THE EFFICACY OF AN ALL-DAY, EVERY-DAY KINDERGARTEN PROGRAM:

A SEVEN YEAR CUMULATIVE REPORT FOR THE ST. JAMES-ASSINIBOIA SCHOOL DIVISION

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EXECUTIVE SUMMARY

The overall conclusion from the statistical comparisons using control group, division-wide, and cohort group data was that, cumulatively, the performance of the full-day kindergarten students was equal to or surpassed the performance of students in the half-day kindergarten groups as assessed by all early reading achievement measures. Results evaluating the long-term effects of the full-day kindergarten program on reading achievement levels reinforced this conclusion. By the end of grade three, the full-day students from less advantaged neighbourhoods were reading at the grade four level, which is above grade placement, and matching approximately the performance levels of their peers from more affluent neighbourhoods.

These conclusions are supported by the detailed summary of findings listed below. Control group, division-wide and cohort group comparison findings across the years for kindergarten are presented first, followed by the results of the long-term effects of being enrolled in the full-day, every day program at the kindergarten level to the end of grade three.

Summary of Findings

End of Kindergarten Year Performance Across the Years

Control Group Comparisons

- Beginning and end-of year reading performance measures were used to assess the benefits of participating in the full-day, every day kindergarten program by examining *full-day* and *control group* achievement scores separately for 2003-2004, each year from 2000-2001 to 2003-2004, and across the years, all data collapsed. Findings showed that in both 2000-2001 and 2001-2002, the first years for which control group pretest data were available, the performance of the target group students compared to the performance of students in the *control group* surpassed that of their half-day peers on all reading measures.

- The trend in 2002-2003 and 2003-2004 indicated more equal performance levels generally. No statistically significant differences were found between the performance of students in the two groups in 2002-2003, except on reading ability in which case the reading performance of the full-day students was superior. As shown by effect sizes, increased performance levels on the part of the half-day students were evident in regard to: (1) letter identification—especially in 2003-2004 where the letter naming ability of *control group* students surpassed that of the full-day target group students by eighteen percentile points, and (2) dictation--control group students in 2003-2004 were better than full-day target group students at matching sounds and letters by four percentile points. In the year 2003-2004, however, the performance of target group students exceeded that of

control group students at statistically significant levels on three important measures: word identification, concepts about print and actual book reading.

- When *target and control group* were collapsed across the years, findings revealed statistically significant performance levels on all reading measures, the performance of the full-day target students surpassing that of their peers in the half-day program.

- It was also evident from *control group* beginning/end-of-year comparisons on all measures that, in general, the full-day students from less affluent areas entered school less ready to learn.

While in 2002-2003, there were eighteen students in one class in the control group school, in 2003-2004 there were 36 students in two classes in that school. The control group comparisons therefore need to be interpreted with caution because they are tempered both by small numbers and by ranking on the Division's income factor scale which suggested that students from the control group school came from a relatively more affluent area. While in the years previous to 2003-2004 parents in the division had the option of enrolling their children in any division school (and this meant some children from more affluent areas attended target group schools because kindergarten was full-day, every day rather than half-day), this opportunity was withdrawn beginning with the 2004-2005 school year. At the present time (2004-2005), students are required to attend schools in their own catchment areas, regardless of whether the kindergarten program in their home school is full or half-day.

Division-Wide Comparisons

- *Division-wide* findings echoed the trend found in control group comparisons. Findings from 2003-2004 indicated that there were no statistically significant performance differences between the full-day kindergarten students and their half-day counterparts across the division on the dictation, and writing vocabulary task. Contrary to the expectation that students from impoverished neighborhoods would be at risk, however, end-of-year comparisons in 2003-2004 showed that the performance of the full-day, every day students exceeded that of the half-day students division-wide on concepts about print, reading level, and approached statistical significance on the word identification task. These *division wide* findings are similar to those established by the 2003-2004 control group comparisons.

- Again the year-by-year *division-wide* analysis indicated that the reading performance of the *half-day students* division wide continued to improve, similar to findings from the year-by-year analysis of control group performance. While the half-day students excelled at letter identification, especially in more recent years (2001-2002, 2002-2003, and 2003-2004), the performance of students in the full-day group was either equal to or surpassed the performance levels of the half-

day students, division-wide, on all other measures. These finding were consistent, year-by-year, and were especially interesting in regard to word identification and reading performance indicators.

Findings when *division-wide* data were collapsed across the years confirmed these results. While the half-day students were superior in terms of letter naming, the performance of the full-day students on all other measures (word identification, concepts about print, dictation, writing vocabulary and book level) exceeded that of their half-day peers.

Cohort Group Comparisons

- *Cohort group* comparisons collapsed across schools that examined the performance of the full-day students in comparison to students in the same schools before program implementation showed that there were statistically significant performance differences on all reading measures at the end of the kindergarten year. These findings were further supported by effect size comparisons. Thus at the beginning of grade one, students who had participated in the full-day kindergarten were now on approximately the same footing as their more affluent peers across the division, closing expected economic disadvantage performance gaps.

- Findings from the examination of across the years cohort group data, *school by school,* indicated that the introduction of the full-day, every day kindergarten program resulted in remarkable improvement in reading performance especially for students at sites one, and two. While as shown by effect sizes, findings were a little less striking at sites three and four (especially in regard to letter identification and concepts about print), and at site five (in relation to letter identification, concepts about print and writing vocabulary), performance on all measures, except for writing vocabulary at site five, was still statistically significant, supporting the efficacy of the full-day program in less affluent areas of the division.

Across the Years Performance of the Half-Day Students

- A statistical analysis that examined the division-wide performance of the *half-day kindergarten students only* across the years indicated that the performance outcomes of students in the half-day program increased significantly on all reading measures in which records were available. This contrasted with the performance of students in the full-day program, which remained relatively constant and suggests that there was an increasingly more academic focus in the half-day kindergarten program.

Incidence of Low Performance

- The across the years analysis of *indicators of low performance* showed that except for writing vocabulary scores which reduced the incidence of low achievement by 35 percent, participation in the full-day every day kindergarten program reduced the frequency of low performance on all other measures by approximately 50 percent, suggesting that participation in the full-day program helped increase performance levels on all reading tasks.

Long Term Effects to the End of Grade Three

End of Grade One

- The overall analysis of *end of grade one* reading achievement levels division-wide showed that in both 2002-2003 and 2003-2004 there were statistically significant differences between the performance of the full-day students compared to their counterparts in the half-day English program in favour of the half-day students. Although statistically the half-day students from more affluent neighborhoods were better readers at the end of grade one than their full-day counterparts, the full-day students were still reading above grade placement level.

  While the reading performance of the full-day and French immersion students at the end of grade one in 2002-2003 was statistically no different from that of the of their full-day counterparts, in 2003-2004 compared to the performance of the full-day students, the performance of the French immersion students was statistically superior, although similar in regard to grade placement levels.

  When inequities in socio-economic status were explored by comparing the end of *grade one* reading performance of students who participated in the full-day kindergarten program with that of students who had transferred into the division after having attended half-day kindergartens in their previous schools, findings showed that while the end of *grade one* reading achievement of the full-day students was significantly higher than that of their half-day peers from other schools in 2002-2003, these difference were not apparent in 2003-2004. Effect sizes at the end of grade one in 2003-2004 nevertheless indicated that the reading achievement level of the full-day, every day students was higher then their transferred-in peers by 9 percentile points.

End of Grade Two

- The end of *grade two,* division-wide findings from 2003-2004 differed from the findings in 2002-2003. While the 2002-2003 end of year reading performance levels of students in *grade two* who had participated in the two alternative kindergarten programs were different at statistically significant levels in favour of students in both the English and French programs, students in all groups were reading above grade placement level. Findings from the 2003-2004 analysis showed, however, that the reading achievement of the full-day kindergarten group was equal to that of their half-day peers from more affluent areas. This finding applied to both the English and French programs.

When target group comparisons were carried out contrasting the end of *grade two* reading achievement of students who had participated in the full-day, every day kindergarten program with that of students who had transferred in to the division after having attended half-day kindergarten programs in other divisions (cohort group), findings in 2002-2003 showed no statistically significant differences in reading ability. The 2003-2004 statistical findings were nevertheless in the expected direction. That is, compared to the end-of-grade two reading performance of the half-day students who had transferred in to the division, the end-of-grade two reading performance of the full-day kindergarten students approached statistical significance.

End of Grade Three

- End-of-*grade three* data were only available for 2003-2004. Based on these reading performance data for both English and French immersion students who had been enrolled in half-day programs when they attended kindergarten compared to the end-of-grade three reading performance levels of their counterparts who had been enrolled in the full-day kindergarten program, there were statistically significant findings in favour of both the half-day English and half-day French immersion students. Although the differences between the groups were statistically significant, the end-of-grade three reading performance of the full-day students from less affluent catchments was still above grade placement level.

- Target group comparisons, that took into account inequities in socio-economic status by comparing the performance of students in the full-day every day kindergarten program with that of students who transferred in to the division after participating in half-day kindergarten programs elsewhere, indicated that in 2003-2004 there were no statistically significant differences between the reading performance of students who had participated in the full-day kindergarten program and those who had attended kindergarten half-days only. The reading performance of the students in the two groups was approximately equal.

Conclusions and Discussion

- The year-by-year analysis of control group, division-wide, and cohort group data, as well as data collapsed across the years make a compelling case for maintaining the full-day, every day kindergarten program in less affluent neighborhoods in the division by reducing school entry performance disparities. This conclusion is also supported by the incidence of low achievement data that showed reductions in low performance. Kindergarten students from less affluent neighborhoods enrolled in the full-day, every day program also made greater beginning to the end of the year gains than their half-day counterparts on all reading measures. When collapsed across-the-years cohort data were analyzed at the kindergarten level, findings were statistically significant, again supporting the efficacy of the full-day program.

- The school by school analysis of the effectiveness of the full-day kindergarten program, that compared the performance of the full-day students to that of students in the same schools when a half-day program was in effect, indicated superior performance levels on all tasks since the introduction of the full-day program, although performance at site five, especially on the concepts about print, letter identification and writing vocabulary tasks were not as striking as at the other four sites.

- The long term data analysis across the school years from 1997-1998 to 2003-2004 indicated that the performance of students in the *half-day kindergarten program* division-wide increased at statistically significant levels year by year on all measures, suggesting that the curriculum in the *half-day program* may now have a more academic focus than in the years previous to the implementation of the full-day program. This finding suggests that the full-day program has had an influence on the kindergarten program in the division as a whole, which is somewhat worrisome because these classes meet only half-days. As a result, the curriculum in the half-day classes may have too narrow a focus.

This finding is somewhat troublesome in the light of research evidence (NICHD, 2005; Stickland and Shanahan, 2004) which indicates that as well as playing with letters and sharing alphabet books, working with rhymes, playing language games with letter sounds, and linking letters to the sounds they represent, young children need to take part in singing and story reading activities, draw and write independently for enjoyment, engage in dialogue with others, and become involved in discussions that are stimulating, not only at meta-linguistic levels, but cognitively, and linguistically as well. While there are strong relationships between oral language development, alphabetic and print knowledge, and future success in reading, one activity must not be carried out at the expense of the others. Young children need to become engaged, unhurried, in all of these kinds of stimulating activities that support learning.

