000-2001. This analysis compared the performance of students in the full-day option with norms based on the performance of all the kindergarten students in the division.

Three-Quarter Day. A second set of analyses examined the efficacy of the three-quarter-day option. The questions were: What is the effect of three-quarter-day kindergarten attendance when compared with cohorts from the 1997-1998 year? This analysis was carried out by comparing, at Crestview school, the 1997-1998 half-day program results with the results from 1999-2000 and 2000-2001 when the three-quarter-day program was in operation. For the other schools that implemented the three-quarter-day option in 2000-2001 (Heritage and Buchanan), the half-day cohort results from 1997-1998 were compared to the results of the three-quarter-day program implemented during the 2000-2001 school year. An overall analysis comparing the half-day cohorts from 1997-1998 with performance of three-quarter-day students in 1999-2000 and 200-2001 was also conducted .

A second major question in determining the efficacy of the three-quarter-day kindergarten option concerned the effect of full-day kindergarten attendance when compared with division-wide norms in 1999-2000 and 2000-2001. This analysis compared the performance of students in the three-quarter-day option with that of norms

based on the performance of all kindergarten students in the division.

Control Group Analyses

The remaining questions focussed on the effect of control group comparisons using both early literacy measures, reading achievement measures as assessed through book level, and measures of math performance.

Emergent Literacy

The questions were: (1) How did performance in each of the options (full-day, three-quarter-day) compare to the performance of students in half-day kindergarten classes (control group) of somewhat similar socio-economic status on measures of emergent literacy for the school years1999-2000, and 2000-2001? And (2) How did the 2000-20001 performance of students in each option, the control schools, and students division-wide in the regular half-day program compare on their post-test performance?

Incidence of Low Performance (Identification of At-Risk Students)

The question addressed here was how did the percentage of low performing students change from 1997-1998 to 1999-2000 and 200-2001 as a result of the implementation of the extended day programs.

Numeracy Performance

The question was: How did performance in each of the target options (full-day, three-quarter-day) compare with each other in the 1999-2000 school year and to the performance of students in the half-day kindergarten classes (control group) of somewhat similar socio-economic status on measures of numeracy performance for the school year 2000-2001?

Scope of the Project and Data Analysis

Statistical Analyses

In order to answer the above questions, the data were subjected to a series of statistical analyses. Under the cohort analysis, the performance of the students in the 1999-2000 and 2000-2001 in both the full- and three-quarter-day kindergartens was compared to the performance of students: (1) from the 1997-1998 group of half-day

kindergarten students (i.e., prior to the implementation of the full-day kindergarten) using a cohort analysis (Cook & Campbell, 1979), and (2) the performance of students across the school division for both the 1999-2000 and 2000-2001 school years (using divisional norms).

For the control group analysis the performance of both full-day and three-quarter-day students was compared with performance of students in control schools in areas with a somewhat similar socioeconomic status who attended kindergarten for half-days only. These data were also compared to students in the regular half-day program division-wide. For the 1999-2000 school year, pre-test data were not available for the control schools, so a post-test only analysis was carried out. However, both pre- and post-test data were available for the program options and the control groups in 2000-2001, so a repeated measures analysis of variance (pre-test to post-test) was conducted to compare any differences in growth patterns across the year among the three groups. In both 1999-2000 and 2000-2001, a post-test comparison with performance in the regular half-day schools was also carried out.

Data were subjected to analyses of variance (ANOVA) with *post-hoc* examinations to locate the source of the differences. Effect sizes were also calculated for performance on each measure. Effect size provides information over and above that provided by analyses of variance which simply identifies whether there are significant differences between and among variables. Effect size states the strength of the relationship, that is, it tells how well the intervention group (full- or three-quarter-day) performed in relation to the comparison groups (the 1997-1998 cohort group in one instance, the overall 1999-2000 divisional performance in another). Effect sizes are interpreted using percentile ranks. Statistical analyses were carried out separately for each area of interest: first *emergent literacy,* and second, *numeracy* development.

As summarized in the following Table, complete data were not available from all schools on all measures each year of the evaluation. Neither the Bracken Language screening test nor the SEA Numeracy test was administered division-wide in the year 1997-1998, so only the Clay Observational Survey was included in the cohort analysis. Also, in the year 1999-2000, none of the testing instruments was administered to the control group in the Fall of 1999, making it unclear whether the groups were comparable at the beginning of the year. Further, the numeracy tasks were not administered to the control group at the end of the year, making it impossible to compare the extended day options with the control group on numeracy. Reading achievement data, as measured by book level was available only on a limited basis in 1999-2000 (no Fall data for the control schools or schools on a division-wide basis), while a complete data set was available in 2000-2001.

Available Data on Which Analysis Was Conducted

	Full-Day	3/4-Day	Control	Divn
1997-1998				
Clay Observational Survey (Spring)	Yes	Yes	Yes	Yes
Reading Achievement (Book Level)	No	No	No	No
Bracken Language Development Test	No	No	No	No
SEA Numeracy Test	No	No	No	No
1999-2000				
Clay Observational Survey - Spring, 2000	Yes	Yes	Yes	Yes
Reading Achievement (Book Level) - Spring, 2000	Yes	Yes	Yes	Yes
SEA Numeracy Test - Fall, 1999	Yes	Yes	No	No
SEA Numeracy Test - Spring, 2000	Yes	Yes	No	No
2000-2001				
Clay Observational Survey - Fall, 2000	Yes	Yes	Yes	No
Clay Observational Survey - Spring, 2001	Yes	Yes	Yes	Yes
Reading Achievement (Book Level) - Spring, 2001	Yes	Yes	Yes	Yes
SEA Numeracy Test - Fall, 2000	Yes	Yes	Yes	No
SEA Numeracy Test - Spring, 2001	Yes	Yes	Yes	No

Organization of Findings

In all cases, the reporting of findings begins with the analysis of the literacy task measures (Clay Observation Survey), followed by the reporting of the results of the numeracy/math data. Results will be presented under each sub-test according to the following organization, first full-day, then three-quarter-day, and then comparisons of the performance of both of these groups with the control group and with levels established by the performance of students in the regular, half-day program, as outlined below.

Cohort Analyses

Full-Day (Literacy)

- Results of the analyses comparing 1999-2000 with the 1997-1998 cohort for the full-day program including comparisons with divisional norms.
- Results of the analysis comparing 2000-2001 with the 1997-1998 cohort for the full-day option including comparisons with divisional norms.

Three-Quarter-Day (Literacy)

- Results of the analyses comparing 1999-2000 with the 1997-1998 cohort for three-quarter-day programs including comparisons with divisional norms.
- Results of the analysis comparing 2000-2001 with the 1997-1998 cohort for the three-quarter-day option including comparisons with divisional norms.

Control Group Analyses

Comparisons of Full- and Three-Quarter-Day Options (Literacy)

- Results of the 1999-2000 and 2000-2001 comparisons with control schools and comparisons with regular half-day program from schools not involved in the project.
- Repeated measures analyses of variance was carried out to examine performance gains from the beginning to the end of the year in 2000-20001.

Incidence of Low Performance Compared to Clay's Norms

Comparisons of Full- and Three-Quarter-Day Options (Numeracy)

- Under each of subtest of the SEA Numeracy Test, the results of the analyses for 2000-2001 with the comparison with control groups will be presented; data from 1999-2000 were restricted only to a comparison between the full-day and three-quarter-day options.

Findings: Literacy Development

Full-Day Cohort Analyses

Letter Identification

Year I of the evaluation (1999-2000). As displayed in the accompanying Table that shows both means and standard deviations, the difference in mean performance between the 1999-2000 full-day target group and the corresponding 1997-1998 half-day cohort groups on the letter identification task was significant at the $p < .001$ for the full-day group ($F_{(1,145)} = 29.511$). The corresponding effect size was $g = .65$, indicating that students in the full-day target group were performing at approximately the 74th percentile compared to the 1997-1998 cohort. When performance was compared to divisional norms for 1999-2000, the effect size for the full-day option was $g = .39$ showing that, on average, the full-day option students were performing 24 percentile points above divisional expectations (74th percentile). The maximum score for letter identification is 54.

Letter Identification: 1999-2000 Compared to 1997-1998 Cohort

1997-1998	1999-2000	*F -ratio (1,145)*	Effect Size Compared to 1997-1998	Effect Size Compared to 2000 Divisional Norms
44.28 (12.34)	52.24 (3.88)	29.511**	.65 (74th %ile)	.39 (65th %ile)

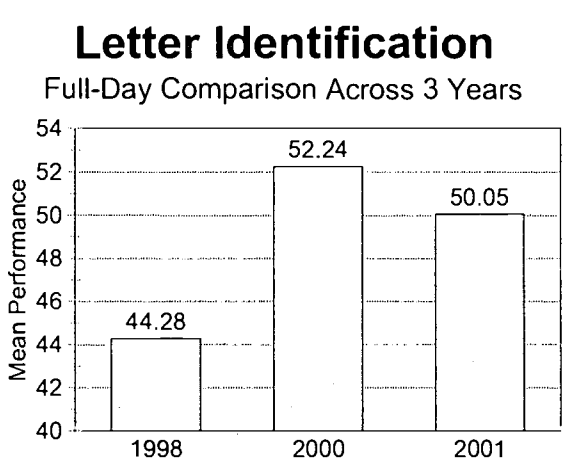
** $p < .001$

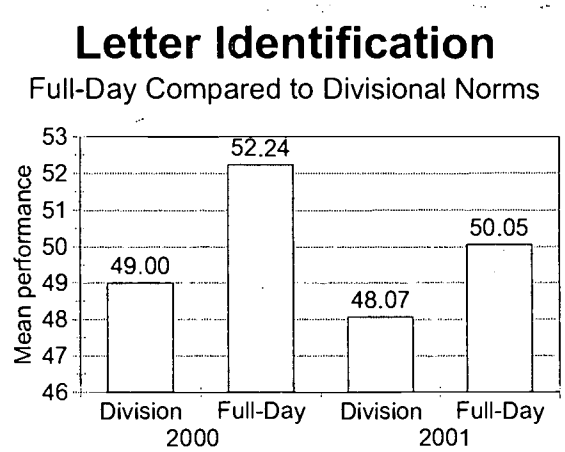
Year II of the evaluation (2000-20001). These findings were repeated in 2000-2001, with students in the full-day option outperforming students division-wide who were in the 1997-1998 half-day programs.($F_{(1,145)} = 9.776, p < .01$). The effect size of $g = .47$ for the full-time option, indicating that the performance of these students exceeded that of the cohort group at approximately the 68th percentile. When the performance of the full-day students was compared to divisional norms for 2000-2001, the resulting effect size was $g = .17$ (57th percentile) indicating that in terms of being able to identify letter names, the full-day students were performing 7 percentile points above their peers division-wide. These findings are depicted in the table below. The figures below provide a visual representation of the findings across both years of the evaluation.

Letter Identification: 2000-2001 Compared to 1997-1998 Cohort

1997-1998	2000-2001	*F -ratio (1,145)*	Effect Size Compared to 1997-1998	Effect Size Compared to 2001 Divisional Norms
44.28 (12.34)	50.05 (10.03)	9.776*	.47 (68th %ile)	.17 (57th %ile)

* $p < .01$





Word Identification

Year I of the evaluation (1999-2000). With the maximum score for naming words in isolation being 15, comparisons between the mean performance of the 1999-2000 full-day target group and the corresponding 1997-1998 cohort group, that attended kindergarten half-days, indicated, as shown in the accompanying Table, that the performance of students in the full-day option was superior ($F_{(1,145)} = 52.781, p < .001$). The effect size was $g = 1.56$ (94th percentile). Comparisons with divisional norms in 1999-2000 indicated, similarly, that students in the full-day option were achieving above divisional expectations that year ($g = .30$, 61st percentile), which is 11 percentile points above that of students in the 1999-2000 half-day option.

Word Identification: 1999-2000 Compared to 1997-1998 Cohort

1997-1998	1999-2000	*F -ratio (1,145)*	Effect Size Compared to 1997-1998	Effect Size Compared to 2000 Divisional Norms
1.84 (3.25)	6.91 (4.89)	52.781**	1.56 (94th %ile)	.30 (61st %ile)

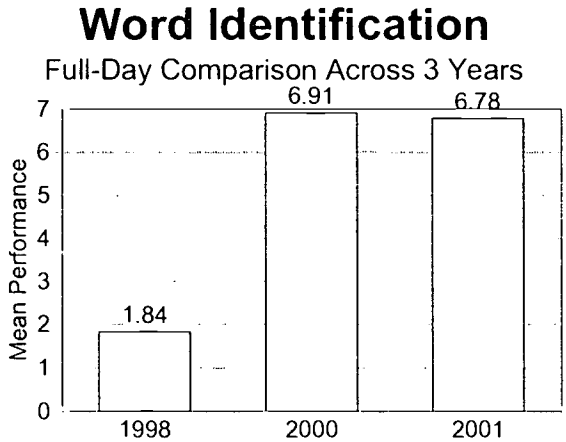
** $p < .001$

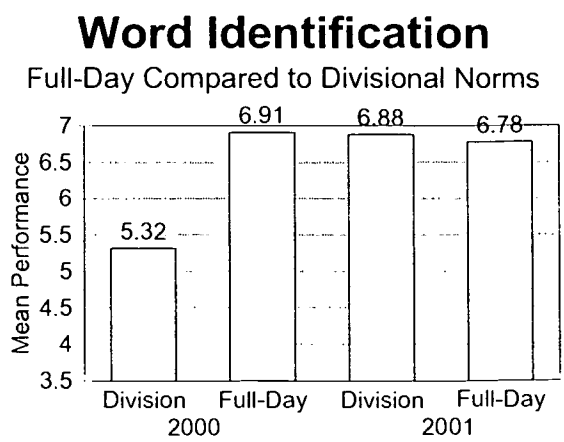
Year II of the evaluation (2000-20001). As depicted in the following Table. the results were similar for 2000-2001, with students in the full-day option outperforming students who attended half-days in 1997-1998 before the full-day option was introduced. Differences in mean performance between the 2000-2001 target and the corresponding 1997-1998 cohort for word identification were significant at the $p < .001$ level ($F_{1,145)} = 53.521$) for the full-day option. The effect size was $g = 1.05$ showing that, on average, the full-day option students were performing 35 percentile points above the half-day cohort group (85th percentile). Again, when the performance of students in 2000-2001 was compared to that of students division-wide, findings showed an effect size of $g = -.02$ (50th percentile), indicating that students in the full-day program were performing at approximately the same level as students division-wide. The following figures display these analyses.

Word Identification: 2000-2001 Compared to 1997-1998 Cohort

1997-1998	2000-2001	*F -ratio (1,145)*	Effect Size Compared to	Effect Size Compared to 2001 Divisional Norms
1.84 (3.25)	6.78 (5.21)	53.521**	1.05 (85th %ile)	-.02 (50st %ile)

** $p < .001$





Concepts about Print

Year I of the evaluation (1999-2000). For students in the full-day option, the difference in mean performance between the 1999-2000 target and 1997-1998 cohort groups was significant at the $p < .001$ for the full-day group ($F_{1,145)} = 18.08$) with an effect size of $g = .62$, indicating that full-day students outperformed cohort students by 23 percentile points (73rd percentile). The score for mastery on this task is 24. When the mean performance of full-day option students was compared to 1999-2000 divisional norms, the effect size, however, was $g = -.25$, indicating that the performance of the full-day group was below divisional norms (40th percentile), which is 10 percentile points below expectations. (Refer to the following Table.)

Concepts about Print: 1999-2000 Compared to 1997-1998 Cohort

1997-1998	1999-2000	*F -ratio (1,145)*	Effect Size Compared to 1997-1998	Effect Size Compared to 2000 Divisional Norms
12.57 (4.77)	15.53 (3.65)	18.08**	.62 (73rd %ile)	-.25 (40th %ile)

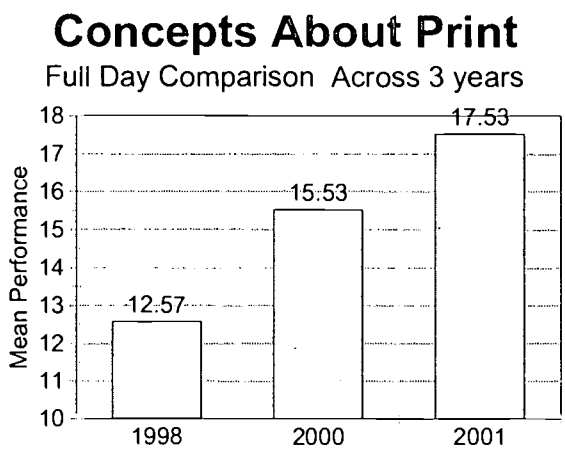
** $p < .001$

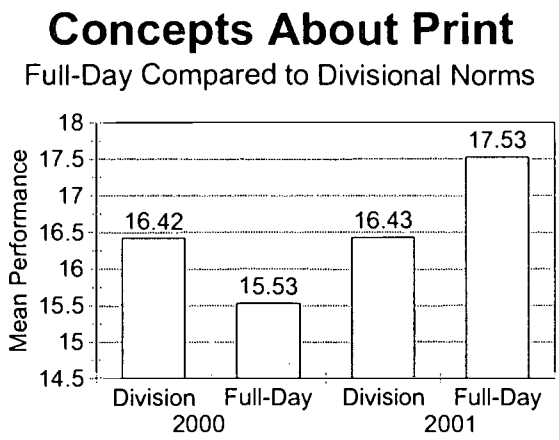
Year II of the evaluation (2000-2001). Performance on the concepts about print task did, nonetheless, fulfill expectations in 2000-2001. Comparisons between the performance of the full-day students with their 1997-1998 counterparts division-wide revealed that students in the full-day option performed significantly better ($F_{1,145)} = 40.201, p < .001$). The effect size was calculated as $g = 1.06$, indicating that the full-day students outperformed the cohort students by 36 percentile points (86th percentile) in 2000-2001. The effect size comparing concepts about print performance for full-day option students with 2000-2001 divisional norms was $g = .23$ (59th percentile), indicating that the performance of full-day option students exceeded that of their peers by 9 percentile points. (See table below.) The accompanying figures display these comparisons.

Concepts about Print: 2000-2001 Compared to 1997-1998 Cohort

1997-1998	2000-2001	*F -ratio (1,145)*	Effect Size Compared to 1997-1998	Effect Size Compared to 2001 Divisional Norms
12.57 (4.77)	17.53 (4.69)	40.201**	1.06 (86th %ile)	.23 (59th %ile)

** $p < .001$





Writing Vocabulary

Year I of the evaluation (1999-2000). As shown in the accompanying Table, the difference in mean performance between the 1999-2000 target groups and the corresponding 1997-1998 cohort groups on writing vocabulary was significant ($p < .001$) for full time students ($F_{1,145} = 78.245$). The corresponding effect size for full-time students was $g = 2.61$, indicating that students were performing at approximately the 99th percentile compared to the cohort. When compared to 2000 divisional norms, the effect size for the full-day option was $g = .58$ (71st percentile), that is 21 percentile points above division-wide norms that year.