- Although results varied somewhat across the three years for which long term data were available, a common thread throughout the analysis was that as students from less affluent neighborhoods who had been enrolled in the full-day kindergarten program progressed through grades one, two and three, they were able to keep pace with the reading performance of their peers who had participated in the half-day kindergarten program. At the end of the respective school years, the full-day kindergarten students were reading above grade placement levels in each of the years, at the end of grade one, the end of grade two, and the end of grade three.

Torgeson (2002) questions the long held basic standard that all children be expected to reach levels of reading comprehension that correspond with their level of listening comprehension. He suggests that this expectation is unrealistic because it implies that all children should have average verbal ability, a premise that has been refuted by decades of research into the effects of special instruction. Allington (2005), on the other hand, finds Torgeson's views disconcerting because of the effect such an outlook may have in lowering classroom expectations. Still, the fact that the students in this study from disadvantaged neighborhoods whose performance upon kindergarten entry was lower than that of their control group peers were able to read above grade placement level at the end of grade three speaks well for the quality of the early years program in the division.

Recommendations

Kindergarten Program

1. Performance gains across the kindergarten year as well as long-term cohort group data, that compared the performance of students in the full-day, every day program with that of their peers in the same schools before the introduction of the full-day program who attended kindergarten for half-days only, support the efficacy of the full-day program, which should therefore be maintained. In addition to closing the academic performance gap between children from advantaged and disadvantaged catchments, goals of the full-day program should include: (1) increasing our understanding of children's home cultures and using that understanding to build bridges between home and school, and (2) helping children experience literacy as part of everyday life, thereby helping to reduce income-based learning disparities.

2. Continue to monitor curriculum implementation in the full-day program, especially at site five to ensure that the curriculum includes a writing component, and in conjunction with the writing reinforces the correspondence between sounds and letters, concepts about print and letter name knowledge. Writing activities can be integrated across the curriculum, the curricular goal being to address issues and questions that are important to children and that use literacy to empower children "to do important life work" (Harris, 2005, p.4).

3. As indicated by research (NICHD, 2005), the ability to match sounds and letters (as measured by the dictation task) is fundamental to future success in school. At the same time that care must be taken to ensure that the kindergarten program is well-rounded and includes varied activities that integrate music, art, physical education, science and social studies with the language arts and helps children relate new learning to their own lives, students must come to understand that spoken words are made up of individual sounds and be able to put these sounds together seamlessly and quickly. In view of these realities, continue to monitor students as they move into grades one, two and three to ensure that their understanding of the speech to print match and knowledge of the alphabetic principle has been consolidated. Turn tacit knowledge into conscious awareness and application.

4. The analysis of the performance of half-day students indicating statistically significant gains on all end-of-year reading measures across the years suggests that the curriculum in the half-day program may be too narrow in focus. Consider extending all kindergartens in the division from half- to full-day, every day programs to ensure a more balanced program that provides for many integrated language and literacy opportunities and builds competence in oral language as well as metalinguistics as suggested by Strickland and Shanahan (2004) and Harris (2005). "Children need to do more than break the phonics code" (Harris, 2005, p.4).

Program Upward Through the Grades

The long-term effects of the full-day kindergarten were rewarding. Contrary to expectations, students from more impoverished areas of the city were able to read beyond grade placement level to the end of grade three. While this effect was gratifying, a related question addresses the issue of why the full-day kindergarten students were unable to maintain the reading performance edge they held at the end of their kindergarten year. While activities that support literacy learning may not be available in homes where overwhelming living conditions and related problems may take precedence over engaging in literacy activities, as students progress upward through the grades, educators must assume responsibility for monitoring progress and ensuring that all children have opportunities to engage in linguistically and cognitively stimulating dialogues.
There may, however, be instructional anomalies both within and across schools in the division. It is therefore advised that:

1. Under the guidance of the language arts consultant and reading clinician, teachers monitor student progress on an on-going basis. Students should continue to be engaged in small group learning activities to enhance expressive language as well as cognition by providing background information, clarifying meaning, and reinforcing the alphabetic principle as it applies to word identification. Meta-linguistic and cognitive knowledge must continue to be monitored closely by analyzing assessment data available through conducting ongoing running records.

As selections are read, teachers can examine whether individual students are more successful at word identification or comprehension and use this information to inform subsequent instruction.

2. In conjunction with this recommendation, consider reducing teacher/pupil ratios at the grade one and two level and/or re-assigning or adding staff to ensure consolidation of word recognition and comprehension skills. While only expert teachers provide instruction to the most needy, a core of volunteers could also enrich schooling by making more individualized attention possible.

3. The success of the school program is, in part, dependent upon the home literacy environment. Without sustained parental support, learning gains may dissipate as children proceed upward through the grades. Ground may also be lost over the summer months. Continue and extend the *Literacy Links* program to ensure continued dialogue between home and school and that parents understand the importance of communicating with their children.

THE EFFICACY OF AN ALL-DAY, EVERY-DAY KINDERGARTEN PROGRAM:
A SEVEN YEAR CUMULATIVE REPORT FOR THE ST. JAMES-ASSINIBOIA SCHOOL DIVISION

Introduction

This is the fourth formal report describing the efficacy of the full-day, every day kindergarten program in the St. James School Division which was initiated in one school located in an economically-disadvantaged neighborhood in the 1997-1998 school year. The success of this undertaking led to the extension of the program in 1998-1999, from one class at Brooklands School to two classes at Stevenson-Britannia, plus two, three-quarter day classes at Crestview. In the three-quarter day pattern, one kindergarten class began the school year attending full-days and alternated to half-days in February, while the other class did the reverse. This group of children began the school year attending kindergarten half-days and then switched to full-days halfway through the school year. The three-quarter-day arrangement resulted in cost saving benefits because instead of two, full time staff, only one full-time and one half-time teacher were required. In 2000-2001, the three-quarter day option was also introduced at Buchanan and Heritage Schools, resulting in six, three-quarter day kindergarten classes across the division. The Zakaluk and Straw evaluation in 2002, however, showed that there was no compelling evidence to continue the three-quarter day option, even though students who attended full-day, every day from February until June had higher achievement levels than those who attended kindergarten full time at the beginning of the year. As a consequence, the three-quarter day kindergarten option was discontinued. From 2001-2002 to the present, a total of nine, full-day, every day kindergarten classes have been offered in five schools located in economically disadvantaged neighborhoods across the division.

The relationship between literacy development and child impoverishment as well as for members of some cultural and linguistic groups is well documented. Too many children from economically disadvantaged areas begin school unready to learn and are therefore at risk. Children from families in which there is abuse, neglect or divorce may also be too anxious to learn. But to benefit as a whole, society must build on the learning potential of all. Lack of school success results in lost economic productivity, lost tax revenues and is related to inappropriate lifestyles, stress levels, crime rates, ill-health, and reduced participation in community life (International Adult Literacy Survey (IALS), 1996; Colorado Preschool Report, 2003).

Another factor that affects children living in poverty with inadequate nutrition relates to brain development. Cynander and Mustard (1999) stress that the period between birth and six years is critical to cognitive development. Shore (cited in Stanley, 2004) reinforces the importance of both genetics and social interaction in enhancing

intellectual growth. In citing statistics from the American Federal Interagency Forum on Child and Family Services, Goldenberg (2004) reported a positive relationship between the educational level of mothers and the percentage of three and five year olds who were read to every day. While seventy percent of mothers who are college graduates read to their children, only forty-two percent who have less than a high school diploma do so. Yet preschool experiences with books relates to reading success.

It is the talk that accompanies sharing picture books and stories that is critical to development. Early cognitive growth is highly dependent upon the quality of mediated learning that children experience. Social settings in which the child interacts with adults and more knowledgeable peers are affirmative settings in which learning occurs. In addition, naturally in the course of every day living, children take part in a series of problem-solving tasks; first simply participating in the routines in the presence of others, and then, under their guidance, assuming the initiative for carrying out the tasks and routines for themselves, with the adult correcting and guiding when the child falters. Ultimately, children gain confidence and learn to carry out the tasks and routines independently on their own (Brown, Palinscar, & Armbruster, 2004).

The presence of adult role models also leads to the well-being of children-- emotional control, the ability to attend, effective learning and problem-solving behaviors, and ultimately academic success, thereby reducing the cycle of poverty that cripples the nation's economy and ability to compete on a global basis (Stanley, 2004). In terms of literacy and academic development, unfortunately, compared to middle class children, "children from low-income families are more dependent on school experiences" (Goldenberg, 2004, p. 1640).

High quality early education produces long-lasting benefits (Strickland & Shanahan, 2004). There are strong relationships between oral language development, alphabetic and print knowledge, and future success in reading. This means that young children need to take part in singing and story reading activities, engage in dialogue with others, and become involved in discussions that are stimulating-- not only linguistically, but cognitively. They need to play language games with letter sounds, recite rhymes and chant verses, as well as link letters to the sounds they represent by writing their names and "writing" messages. They need to draw and write independently for enjoyment, make sense of print, understand labels and signs, observe adults read and write, contribute ideas for others to write down, and observe and follow along as print is tracked from left to right.

Unfortunately, perhaps because of apathy, ignorance or lack of commitment, some children may not have experienced this kind of mediated, preschool learning. Such social interaction patterns may also be alien to their culture. Parents cannot be expected to dialogue and interact with their children in productive ways if they themselves grew up in disadvantaged homes, or are overwhelmed by their living conditions and the social

isolation that may accompany urban living. But children become competent communicators through "tuning-in " to one another. According to such experts as Rogoff, and Wertsch (1986) and Vygotsky (1978), "Eventual linguistic and metalinguistic awareness … rest in the fast-paced co-constructions of reality that adults and children create in everyday life" (Heath, 2004, p. 206).

Cox, Fang, and Otto (2004), reinforce the need for social interaction in facilitating learning. Although they suggest that the relationship between low income and school preparedness is complex, they believe that the association is, for the most part, due to experiential factors. The lack of economic resources limits the availability of literacy materials in the home and may also limit the frequency of parent/child centered interactions with books and multiparty talk with members of the extended family and the community that are so vital to language development and learning to communicate competently across contexts and experiences (Heath, 2004). These adult-mediated experiences provide opportunities for children to express their thoughts and ideas. Accordingly, children who have multiple opportunities to interact with adults and peers are more likely to develop "ways with words" (Heath, 1983). Even further, competent communicators, proficient in both oral and literate registers, are more likely to experience literacy success. What is more, Tabors and Snow (2004) contend that language input and support for literacy in the pre-kindergarten years, at home and in preschool, is predictive of skill in fourth-grade reading comprehension.

Fifteen years ago, in a resolution approved by all parties, the parliament of Canada voted to end child poverty. Yet, according to statistics issued in the Manitoba Child Poverty Report Card (2004), more than one million Canadian children (1 in 6) still live in economically disadvantaged homes. The statistics for Manitoba are even more disheartening. One in five children come from single parent, Aboriginal, or immigrant families, children with disabilities being most at risk. The relationship between income level and school success is well documented. Providing full-day, every day kindergartens is one way to provide learning opportunities to make school work for all children (Goldenberg, 2004).

Among the educational goals developed by the American government for the year 2000 were that all children will: (1) begin school ready to learn, and (2) leave grade 4 with demonstrated competency over challenging subject matter. A third goal was to increase parental involvement to support the social, emotional, and academic growth of children (National Education Goals Panel, 1997). We, in Canada, need to follow suit. As cautioned by Goldenberg (2004), we must ensure that these goals advance beyond rhetoric.

THE STUDY

The purpose of the current report was to determine whether the findings from Year VII of the implementation of the full-day kindergarten project (2003-2004) confirmed the positive findings from the previous years by comparing the performance of the full-day students with that of half-day kindergarten students: (1) in a control school in a relatively similar socio-economic area; (2) across the division in schools in which students from more middle class and affluent neighborhoods were enrolled in half-day programs; and (3) in the same schools before the institution of the full-day, every day program--a half-day cohort group. A second major focus was to determine the long-term effects of the full-day, every day program.

Questions for Study

Full-Day and Control School Comparisons

Question 1

The first major question considered the pre- and post-test reading performance of students in the full-day, every-day kindergarten classes in comparison to students in a control group school located in a slightly higher socio-economic level who received a half-day program.

The purpose of this question and analyses was to make comparisons between the target, full-day, every-day students with students who were from a school that was slightly above the target schools in socio-economic level, but received a half-day program. Three analyses were carried out: (1) an analysis of the comparison of the full-day and half-day control school of the 2003-2004 pre- to post-test gains on the Clay measures and on reading level (SASI equivalents); (2) a presentation of the analyses of the four years over which both pre- and post-test data were collected on the two conditions (full-day and control half-day); (3) an analysis of the pre-to post-test gains when the data were collapsed across the four years in which control school data were collected. A further analysis showing achievement gains across the years was carried out to see whether either setting was producing students with higher scores.

Full-Day and Half-Day Across the Division Comparisons

Question 2

A second major question examined the reading performance of students in the full-day, every-day kindergarten program compared to the other students in the division who attended the half-day program and were from more advantaged neighborhoods than those who attended the full-day program at the end of kindergarten.

The purpose of this question and analyses was to determine how the reading performance of students in the full-day, every day kindergarten option compared to that of students across the division (from more advantaged neighborhoods). Three analyses were carried out to address this question: (1) an analysis of the 2003-2004 end of school year kindergarten data on the Clay measures of literacy, as well as book level results (SASI equivalents); (2) a reporting of the analyses from previous years on a year-by-year basis comparing full-day and half-day reading performance; and (3) an analysis of the data collapsed across the seven years of the study (into one analysis). Changes in performance across the years were also assessed.

Cohort Group Comparisons

Question 3

This question compared the end-of-year reading performance of the full-day, every-day kindergarten students with the performance of students in the same target schools before the program was implemented.

The purpose of this question and analyses was to compare students from the same neighborhoods (and therefore, within the same socio-economic level) before and after implementation of the full-day program. In addition to the collapsed analysis from all schools, a school-by-school analysis was carried out to see if the differences observed in the collapsed data were reflected in each of the target schools. Finally, an analysis of the incidence of low performance was carried out for the target schools, comparing the number of students who ranked in the lowest two percentiles before implementation and those students who ranked in the lowest two percentiles after the implementation of the program.

Long Term Effect Comparisons

Question 4

The final major question explored how the reading achievement of students in the full-day, every-day kindergarten program compared to the reading achievement of students who attended kindergarten half-day after the completion of Grades 1, 2, and 3.

The purpose of this question and analyses was to compare students in the full-day program with three comparison groups: (1) students from the same schools who did not participate in the full-day program; (2) students from the English-only schools in the

division who received a half-day program; (3) students from across the division (both English and French Immersion) who received a half-day program.

Participants

The criterion employed by the St. James-Assiniboia School Division for designating the kindergarten in any school full-day, every day was socio-economic status. According to data obtained from the Manitoba Education and Training Schools' Finance Branch (1996), based on census data, Brooklands schools ranked first in the Division in terms of low income and Stevenson-Britannia and Crestview schools ranked second and third, respectively. Heritage and Buchanan schools ranked fourth and sixth. Lakewood School, which served as a control, ranked seventh among the participating schools on the Division's income-factor scale. The fifth ranked school was not included in the study because of the stability of that neighbourhood in terms of home ownership, number of transient families, and number of single-parent families. The participating schools with the number of full-day, every day classrooms are listed in the following table.

Number of Classrooms Participating

School	**Brooklands**	**St. Britannia**	**Crestview**	**Heritage**	**Buchanan**	**Lakewood**
Option	Full-Day	Full-Day	Full-Day	Full-Day	Full-Day	Half-Day
Classes	1	2	2	2	2	2

Measures

Literacy development. The tasks from the Marie Clay *Observation Survey* (1976,1985, 1993) were employed to evaluate literacy performance gains. Tasks, administered individually by classroom teachers, included: (1) *letter identification* in which children are asked to name both upper and lower case letters, 54 in all counting two forms of the letters *a* and *g*, credit being given 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 are required to answer a set of 24 questions to evaluate (a) their understanding that it is the print, not the pictures that tell the story, and (b) their knowledge of such concepts as a word, a letter, a sentence, the function of punctuation, marks, and print directionality -- from left to right and return on the next line from left to right again, (3) *words in isolation* in which shown a list of 15 of the most commonly-occurring words, children are asked to identify them, (4) *writing vocabulary* -- where

children are required to write all the words they know within a ten-minute time limit, beginning with their own name, (5) *dictation* (hearing sounds in words) in which two sentences are dictated, one word at a time, with points being awarded for every sound represented correctly. 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 as designated by Clay to represent the range of difficulty of books used in the grade one program) 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.

Before 2002-2003, Clay's (1993) equivalency levels were used to analyse and interpret book level or reading achievement performance. The Clay levels, however, fail to go beyond the very beginning of grade 2. Accordingly, in order to trace reading achievement on upward through the grades, in 2002-2003 the Clay equivalents were replaced by the *Benchmark Kit* (Nelson Thomson Learning, 2001) reading achievement levels. While the Clay levels terminate at the grade 2 level, the *Benchmark Kit* system distributes levels 17 to 20 across grade two and grades two/three. For ease of interpretation, the division also tracks student achievement through a computerized system named the Student Administrative System Information (SASI). The SASI equivalents represent achievement in terms of grade level and are therefore useful for interpreting performance across subject areas. The SASI reading level equivalents were assigned in the division office and correspond approximately with both the Clay and *Benchmark Kit* reading levels. The analyses reported here are reported in SASI equivalents. (Refer to Appendix for an equivalency chart that shows the similarity between these assessment levels.)

Control Group Findings

The first section of the report presents the data for question #1 regarding the reading performance of students in the full-day, every-day kindergarten classes in comparison to the reading performance of students in a control group school located in a slightly higher socio-economic area that participated in a half-day program. It was expected that participation in the full-day, every day program would have a positive effect on literacy development.

The analysis addressed increases in performance from the beginning to the end of year in the full-day, every day kindergarten option compared to the beginning, end of year performance of students in the one, half-day kindergarten class in a control group school located in a slightly higher socio-economic background.

An analysis of covariance was employed to assess the September to June achievement and growth patterns of the full-day intervention group (Brooklands, Stevenson-Britannia, Crestview, Buchanan, and Heritage Schools) in comparison to the September to June achievement and growth patterns of the half-day control group (Lakewood School).

Findings from the Full-Day/Control Group Performance Comparisons: 2003-2004

There were 160 students in the full-day, every day kindergarten classes and 36 students in the half-day control group class in 2003-2004. As indicated in the accompanying table and the figures at the end of this section of the report, when pre-test scores were used as covariates, there were no significant differences between the end-of-year performance of the full-day every day intervention group and the control group on letter identification ($F_{(1,193)} = 2\ .892$, $p = .091$); dictation ($F_{(1,193)} = .380$, $p = .538$); or writing vocabulary $F_{(1,191)} = 3.015$, $p = .084$. There were, however, significant differences between the two groups in favour of the full-day students on word identification ($F_{(1,193)} = 4.897$, $p = .028$), concepts about print ($F_{(1,193)} = 23.463$, $p < .001$), and reading achievement as measured by end-of-year (SASI) book levels ($F_{(1,194)} = 15.259$, $p < .001$). In terms of actual text reading ability and the important reading concepts of word identification and concepts about print, therefore, the performance of students in the full-day group exceeded that of their counterparts in the half-day program.

When the growth patterns for each of the variables were examined, it was nevertheless evident that the full-day students began the school year at lower levels. Using pre-test scores as a covariate, effect size comparisons indicated that with the exception of performance on the letter identification task, the full-day option students were able to match or exceed the performance levels of students in the control group by the end of the school year.

These findings are reviewed in the following task-by-task analyses:

- *Letter identification.* The respective end-of-year adjusted means were: $M = 50.48$ (full-day), $M = 52.88$ (control), with an effect size of $g = -.48$, indicating that the full-day students performed at the 32nd percentile or 18 percentile points below the control group. The maximum score for letter identification is 54.

- *Word Identification*: The adjusted mean scores ($M = 9.13$, full-day, and $M = 7.07$, control) plus the effect size ($g = .41$) showed that the full-day students performed at the 66th percentile or 16 percentile points above the control group on the word identification task at the end of the school year. The maximum score for word identification is 15, mastery being expected at the end of Grade 1.

- *Concepts about Print*: An examination of pre-post test performance, as shown in the accompanying figure, indicated that in terms of effect size (g = .90), the full-day group performed at the 82nd percentile compared to the half-day control group, demonstrating that the full-day kindergarten students in 2003-2004 made more gains across the school year (adjusted M = 17.61, (full-day); adjusted M = 14.45, control). The performance of the full-day students was superior to that of the control group by 32 percentile points.

Analyses of Co-Variance: 2003-2004 Kindergarten Control Group Comparisons

Variable	N	Pre-Test (stand dev)	Post-Test (stand dev)	Adjusted Post-Test	Effect Size	%-ile Equiv	d/f	*F*-ratio	*p*-value
Letter Identification					-.48	32	1,193	2.892	.091 ns
Full-Day	160	21.36 (16.993)	50.41 (8.968)	50.482					
Control	36	23.58 (17.560)	53.19 (2.068)	52.884					
Word Identification					.41	66	1,193	4.897	.028*
Full-Day	160	0.39 (1.099)	9.06 (5.204)	9.127					
Control	36	0.780 (2.486)	7.36 (4.964)	7.073					
Concepts About Print					.90	82	1,193	23.463	.000**
Full-Day	160	6.91 (4.081)	17.66 (3.878)	17.612					
Control	36	6.14 (3.118)	14.22 (3.390)	14.448					
Dictation					-.11	46	1,193	0.380	.538 ns
Full-Day	160	2.85 (5.531)	27.76 (10.454)	29.072					
Control	36	4.08 (6.349)	29.47 (6.826)	26.498					
Writing Vocabulary					.32	63	1,193	3.015	.084 ns
Full-Day	160	1.49 (2.043)	26.08 (20.437)	26.414					
Control	36	2.06 (2.317)	22.14 (9.505)	20.681					

*p < .05
**p < .001

- *Dictation*: The maximum score attainable for dictation is 37. The full-day students achieved an adjusted mean score of 29.07, while the control group achieved an adjusted mean score of 26.50, g = -.11). Compared to the half-day students, the full-day option students performed at the 46th percentile, or 4 percentile points below the control group.