Writing Vocabulary: 1999-2000 Compared to 1997-1998 Cohort

1997-1998	1999-2000	*F -ratio (1,145)*	Effect Size Compared to 1997-1998	Effect Size Compared to 2000 Divisional Norms
7.03 (6.49)	23.97 (14.60)	78.245**	2.61(99th %ile)	.58 (71st %ile)

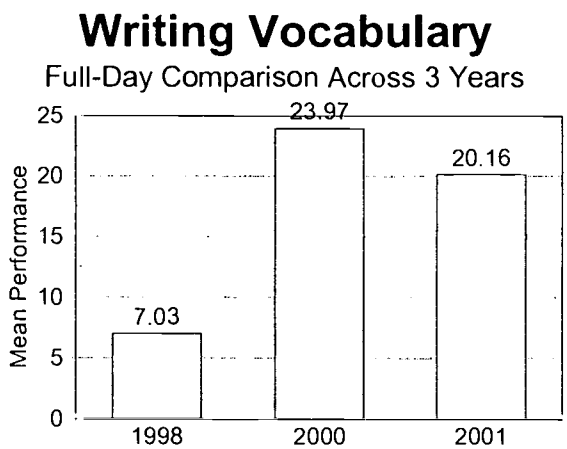
** $p < .001$

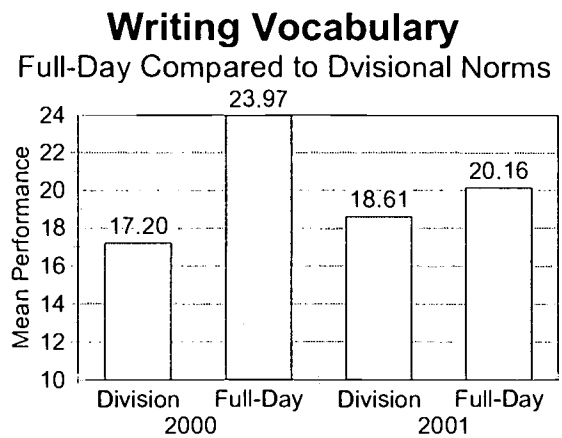
Year II of the evaluation (2000-2001). As was the case in 1999-2000, the difference in mean performance between the 2000-2001 target and corresponding 1997-1998 cohort groups on writing vocabulary (see Table below), was significant for students in the full-day option ($F_{1,145)} = 187.782$, $p < .001$). The corresponding effect size for the full-time group was $g = 1.01$, indicating that these students were performing at approximately the 84th percentile compared to the cohort. When compared to 2000-2001 divisional norms, the effect size for the full-day option was $g = .11$ (54st percentile), which is four percentile points above the norm. These data are displayed in the following figures.

Writing Vocabulary: 1999-2000 Compared to 1997-1998 Cohort

1997-1998	2000-2001	*F -ratio (1,145)*	Effect Size Compared to 1997-1998	Effect Size Compared to 2001 Divisional Norms
7.03 (6.49)	20.16 (12.94)	187.782**	1.01(84th %ile)	.11 (54th %ile)

** $p < .001$





Dictation (Hearing and Recording Sounds in Words)

Year I of the evaluation (1999-2000). The maximum score for dictation is 37. When comparisons with the cohort group for dictation were carried out, the overall pattern was repeated; that is students in the full-day option performed significantly better ($p < .001$) than their cohorts in 1997-1998 ($F_{1,145)} = 269.611$). The corresponding effect size was $g = 2.18$ (99th percentile) for the full-day group, indicating that the performance of the students in the full-day option was 49 percentile points above that of their peers in the half-day option in 1997-1998. When the 1999-2000 performance was compared to divisional norms, the effect size for the full-day group was $g = .79$ (78th percentile), showing that students in the full-day option were still performing better than their peers by 28 percentile points.

Dictation: 1999-2000 Compared to 1997-1998 Cohort

1997-1998	1999-2000	*F -ratio (1,145)*	Effect Size Compared to 1997-1998	Effect Size Compared to 2000 Divisional Norms
10.78 (9.91)	32.43 (5.81)	269.611**	2.18 (99th % ile)	.79 (78th %ile)

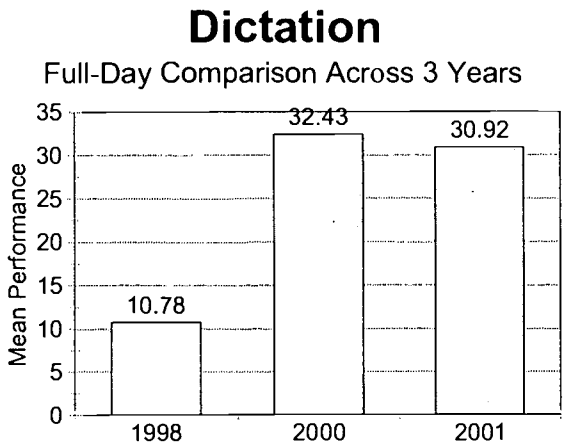
** $p < .001$

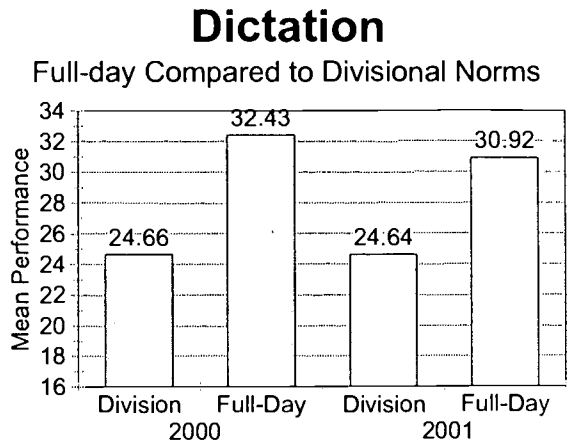
Year II of the evaluation (2000-2001). When performance comparisons were made between the performance of full-day students in 2000-20001 and students in 1997-1998 before the introduction of the project, there was a statistically significant overall effect ($F_{(1,145)} = 57.554, p < .001$). The effect size was $g = 2.03$ (98th percentile) in favour of the full-day option students. As indicated in the accompanying table, the effect size for the performance of students in the full-day option and students division-wide was $g = .58$. The full-day students were performing at the 72nd percentile, 22 percentile points above the divisional norms, repeating the pattern established in 1999-2000. These data are displayed in the accompanying figures.

Dictation: 2000-2001 Compared to 1997-1998 Cohort

1997-1998	2000-2001	*F -ratio (1,145)*	Effect Size Compared to 1997-1998	Effect Size Compared to 2001 Divisional Norms
10.78 (9.91)	30.92 (7.91)	57.554**	2.03(98th %ile)	.58 (72nd %ile)

** $p < .001$





Summary of Cohort Analyses Findings: Full-Day Option

1999-2000. As revealed in Table 1 (See Appendix) that summarizes the comparisons between the 1997-1998 cohort, the pattern that evolved when the performance of the 1999-2000 full-day kindergarten students (Year I of the evaluation) was compared to that of the 1997-1998 cohort group, in which attendance at kindergarten was only half-time, was significance for all measures (letter and word identification, concepts about print, writing vocabulary and dictation). While the analysis of variance showed significant effects for concepts about print, the effect size (g = -.25, 40th percentile) for that measure showed that the full-day students in 1999-2000 were performing10 percentile points below their divisional peers.

2000-2001. Findings from the cohort analysis of the performance of full-day students in Year II of the project (2000-2001) were also positive for all measures, especially when compared to the performance of the 1997-1998 cohort group. The effect sizes for the comparisons with divisional norms in 2000-2001 indicated that the performance of students in the full-day kindergarten was equal to (50th percentile for word identification) or surpassed division-wide performance by a range of 4 to percentile points, except for dictation in which case the performance of those in the full-day option exceeded that of the peer group by 22 percentile points. These results are depicted in Table 2 (appended).

Conclusion. When compared to cohort group performance, the 1999-2000 full-day group outperformed the 1997-1998 cohort group on all measures, but when effect sizes were calculated using 1999-2000 divisional norms, results were above expectations on all measures except concepts about print. When compared to both cohort group

performance and divisional norms, results for 2000-2001 were similar to those of 1999-2000, with students in the full-day option surpassing the performance of the 1997-1998 cohort group on all measures, including meeting expectations on the concepts about print task. Effect size comparisons with 2000-20001 divisional norms showed, however, that performance on the word identification task was equal.

Three-Quarter-Day Cohort Analyses

Letter Identification

Year I of the evaluation (1999-2000). As indicated in the accompanying Table which also shows means and standard deviations, the difference in mean performance between the 1999-2000 three-quarter-day target group and the corresponding 1997-1998 half-time cohort group on the letter identification task was significant at the $p < .001$ for the three-quarter day group ($F_{1,90)} = 13.383$). The corresponding effect size was $g = .66$, indicating that students in the three-quarter-day option were performing at approximately the 75th percentile compared to the cohort group. The comparison of the three-quarter day students with divisional norms in 1999-2000, however, denoted an effect size of $g = -.33$, indicating that this group was performing 13 percentile points below divisional expectations (37th percentile).

Letter Identification: 1999-2000 Compared to 1997-1998 Cohort

1997-1998	1999-2000	*F -ratio (1,90)*	Effect Size Compared to 1997-1998	Effect Size Compared to 2000 Divisional Norms
35.43 (16.80)	46.28 (10.45)	13.383**	.66 (75th %ile)	-.33 (37th %ile)

** $p < .001$

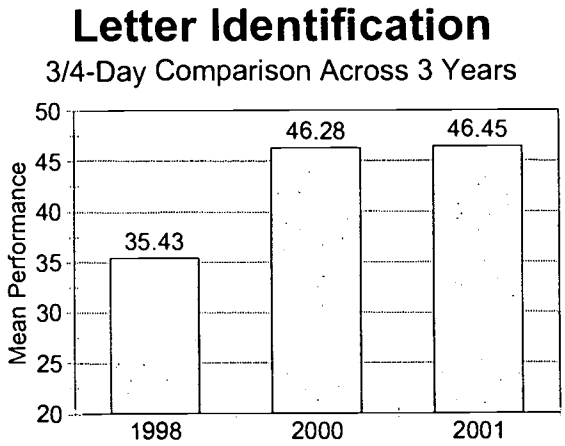
Year II of the evaluation (2000-2001). The difference in mean performance between the 2000-2001 target and corresponding 1997-1998 half-day cohort group on letter identification was significant for the three-quarter day group ($F_{1,170)} = 20.710$, $p < .001$), with an effect size of $g = .54$ for the three-quarter day option, indicating that they were performing at the 71st percentile compared to their cohort. Division-wide comparisons using 2000-2001 norms revealed an effect size for the three-quarter-day option of $g = -.15$ (44th percentile) which was below divisional norms. Although the

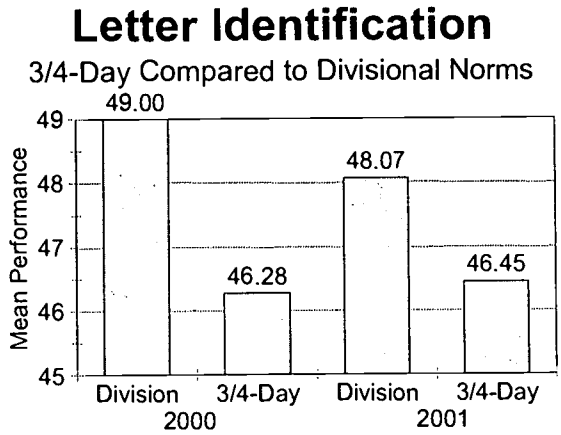
three-quarter-day students outperformed their 1997-1998 analogues in both years of the evaluation, in neither year did they meet divisional expectations. Refer to the following Table. These data are exhibited in the following figures.

Letter Identification: 2000-2001 Compared to 1997-1998 Cohort

1997-1998	2000-2001	*F -ratio (1,170)*	Effect Size Compared to 1997-1998	Effect Size Compared to 2001 Divisional Norms
35.43 (16.80)	46.29 (12.93)	20.710**	.54 (71st %ile)	- .15 (44th %ile)

** $p < .001$





Word Identification

Year I of the evaluation (1999-2000). When mean group comparisons were made between the 1999-2000 students and their 1997-1998 counterparts, findings for the three-quarter day group on word identification were significant ($F_{1,90} = 61.059, p < .001$) with a corresponding effect size of $g = 3.21$ (99th percentile), suggesting that students in the three-quarter-day option were performing 49 percentile points above their peers before the introduction of the three-quarter-day option. When the performance of the 1999-2000

three-quarter-day students was compared with that of students division-wide, the results indicated an effect size of $g = .47$ (68th percentile). That is, in terms of being able to identify words on a list, the students who attended kindergarten in the three-quarter-day option in 1999-2000 were performing at a level that was 18 percentile points above divisional averages.

Word Identification: 1999-2000 Compared to 1997-1998 Cohort

1997-1998	1999-2000	*F -ratio (1,90)*	Effect Size Compared to 1997-1998	Effect Size Compared to 2000 Divisional Norms
1.78 (1.89)	7.84 (5.05)	61.059**	3.21 (99th %ile)	.47 (68th %ile)

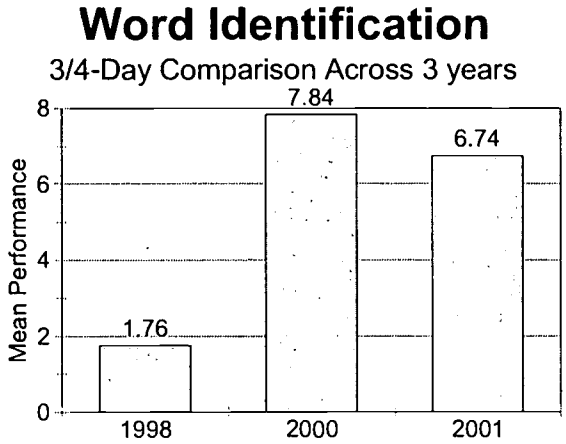
** $p < .001$

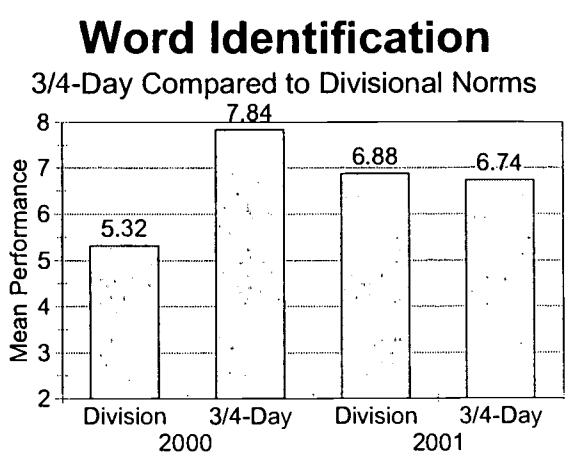
Year II of the evaluation (2000-2001). As shown in the following table and figures, the results of the statistical analysis comparing the performance of students in the three-quarter day option in 2000-20001 with that of their counterparts in 1997-1998, who attended kindergarten for half-days only, revealed statistically significant findings ($F_{(1,170)} = 41.092, p < .001$). Corresponding effect sizes were $g = 2.61$ (99th percentile) for the three-quarter day option. Comparisons with divisional norms that year indicated that students in the three-quarter-day option were performing approximately at divisional levels for word identification ($g = -.03$, 49th percentile), which is one percentile point below division-wide expectations and not commensurate with expectations established by the performance of the three-quarter-day option students in 1999-2000.

Word Identification: 2000-2001 Compared to 1997-1998 Cohort

1997-1998	2000-2001	*F -ratio (1,170)*	Effect Size Compared to 1997-1998	Effect Size Compared to 2001 Divisional Norms
1.78 (1.88)	6.68 (5.22)	41.092**	2.61 (99th %ile)	-.03 (49th %ile)

** $p < .001$





Concepts About Print

Year I of the evaluation (1999-2000). The comparison of the performance of three-quarter-day option with that of their peers in 1997-1998, preceding the introduction of the three-quarter-day option, showed that there were no statistically significant differences between the two groups ($F_{(1,90)} = 2.452$, ns). The effect size for this difference ($g = .33$) indicated, however, that the three-quarter day students were performing at the 63rd percentile compared to cohort students, which is 13 percentile points above divisional norms. Comparisons with their counterparts division-wide in 1999-2000 indicated that the three-quarter-day option students were performing at about par, however ($g = .10$, 54th percentile), 4 percentile points above divisional norms. These results are depicted in the following Table.

Concepts About Print: 1999-2000 Compared to 1997-1998 Cohort

1997-1998	1999-2000	*F -ratio (1,90)*	Effect Size Compared to 1997-1998	Effect Size Compared to 2000 Divisional Norms
15.45 (4.07)	16.79 (4.14)	2.452 (ns)	.33 (63rd %ile)	.10 (54th %ile)

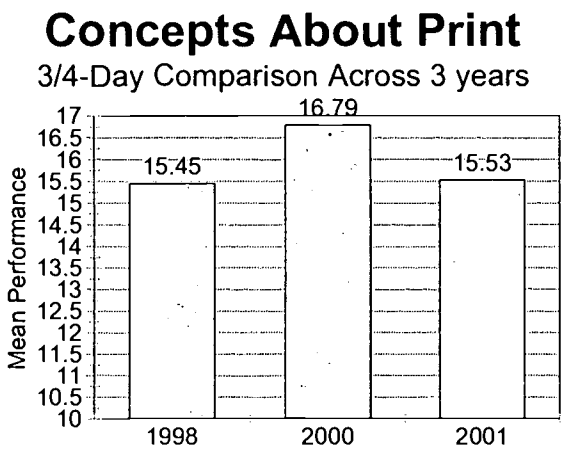
ns (non-significant)

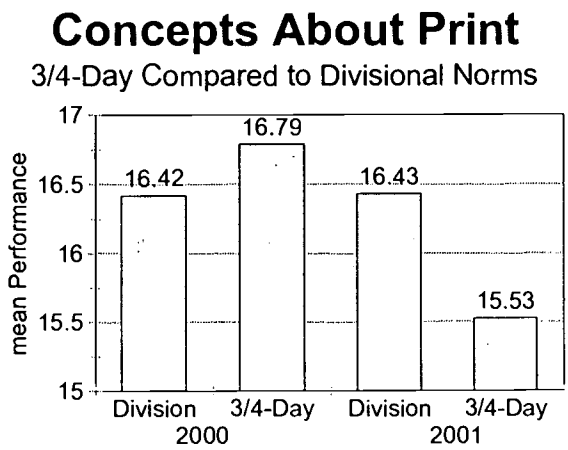
Year II of the evaluation (2000-2001). When the data for concepts about print comparing the performance of 2000-2001 students with their peers in 1997-1998 were analyzed, findings showed, similarly, that the performance difference between three-quarter-day students and this cohort group was not significant ($F_{1,170}$ = .006, ns). As indicated by the effect size for this difference (g = .01), the three-quarter day students were performing at the 50th percentile, that is, approximately the same as the cohort students. The effect size that resulted from the comparisons between the three-quarter day group and their peers division-wide in 2000-2001 indicated that the performance of students in the three-quarter-day option did not exceed that of students in the half-day group. The effect size was g = -.19, confirming that three-quarter-day student performance was below the expected norms (42nd percentile). These data are displayed in the following table and figures.