- *Writing Vocabulary*: The mean performance level at year-end (adjusted for differences in entering scores) for the full-day group was 26.41, and for the control group, 20.68, with Clay (1993) suggesting that being able to write 40 words within ten minutes at the end of Grade 1 distinguishes adequate from inadequate performance. The effect of participating in the full-day option was thus greater (g = .32), students in the full-day, every day option performing at the 63rd percentile compared to the students in the half-day control group, thereby exceeding the performance level of the half-day control group by 13 percentile points.

- In terms of actual r*eading achievement* (see table below), as indicated by the analysis of variance, the reading ability of students in the full-day group was more advanced at the end of the year than the reading ability of students in the half-day program ($F_{(1,198)}$ = 15.259, p < .001). The magnitude of these differences is revealed by the calculation of effect sizes (g = .70). The respective end-of-year mean scores, as expressed in S.A.S.I. grade level equivalents, were M = 1.095 (full-day), and M = 0.606 (half-day), suggesting that the reading level of students in the full-day program was 26 percentile points higher than that of the half-day students.

Reading Achievement (Book Level Grade Equivalency – SASI)
Full-Day vs. Control, 2003-2004

Reading Achievement (Book Level)	**N**	**Mean (stand dev)**	**Effect Size**	**%-ile Equivalent**	**d/f**	***F*-ratio**	***p*-value**
Full-Day	160	1.0950 (.70744)	.70	76	1,194	15.259	.000**
Control	36	0.6056 (.53262)					

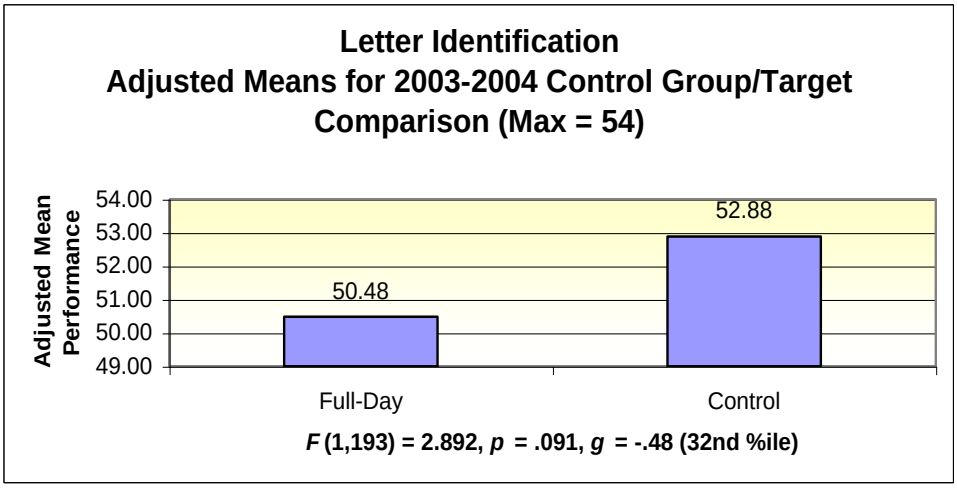
** p < .001

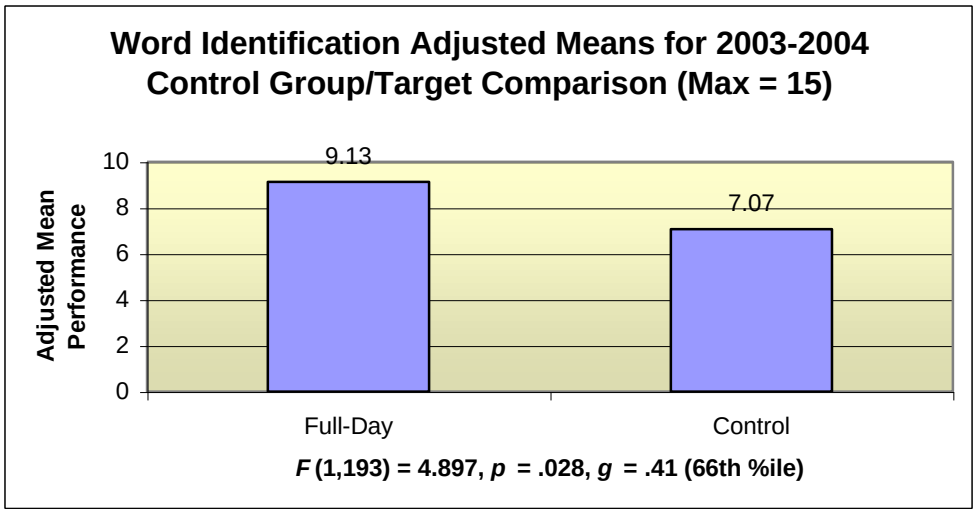
Summary and Discussion of 2003-2004 Control Group Comparison Findings

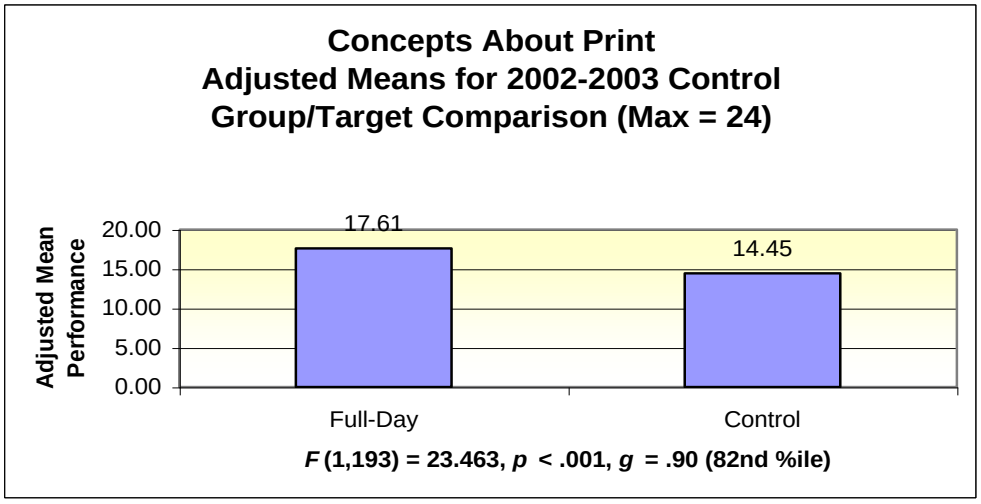
The results of the 2003-2004 analysis of covariance for the measures (letter identification, dictation and writing vocabulary) showed no significant statistical differences between the performance of the full-day, every kindergarten students and those in the half-day control group. Statistical differences were found in favour of the full day, every day student on word identification, concepts about print, and book level.

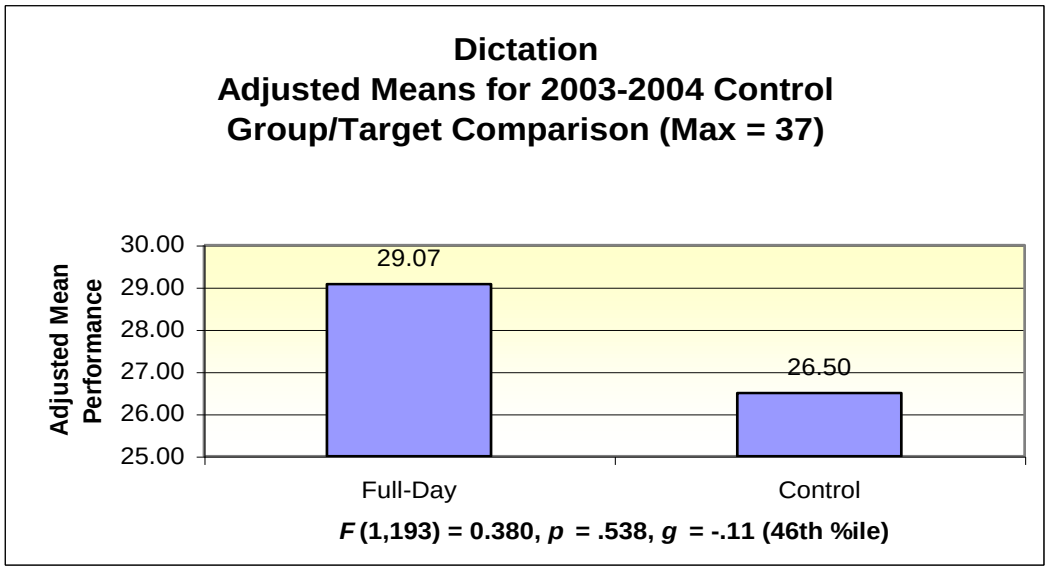
The superior performance of the half-day control group on the letter-naming task (effect size for full-day group = -.13) is perhaps indicative of an increase emphasis on rote learning and/or a more academic focus in the half-day program than in previous years. An alternative explanation might be the location of the control school, which ranked seventh in the division in terms of income level. More middle class parents may stress knowledge of letter names at home.

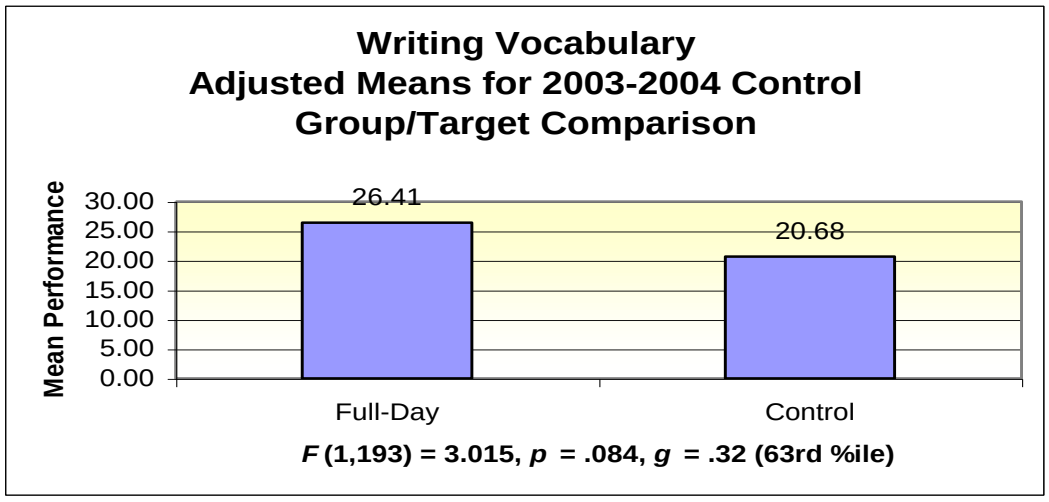
In spite of the letter name knowledge results, what is particularly striking about these 2003-2004 control group findings is that analysis of variance comparisons for reading achievement show that the full-day students were better readers than the students in the half-day control group. The following figures plot the mean performance levels for both full- and half-day control group students on each of Clay's variables.

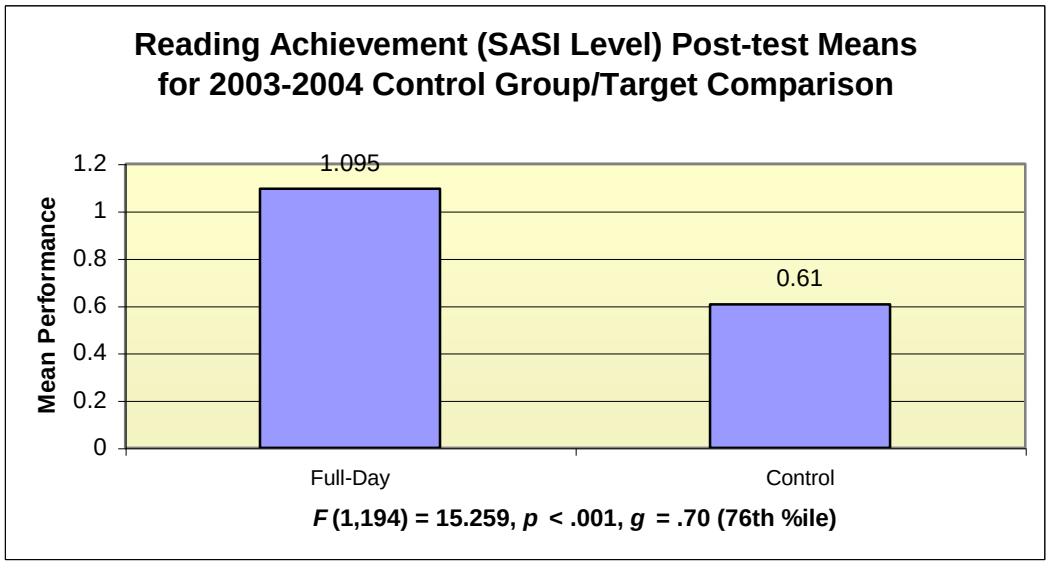



Word Identification Adjusted Means for 2003-2004
Control Group/Target Comparison (Max = 15)
Adjusted Mean Performance
10
8
6
4
2
0
9.13
7.07
Full-Day
Control
F (1,193) = 4.897, p = .028, g = .41 (66th %ile)

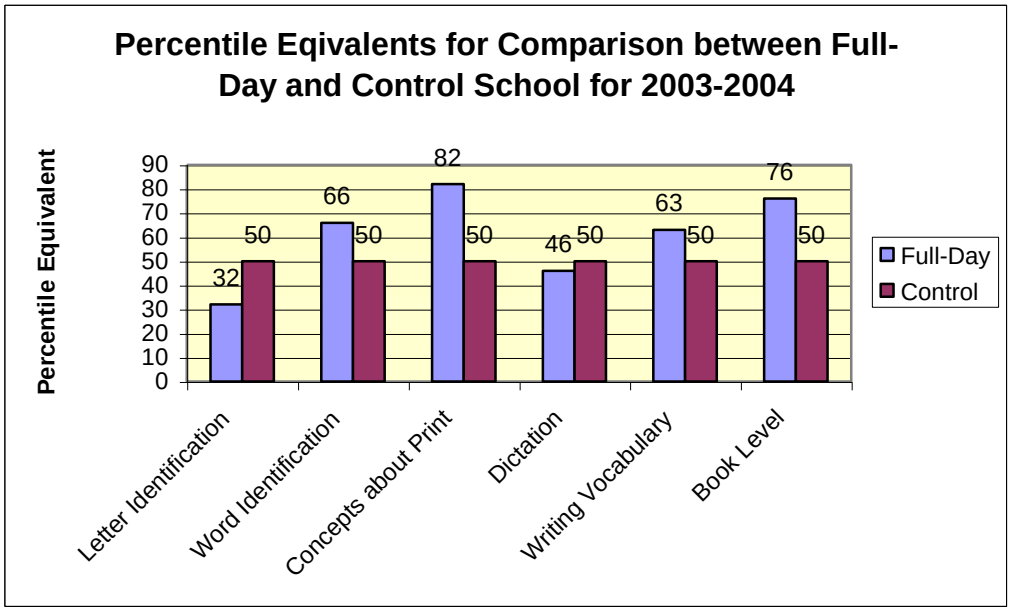

Concepts About Print
Adjusted Means for 2002-2003 Control
Group/Target Comparison (Max = 24)
Adjusted Mean Performance
20.00
15.00
10.00
5.00
0.00
17.61
14.45
Full-Day
Control
F (1,193) = 23.463, p < .001, g = .90 (82nd %ile)


Dictation
Adjusted Means for 2003-2004 Control
Group/Target Comparison (Max = 37)
Adjusted Mean Performance
30.00
29.00
28.00
27.00
26.00
25.00
29.07
26.50
Full-Day
Control
F (1,193) = 0.380, p = .538, g = -.11 (46th %ile)


Writing Vocabulary
Adjusted Means for 2003-2004 Control
Group/Target Comparison
Mean Performance
30.00
25.00
20.00
15.00
10.00
5.00
0.00
26.41
20.68
Full-Day
Control
F (1,193) = 3.015, p = .084, g = .32 (63rd %ile)



The following figure illustrates the comparison of full-day and control group performance for 2003-2004 as shown by percentile equivalents based on the calculation of effect sizes. The standard for performance of the control group was set at the 50th percentile rank, while the performance of the full-day students was expressed in comparison to this standard.



Full-Day/Half-Day Control Group Performance Comparisons Across the Years

The second major set of analysis using control group data compared the statistical findings from previous years folded into the results from 2003-2004. These comparisons were restricted to the years 2000-2001, 2001-2002, 2002-2003, 2003-2004 because control group Clay *Observation Survey* tasks pre-test data were unavailable for the years 1998-1999 and 1999-2000.

2000-2001. As shown in the accompanying table, for the school year 2000-2001, the performance of students in the full-day option was superior to that of students in the half-day program on each measure, letter and word identification, concepts about print, dictation, writing vocabulary and reading ability (book level) with the probability of these findings being due to chance only one in one thousand. Effect sizes ranged from a low of .45 for writing vocabulary to a high of 1.26 for dictation. The scope of percentile rankings was from the 67^{th} percentile for writing vocabulary to the 90^{th} for dictation. Thus in the 2000-2001 school year, the full-day students outperformed the half-day control group by 20 percentile points on letter naming, by 23 percentile points on word identification, by 35 percentile points on concepts about print, by 40 percentile points on dictation (the ability to match sounds with letters), by 17 percentile points on writing vocabulary (the ability to write words from memory), and by 22 percentile points on reading achievement (book level).

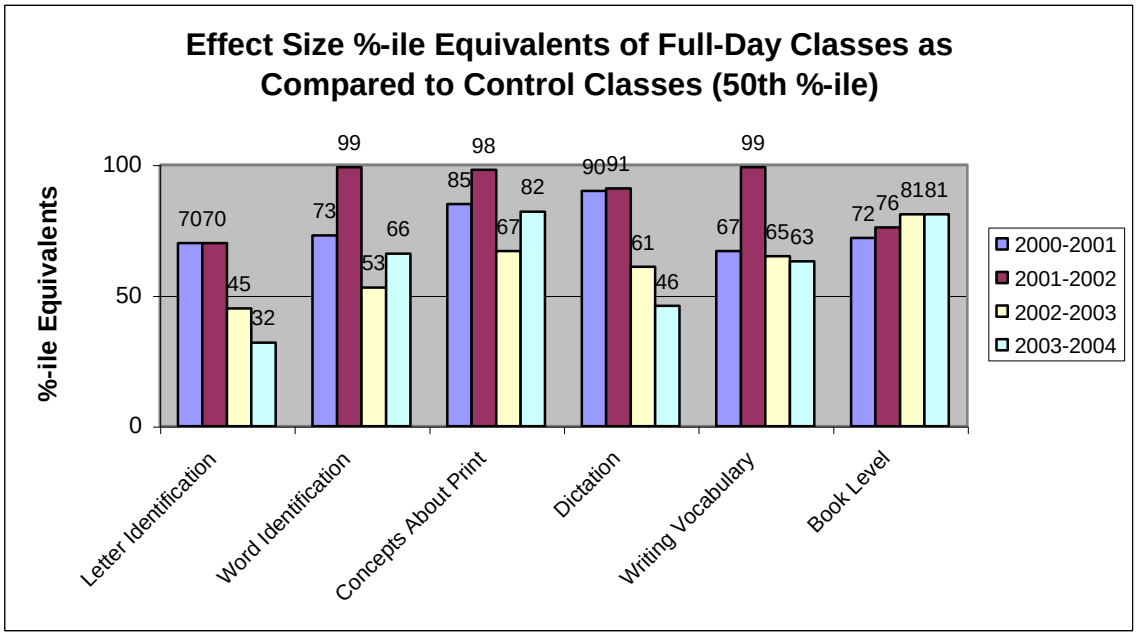
Full-Day/Control Group Performance Comparisons Across the Years

Measure	2000-2001			2001-2002			2002-2003			2003-2004		
	Sig (*p*-value)	**Effect Size**	**%-ile**	**Sig (*p*-value)**	**Effect Size**	**%-ile**	**Sig (*p*-value)**	**Effect Size**	**%-ile**	**Sig (*p*-value)**	**Effect Size**	**%-ile**
Letter Identification	< .001	.51	70th	< .01	.52	70th	ns	- .13	45th	ns	-.48	32nd
Word Identification	< .001	.62	73rd	< .001	2.34	99th	ns	.07	53rd	<.05	.41	66th
Concepts About Print	< .001	1.05	85th	< .001	2.06	98th	ns	.44	67th	<.001	.90	82nd
Dictation	< .001	1.26	90th	< .001	1.36	91st	ns	.28	61st	ns	-.11	46th
Writing Vocabulary	< .001	.45	67th	< .001	2.21	99th	ns	.39	65th	ns	.32	63rd
Book Level	< .001	.58	72nd	< .001	.71	76th	< .001	.89	81st	<.001	.89	81st

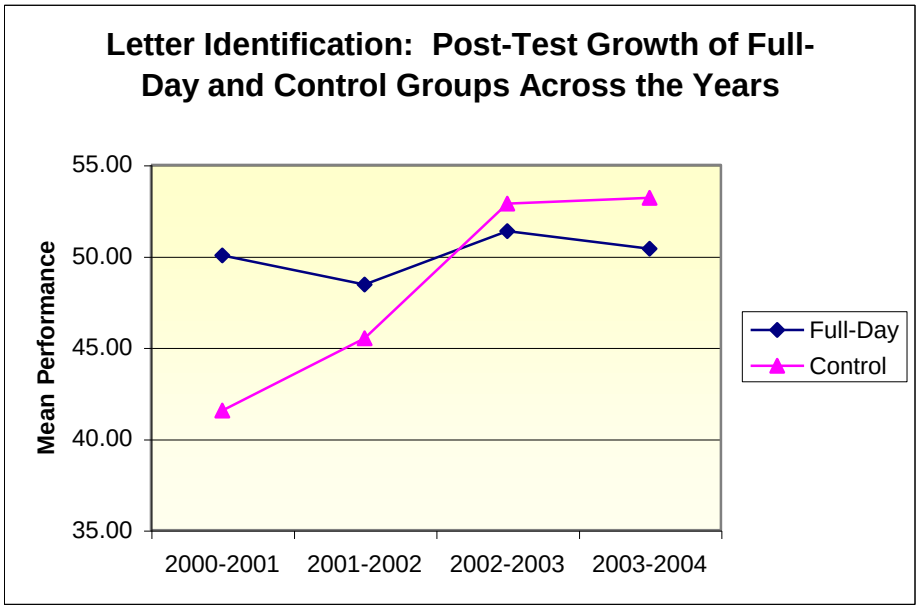
2001-2002. This pattern was repeated in 2001-2002. The performance of the full-day kindergarten option students surpassed that of their counterparts in the half-day program even more dramatically on all measures, effect sizes ranging from .52 for letter identification to 2.34 for word identification. The scope of percentile rankings was from the 70th (letter identification) to the 99th (word identification and writing vocabulary) and the 98th for concepts about print. Thus, in the school year 2001-2002, the full-day students outperformed their counterparts in the half-day control group by 20 percentile points on letter naming, by 48 percentile points on concepts about print, by 41 percentile points on dictation, by 49 percentile points on both word identification and writing vocabulary, and by 26 percentile points on reading achievement.