Concepts About Print: 2000-2001 Compared to 1997-1998 Cohort

1997-1998	2000-2001	*F -ratio (1,170)*	Effect Size Compared to 1997-1998	Effect Size Compared to 2001 Divisional Norms
15.45 (4.07)	15.51 (4.96)	.006 (ns)	.01 (50th %ile)	-.19 (42nd %ile)

ns (non-significant)





Writing Vocabulary

Year I of the evaluation (1999-2000). The difference in mean performance between the 1999-2000 three-quarter-day target group and the corresponding 1997-1998 cohort group on the writing vocabulary task was significant at the $p < .001$ in favour of the three-quarter day group ($F_{1,90)} = 18.086$). As suggested in the accompanying Table, the corresponding effect size was $g = 1.17$, indicating that students in the three-quarter-day option were performing at the 88th percentile compared to their 1997-1998 cohort. The comparison of the three-quarter day students with divisional norms in 1999-2000 denoted an effect size of $g = -.47$, however, indicating that this group was performing 18 percentile points below divisional expectations (32nd percentile) in 1999-2000.

Writing Vocabulary: 1999-2000 Compared to 1997-1998 Cohort

1997-1998	1999-2000	*F -ratio (1,90)*	Effect Size Compared to 1997-1998	Effect Size Compared to 2000 Divisional Norms
5.16 (5.55)	11.63 (8.84)	18.086**	1.17 (88th %ile)	-.47 (32nd %ile)

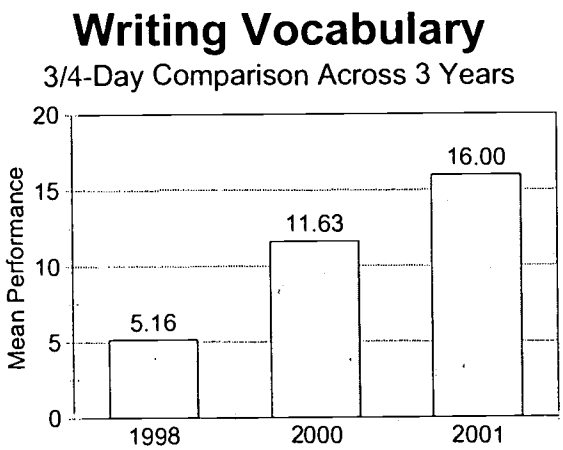
** $p < .001$

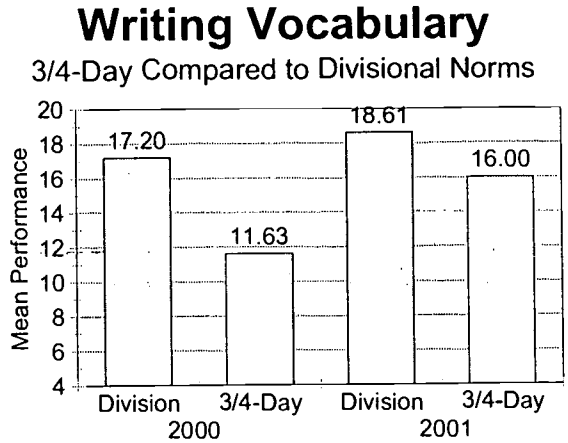
Year II of the evaluation (2000-2001). The difference in mean performance between the 2000-2001 target and corresponding 1997-1998 cohort group on writing vocabulary (following table) was significant for the three-quarter day group ($F_{1,170)} = 35.330, p < .001$). The effect size for the three-quarter day option compared to the 1997-1998 cohort was $g = 1.94$ (97th percentile, that is 47 percentile points above the cohort). The corresponding effect size for the comparison with 2000-2001 divisional norms for the three-quarter day option was $g = -.20$ (42nd percentile) which is 8 percentile points below division-wide performance. The following table and figures illustrate these findings.

Writing Vocabulary: 2000-2001 Compared to 1997-1998 Cohort

1997-1998	2000-2001	*F -ratio (1,170)*	Effect Size Compared to 1997-1998	Effect Size Compared to 2001 Divisional Norms
5.16 (5.55)	15.95 (12.19)	35.330**	1.94 (97th %ile)	-.20 (42nd %ile)

** $p < .001$





Dictation (Hearing and Recording Sounds in Words)

Year I of the evaluation (1999-2000). As depicted in the following Table, the difference in mean performance between the 1999-2000 target groups and the corresponding 1997-1998 cohort groups on the dictation sub-test was significant ($p <$ .001) for the three-quarter-day students ($F_{1,90}$ = 78.040). The corresponding effect size was g = 3.40, indicating that the three-quarter-day students were performing at approximately the 99th percentile compared to the cohort. When compared to 1999-2000 divisional norms, the effect size for the three-quarter-day option was g = -.41 (34th percentile, that is 16 percentile points below the norm).

Dictation: 1999-2000 Compared to 1997-1998 Cohort

1997-1998	1999-2000	*F -ratio (1,90)*	Effect Size Compared to 1997-1998	Effect Size Compared to 2000 Divisional Norms
4.98 (4.61)	20.65 (11.41)	78.040**	3.40 (99th %ile)	-.41 (34th %ile)

** $p < .001$

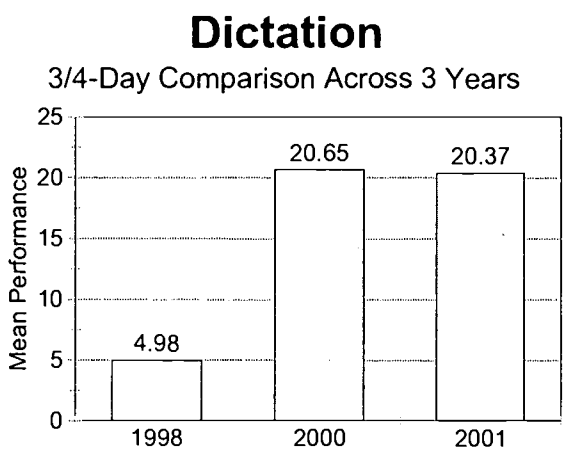
Year II of the evaluation (2000-2001). Cohort group comparisons showed that the three-quarter-day target group outperformed their 1997-1998 cohorts at the $p < .001$ level ($F_{1,171}$ = 70.705). The corresponding effect size for the three-quarter day group was g =

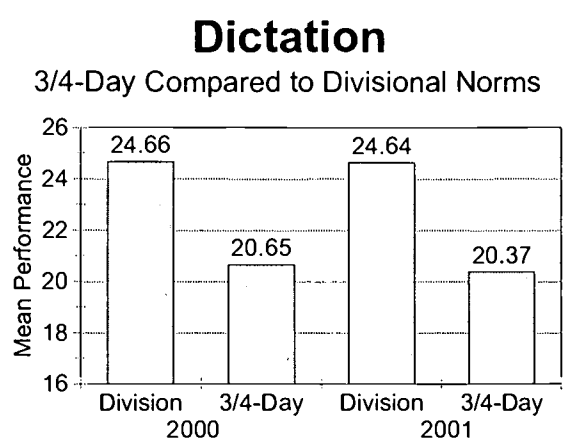
3.34 (99th percentile). Comparisons with divisional norms, on the other hand, revealed an effect size of g = -.40 (34th percentile) for the three-quarter-day option, which is also 16 percentile points below divisional norms. The data are displayed in the following table and figures.

Dictation: 2000-2001 Compared to 1997-1998 Cohort

1997-1998	2000-2001	*F -ratio (1,171)*	Effect Size Compared to 1997-1998	Effect Size Compared to 2001 Divisional Norms
4.98 (4.61)	20.37 (12.45)	70.705**	3.34 (99th %ile)	-.40 (34th %ile)

** $p < .001$





Summary of Cohort Analyses Findings: Three-Quarter-Day Option

1999-2000. Compared to the results of the evaluation of the full-day option, findings from the 1999-2000 analysis of the data from the three-quarter-day option were not so clear-cut. According to the analysis of variance, the performance of students in this group exceeded that of the 1997-1998 cohort at statistically significant levels on all measures except concepts about print (see Table 1, appended for a summary), but when

effect sizes were used as the basis for comparison using divisional norms that year, this group performed below expectations on all measures except word identification, although performance met expectation levels on concepts about print. Effect sizes for letter identification, writing vocabulary, and dictation were below divisional standards.

2000-2001. The results for the three-quarter day option analysis of variance in 2000-2001 showed that students outperformed the cohort on all measures except concepts about print. Cohort effect sizes ranged from 49 percentile points above expectation for word identification and dictation to 25 percentile points for letter identification, with the effect size for concepts about print (51st percentile) meeting expectations. When performance was compared to divisional norms, however, this three-quarter-day group performed below expectations on all measures (refer to the summary Table 2, appended).

Conclusions: Full-day option. The conclusions in reference to the full-day option were compelling. The full-day option outperformed the cohort groups on all measures in both years. Effect sizes when compared to the cohort groups and the control groups ranged from .44 (67th percentile) to 2.90 (99th percentile). When compared to divisional norms, the full-day option met or exceeded expectations on all measures except concepts about print. Given the low socio-economic status of the schools in the full-day option, these results show that a full-day program can compensate for economic disadvantages. In fact, in this study, socio-economically disadvantaged students generally performed at the same levels or above their more advantaged suburban counterparts.

Conclusions: Three-quarter-day option. The analysis of variance showed that the performance of the students in the three-quarter-day option compared to the cohort group in both 1999-2000 and 2000-2001 was superior, except for concepts about print. Effect size comparisons using divisional norms, however, suggested that students in the three-quarter-day option did not measure up to expectations, except for word identification (where performance was superior in 1999-2000 and equal in 2000-2001), and concepts about print (where performance was approximately equal in 1999-2000, but not in 2000-2001). These findings suggest that the value of the three-quarter-day option was open to question.

Control group and division-wide norm comparisons for literacy are reported on, task by task, next. The examination of these data reinforce the efficacy of the full-day kindergarten option as opposed to the three-quarter-day option.

Results of Both Years Compared to the Performance of Control Group and Regular Students

In 1999-2000 (Year I of the evaluation), only post-test data were analyzed using Clay's literacy measures for all groups (full-day, three-quarter-day, control, and regular half-day). In 2000-2001 (Year II of the evaluation), however, both pre- and post-test data were analyzed for the full-day, three-quarter-day, and control groups. Post-test data only were analyzed for the regular students in the half-day program in both years of the evaluation. Therefore, analysis involving regular half-day students was carried out only on the post-test data (Spring).

Letter Identification

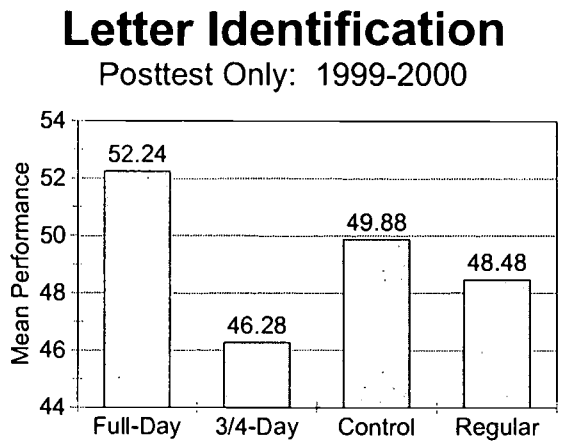
Year I of the evaluation (1999-2000). The results of the analysis from both years with the control groups and regular half-day program students division-wide are displayed in the following Table. With the maximum score for letter identification being 54, the difference in mean performance between the two options, control group and regular students was significant ($F_{(3,560)} = 6.609$, $p < .001$). *Post-hoc* analysis indicated: (1) that the performance of students in the full-day option was better than both that of students in the control group and that of students in the regular half-day program division-wide, (2) that the performance of students in the regular half-day program was equal to that of students in the control group, but (3) that the performance of students in both of these groups was superior to that of students in the three-quarter-day option.

The corresponding effect sizes comparing first, option and control group performance and then the performance of option students with that of half-day students, indicated that the performance of students in the full-day option exceeded that of the control group ($g = .44$, 67th percentile), while the performance of students in the three-quarter day option was below that of the control group ($g = -.67$, 25th percentile). Effect sizes when the performance of each of these target groups was compared to the performance of half-day students were: $g = .43$ (67th percentile) for students in the full-day option; and $g = -.25$ (40th percentile) for students in the three-quarter-day option. The performance of students in the first year of the intervention showed that, when performance on the letter identification task was used as an indicator, the full-day option was superior to both the regular and control group options with no support for the three-quarter-day option.

Letter Identification: Comparisons across Program Options
1999-2000: Post-Test Only

	M (sd)	*F-ratio* (3,560)	Post Hoc	Effect Size Compared to Control‡	Effect Size Compared to Regular‡
Full-Day	52.24 (3.88)	6.609**	F>R=C>3/4	.44 (67th)	.43 (67th)
3/4-	46.28 (10.45)			-.67 (25th)	-.25 (40th)
Control	49.88 (5.36)				.16 (56th)
Regular	48.48 (8.79)				

‡Percentile equivalent in parentheses
**p <.001



Year II of the evaluation (2000-2001). What is evident from examining pre- to post-test mean performance and growth patterns illustrated in the following Tables and the graph, is that students in the full- and three-quarter-day options made considerable gains over the year ($\bar{x}$ = 19.38 full-day option pre-test, to $\bar{x}$ = 50.05, post-test; $\bar{x}$ = 28.32 three-quarter-day option pre-test to $\bar{x}$ = 46.29, post-test). These differences resulted in a significantly different growth pattern for the three groups (full-day, three-quarter-day, and control) with $F_{(32,227)} = 32.368$, $p < .001$ on the repeated measures analysis. The pre-test differences among the full- three-quarter-day and control group students showed significant pre-test differences ($F_{(3, 560)} = 10.675$, $p < .001$). The pre-test post-hoc analysis indicated that while the performance of students in the control group and the three-

quarter-day option was equal and significantly better than the performance of students in the full-day program option. The post-test analysis showed a significant difference among groups ($F_{(3,476)} = 9.387$ $p < .001$) in that the ability of students in the full-day option to identify letter names was equal to that of their more affluent peers in the regular program, and the performance of students in both of these groups was superior to the performance of students in the three-quarter-day option, which, in turn, was better than the performance of students in the control group.

The post-test corresponding effect sizes (each option compared to the control group) were $g = .51$ for the full-time option, indicating that these students outperformed the control group at approximately the 70th percentile, and $g = .29$ for the three-quarter day option (61st percentile), indicating that the performance of students in each of these options was better than that of control group students. When the post-test effect sizes comparing the performance of students (full-, three-quarter-day and control) with the performance of students in the regular half-day program were examined, however, the performance of the half-day students was approximately equal to the performance of the students in the regular program ($g = .04$, 52nd percentile), while the performance of students in the three-quarter-day and control groups was less than would be expected ($g = -.41$, 34th percentile, and $g = .-98$, 16th percentile), again supporting the efficacy of the full-day option for students in economically disadvantaged neighbourhoods who, at the beginning of the school year, were performing well below the control group in terms of knowledge of letter names, an important predictor of future success in reading.

As displayed in the figures below, it is evident that even though the full-day students began the year significantly below their peers in the three-quarter-day and control groups, they significantly exceeded those groups at the end of the year on letter identification, bringing them up to the performance of their counterparts from more affluent neighbourhoods. The full-day option clearly counteracted the effects of low soio-economic disparity on the measure of letter identification in both years of the study. The three-quarter-day option, however, was less successful in offsetting this disparity.

Letter Identification: Comparisons across Program Options
2000-2001: Pre- and Post-Test Data

	Pre-test M (sd)	Post-test M (sd)	Post-test Effect Size Compared to Control‡	Post-test Effect Size Compared to Regular‡
Full-Day	19.38 (16.65)	50.05 (10.03)	.51 (70th)	.04 (52nd)
3/4-	28.32 (17.32)	46.29 (12.93)	.29 (61st)	- .41 (34th)
Control	34.06 (18.33)	41.54 (16.61)		- .98 (16th)
Regular	--	49.71 (8.26)		

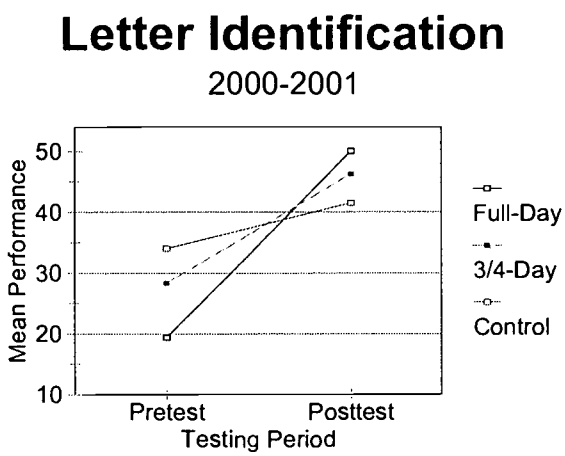
‡Percentile equivalent in parentheses

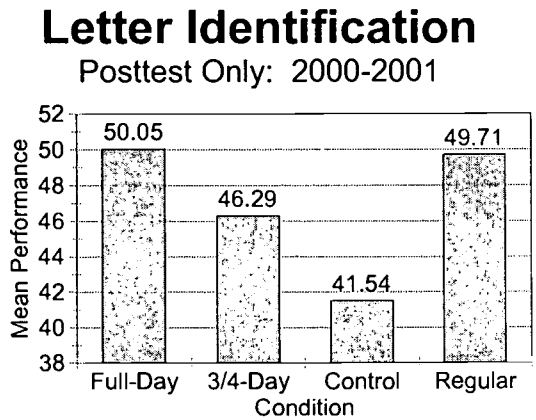
	Growth Comparison§ *(2,227)*	Pre-test *F-ratio (2,238)*	Pre-test Post Hoc	Post-test *F-ratio (3,476)*	Post-test Post Hoc
Letter Identification	32.368**	10.675**	C=3/4>F	9.387**	F=R>3/4>C

§Repeated Measures Analysis

*p<.01

**p<.001





Word Identification

Year I of the evaluation (1999-2000). The omnibus ANOVA for word identification for the 1999-2000 year indicated a significant difference among the groups ($F_{(3, 560)} = 11.045, p < .001$). The maximum score for word identification was 15. As indicated by mean performance shown in the accompanying Table, the *post-hoc* analysis confirmed that the year-end performance for the full- and three-quarter day options was equal, with the performance of both groups being significantly superior to that of the students in the regular half-day program and the control group. The effect size comparisons confirmed the superiority of the full- and three-quarter-day option students over the control group ($g = .84$, 80th percentile and $g = 1.08$, 86th percentile). Effect sizes when the performance of each of these target groups was compared to the performance of half-day students in more advantaged neighbourhoods were: $g = .42$ (66th percentile) for students in the full-day option; $g = .63$ (74th percentile) for students in the three-quarter-

day option, and g = -.29 (39th percentile) for students in the control group. The performance of students in the three-quarter-day option, who could read almost 8 of the 15 words, on average, was slightly above that of students in the full-day option students, who could read almost 7 of the 15 words. Students in the regular half-day program could read approximately 5 words, and control group students could read approximately 4 words.

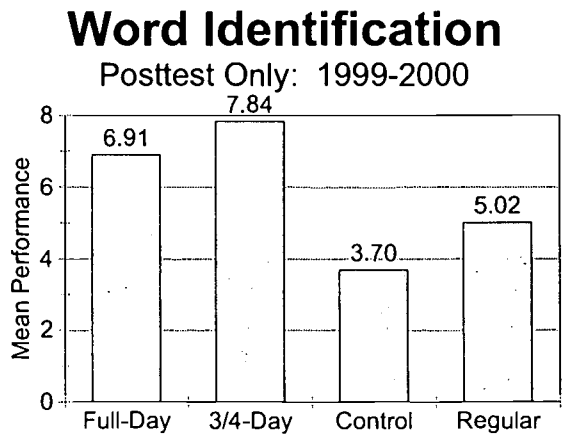
Word Identification: Comparisons across Program Option
1999-2000: Post-Test Only

	M (sd)	*F-ratio (3,560)*	Post Hoc	Effect Size Compared to Control‡	Effect Size Compared to Regular‡
Full-Day (F)	6.91 (4.89)	11.045**	F=3/4>R>C	.84 (80th)	.42 (66th)
3/4-DayDay (3/4)	7.84 (5.05)			1.08 (86th)	.63 (74th)
Control (C)	3.70 (3.83)				- .29 (39th)
Regular (R)	5.02 (4.46)				

‡Percentile equivalent in parentheses

*p<.01

**p<.001



Year II of the evaluation (2000-2001). As indicated in the following Tables, there were significant differences in the ability to identify words on a list among the full-day, three-quarter-day, and control groups at the beginning of the year in 2000-20001 ($F_{(2,228)} = 5.724, p < .01$), with the respective mean scores being $\bar{x}$ = .29 for full-day option students and $\bar{x}$ = .83 for three-quarter-day option students, which is less than one word

for both groups, and $\bar{x} = 1.49$ for the control group. When the performance of the regular half-day program students was also considered at the end of the school year, differences among the groups, indicated by the analysis of variance ($F_{1(3,476)} = 6.825, p < .001$), were also significant. *Post hoc* comparisons showed that the ability to name words in isolation was significantly better for control group students in the Fall. These students made relatively fewer gains, however, compared to students in the full- and three-quarter-day options. At the end of the year, the performance of students in both the full-day and three-quarter-day options were equivalent to the performance of students in the regular half-day program, and superior to the performance of students in the control group. The analysis of variance on growth patterns indicated that there were significant differences in how the three groups changed from the pre-test to the post-test ($F_{(2,227)} = 12.349, p < .001$). These data are displayed in the following figures

When effect sizes were calculated comparing the target groups with the control group, it was found that the performance of the full-day students was 23 percentile points above the control group ($g = .621$, 73rd percentile), and the performance of the three-quarter-day option was 24 percentile points above the control group ($g = .64$, 74th percentile). Effect size comparisons, using post-test results, also revealed that students in the full-day option did not perform as well as those in the regular half-day program ($g = .-.15$, 44th percentile - - which is 6 percentile points below the performance of regular students). Findings were similar for students in the three-quarter-day option ($g = .-.14$, 44th percentile - - which is also 6 percentile points below the performance of regular students). But the gap was very much wider for control group students from relatively similar disadvantaged neighbourhoods ($g = - .69$, 25th percentile), which is 25 percentile points below the performance of the students in the regular half-day program.

On word identification across the two years, it was found that both the full-day option students and the three-quarter-day option students were performing equal to or better than their counterparts in the regular half-day students who were from more advantaged neighbourhoods. When compared to students from a somewhat similar neighbourhood as the target schools, the growth patters of students who participated in the extended-day programs was superior. For example, see the pre-test/post-test comparisons as displayed in the first figure below showing that the slope of the line for the control group was very much flatter than that of the target groups.

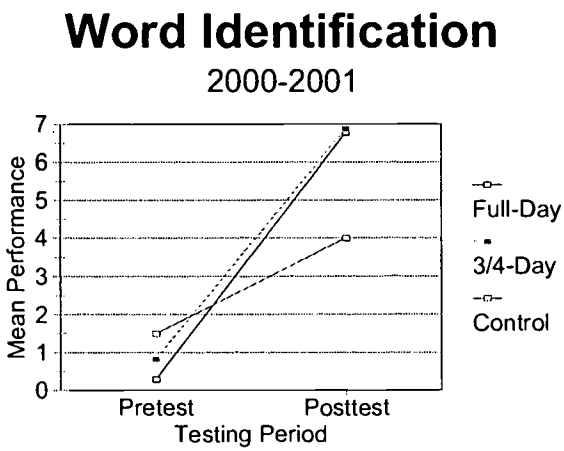
Word Identification: Comparisons across Program Option
2000-2001: Pre- and Post-Test Data

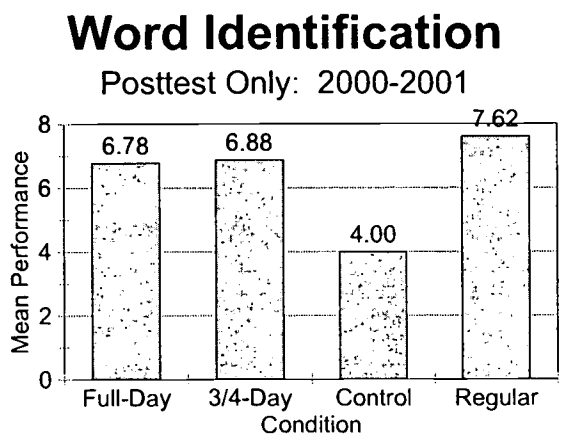
	Pre-test M (sd)	Post-test M (sd)	Post-test Effect Size Compared to Control‡	Post-test Effect Size Compared to Regular‡
Full-Day	.29 (.65)	6.78 (4.69)	.62 (73rd)	- .15 (44th)
3/4-DayDay	.83 (1.65)	6.88 (5.22)	.64 (74th)	- .14 (44th)
Control	1.49 (3.12)	4.00 (4.47)		- .69 (25th)
Regular	--	7.62 (5.27)		

‡Percentile equivalent in parentheses

	Growth Comparison§ (2,227)	Pre-test *F-ratio (2,228)*	Pre-test Post Hoc	Post-test *F-ratio (3,476)*	Post-test Post Hoc
Word Identification	12.349**	5.724*	C>3/4=F	6.825**	F=R=3/4>C

§Repeated Measures Analysis
*p<.01
**p<.001





Concepts about Print

Year I of the evaluation (1999-2000). As in previous analyses, a different pattern emerged for concepts about print. The omnibus ANOVA indicated that there were no post-test significant differences among the three target groups (full-day, three-quarter-day, control and regular half-day) in 1999-2000 ($F_{(3,560)} = 2.098$, ns). The effect size for the full-day option compared to the control group was $g = -.21$ (42nd percentile), while the effect size for the three-quarter day option was $g = .14$ (56th percentile), revealing that although these differences were not significant, the performance of students in the three-quarter-day option on the concepts about print task was 6 percentile points above that of control group students, while the performance of students in the full-day option was 8 percentile points below that of the control students. When the effect sizes including the performance of students in the regular half-day program were considered, however, findings revealed that students in the three-quarter-day option were able to perform at a relatively similar level to that of students in the regular program from more affluent homes ($g = .06$, 52nd percentile). The 1999-2000 end-of-year performance of students in the full-day option and control group was below that of students in the regular half-day program however ($g = -.30$, 38th percentile, and $g = -.08$, 47th percentile, respectively).

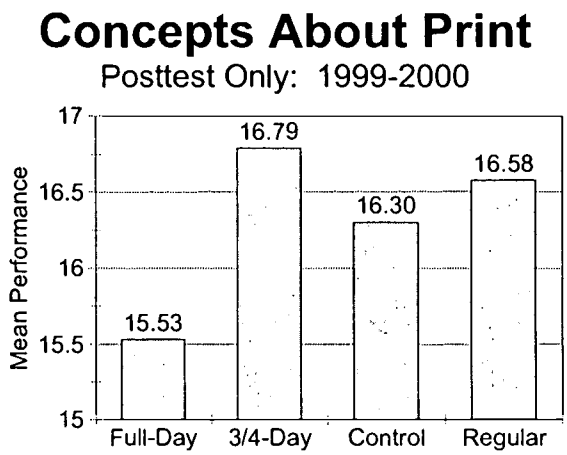
Concepts About Print: Comparisons across Program Option
1999-2000: Post-Test Only

	M (sd)	*F-ratio (3,560)*	Post Hoc	Effect Size Compared to Control‡	Effect Size Compared to Regular‡
Full-	15.53 (3.65)	2.098 ns	n/a	- .21 (42nd)	- .30 (38th)
3/4-	16.79 (4.14)			.14 (56th)	.06 (52nd)
Control	16.30 (3.59)				- .08 (47th)
Regular	16.58 (3.45)				

‡Percentile equivalent in parentheses

*p<.01

**p<.001



Year II of the evaluation (2000-2001). As indicated in the accompanying table and graph, at the beginning of the school year, the performance of students in the full-day option was significantly lower than the performance of either the three-quarter-day or the control group, the performance of the latter two groups being approximately equal ($F_{(2,227)} = 5.462, p < .01$). Comparisons for end-of-year performance showed that students in the control group made relatively small gains, but that students in the full-day option outperformed students in the three-quarter-day option, both outperforming students in the half-day control group ($F_{(3,475)} = 33.154, p < .001$). The accompanying graph reveals that the performance of the full-day students was similar to the performance of students in the regular half-day option ($\bar{x} = 17.53$ and 17.64, respectively) and the performance of students in the three-quarter-day option exceeded that of students in the half-day control school ($\bar{x} = 15.51$ and 11.11), but that students in both of these groups failed to measure up to the performance of students in the full-day and regular half-day programs. These growth differences were substantiated by the repeated measures analysis of growth patterns ($F_{(2,226)} = 55.249, p < .001$). These results are quite stunning, nonetheless, given the pre-test performance of students in the full-day option, which was lower than that of students in the other groups. The first figure below illustrates these differences in growth patterns.

The respective effect sizes when only control group comparisons were made were: $g = 1.50$ (93rd percentile in favour of the full-day option compared to the control group), and $g = 1.02$ (85th percentile favouring the three-quarter day option over the control group). When the performance of students in the regular half-day program was also weighed, the respective effect sizes were $g = -.03$ (49th percentile) for the full-day group, which indicated that students in the full-day option were performing at approximately par with regular students, which is impressive given their beginning of the year performance on concepts about print. Students in the three-quarter-day option and

the control group were unable to match these performance levels, however (g = -.56, 29th percentile, for the three-quarter-day option, and g = -1.70, 5th percentile, for the control group), which is 21 and 45 percentile points, respectively, below their counterparts in the regular half-day program.

As illustrated in the first figure below, the growth patter (from pre-test to post-test) was dramatic for the full-day students, somewhat less pronounced for the three-quarter-day students, and almost level for the control group. Although the analysis for the first year of the evaluation showed no significant differences among the groups on concepts about print, in the second year of the study, the data showed dramatic growth for the full-day students such that their performance was equal to that of students in the regular half-day program who were from more affluent backgrounds.

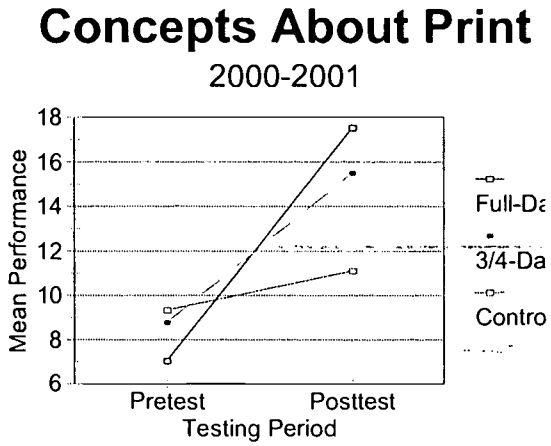
Concepts About Print: Comparisons across Program Option
2000-2001: Pre- and Post-Test Data

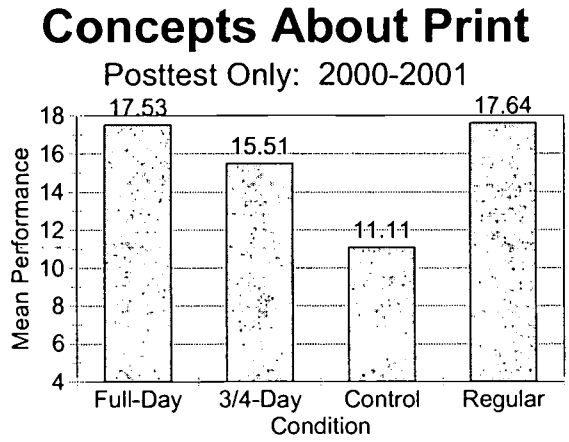
	Pre-test M (sd)	Post-test M (sd)	Post-test Effect Size Compared to Control‡	Post-test Effect Size Compared to Regular‡
Full-Day	7.03 (3.85)	17.53 (4.69)	1.50 (93rd)	-.03 (49th)
3/4-	8.77 (4.22)	15.51 (4.96)	1.02 (85th)	- 56 (29th)
Control	9.33 (4.01)	11.11 (4.29)		- 1.70 (5th)
Regular	--	17.64 (3.83)		

‡Percentile equivalent in parentheses

	Growth Comparison§ *(2,226)*	Pre-test *F-ratio (2,227)*	Pre-test Post Hoc	Post-test *F-ratio (3,475)*	Post-test Post Hoc
Concepts About Print	55.249**	5.462*	C=3/4>F	33.154**	F=R>3/4>C

§Repeated Measures Analysis
*p<.01
**p<.001





Writing Vocabulary

Year I of the evaluation (1999-2000). The analysis of variance on end-of the year data identified statistically differences in mean performance among 1999-2000 target groups, the control group and students in the regular half-day program ($F_{3,560)} = 15.096$, $p < .001$). According to the *post-hoc* analysis, full-day performance at the end of the year was superior to that of students in the regular half-day program and superior to the performance of students in both the control group and three-quarter day, which were equal, the respective means being 23.97 for the full-day, 17.04 for regular students, 13.53 for control students, and 11.63 for students in the three-quarter-day option Corresponding effect sizes were $g = 1.36$, for the full-day option indicating that, compared to the control group, these students were performing at approximately the 91st percentile. The effect size of $g = -.25$ for the three-quarter day option indicated that these students were performing below the control group at the 40th percentile. The effect sizes, when the performance of students in the regular half-day program were included in the analyses, indicated that the students in the full-day program scored at the 73rd percentile ($g = .61$), which is 23 percentile points above their half-day counterparts, students in the three-quarter-day option at the 32 nd percentile, 18 percentile below students in the regular half-day program ($g = -.48$), and students in the control group at the 38th percentile ($g = -.31$), 12 percentile points below the norm. These results are depicted in the following Table.

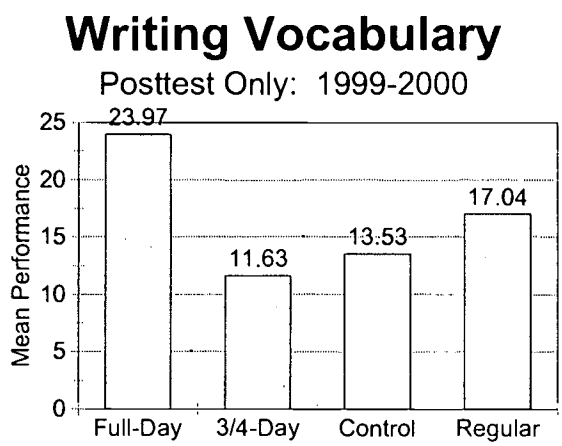
Writing Vocabulary Comparisons across Program Option
1999-2000: Post-Test Only

	M (sd)	*F-ratio (3,560)*	Post Hoc	Effect Size Compared to Control‡	Effect Size Compared to Regular‡
Full-Day (F)	23.97 (14.60)	15.096**	F>R>C=3/4	1.36 (91st)	.61 (73rd)
3/4-DayDay	11.63 (8.84)			- .25 (40th)	- 48 (32nd)
Control (C)	13.53 (7.68)				- .31 (38th)
Regular (R)	17.04 (11.34)				

‡Percentile equivalent in parentheses

*p<.01

**p<.001



Year II of the evaluation (2000-2001). The pre-post-test analysis for writing vocabulary indicated that the performance level of students in both the full- and three-quarter-day options was similar at the pre-test, but that the control group scored significantly higher ($F_{(2,227)} = 46.930, p < .001$). By the end of the year, nevertheless, the performance of the full-day students was equal to that of students in the regular half-day kindergarten, and significantly better than the performance of students in either the three-quarter-day option or the control group, whose performance was similar ($F_{(3, 475)} = 5.221$, $p < .001$). Mean performance is plotted in the accompanying figure with the means for students in the full-day option being $\bar{x} = 20.16$, the regular half-day students $\bar{x} = 20.37$, three-quarter-day students $\bar{x} = 15.95$, and control students $\bar{x} = 14.44$. Students in the full-day option were thus able to match the performance of students in the regular half-day program and outperform their counterparts in the three-quarter-day and control groups.

The repeated measures analysis of variance indicated that the growth patterns from pre-test to post-test were significantly different among the three groups on which both pre- and post-test data were available ($F_{(2,226)} = 17.984, p < .001$).

Although in effect size comparisons, the performance of students in the full- and three-quarter-day options was superior to that of control group students ($g = .45$, 67^{th} percentile and $g = .12$, 55^{th} percentile, respectively). As shown in the accompanying tables, the respective effect sizes when the performance of regular students was considered were: $g = -.02$ (49^{th} percentile) for full-day option students, which is one percentile point below that established by the performance of students in the half-day program, $g = -.33$ (37^{th} percentile) for three-quarter-day option students, but $g = -.45$ (33^{rd} percentile) for the control group students, which is 17 percentile points below that of students in the regular program. These results suggest that in the second year of program implementation, students in the full-day option made the most gains (from a mean of 1.71 to a mean of 20.16) and were able to hold their own in comparison to regular half-day students (end-of-year $\bar{x} = 20.37$), but that the performance of the students in the three-quarter-day option failed to measure up ($\bar{x} = 15.95$).

As can be seen in the first figure below, the pattern of growth from pre-test to post-test was different among the three groups for whom pre-to-post-test data are available. There is a very steep growth pattern for the full-day group, as less steep growth pattern for the three-quarter-day group, and a much flatter growth pattern for the control group. The second figure shows that the full-day group's performance on writing vocabulary was superior to all other groups including the students from less disadvantaged neighbourhoods (regular) who received a half-day program. These data reflect those from the first year of the study indicating that a full-day program is highly profitable for students from disadvantaged neighbourhoods, though the same cannot be said with any assurance about the three-quarter-day program.