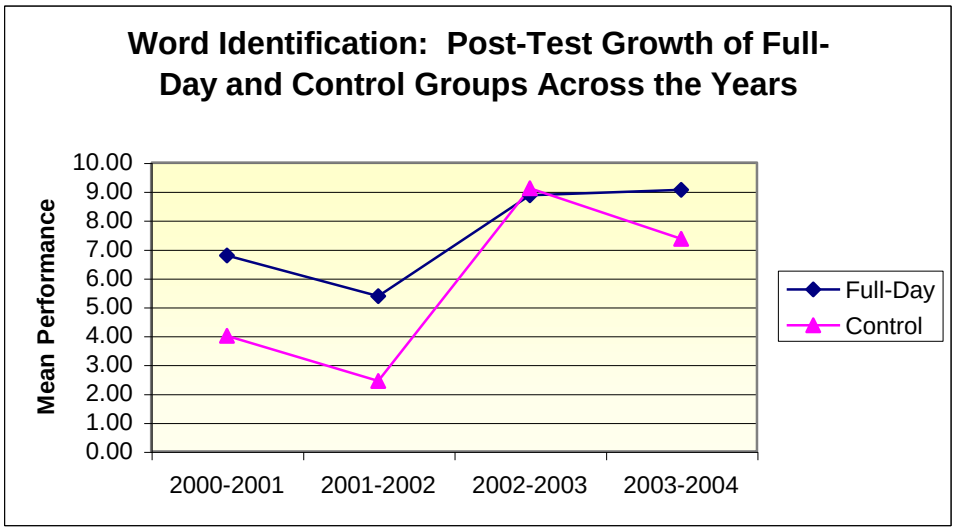
2002-2003. As shown in the preceding table, the pattern changed somewhat in 2002-2003, the results of the analysis of covariance indicating no significant performance differences between the two groups on any of the emergent literacy measures (letter and word identification, concepts about print, dictation and writing vocabulary) but a significant difference ($p < .001$) on reading achievement as measured by book level. Effect sizes, that go beyond analysis of covariance which simply determines whether or not there were differences between the two groups, showed, nevertheless, that the performance of the full-day students surpassed that of the students in the half-day control group on every measure except letter identification (by 3 percentile points for word identification, 17 for concepts about print, 11 for dictation, 15 for writing vocabulary, and 31 for book level). The respective effect sizes were .07 for word identification, .44 for concepts about print, .28 for dictation, .39 for writing vocabulary, and .89 for book level. Compared to the findings from previous years, the 2002-2003 findings were puzzling.

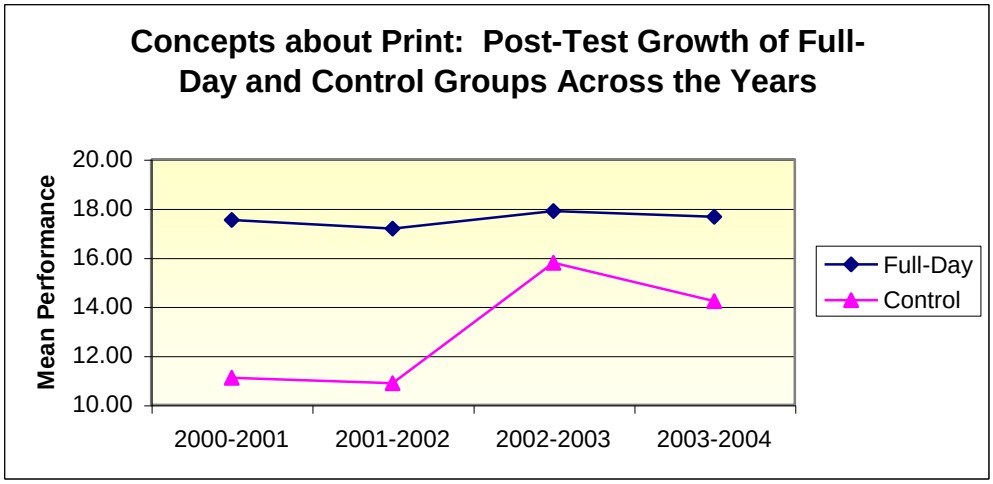
The percentile equivalents are graphed in the following figure, showing the progression of differences across the three years on each of the dependent measures:

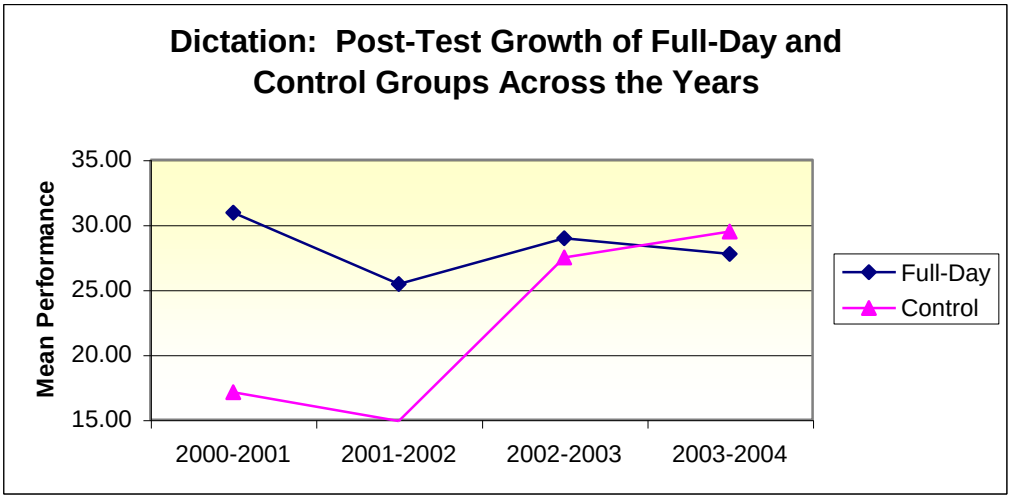


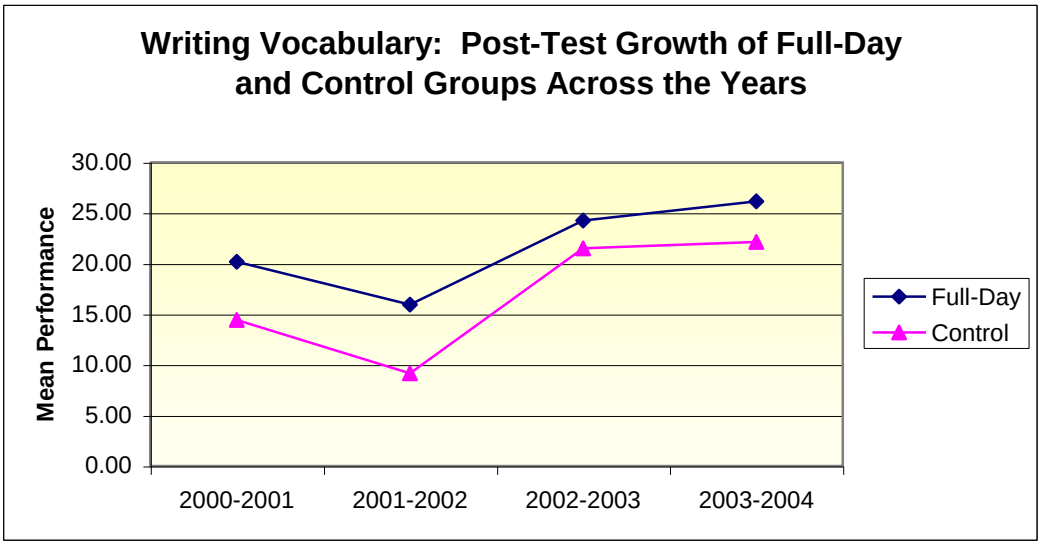
Some of the explanation of why the significance values decreased over the years may be in the growth of the control group scores rather than a decrease in the scores from the full-day group. The following charts indicate the patterns across the years of the two groups. As seen in the figures, the performance of the full-day group has remained relatively constant over the four years, whereas the performance of the control group has improved in all areas except writing vocabulary. This gain in the control group over the years, therefore, can account for the changes in the analysis from significant differences in the early years (2000-2001, 2001-2002) to a lack of significant differences in the later years (2002-2003, 2003-2004). This positive growth pattern is apparent on all of the sub-tests except writing vocabulary, in which the pattern of change across the years was almost identical in the two groups.






Concepts about Print: Post-Test Growth of Full-Day and Control Groups Across the Years
Mean Performance
20.00
18.00
16.00
14.00
12.00
10.00
2000-2001
2001-2002
2002-2003
2003-2004
Full-Day
Control


Dictation: Post-Test Growth of Full-Day and Control Groups Across the Years
Mean Performance
35.00
30.00
25.00
20.00
15.00
2000-2001
2001-2002
2002-2003
2003-2004
Full-Day
Control


Writing Vocabulary: Post-Test Growth of Full-Day and Control Groups Across the Years
Mean Performance
30.00
25.00
20.00
15.00
10.00
5.00
0.00
2000-2001
2001-2002
2002-2003
2003-2004
Full-Day
Control

Full-Day/Half-Day Control Group Comparisons: Collapsed across Four Years

A final control group analysis collapsed the full-day target/half-day control group data on each of the Clay measures across the four years for which pre- and post-test statistics were available (2000-2001, 2001-2002, 2002-2003, and 2003-2004). As shown in the table that follows, the analysis of covariance findings indicated that there were statistically significant differences in favour of full-day program students on each variable: for letter identification ($F_{(1,600)} = 27.047$, $p < .001$); for word identification ($F_{(1.601)} = 40.133$, $p < .001$); for concepts about print ($F_{(1,599)} = 177.119$, $p < .001$); for dictation ($F_{(1,597)} = 69.683$, $p < .001$); and for writing vocabulary ($F_{(1,598)} = 27.476$, $p < .001$).

Effect size comparisons, isolating the extent of these differences, show that on every variable the performance of the full-day group exceeded that of the control group. These effect sizes ranged from .51 for letter identification and writing vocabulary to 1.31 for concepts about print, the respective percentile equivalents varying from 70 to 90. For letter identification, the percentile equivalent was 70 ($g = .51$), meaning that the performance of the full-day group was superior to that of the half-day control group by 20 percentile points; for word identification the percentile equivalent was 73 ($g = .6$), the performance of the full-day group being superior to that of the half-day control group by 23 percentile points; for concepts about print the percentile equivalent was 90 ($g = 1.31$), the performance of the full-day group being superior to that of the half-day control group by 40 percentile points; for dictation the percentile equivalent was 79 ($g = .82$), the performance of the full-day group being superior to that of the half-day control group by 29 percentile points; and for writing vocabulary, 70 ($g = .51$), the performance of the full-day group being superior to that of the half-day control group by 20 percentile points.

These data are shown in the table that follows:

Analysis of Co-Variance: Data Collapsed over Four Years (2000-2001, 2001-2002, 2002-2003, 2003-2004)

Variable	N	Pre-Test (stand dev)	Post-Test (stand dev)	Adjusted Post-Test	Effect Size	%-ile Equiv	d/f	*F*-ratio	*p*-value
Letter Identification					.51	70	1,600	27.047	.000***
Full-Day	469	22.35 (17.713)	50.55 (8.714)	50.821					
Control	134	28.12 (17.679)	47.22 (12.014)	46.291					
Word Identification					.62	73	1,601	40.133	.000***
Full-Day	470	0.77 (2.419)	8.25 (5.220)	8.271					
Control	134	0.92 (2.507)	5.23 (5.038)	5.169					
Concepts About Print					1.31	90	1,599	177.119	.000***
Full-Day	469	7.66 (4.767)	17.70 (4.104)	17.305					
Control	133	6.95 (3.874)	12.59 (4.196)	12.184					
Dictation					.82	79	1,597	69.683	.000***
Full-Day	466	4.84 (8.877)	28.48 (10.143)	28.666					
Control	134	7.10 (7.896)	21.17 (11.343)	20.511					
Writing Vocabulary					. .51	70	1,598	27.476	.000***
Full-Day	467	2.94 (6.934)	23.43 (16.916)	23.577					
Control	134	3.96 (5.386)	16.17 (11.637)	15.676					

*** $p < .001$

There were also significant differences between the two groups on reading achievement as measured by end-of-year book levels ($F_{(1,1073)} = 234.282$, $p < .001$). That is, as shown in the following table, the actual reading ability of the students in the full-day program exceeded that of their peers in the half-day program across the years. Calculation of the effect size ($g = .23$) indicated that the reading performance of the full-day, every day students surpassed that of the half-day students by 9 percentile points (59th percentile).

Comparison of Full-Day/Control Group Half-Day Reading Level Performance Collapsed Across the Years as Expressed in SASI Equivalents

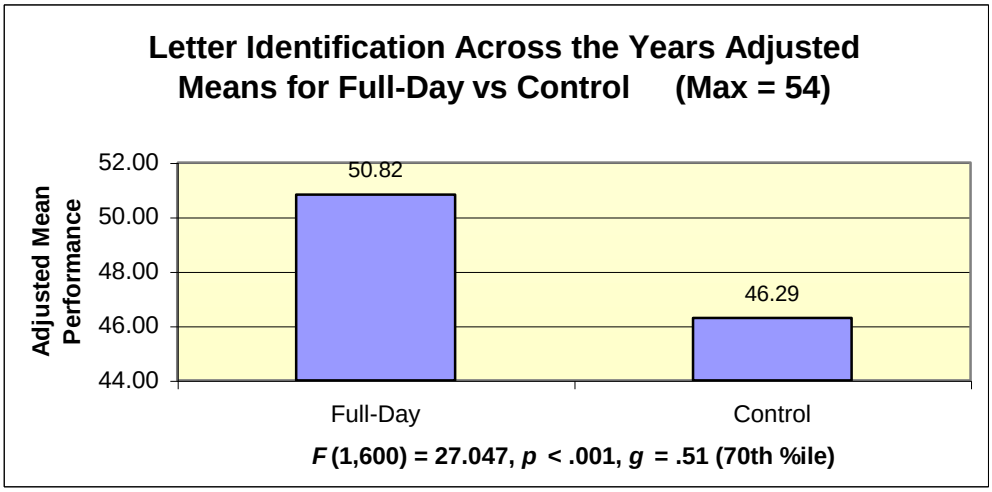
Measure	Condition	N	Mean (stand dev)	Effect Size	%-ile Equivalent	d/f	*F*-ratio	*p*-value
Book Level	**Full-Day**	618	1.0230 (.60750)	.92	82nd	1,763	100.209	.000***
	Half-Day Control Group	147	0.4888 (.45574)					

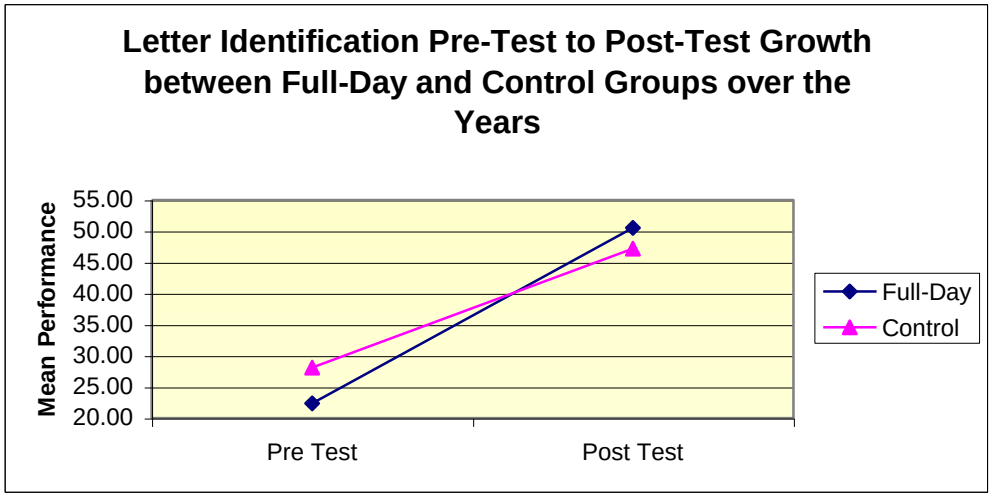
***$p < .001$

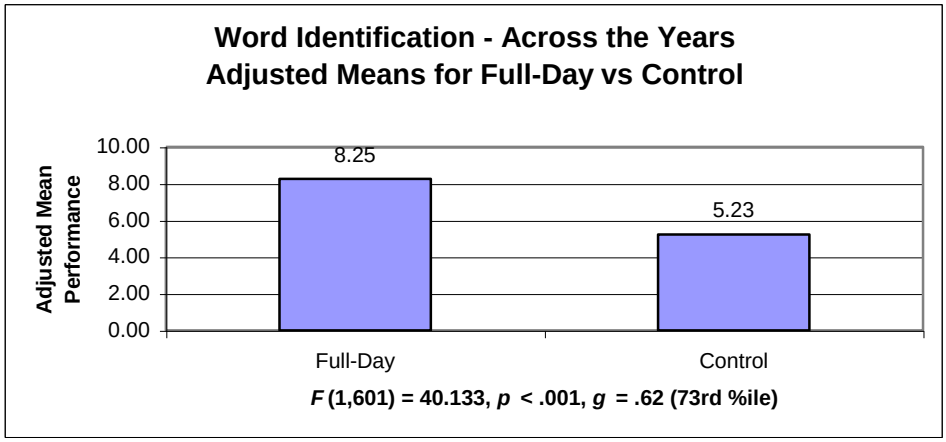
Conclusion. The analysis of covariance using data collapsed across the years (2000-2001, 2001-2002, 2002-2003, and 2003-2004) that compared the performance of the full-day, every day kindergarten students with that of their peers in a school in a somewhat higher socio-economic neighbourhood who attended kindergarten for half-days only were consistent on all emergent literacy measures (letter and word identification, concepts about print, dictation, and writing vocabulary). These findings, together with the findings from the end-of-year analysis of variance on reading achievement scores (book level) using data collapsed across the years, make a compelling argument for continuing to offer full-day kindergarten options in economically disadvantaged neighbourhoods. These findings countermand the 2002-2003 analysis of covariance control/target group comparison findings on the emergent literacy measures that were less than significant. Findings from the collapsed-across-the-years data analysis, together with the results of effect size calculations showed that students in economically disadvantaged schools which participated in the all-day, every day kindergarten program made more gains than their half-day counterparts across the school year in terms of early literacy performance. Although the relatively small number of students in the half-day option (n = 36) could have improved performance

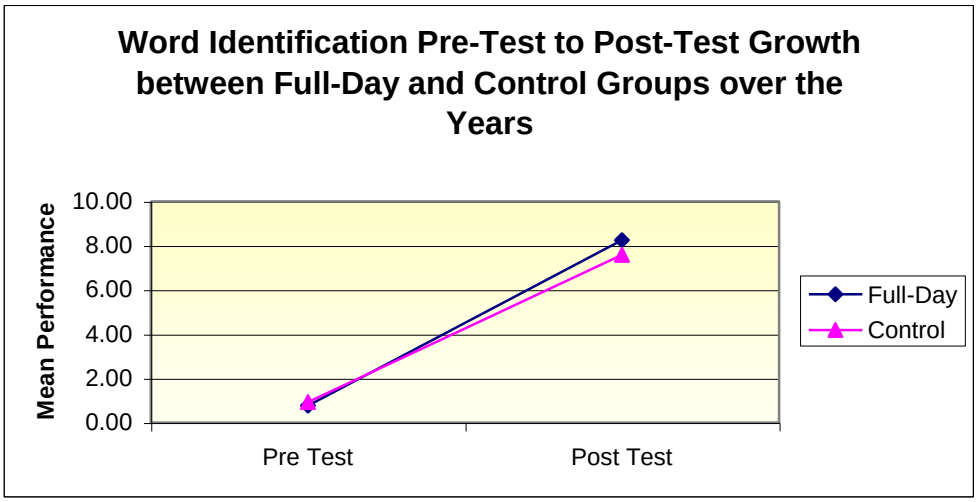
because more individualized instruction was possible, the performance of the half-day group in 2002-2003 could also be attributed to an increased emphasis on academic skills. Even so, the general trend, as confirmed in the collapsed data analysis and as evident in the growth patterns, suggests that participation in the full-day kindergarten option benefits students from economically disadvantaged areas.