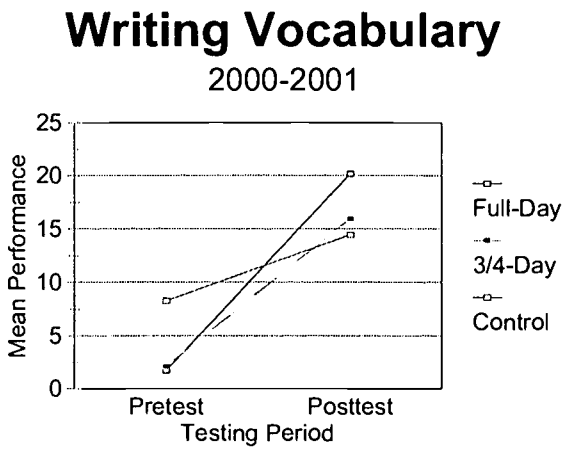
Writing Vocabulary: Comparisons across Program Option
2000-2001: Pre- and Post-Test Data

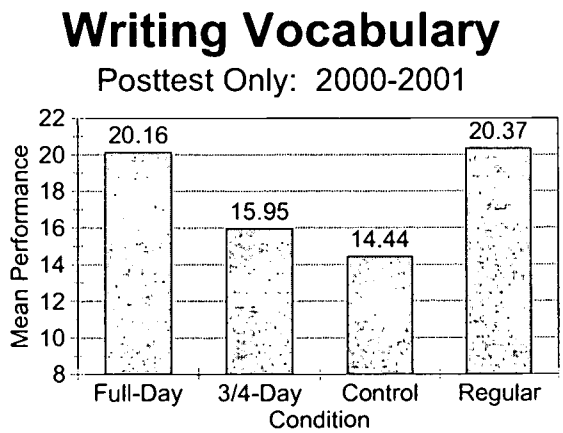
	Pre-test M (sd)	Post-test M (sd)	Post-test Effect Size Compared to Control‡	Post-test Effect Size Compared to Regular‡
Full-Day	1.71 (2.94)	20.16 (12.94)	.45 (67th)	- .02 (49th)
3/4-DayDay	2.12 (2.79)	15.95 (12.19)	.12 (55th)	-.33 (37th)
Control	8.26 (6.80)	14.44 (12.62)		- .45 (33rd)
Regular	--	20.37 (13.29)		

‡Percentile equivalent in parentheses

	Growth Comparison§ *(2,226)*	Pre-test *F-ratio (2,227)*	Pre-test Post Hoc	Post-test *F-ratio (3,475)*	Post-test Post Hoc
Writing Vocabulary	17.984**	46.930**	C>3/4=F	5.221**	F=R>3/4=C

§Repeated Measures Analysis
*p<.01
**p<.001





Dictation (Hearing Sounds in Words)

Year I of the evaluation (1999-2000). For the dictation task, the overall pattern for students in the full-day program was similar to that found for writing vocabulary for students in the full-day option, except that the performance of the students in the regular

half-day program was only equal to and did not exceed the performance of control group students. In the post-test comparisons that compared the end-of-year performance of students in each of the target groups with that of both control group students and students in the regular half-day program, there was a significant difference among the groups ($F_{(3, 560)} = 23.538, p < .001$). Mean scores are shown in the accompanying Table, the maximum score for this task being 37. The respective means were: 32.43 (full-day option), 23.92 (regular half-day students), 22.19 (control group) and 20.65 (three-quarter-day option). The *post-hoc* analysis revealed that the performance of the full-day option students was superior to that of both the regular students and the control group, whose performance was equal, but that the performance of students in both of these groups was superior to that of students in the three-quarter day option. Corresponding effect sizes were $g = 1.27$ (90th percentile, full-day), and $g = -.19$ (42nd percentile, three-quarter day). When the effect sizes for students in the regular-half-day program were included in the post-test analyses, findings for 1999-2000 showed that the full-day students outperformed the regular half-day students by 31 percentile points ($g = .87$, 81st percentile). The performance of students in the three-quarter-day option and the control group did not match the performance of students in the regular half-day program ($g = -.34$, 37th percentile, and $g = -.18$, 43rd percentile, repectively).

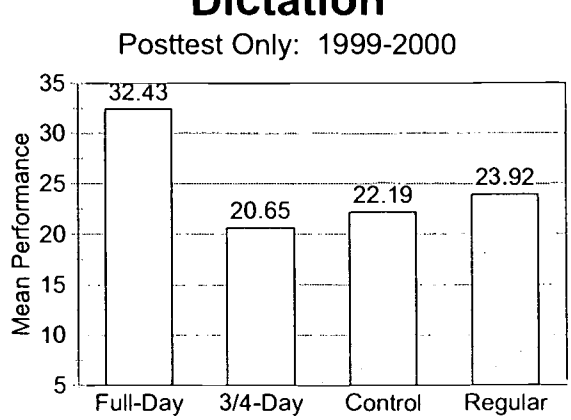
Dictation: Comparisons across Program Options
1999-2000: Post-Test Only

	M (sd)	*F-ratio (3,560)*	Post Hoc	Effect Size Compared to Control‡	Effect Size Compared to Regular‡
Full-Day (F)	32.43 (5.81)	23.538**	F>R=C>3/4	1.27 (90th)	.87 (81st)
3/4-DayDay	20.65 (11.41)			- .19 (42nd)	- .34 (37th)
Control (C)	22.19 (8.06)				- .18 (43rd)
Regular (R)	23.92 (9.75)				

‡Percentile equivalent in parentheses

*p<.01

**p<.001



Year II of the evaluation (2000-2001). For the 2000-2001 year, the pattern for performance on the dictation task (hearing sounds in words) was repeated, except that the performance of the students in the three-quarter-day and control groups was statistically equal. There was a significant overall effect ($F_{(2,227)} = 55.894, p < .001$) with significant pre-test and post-test differences among the groups ($F_{(2, 228)} = 31.116, p < .001$ and ($F_{(3,475)} = 29.048, p < .001$) respectively. *Post hoc* analyses indicated that, initially, the performance of control group students exceeded that of students in the three-quarter-day option as well as students in the full-day option which, in turn, was significantly lower than that of the students in the three-quarter-day option ($\bar{x} = 11.53$, 5.32 and 2.57, respectively). Findings from the *post-hoc* analysis of end-of-year scores showed, however, that the performance of students in the full-day option was superior to that of both regular students (half-day), which was superior to the performance of students in the three-quarter day option, and the performance of students in the control group was equal to that of the three-quarter-day option. These growth comparisons were significant as shown by the repeated measures analysis ($F_{(2,227)} = 55.894, p < .001$).

When effect sizes between the control group and students in the program options were calculated, findings showed a g of 1.26 (90th percentile) for full-day students compared to control group students, and $g = .30$ (62nd percentile) for three-quarter-day students. When the performance of students in the regular half-day program were considered, however, the effect sizes for the full-day option were $g = .52$, 70th percentile, for the full-day option, $g = -.67$, 25th percentile for the three-quarter day option (25 percentile points below those students receiving the half-day program), and $g = -1.03$, 15th percentile for the control group (35 percentile points below the regular group).

As indicated in the accompanying tables and figures, the performance of students in the full-day option exceeded that of the students in the regular-half-day option. The performance of these students, in turn, surpassed that of students in the three-quarter-day option, whose performance was equal to that of students in the control group, attesting further to the efficacy of the full-day program for students in economically disadvantaged areas. When the pre-to-post-test comparisons were graphed (the first figure below), it became obvious that, although the full-day student began substantially below the control group, as did the three-quarter-day group, the pattern of growth was dramatically steep for both of these groups, while the control group remained more nearly level. The data over the two years of the study on dictation provide additional evidence of the effectiveness of a full-day program for children from disadvantaged neighbourhoods, so much so that they outperformed students from more advantaged neighbourhoods who received the regular half-day program.

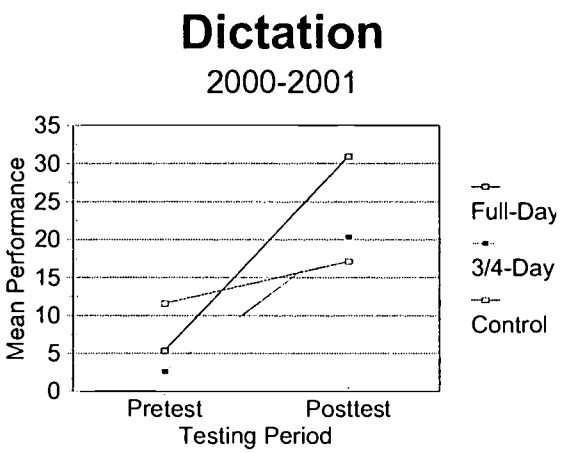
Dictation: Comparisons across Program Option
2000-2001 Pre- and Post-Test Data

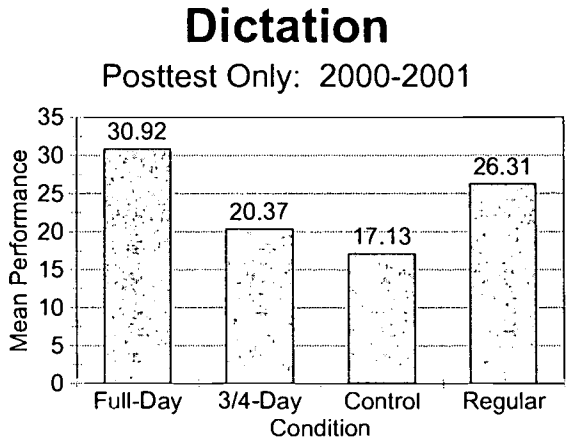
	Pre-test M (sd)	Post-test M (sd)	Post-test Effect Size Compared to Control‡	Post-test Effect Size Compared to Regular‡
Full-Day	5.32 (7.55)	30.92 (7.91)	1.26 (90th)	.52 (70th)
3/4-DayDay	2.57 (4.26)	20.37 (12.45)	.30 (62nd)	- .67 (25th)
Control	11.53 (9.27)	17.13 (10.94)		-1.03 (15th)
Regular	--	26.31 (8.90)		

‡Percentile equivalent in parentheses

	Growth Comparison§ (2,227)	Pre-test *F-ratio (2,228)*	Pre-test Post Hoc	Post-test *F-ratio (3,475)*	Post-test Post Hoc
Dictation	55.894**	31.116**	C>F>3/4	29.048**	F>R>3/4=C

§Repeated Measures Analysis
*p<.01
**p<.001





Book Level

As would be expected with the reading ability of students as they first enter kindergarten, no pre-test scores for reading ability were available in either of the years in which this evaluation was conducted. Accordingly, only post-test results are discussed in the following section.

Year I of the evaluation (1999-2000). The omnibus ANOVA for book level in the 1999-2000 year indicated a significant end-of-year difference among the groups ($F_{(3,559)} = 13.820, p < .001$). The *post hoc* analysis confirmed that the performance for the full-day option was better than that of the regular students which was, in turn, superior to the performance of both the three-quarter day and control options, which were not significantly different. Effect size comparisons showed a very strong effect size of $g = 2.90$ for the full-day option, indicating that those students were performing at the 99th percentile compared to the control group. The three-quarter day option students attained an effect size of $g = .46$ (67th percentile) compared to the control group, indicating that students in both options were reading at higher levels than control group students.

The performance of students in the regular half-day program substantiated the efficacy of the full-day program option. The performance of students in the full-day program was substantially higher ($\bar{x} = 5.66$) than that of students in the regular program ($\bar{x} = 2.81$), which was higher than the performance of students in the control group ($\bar{x} = 1.45$), which, in turn, was statistically equal to the performance of students in the three-quarter-day option ($\bar{x} = 2.81$). Refer to the accompanying table and figure for a graphic display of these finding.

Book Level

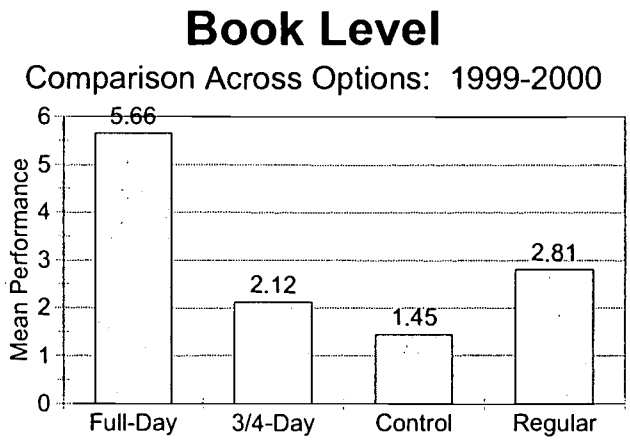
1999-2000: Post-Test Only

	M (sd)	*F-ratio* (3,559)	Post Hoc	Effect Size Compared to Control‡	Effect Size Compared to Regular‡
Full-Day (F)	5.66 (4.80)	13.820**	F>R>C=3/4	2.90 (99th)	.61 (73rd)
3/4-DayDay	2.12 (1.47)			.46 (67th)	- .15 (44th)
Control (C)	1.45 (1.45)				- .29 (39th)
Regular (R)	2.81 (4.67)				

‡Percentile equivalent in parentheses

*p<.01

**p<.001



Year II of the evaluation (2000-2001). For the 2000-2001 school year, the pattern for the previous year was repeated. The overall ANOVA indicated a significant difference among the four groups ($F_{(3, 419)} = 13.467, p < .001$). The full-day option outperformed both the three-quarter day and the control group as shown by the *post-hoc* analysis, and the performance of students in the control group was equal to that of students in the three-quarter-day option, but the performance of the control group was equal to that of students in the three-quarter-day option. Surprisingly, all three of these groups were superior to the students from more advantaged neighbourhoods who had participated in a half-day, regular program. The average reading achievement level was highest for students in the full-day option ($\bar{x} = 5.42$). Students in the three-quarter-day option achieved a book level mean of 3.67. The performance of students in each of these extended-day kindergarten options significantly exceeded the achievement of each of the other groups, whose performance was approximately equal ($\bar{x} = 3.10$, control, and $\bar{x} = 2.03$, regular program). These differences may indicate that extended reading was not a focus for the students in the regular program or that teachers in the regular half-day program simply did not have time to focus children's attention on extended (book) reading. The time element may not have allowed the teachers in the regular program to focus as heavily on book reading as may have been possible in the extended-day circumstances.

Post-test effect sizes between target and control groups indicated that $g = .58$ (72rd percentile, full-day option) and $g = .14$ (56th percentile, three-quarter day option). The effect sizes between option, control, and regular half-day students were: $g = .98$ (84th percentile) for full-day option students, $g = .48$ (68th percentile) for three-quarter-day option students, and $g = .31$ (62nd percentile) for control group students. Thus the reading achievement level of students in each target option exceeded that of their counterparts in the regular program. Book level is a particular salient measure since it indicates the

overall reading achievement of students. In both years, the performance of the full-day students was significantly higher than the performance of students in the regular program and full-day students outperformed their counterparts in the three-quarter-day program option (by 14 percentile points) and the control group (by 22 percentile points). These findings are depicted in the following table and figure.

Book Level: Comparisons across Program Options

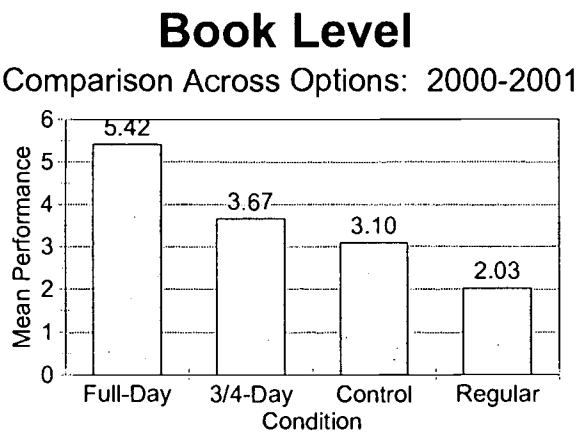
2000-2001: Post-Test Only

	M (sd)	Post-test *F-ratio (3,419)*	Post-test Post Hoc	Effect Size Compared to Control‡	Effect Size Compared to Regular‡
Full-Day	-5.42 (4.98)	13.467**	F>3/4=C>R	.58 (72nd)	.98 (84th)
3/4-DayDay	3.67 (4.04)			.14 (56th)	.48 (68th)
Control	3.10 (3.98)				.31 (62nd)
Regular	2.03 (3.45)				

‡Percentile equivalent in parentheses

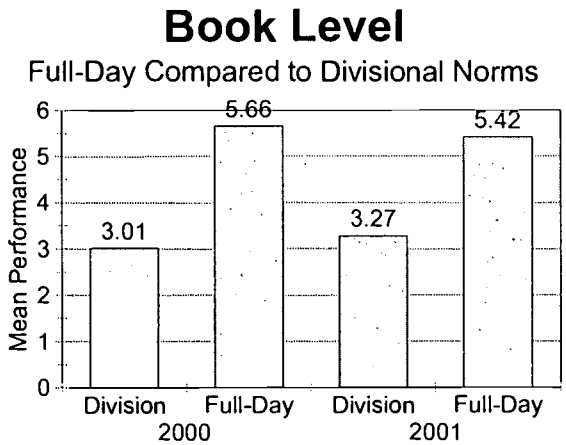
*p<.01

**p<.001

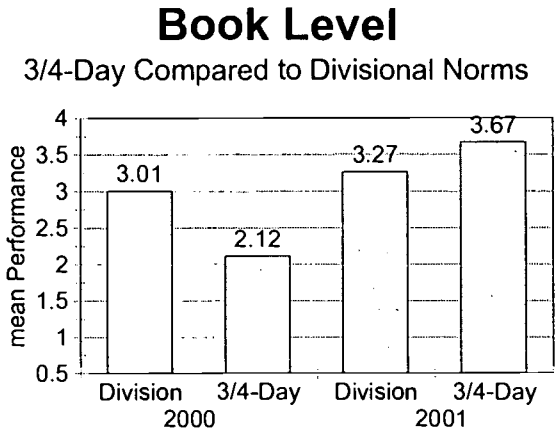


Full-Day compared to divisional norms. In comparing book level performance between the two extended day programs and all students in the division (division-wide norms), the full-day option outperformed divisional expectations in both years ($\bar{x}$ = 5.66 for the full-day option, $\bar{x}$ = 3.01 division-wide for 1999-2000; and $\bar{x}$ = 5.42 for the full-day option, $\bar{x}$ = 3.27 division-wide for 2000-2001). The data are displayed in the

following figure. The full-day students outperformed divisional expectations by more than two full book levels in both years. These data clearly support the implementation of a full-day program for children in socio-economically disadvantaged areas.



Three-quarter-day compared to divisional norms. The data are much less compelling when the three-quarter-day option is considered in comparison to divisional norms. In 1999-2000, the performance fo the three-quarter day students did not approach division-wide expectations ($\bar{x}$ = 2.12 for the three-quarter-day students; $\bar{x}$ = 3.01 for the division). In 2000-2001, the performance of students in the three-quarter-day option did exceed divisional expectations, but only by half a book level ($\bar{x}$ = 3.67 for the three-quarter-day option; $\bar{x}$ = 3.27 for the division).



Summary

Control group comparisons. When compared to control groups, the conclusions were compelling. The full-day option students outperformed: (1) the control group in all cases in both years, except for concepts about print in the 1999-2000 year, and (2) the three-quarter day option students on all measures in both years except for word identification in which case performance was not statistically different. On the other hand, the students in the three-quarter day option were only significantly better than the control group on word identification in both years, letter identification in 2000-2001, and concepts about print in the 2000-2001 school year, a task in which their performance was statistically equal to that of the full-day students. Of the twelve comparisons carried out, the performance of the control group exceeded or equalled statistically the three-quarter-day students on eight of the comparisons (letter identification and concepts about print in 1999-2000, and writing vocabulary, dictation, and book level in both years). The data for 1999-2000 are summarized in Table 3 (Appendix). The data for 2000-2001 are summarized in Tables 4 and 5 (Appendix).

Comparisons with regular half-day program. When the performance of the target and control groups was compared to the performance of students in the regular-half-day program across schools in the division, students in the full-day option performed better than the students from more advantaged neighbourhoods in the regular half-day program on all measures in 1999-2000, except for concepts about print, when differences among the groups were not significant (See Table 3). For 2000-2001, the performance of students in the full-day program matched statistically the performance of their regular half-day counterparts on all measures except dictation and book level in which case the performance of the full-day students exceeded that of the students in the regular half-day program (See Tables 4 and 5). In addition, the performance of students in the full-day option was superior to that of students in the three-quarter-day option on all tasks except for word identification, in which case performance was equal. Except for these two cases, concepts about print and word identification, the 1999-2000 performance of students in the three-quarter-day option failed to match the performance of regular students, although their 1999-2000 performance on the word identification task matched the performance level of students in the full-day option.

The performance of students in the three-quarter-day option only matched that of full-day and regular half-day group of students on word identification. When the pre-post-test information that showed the low entering behaviour of the students in the full-day option and the strides made by this group with appropriate instruction, either matching or exceeding the performance of their peers from more affluent neighbourhoods by the end of the school year, clearly, it is advantageous for economically disadvantaged students to attend kindergarten for full, rather than three-quarter-days. While time on task is the most obvious explanation for these performance differences, instructional effects can not be ruled out.

Incidence of Low-Performance

Another way of examining the benefits of the program options is to compare the frequency of low scores before (1997-1998) and after program implementation (1999-2000 and 2000-2001). If scores falling within the first and second stanine (Clay, 1993) are considered low (based on the normal curve), then the program option has reduced the incidence of low-performance on all measures as indicated in the accompanying table.

Full-day option. These numbers, based on Grade 1 norms (Clay, 1993), show that participation in the full-day kindergarten option has dramatically reduced the number of low performers. The data shown here indicate that the kindergarten students from the full-day option are all performing virtually at Grade 1 levels. Of special interest are the percentages for letter identification, concepts about print, and dictation. After the introduction of the project, the frequency of low scores on these emergent literacy measures dropped substantially.

Incidence of Low Performance
Full-Day Option

Subtest	1997-1998 n = 68 (%)	1999-2000 n = 79 (%)	2000-2001 n = 79 (%)
Letter Identification	13 (19%)	0 (0%)	6 (8%)
Word Identification	62 (91%)	34 (43%)	39 (49%)
Concepts about Print	29 (43%)	9 (11%)	10 (13%)
Writing Vocabulary	63 (93%)	32 (41%)	44 (56%)
Dictation Task	36 (53%)	0 (0%)	4 (5%)

Three-quarter-day option. When the data from the three-quarter-day kindergartens was examined for incidence of low-performance, with scores falling within the first and second stanine being considered low (Clay, 1993), as was the case with the full-day option, the three-quarter-day option also reduced the incidence of low-performance on all measures, as indicated in the accompanying table.

Incidence of Low Performance
Three-Quarter-Day Option

Subtest	1997-1998 n = 49 (%)	1999-2000 n = 43 (%)	2000-2001 n = 83
Letter Identification	17 (35%)	4 (9%)	13 (16%)
Word Identification	45 (92%)	17 (40%)	51 (61%)
Concepts About Print	6 (12%)	6 (14%)	24 (29%)
Writing Vocabulary	48 (98%)	33 (77%)	59 (71%)
Dictation Task	41 (84%)	8 (19%)	30 (37%)

These figures are based on Grade 1 norms and show that participation in the three-quarter-day kindergarten option did reduce the number of low performers, although not as much as the full-day option. See, for example, the differences between the two options on dictation (37% for three-quarter-day vs 5% for full-day in 2000-2001). Performance on the dictation task is indicative in regard to understanding the correspondence between the sounds of letters and their representative symbols. The data shown here indicate that this option, though effective in some areas, is not as advantageous as the full-day option.

Overall Conclusions for Literacy

The conclusions to be gained from all the analyses is that in terms of literacy development, attending full-day kindergarten is superior to attending three-quarter-day kindergarten for children in economically depressed areas. The data in this analyses were not so clear for students who received mixed full-day/half-day combinations (i.e., the three-quarter day option). Results do not show a pervasive advantage for the three-quarter day option as implemented in this study.

Findings: Numeracy Development

The final statistical analyses examined numeracy development. No data were available across the division for numeracy development in the1997-1998 school year. Division-wide test results and control group results were also not available for 1999-2000. While only pre- and post-test data for the full- and three-quarter-day options were available in 1999-2000, pre- and post-test results were available, however, for the target schools and for the control group in 2000-2001. The major question for study was:

For the years 1999-2000, and 2000-20001, how did the pre- post-test math performance of students in the full-day option compare to the performance of the students in the three-quarter-day pilot program and to that of the control group in the 2000-2001 school year?

The analyses of the data (full-day vs three-quarter-day in 1999-2000 and full-day vs three-quarter-day vs control in 2000-2001) for each of the subtests of The School Entry Assessment Test (SEA) -- *number recognition, number patterns, forming groups, rote counting, before/after* and *mental operations* -- are presented in the following discussion.

Number Recognition

Year I of the evaluation (1999-2000). A repeated measures statistical analysis comparing pre-to-post-test scores for number recognition showed significant growth in student performance over the school year for both the full-day and three-quarter-day groups ($F_{(1,115)} = 115.886, p < .001$). The repeated measures assessment of differences in growth patterns indicated that both groups grew in approximately the same way from pre-to post-test ($F_{(1,115)} = 0.00, p = .992$). The pre-test comparison indicated that the two groups were statistically equal ($F_{(1,115)} = .364, p = .547$) at the beginning of the study, but the post-test comparison ($F_{(1,121)} = 3.726, p = .056$) showed that the performance of the full-day students was superior to that of the three-quarter-day students, although the analysis did not achieve the traditional level of significance ($p < .05$).

The mean scores are displayed in the following table and the analysis is graphically displayed in the figure. These findings indicate that students in both options were approaching ceiling (number possible = 7). This result suggests that, in both programs, number recognition received appropriate instructional emphasis, although it appeared to be more effective with the full-day students.

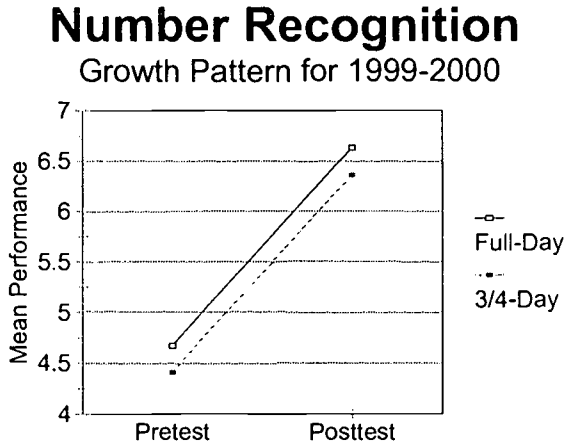
Number Recognition: 1999-2000

Condition	Pre-test	Post-test	*F-ratio*§ *(1,115)* Pre-to Post	*F-ratio*§ *(1,115)* Growth Pattern	Pre-test Comparison *F(1,115)*	Post-Test Comparison *F(1,121)*
Full-Day	4.67 (2.25)	6.63 (.68)	115.886**	0.000 ns	.364 ns	3.726*
3/4-Day	4.41 (2.09)	6.36 (.84)				

§Repeated Measures Analysis

* $p = .056$

** $p < .001$



Year II of the evaluation (2000-2001). A repeated measures statistical analyses comparing pre-post-test number recognition scores for the two target and the control groups showed that there was a significant differential effect for condition on this measure; that is, the three groups grew in different ways between September and June ($F_{(2,234)} = 10.873, p < .001$). *Post-hoc* analysis indicated that all three groups were performing differently in September, with the performance of the full-day group being significantly lower than that of the three-quarter-day group, and that of both groups scoring significantly lower than the control group. At the post-test, however, all three groups were performing at same level statistically; that is, there were no statistical differences between the scores for the three groups (full=three-quarter=control). As

indicated in the accompanying figure, students in the full-day kindergarten made the most gains, with the full-day students showing a much steeper growth curve for the full-day students than the growth curve for either of the other two groups.

The calculated post-test effect sizes for the two target groups when compared to the control group were as follows: full-day, $g = .01$ indicating that by the end of the year, the full-day group performed at virtually the same level as the half-day control group (50^{th} percentile); and the three-quarter-day $g = -.15$, revealing that this group performed at approximately 6 percentile points below the half-day control group (44^{th} percentile). The end-of-year performance of all three groups was statistically equal, the respective post-test means being 6.63, 6.62, and 6.52 as depicted in the following table and figure.

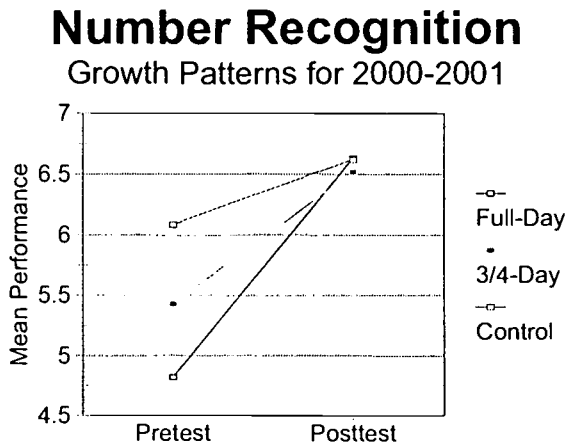
Number Recognition: 2000-2001

Condition	Pre-test	Post-test	*F-ratio*§ *(2,234)*	Effect Size‡	Post-Hoc on Pre-test	Post-Hoc on Post-test
Full-Day	4.82 (2.21)	6.63 (.90)	10.873**	.01 (50^{th})	C>3/4>F	F=3/4=C
3/4-Day	5.43 (1.83)	6.52 (.72)		-.15 (44^{th})		
Control	6.09 (1.02)	6.62 (.68)				

§Repeated Measures Analysis

‡Percentile equivalent in parentheses

** $p < .001$



Number Patterns

Year I of the evaluation (1999-2000). Statistically significant gains were also made from pre-test to post-rest on number patterns The repeated measures statistical analysis comparing pre-to-post-test scores showed significant growth in performance over the school year for both the full-day and three-quarter-day groups ($F_{(1,114)} = 72.215$, $p < .001$). The repeated measures assessment of differences in growth indicated that both groups grew in approximately the same way from pre- to post-test ($F_{(1,114)} = .245$, $p = .621$). At the time of the pre-test, however, the performance of the two groups was statistically different ($F_{(1,114)} = 7.759$, $p < .01$), with the students in full-day option outperforming the three-quarter-day students by more than half a point (.53). The post-test comparison also showed a significant difference in favor of the full-day option ($F_{(1,121)} = 17.689$, $p < .001$). The mean scores are displayed in the following table (ceiling level = 4) and the analysis is graphically displayed in the figure. These data, like those for number recognition, show no pervasive advantage for either of the program options in 1999-2000.

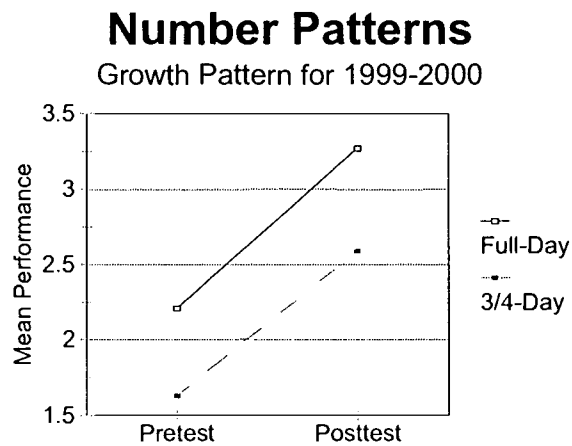
Number Patterns: 1999-2000

Condition	Pre-test	Post-test	*F-ratio*§ *(1,114)* Pre-to Post	*F-ratio*§ *(1,114)* Growth Pattern	Pre-test Comparison *F(1,114)*	Post-Test Comparison *F(1,121)*
Full-Day	2.21 (1.17)	3.27 (.93)	72.215**	0.245 ns	7.759*	17.689**
3/4-Day	1.63 (.87)	2.59 (.69)				

§Repeated Measures Analysis

*p <.01

**p < .001



Year II of the evaluation (2000-2001). The analysis of repeated measures indicated that the half-day control group reached maximum on both the pre- and the post-test. The analysis indicated that the performance of the control group was superior to that of both the full-day and three-quarter-day options on the pre-test, and, although students in the two target conditions made significant gains from pre- to post-test, the performance of the control group remained superior to that of the two option groups in June. The assessment of the differences in growth patterns between the three groups indicated that the three groups grew differently across the test times ($F_{(2,234)} = 10.832$, $p < .001$) in part because the control group began the school year at ceiling level. The growth patterns were similar between the students in the full-day and three-quarter-day groups. These data are displayed in the following table and figure.

Because the control had reached ceiling, the effect size was calculated by employing the pooled standard deviation rather than the control group standard deviation (Glass, McGaw, & Smith, 1981). Findings from effect size calculations suggested that the full-day group had a $g = -.57$, showing that this group performed at the 28th percentile when compared to the control group. The performance of the three-quarter-day option showed an effect size of $g = -.83$, meaning that the performance of this group was at the 20th percentile compared to the control. These data reflect the conclusions drawn from the ANOVA calculations that showed that the performance of the control group on number pattern recognition was significantly superior to that of either of the two target groups.

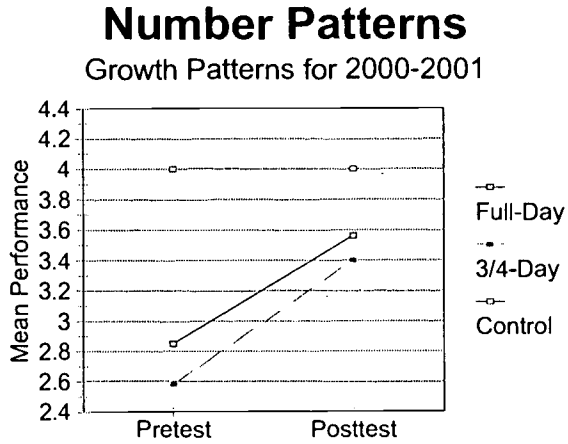
Number Patterns: 2000-2001

Condition	Pre-test	Post-test	*F-ratio*§ *(2,234)*	Effect Size‡	Post-Hoc on Pre-test	Post-Hoc on Post-test
Full-Day	2.85 (1.24)	3.56 (.80)	10.832**	- 0.57 (28th)	C>F=3/4	C>F= 3/4
3/4-Day	2.58 (1.42)	3.40 (.86)		- 0.83 (20th)		
Control	4.00 (.00)	4.00 (.00)				

**§Repeated Measures Analysis

‡Percentile equivalent in parentheses

$p < .001$



Forming Sets

Year I of the evaluation (1999-2000). The analysis of the performance on the forming sets sub-test approximated the performance of students on the two previous sub-tests. The repeated measures statistical analysis comparing pre-to-post-test scores for showed significant performance growth over the school year for both the full-day and three-quarter-day groups ($F_{(1,115)} = 73.361, p < .001$). The repeated measures assessment of differences in growth, however, indicated that both groups grew in approximately the same way over the year ($F_{(1,115)} = .265,\ p = .607$). The pre-test comparison of entering level performance indicated that, at the beginning of the study, the two groups were statistically equal ($F_{(1,115)} = .107, p = .744$), but the post-test comparison showed a pronounced difference between the two groups ($F_{(1,121)} = 3.307, p = .071$) in favor of the full-day over the three-quarter-day students. Although the traditional level of significant ($p < .05$) was not reached, it did approach significance. The mean scores (maximum = 7) are displayed in the following table and the analysis is graphically displayed in the figure.

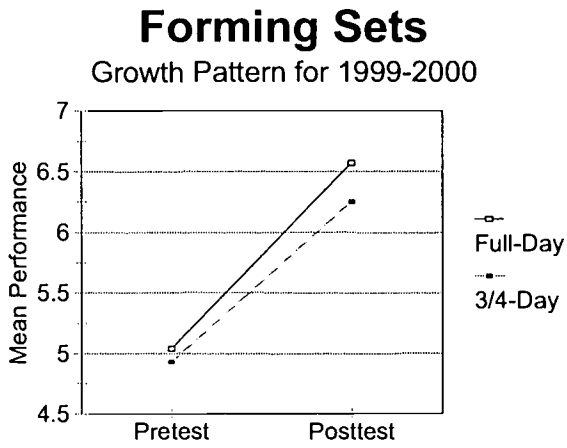
Forming Sets: 1999-2000

Condition	Pre-test	Post-test	*F-ratio*§ *(1,121)* Pre-to Post	*F-ratio*§ *(1,1 21)* Growth Pattern	Pre-test Comparison *F(1,115)*	Post-Test Comparison *F(1,121)*
Full-Day	5.04 (4.85)	6.57 (.78)	73.361**	.265 ns	.107 ns	3.307*
3/4-Day	4.93 (1.63)	6.25(1.16)				

§Repeated Measures Analysis

* $p = .071$

** $p < .001$



Year II of the evaluation (2000-2001). A repeated measures statistical analyses comparing pre- to post-test scores for forming sets showed that there was a significant differential effect for condition on this measure; that is, the three groups grew in different ways between September and June ($F_{(2,234)} = 5.538$ $p < .01$). *Post-hoc* analysis indicated that, at the time of the pre-test, the performance of the half-day control group was statistically superior to that of the two target groups, which were not statistically different. At the post-test, however, all three groups were statistically the same; that is, there were no statistical differences between the scores for the three groups (full=three-quarter=control). The mean scores are displayed in the accompanying table and figure. Again, as shown in the figure, the growth pattern was steepest for the full-day students, similar for the three-quarter-day students, and least steep for the control group.

Post-test effect size calculations for the two target groups when compared to the control group were as follows: full-day, $g = .-.16$ indicating that the full-day group performed six percentile points below the control group (44th percentile); three-quarter-day, $g = .03$ indicating that this group performed at approximately one percentile point above the control group (51th percentile). The two target groups, therefore, were performing at approximately expected levels.

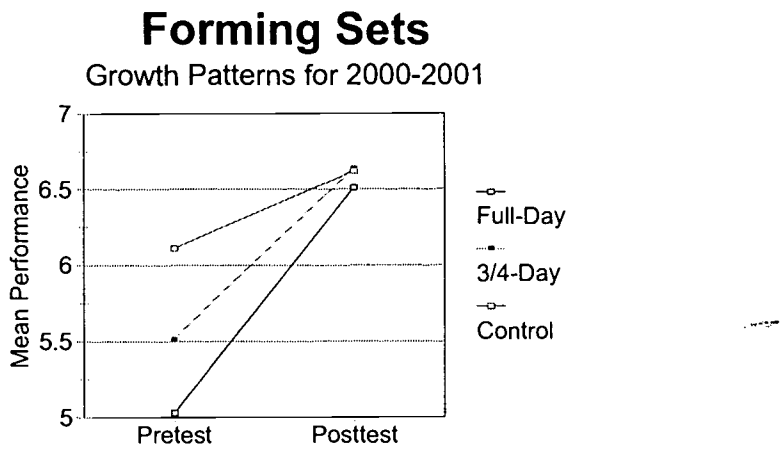
Forming Sets: 2000-2001

Condition	Pre-test	Post-test	*F-ratio*§ *(2,234)*	Effect Size‡	Post-Hoc on Pre-test	Post-Hoc on Post-test
Full-Day	5.03 (2.01)	6.51 (1.05)	5.538*	- 0.16 (44th)	C>F=3/4	F=3/4=C
3/4-Day	5.52 (1.78)	6.64 (.74)		0.03 (51st)		
Control	6.11 (.96)	6.62 (.68)				

§Repeated Measures Analysis

‡Percentile equivalent in parentheses

* $p < .01$



Rote Counting

Year I of the evaluation (1999-2000). The repeated measures statistical analysis comparing pre-to-post-test scores showed significant performance growth over the school year for both the full-day and three-quarter-day groups on the sub-test, rote counting ($F_{(1,115)} = 20.3.929, p < .001$). The repeated measures assessment of differences in growth, however, indicated that both groups grew in approximately the same way from

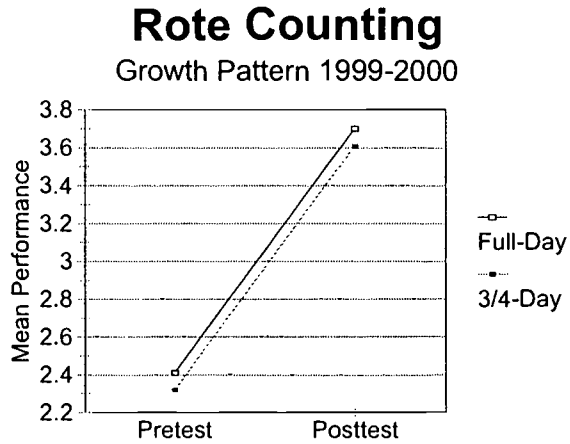
pre- to post-test ($F_{(1,115)} = .002, p = .964$). The pre-test comparison indicated that, at the beginning of the study, the two groups were statistically equal ($F_{(1,115)} = .215, p = .643$), The post-test comparison showed no pronounced difference between the two groups ($F(_{1,121)} = .540, p = .464$). The mean scores (total possible = 4) are displayed in the following table and the analysis is graphically displayed in the figure.

Rote Counting: 1999-2000

Condition	Pre-test	Post-test	*F-ratio*§ *(1,121)* Pre-to Post	*F-ratio*§ *(1,1 21)* Growth Pattern	Pre-test Comparison *F(1,115)*	Post-Test Comparison *F(1,121)*
Full-Day	2.41 (1.07)	3.70 (.56)	203.929**	.002 ns	.215 ns	.540 ns
3/4-Day	2.32 (.88)	3.61 (.65)				

§Repeated Measures Analysis

** $p < .001$



Year II of the evaluation (2000-2001). The analysis of repeated measures indicated that the three groups were statistically different in the Fall (pre-test), but were statistically the same in June. This differential growth was indicated by the significant ANOVA ($F_{(2,234)} = 10.191$, $p < .001$). That is, even though the groups started out at different levels, participation in the extended-day programs led to the groups being approximately the same at the end of the year. These data are displayed in the subsequent table and figure. As can be seen in the figure, the growth pattern for the full-

day option was the greatest, while the growth across the year was the smallest for the control group, with the growth pattern of the three-quarter-day group falling between the two.

Findings from post-test effect size calculations suggested that the full-day group had a $g = -.28$ showing that this group performed at the 39th percentile when compared to the control group. The performance of the three-quarter-day option showed an effect size of $g = -.14$, meaning that the performance of this group was at the 44th percentile compared to the control. These data help illuminate the ANOVA calculations that the performance of the three groups was essentially equal at the end of the year.

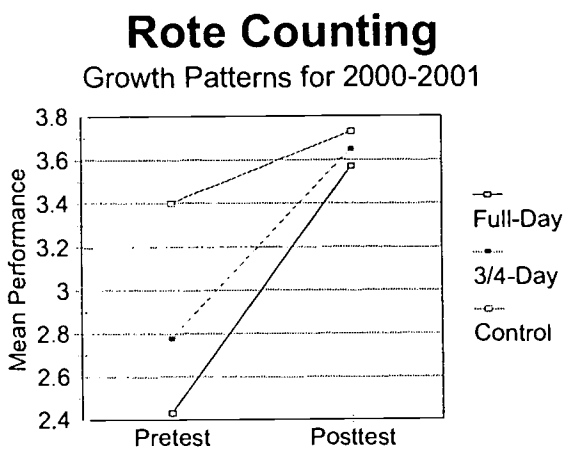
Rote Counting: 2000-2001

Condition	Pre-test	Post-test	*F-ratio*§ *(2,234)*	Effect Size‡	Post_Hoc on Pre-test	Post-Hoc on Post-test
Full-Day	2.43 (1.07)	3.57 (.78)	10.191**	- .28 (39th)	C>3/4>F	F=3/4=C
3/4-Day	2.78 (1.14)	3.65 (.66)		- .14 (44th)		
Control	3.40 (.89)	3.73 (.58)				

§Repeated Measures Analysis

‡Percentile equivalent in parentheses

** $p < .001$



Sequencing Forwards and Backwards (Before/After)

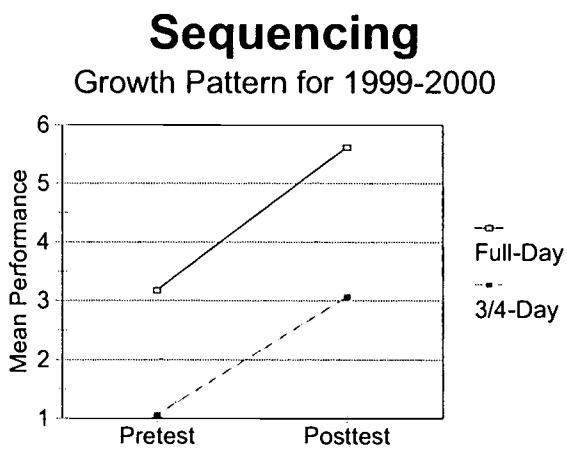
Year I of the evaluation (1999-2000). The sequencing forwards and backwards (before/after) sub-test demonstrated a somewhat different pattern from that of the other SEA sub-tests. The repeated measures statistical analysis comparing pre-to-post-test scores showed significant performance growth over the school year for both the full-day and three-quarter-day groups ($F_{(1,115)} = 190.809, p < .001$) similar to the finding from the other 1999-2000 analyses. Also, as on the other sub-tests, the repeated measures assessment of differences in growth also indicated that both groups grew in approximately the same way from pre- to post-test ($F_{(1,115)} = 1.429, p = .234$). However, unlike the performance on the previous sub-tests, the pre-test comparison indicated that, at the beginning of the study, the two groups were statistically different ($F_{(1,115)} = 29.277$, $p < .001$), with the students in the full-day option dramatically outperforming the students in the three-quarter-day option ($\bar{x} = 3.18$ for the full-day option and $\bar{x} = 1.07$ for the three-quarter-day option). This initial difference was also reflected in the post-test comparison ($F_{(1,121)} = 64.479, p = .001$). Again, the performance of students in the full-day option significantly outstripped the performance of students in the three-quarter-day option (post-test $\bar{x} = 5.62$ for the full-day students, and $\bar{x} = 3.07$ for the three-quarter-day students). The mean scores (maximum = 8) are displayed in the following table and the analysis is graphically displayed in the figure. Although this pattern was distinctly different from that found on earlier sub-tests reported here, as in those analyses, there was no particular advantage observe for either the full-day or three-quarter-day options in 1999-2000

Sequencing Forwards and Backwards: 1999-2000

Condition	Pre-test	Post-test	*F-ratio*§ *(1,121)* Pre-to Post	*F-ratio*§ *(1,1 21)* Growth Pattern	Pre-test Comparison *F(1,115)*	Post-Test Comparison *F(1,121)*
Full-Day	3.18 (2.35)	5.62 (1.95)	190.809**	1.429 ns	29.277**	64.479**
3/4-Day	1.07 (1.15)	3.07 (1.07)				

§Repeated Measures Analysis

** $p < .001$



Year II of the evaluation (2000-2001). The repeated measures statistical analyses comparing pre- to post-test scores for sequencing forwards and backwards indicated that there was a significant differential effect for condition on this measure; that is, the three groups grew in different ways between September and June ($F_{(2,234)} = 15.972$, $p < .001$). *Post-hoc* analysis indicated that while the performance of the groups was significantly different in the Fall; in June, the performance of the full-day and three-quarter-day groups was statistically equal, and the performance of the control group continued to surpass that of the two target groups (C < F = 3/4). The mean scores (ceiling = 8) are displayed in the accompanying table and are graphed in the accompanying figure. As the figure indicates, the growth pattern for the full-day group was dramatically different from the other two groups, even though the full-day group did not achieve parity with the control group.

When post-test effect sizes were calculated for the two target groups findings were that the full-day group achieved a $g = .-.65$ indicating that the full-day group performed at the 26th percentile when compared to the control group and the three-quarter-day group achieved a $g = - .75$ indicating that this group performed at approximately the 23rd percentile compared to control group. These calculations support the ANOVA test which showed that the performance of the control group was significantly superior to the that of the two target groups, whose performance was equal.

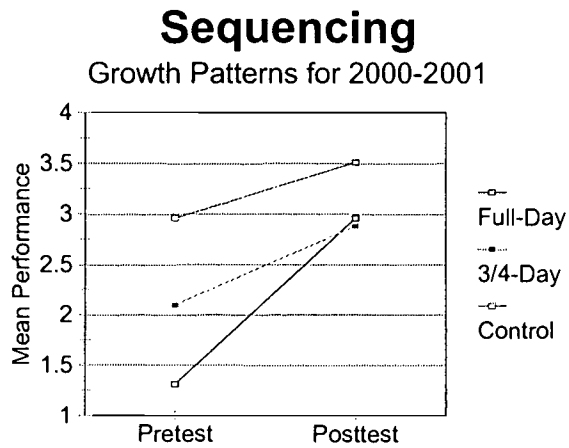
Sequencing Forwards and Backwards: 2000-2001

Condition	Pre-test	Post-test	*F-ratio*§ *(2,234)*	Effect Size‡	Post-Hoc on Pre-test	Post-Hoc on Post-test
Full-Day	1.31 (1.36)	2.96 (1.27)	15.972**	- 0.65 (26th)	C>3/4>F	C<F=3/4
3/4-Day	2.10 (1.42)	2.88 (1.23)		-0.75 (23rd)		
Control	2.96 (1.17)	3.51 (.84)				

§Repeated Measures Analysis

‡Percentile equivalent in parentheses

** $p < .001$



Mental Operations

Year I of the evaluation (1999-2000). On the sub-test of mental operation, the repeated measures statistical analysis comparing pre-to-post-test scores showed significant performance growth over the school year for both the full-day and three-quarter-day groups ($F_{(1,115)} = 108.316, p < .001$). The repeated measures assessment of growth differences, however, indicated that both groups grew in approximately the same way from pre- to post-test ($F_{(1,115)} = .090, p = .765$). The pre-test comparison indicated that, at the beginning of the study, the two groups were statistically equal ($F_{(1,115)} = .286,$

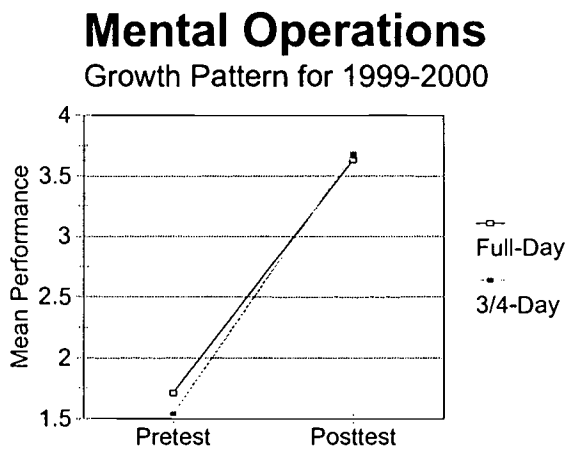
$p = .594$), while the post-test comparison showed no statistically significant difference between the two groups ($F_{(1,121)} = .019$, $p = .891$). The mean scores are displayed in the following table (maximum score = 6), and the analysis is graphically displayed in the figure.

Mental Operations: 1999-2000

Condition	Pre-test	Post-test	*F-ratio*§ *(1,121)* Pre-to Post	*F-ratio*§ *(1,1 21)* Growth Pattern	Pre-test Comparison *F(1,115)*	Post-Test Comparison *F(1,121)*
Full-Day	1.71 (1.60)	3.63 (1.88)	108.316**	.090 ns	.286 ns	.019 ns
3/4-Day	1.54 (1.82)	3.68 (1.94)				

§Repeated Measures Analysis

** $p < .001$



Year II of the evaluation (2000-2001). The analysis of repeated measures indicated that, although the performance of the three groups was statistically different in September, by June, their performance was statistically equal. The assessment of the differences in growth patterns between the three groups indicated that the groups grew differentially across test times ($F_{(2,234)} = 6.426$, $p < .01$). These data are displayed in the following table and figure. From a perusal of the table, it can be seen that the three-quarter-day and control groups grew in similar ways from September to June (ceiling =

6), but the growth pattern for the full-day group was superior to that of the other two groups.

Findings from effect size calculations suggested that the full-day group had a g = -.16 showing that this group performed at the 44th percentile compared to the control group. The performance of the three-quarter-day option showed an effect size of g = -.28, meaning that the performance of this group was at the 39th percentile compared to the control. These data highlight the ANOVA calculations which indicated that the performance of the three groups was essentially equal at the end of the year.

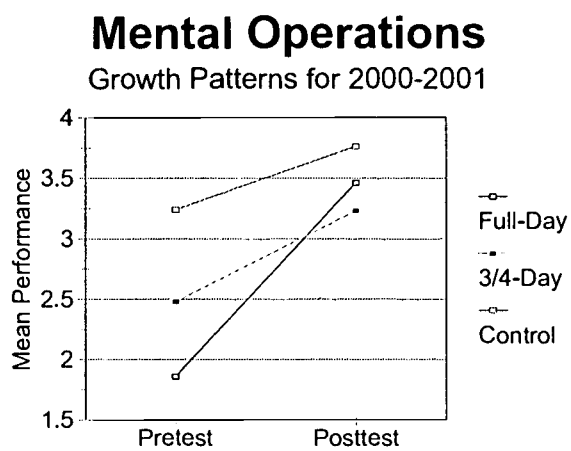
Mental Operations: 2000-2001

Condition	Pre-test	Post-test	*F-ratio*§ *(2,234)*	Effect Size‡	Post-Hoc on Pre-test	Post-Hoc on Post-test
Full-Day	1.86 (1.71)	3.46 (1.88)	6.426*	- 0.16 (44th)	C>3/4>F	F=3/4=C
3/4-Day	2.48 (1.86)	3.23 (1.84)		- 0.28 (39th)		
Control	3.24 (1.85)	3.76 (1.86)				

§Repeated Measures Analysis

‡Percentile equivalent in parentheses

* $p < .01$



Summary of Numeracy Development

The data on numeracy were not nearly as conclusive in terms of actual levels of achievement as the data derived from the literacy assessments. Student performance on all measures grew from September to June, as would be expected. In 1999-2000, the pattern over the sub-tests of the SEA were highly consistent. The growth patterns on all sub-tests of the SEA from pre-test (September) to post-test (June) were virtually identical regardless of program option (full-day or three-quarter-day). If there were differences at the time of the pre-test, these were maintained at the end of the year.

In the 2000-2001, the pattern of growth was different for different groups. The least amount of growth was shown overall by the control group, whereas, the slope of the growth patterns for the two target groups was steep (see Figures accompanying each measure). The pattern of growth for the full-day program was steepest in all cases supporting the efficacy of the full-day option. In all cases the groups were significantly different at the beginning of the school year with the performance of the full-day group being the lowest, and the performance of the three-quarter-day option somewhat higher. However, on the post-test measures, the performance of the three groups was equal on all but number patterns and sequencing forwards and backwards (before and after). The data for number patterns indicate that the control group was at ceiling level on both pre- and post-tests, highlighting the limitations of the School Entry Assessment (SEA) as an assessment instrument.

Across the two years of the study, no firm conclusions can be drawn about the effectiveness of the extended day programs except that, in year II (2000-2001), the full-day students appeared to grow more rapidly on all the numeracy measures. In all cases, the control group grew the least rapidly; this may be because the controls came into the study with higher scores than either the full-day or the three-quarter-day options. The performance of the three-quarter-day group fell between the full-day group and the control group in terms of growth patterns. Although the data from 2000-2001 would support the efficacy of the full-day program over either the three-quarter-day program or the half-day program, this conclusion was not supported by the data from 1999-2000. The results of the analyses across the two years is summarized in the next table.

Summary Table: Numeracy Development

Subtest	1999-2000			2000-2001			
	Pre-test	**Post-test**	**F-ratio (1,115)§**	**Pre-test**	**Post-test**	***F-ratio* (2,234)§**	**Post-Hoc**
Number Recognition							
Full-Day	4.67 (2.25)	6.63 (.68)	0.00 ns	4.82 (2.21)	6.63 (.90)	10.873**	F=3/4=C
3/4-Day	4.41 (2.09)	6.36 (.84)		5.43 (1.83)	6.52 (.72)		
Control	n/a	n/a		6.09 (1.02)	6.62 (.68)		
Number Pattern							
Full-Day	2.21 (1.17)	3.27 (.93)	0.245 ns	2.85 (1.24)	3.56 (.80)	10.832**	C>F=3/4
3/4-Day	1.63 (.87)	2.59 (.69)		2.58 (1.42)	3.40 (.86)		
Control	n/a	n/a		4.00 (.00)	4.00 (.00)		
Forming Groups							
Full-Day	5.04 (4.85)	6.57 (.78)	0.265 ns	5.03 (2.01)	6.51 (1.05)	5.538*	F=3/4=C
3/4-Day	4.93 (1.63)	6.25 (1.16)		5.52 (1.78)	6.64 (.74)		
Control	n/a	n/a		6.11 (.96)	6.62 (.68)		
Counting							
Full-Day	2.41 (1.07)	3.70 (.56)	0.002 ns	2.43 (1.07)	3.57 (.78)	10.191**	F=3/4=C
3/4-Day	2.32 (.88)	3.61 (.65)		2.78 (1.14)	3.65 (.66)		
Control	n/a	n/a		3.40 (.89)	3.73 (.58)		
Before/After							
Full-Day	3.18 (2.35)	5.62 (1.95)	1.429 ns	1.31 (1.36)	2.96 (1.27)	15.972**	C>F=3/4
3/4-Day	1.07 (1.15)	3.07 (1.07)		2.10 (1.42)	2.88 (1.23)		
Control	n/a	N/A		2.96 (1.17)	3.51 (.84)		
Mental Operations							
Full-Day	1.71 (1.60)	3.63 (1.88)	0.090 ns	1.86 (1.71)	3.46 (1.88)	6.426*	F=3/4=C
3/4-Day	1.54 (1.82)	3.68 (1.94)		2.48 (1.86)	3.23 (1.84)		
Control	n/a	n/a		3.24 (1.85)	3.76 (1.86)		

§ Repeated Measures Analysis of growth patterns ns = no significant difference $*p < .01$ $*p < .001$

Qualitative Analyses

While no qualitative data was gathered in 2000-20001, the following summary of staff interview and observational data collected in 1999-2000 is included in this report to reflect the tenor of the implementation of the extended-day kindergarten options.

Staff Interviews (1999-2000)

Teachers suggested that increases in daycare placements and a resultant decrease in one-to-one child-adult interactions was one of the important reasons underlying the need for full-day kindergartens to improve the development not only of oral language, but also emergent literacy and social skills. School staff felt that many of the parents in their catchment areas had minimal understanding of the goals of education and the expectations of the school. Many of the parents had themselves experienced little school success.

Teachers found that one of the advantages of the full-day kindergarten was an increase in both the "quality and quantity of instruction". Concern about cleaning up and preparing for a second group of students in the afternoon was eliminated. More time was available for immersing children in language and literacy experiences -- reading to students regularly, shared reading, guided and independent reading, teacher writing, shared writing, independent writing, and making meaningful cognitive connections using themes in which topics could be explored with greater depth and intensity. It seemed easier to provide individualized scaffolding. Using poetry and chants developed the flow of language and an "ear" for the sounds of words. There seemed to be more time throughout the day for children to engage in conversations with their peers and with the teacher. Overall there was more time to "talk", more time to engage in literate behaviours, and more time to think about and make connections between old and new concepts, strategies, and skills.

In addition to a thematically-based curriculum and whole class oral reading and writing, a more individualized reading/writing program was in effect, being introduced gradually in the fall of the school year through small literature response groups of three or four students meeting for approximately 30 minutes every second day. In this way, all students in the class were accommodated. These sessions gradually evolved into guided reading and writing lessons in which individual progress was monitored and instruction adapted accordingly. After the spring break, the guided reading and writing lessons were changed to a morning slot and carried out daily.

Observations (1999-2000)

Observations revealed that guidelines established by McGee and Richgels (2000) were very much in evidence and that a social constructivist paradigm prevailed. The teacher followed the children's leads and provided strong support as she interacted with the children; expected children to read and write as part of their daily activities; modeled reading and writing strategies; drew students' attention to print; and gradually shifted the responsibility for reading and writing to the students themselves. Classroom teacher-student collaboration was linked through oral language and meaning-making governed by the topic at hand. The teacher engaged students in whole class storybook reading, shared reading using chart stories and Big Books, guided reading and writing in small groups, and word building activities, exemplifying a balanced approach to literacy instruction (Fountas & Pinnell, 1996).

Conclusion

No child was hurried or experienced frustration or failure. Instruction was totally embedded within authentic activities and with teacher support, knowledge was co-constructed as a result of working on increasingly complex problems. Students engaged freely in exploratory talk (Barnes, 1995) to clarify their understanding. An advantage of being in class all day was that the teacher could give children more individualised instruction, extend ideas and made connections with discoveries made earlier. Concepts were thus discussed, integrated, reviewed and broadened over time and more learning took place in developmentally appropriate ways.

References

Barnes (1995). Talking and learning in classrooms: An introduction. *Primary Voices K - 6, 3*(1). 2-

Boyer, E. (1995). *The basic school: A community for learning*. Princeton, NJ: The Carnegie Foundation for the Advancement of Teaching.

Braunger, J., & Lewis, J. (1998). *Building knowledge base in reading*. Portland, OR: Northwest Regional Laboratory's Curriculum and Instruction Services.

Bredekamp, S., & Copple, C. (1997). *Developmentally appropriate practice in early childhood programs*. Washington, DC: NAEYC.

Clay, M. M. (1993). *An observational survey of early literacy achievement.* Portsmouth, NH: Heinemann.

Cook, T. D., & Campbell, D. T. (1979). *Quasi-experimentation: Design and analysis issues for field settings.* Chicago, IL: Rand McNally.

Cryan, J. R., Sheehan, R., Wiechel, J., & Bandy-Heddon, I. G. (1992). Success outcomes of full-day kindergarten: More positive behaviour and increased achievement in the years after. *Early Childhood Research Quarterly, 7,*187-203.

Elicker, J., & Mathur, S. (1997). What do they do all day? Comprehensive evaluation of a full-day kindergarten. *Early Childhood Research Quarterly, 12,*459-480.

Entwisle, D. R., Alexander, K. L.(1998). Facilitating the transition to first grade: The nature of transition and research on factors affecting it. *The Elementary School Journal,* 98 (4), 351-364.

Entwisle, D. R., Alexander, K. L., & Olson, L. S. (1997). Children, schools and inequality. Boulder, Co: Westview.

Entwisle, D. R., Alexander, K. L., Cadigan, D., & Phallas, A. M. (1987). Kindergarten experience: Cognitive effects or socialization? *American Educational Research Journal* (24), 337-364.

Fischer, C., Hout, M., Jankowski, M. S., Lucas, S., Swidler, A., & Vos, K. (1996). *Inequality by design: Cracking the bell curve myth.* Princeton, NJ: Princeton University Press.

Fromberg, D. P. (1992). Implementing the full-day kindergarten. *Principal, 71*, 26-28.

Fountas, I. C., & Pinnell, G. S. (1996). *Guided reading: Good first teaching for all children.* Portsmouth, NH: Heinemann.

Gaziano, C. (1997). Forecast 2000: Widening knowledge gaps. *Journal and Mass Communications Quarterly*, 74, 237-264.

Glass, G. V., McGaw, B., & Smith, M. L. (1981). *Meta-analysis in social research.* Newbury Park, CA: Sage.

Gullo, D. F. (1990). The changing family context: Implications for the development of all-day kindergartens. *Young Children, 45*(4), 35-39.

Housden, T., & Kam, R. (1992), *Full-day kindergarten: A summary of the research.* Carmichael, CA: San Juan Unified School District. (ERIC Document Reproduction Service No. ED345868)

Humphrey, J. W. (1980). *A study of the effectiveness of full-day kindergarten.* (ERIC Document Reproduction Service No. ED 190 224)

Humphrey, J. W. (1983). A comparison of full-day and half-day kindergartens. *ERS Spectrum*, 1, 11-16.

Humphrey, J. W. (1990). *Feasibility study concerning mandatory half-day kindergarten and mandatory and voluntary full-day kindergarten.* Prepared for the Indiana Department of Education. (ERIC Document Reproduction Service No. ED 327 268)

IALS: International adult Literacy Survey (1996). Ottawa, ON: Statistics Canada.

IRA/NAEYC (1998). *Overview of learning to read and write: Developmentally appropriate practices for young children. [http://www.naeyc.org/resources/position-statement/psread).htm]*

Johnson, L. C., & Mathien, J. (1998). Early childhood services for Kindergarten-age children in four Canadian provinces: Scope, nature and models for the future. Ottawa, ON: Renouf Publishing.

McCain, M. N., & Mustard, J. F. (1999). *Reversing the real brain drain: Early years study* (Final Report). Toronto, ON: Ontario Children's Secretariat.

McGee, L. M., & Richgels, D. J., (2000). *Literacy's beginnings: Supporting young readers and writers, 3rd ed.* Boston, MA: Allyn and Bacon.

Ministry of Education (1997). *School Entry Assessment (SEA).* Wellington, NZ: Learning Media.

Morrow, L. M., Strickland, D. S., & Woo, D. G. (1998), *Literacy instruction in half- and whole-day kindergarten.* Newark, DE and Chicago, Il: International Reading Association and National Reading Conference.

NCTM (2000). *Principles and standards for school mathematics.* The National Council of Teachers of Mathematics. Reston, VA.

Neuman, S. B. (2001). Essay Book Review: The role of knowledge in early literacy. *Reading Research Quarterly* (*36*) 4, 468-475.

Neuman, S. B. (1998). Forward. In L. M. Morrow, D. S. Strickland, & D. G. Woo, *Literacy instruction in half- and whole-day kindergarten.* Newark, DE and Chicago: International Reading Association and National Reading Conference.

Neuman, S. B., & Gallagher, P. (1994). Joining together in literacy learning: Teenage mothers and children. *Reading Research Quarterly, 29*, 382-401.

Peskin, M. (1988). *Are social and economic changes in family patterns dictating the frequency and curriculum of all-day kindergarten?* Seton Hall, NJ: Seton Hall University College of Education. (ERIC Document Reproduction Service No. ED293647)

Puleo, V. (1988). A review and critique of research on full-day kindergarten. *The Elementary School Journal, 88,* 427-439.

Ramey, C., & Campbell, F. (1991). Poverty, early childhood education, and academic competence: The Abcedarian experiment. In A. Huston (ed.), *Children reared in poverty* (190-221). New York: Cambridge University Press.

Rothenburg, D. (1995). *Full-day kindergarten programs. ERIC Digest* (ERIC Document Reproduction Service No. ED 383 410)

Shubert, E. (1997). Practitioner perspectives. Half-day kindergarten perspective. *Early Childhood Research Quarterly, 12,* 481-83.

Snow, C., Burns, M. S., & Griffin, P. (1998). *Preventing reading difficulties in young children.* Washington, DC: National Academy Press.

Tatum, D. S. (1999). Is more better? Measuring the effects of full-day kindergarten. *Popular measurement* (24-26).

Wang, Y. L., & Whitcomb, G. J. (1999). Evaluation of a full-day kindergarten program. *ERS Spectrum*, *17*(2), 27-32.

Zakaluk, B. L., Straw, S. B., & Haydey, D. C. (2001). The efficacy of an extended day kindergarten program: A report for the St. James School Division. Unpublished paper, University of Manitoba.

Zakaluk, B. L. Haydey, D. C. & Guericio , K. (2001). Reading and writing in kindergarten: What does instruction look like? Unpublished paper, University of Manitoba.

Appendices

Table 1

Comparisons between the 1997-98 Cohort with the 1999-2000 Cohort on Clay's Measures

Measure	1997-1998	1999-2000	*F -ratio*	Effect Size	Effect Size Compared to 2000 Divisional Norms
Letter Identification					
Full-Day M (sd)	44.28 (12.34)	52.24 (3.88)	29.511**	.65 (74th %ile)	.39 (74th %ile)
3/4-Day M (sd)	35.43 (16.80)	46.28 (10.45)	13.383**	.66 (75th %ile)	-.33 (37th %ile)
Word Identification					
Full-Day M (sd)	1.84 (3.25)	6.91 (4.89)	52.781**	1.56 (94th %ile)	.30 (61st %ile)
3/4-Day M (sd)	1.78 (1.89)	7.84 (5.05)	61.059**	3.21 (99th %ile)	.47 (68th %ile)
Concepts about Print					
Full-Day M (sd)	12.57 (4.77)	15.53 (3.65)	18.08**	.62 (73rd %ile)	-.25 (40th %ile)
3/4-Day M (sd)	15.45 (4.07)	16.79 (4.14)	2.452 (ns)	.33 (63rd %ile)	.10 (54th %ile)
Writing Vocabulary					
Full-Day M (sd)	7.03 (6.49)	23.97 (14.60)	78.245**	2.61 (99th %ile)	.58 (71st %ile)
3/4-Day M (sd)	5.16 (5.55)	11.63 (8.84)	18.086**	1.17 (88th %ile)	-.47 (32nd %ile)
Dictation					
Full-Day M (sd)	10.78 (9.91)	32.43 (5.81)	269.611**	2.18 (99th %ile)	.79 (78th %ile)
3/4-Day M (sd)	4.98 (4.61)	20.65 (11.41)	78.040**	3.40 (99th %ile)	-.41 (34th %ile)

**$p < .001$

Table 2
Comparisons between the 1997-98 Cohort with the 2000-2001 Cohort on Clay's Measures

Measure	1997-1998	2000-2001	*F -ratio*	Effect Size	Effect Size Compared to 2001 Divisional Norms
Letter identification					
Full-day M (sd)	44.28 (12.34)	50.05 (10.03)	9.776*	.47 (68th %ile)	.17 (57th %ile)
3/4-Day M (sd)	35.43 (16.80)	46.29 (12.93)	20.710**	.54 (71st %ile)	-.15 (44th %ile)
Word identification					
Full-day M (sd)	1.84 (3.25)	6.78 (5.21)	53.521**	1.05 (85th %ile)	-.02 (50th %ile)
3/4-Day M (sd)	1.78 (1.88)	6.68 (5.22)	41.092**	2.61 (99th %ile)	-.03 (49th %ile)
Concepts about print					
Full-day M (sd)	12.57 (4.77)	17.53 (4.69)	40.201**	1.06 (86th %ile)	.23 (59th %ile)
3/4-Day M (sd)	15.45 (4.07)	15.51 (4.96)	.006 (ns)	.02 (50th %ile)	-.19 (42nd %ile)
Writing vocabulary					
Full-day M (sd)	7.03 (6.49)	20.16 (12.94)	187.782**	1.01 (84th %ile)	.11 (54th %ile)
3/4-Day M (sd)	5.16 (5.55)	15.95 (12.19)	35.330**	1.94 (97th %ile)	-.20 (42nd %ile)
Dictation					
Full-day M (sd)	10.78 (9.91)	30.92 (7.91)	57.554**	2.03 (98th %ile)	.58 (72nd %ile)
3/4-Day M (sd)	4.98 (4.61)	20.37 (12.45)	70.705**	3.34 (99th %ile)	-.40 (34th %ile)

*p<.01
**p<.001

Table 3
Comparisons between Extended-Day Options, Control, and Regular Half-Day Programs for 1999-2000

	M (sd)	*F-ratio* (3,560)	Post Hoc	Effect Size Compared to Control‡	Effect Size Compared to Regular‡
Letter Identification					
Full-Day (F)	52.24 (3.88)	6.609**	F>R=C>3/4	.44 (67th)	.43 (67th)
3/4-Day)	46.28 (10.45)			- .67 (25th)	- .25 (40th)
Control (C)	49.88 (5.36)				.16 (56th)
Regular (R)	48.48 (8.79)				
Word Identification					
Full-Day (F)	6.91 (4.89)	11.045**	F=3/4>R>C	.84 (80th)	.42 (66th)
3/4-Day	7.84 (5.05)			1.08 (86th)	.63 (74th)
Control (C)	3.70 (3.83)				- .29 (39th)
Regular (R)	5.02 (4.46)				
Concepts About Print					
Full-Day	15.53 (3.65)	2.098 ns	n/a	- .21 (42nd)	- .30 (38th)
3/4-Day	16.79 (4.14)			.14 (56th)	.06 (52nd)
Control (C)	16.30 (3.59)				- .08 (47th)
Regular (R)	16.58 (3.45)				
Writing Vocabulary					
Full-Day (F)	23.97 (14.60)	15.096**	F>R>C=3/4	1.36 (91st)	.61 (73rd)
3/4-Day	11.63 (8.84)			- .25 (40th)	- 48 (32nd)
Control (C)	13.53 (7.68)				- .31 (38th)
Regular (R)	17.04 (11.34)				
Dictation					
Full-Day (F)	32.43 (5.81)	23.538**	F>R=C>3/4	1.27 (90th)	.87 (81st)
3/4-Day	20.65 (11.41)			- .19 (42nd)	- .34 (37th)
Control (C)	22.19 (8.06)				- .18 (43rd)
Regular (R)	23.92 (9.75)				
Book Level					
Full-Day (F)	5.66 (4.80)	13.820**	F>R>C=3/4	2.90 (99th)	.61 (73rd)
3/4-Day	2.12 (1.47)			.46 (67th)	- .15 (44th)
Control (C)	1.45 (1.45)				- .29 (39th)
Regular (R)	2.81 (4.67)				

‡Percentile equivalent in parentheses
*p<.01
* *p<.001

Table 4

Pre-test/Post-test Comparisons between Extended-Day Options, Control, and Regular Programs: 2000-2001

Clay Measures	Pre-test	Post-test	Effect Size (Compared to Control)	Effect Size (Compared to Regular)
Letter Identification				
Full-Day	19.38 (16.65)	50.05 (10.03)	.51 (70th)	.04 (52nd)
3/4-Day	28.32 (17.32)	46.29 (12.93)	.29 (61st)	- .41 (34th)
Control	34.06 (18.33)	41.54 (16.61)		- .98 (16th)
Regular	--	49.71 (8.26)		
Word Identification				
Full-Day	.29 (.65)	6.78 (4.69)	.62 (73rd)	- .15 (44th)
3/4-Day	.83 (1.65)	6.88 (5.22)	.64 (74th)	- .14 (44th)
Control	1.49 (3.12)	4.00 (4.47)		- .69 (25th)
Regular	--	7.62 (5.27)		
Concepts About Print				
Full-Day	7.03 (3.85)	17.53 (4.69)	1.50 (93rd)	-.03 (49th)
3/4-Day	8.77 (4.22)	15.51 (4.96)	1.02 (85th)	- 56 (29th)
Control	9.33 (4.01)	11.11 (4.29)		- 1.70 (5th)
Regular	--	17.64 (3.83)		
Writing Vocabulary				
Full-Day	1.71 (2.94)	20.16 (12.94)	.45 (67th)	- .02 (49th)
3/4-Day	2.12 (2.79)	15.95 (12.19)	.12 (55th)	-.33 (37th)
Control	8.26 (6.80)	14.44 (12.62)		- .45 (33rd)
Regular	--	20.37 (13.29)		
Dictation				
Full-Day	5.32 (7.55)	30.92 (7.91)	1.26 (90th)	.52 (70th)
3/4-Day	2.57 (4.26)	20.37 (12.45)	.30 (62nd)	- .67 (25th)
Control	11.53 (9.27)	17.13 (10.94)		-1.03 (15th)
Regular	--	26.31 (8.90)		
Book Level				
Full-Day		5.42 (4.98)	.58 (72nd)	.98 (84th)
3/4-Day		3.67 (4.04)	.14 (56th)	.48 (68th)
Control		3.10 (3.98)		.31 (62nd)
Regular		2.03 (3.45)		

‡Percentile equivalent in parentheses

*p<.01

**p<.001

Table 5
ANOVA Results for Growth Patterns, Pre-Test, and Post-Test: 2000-2001

Clay Measures	Growth Comparison§ *(2,227)*	Pre-test *F-ratio* *(2,238)*	Pre-test Post Hoc	Post-test *F-ratio* *(3,476)*	Post-test Post Hoc
Letter Identification	32.368**	10.675**	C=3/4>F	9.387**	F=R>3/4>C
Word Identification	12.349**	5.724*	C>3/4=F	6.825**	F=R=3/4>C
Concepts About Print	55.249**	5.462*	C=3/4>F	33.154**	F=R>3/4>C
Writing Vocabulary	17.984**	46.930**	C>3/4=F	5.221**	F=R>3/4=C
Dictation	55.894**	31.116**	C>F>3/4	29.048**	F>R>3/4=C

‡Percentile equivalent in parentheses
*p<.01
**p<.001

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