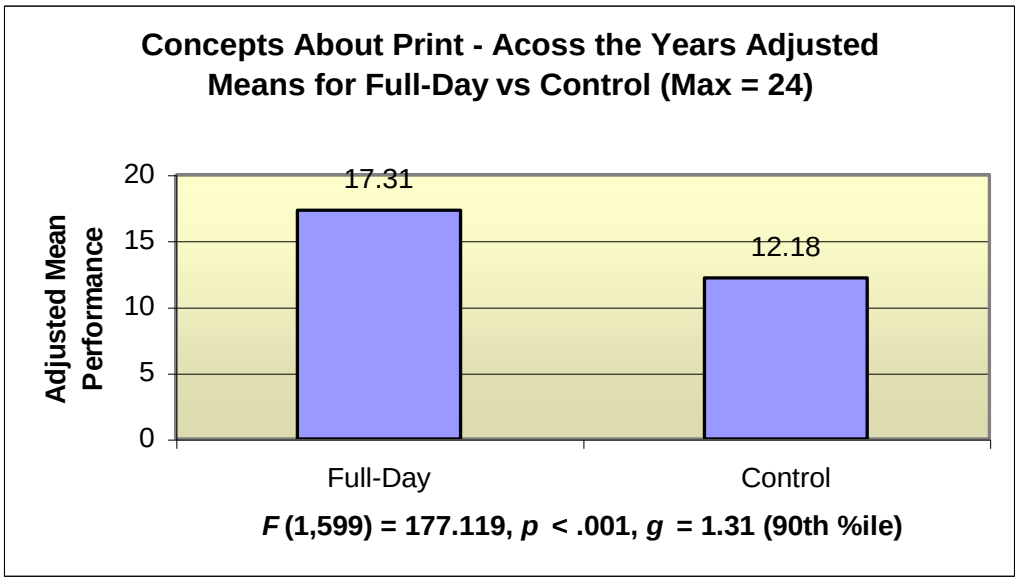
These data are illustrated in the following figures:

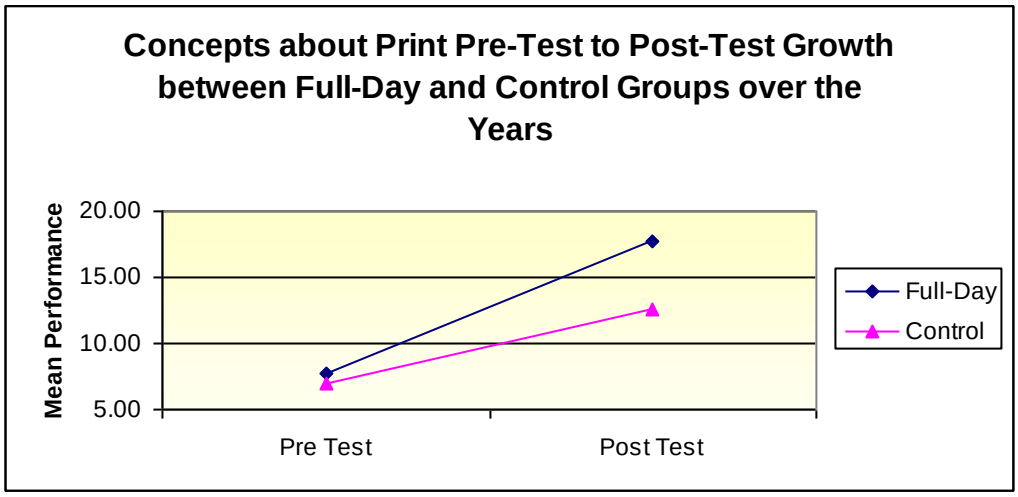


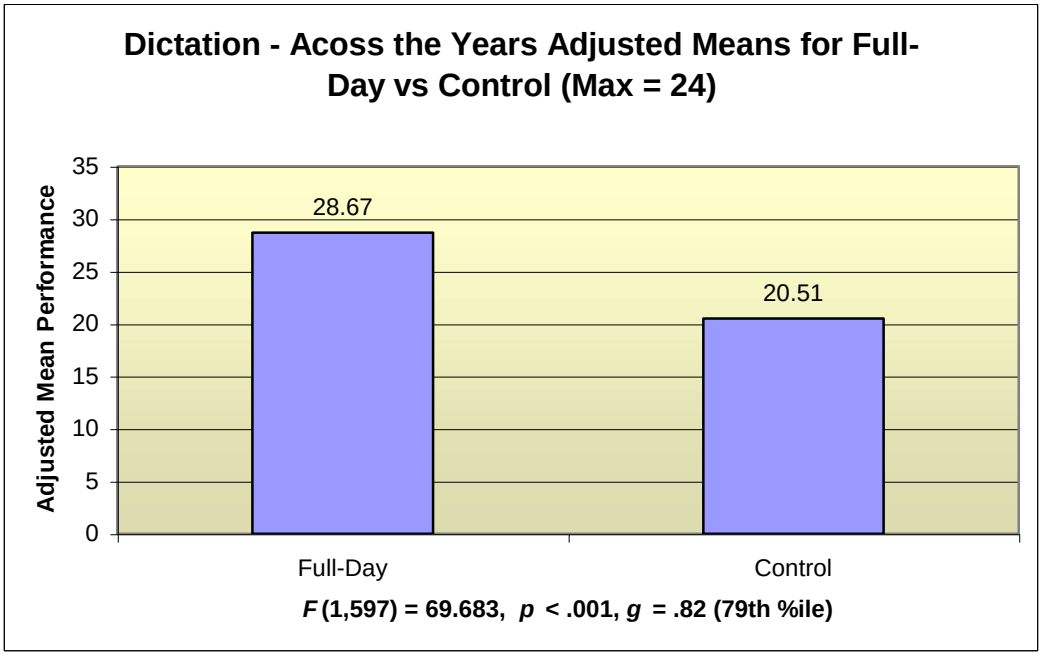


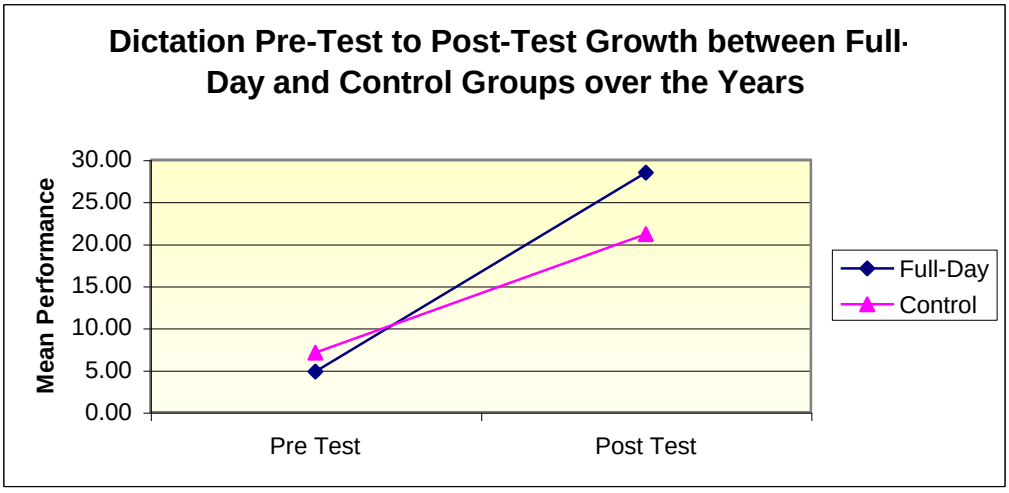

Word Identification - Across the Years
Adjusted Means for Full-Day vs Control
Adjusted Mean Performance
10.00
8.00
6.00
4.00
2.00
0.00
8.25
5.23
Full-Day
Control
F (1,601) = 40.133, p < .001, g = .62 (73rd %ile)

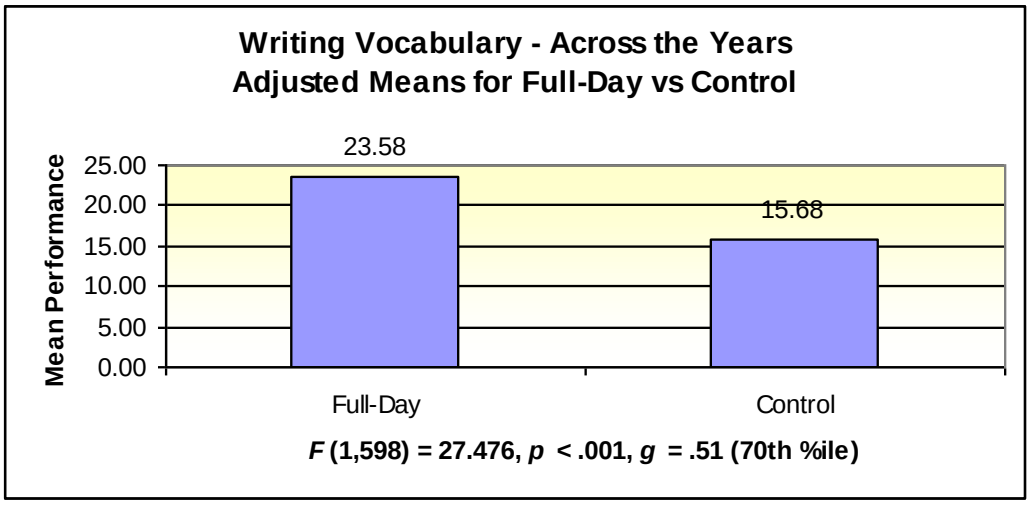

Word Identification Pre-Test to Post-Test Growth between Full-Day and Control Groups over the Years
Mean Performance
10.00
8.00
6.00
4.00
2.00
0.00
Pre Test
Post Test
Full-Day
Control

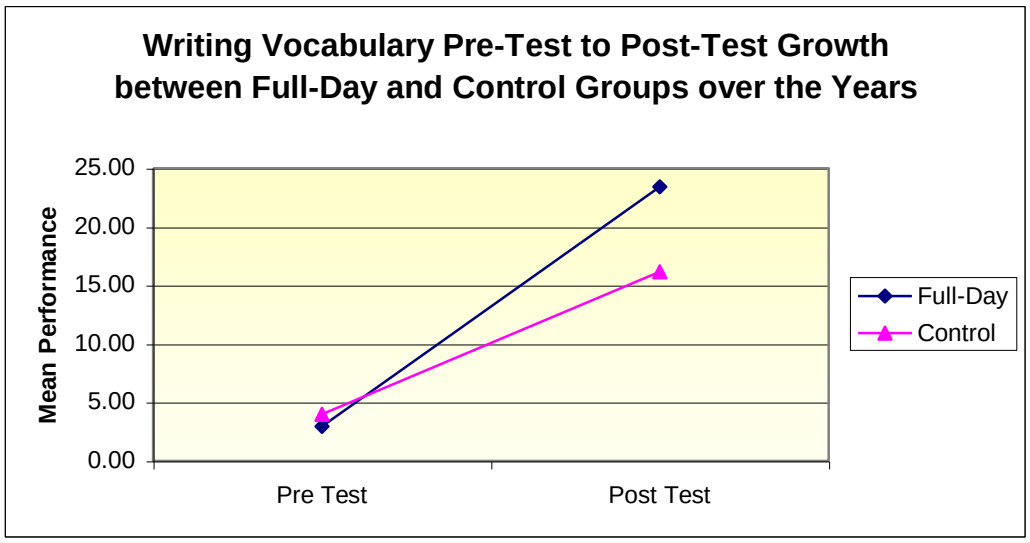

Concepts About Print - Acoss the Years Adjusted Means for Full-Day vs Control (Max = 24)
Adjusted Mean Performance
20
15
10
5
0
17.31
12.18
Full-Day
Control
F (1,599) = 177.119, p < .001, g = 1.31 (90th %ile)


Concepts about Print Pre-Test to Post-Test Growth between Full-Day and Control Groups over the Years
Mean Performance
20.00
15.00
10.00
5.00
Pre Test
Post Test
Full-Day
Control

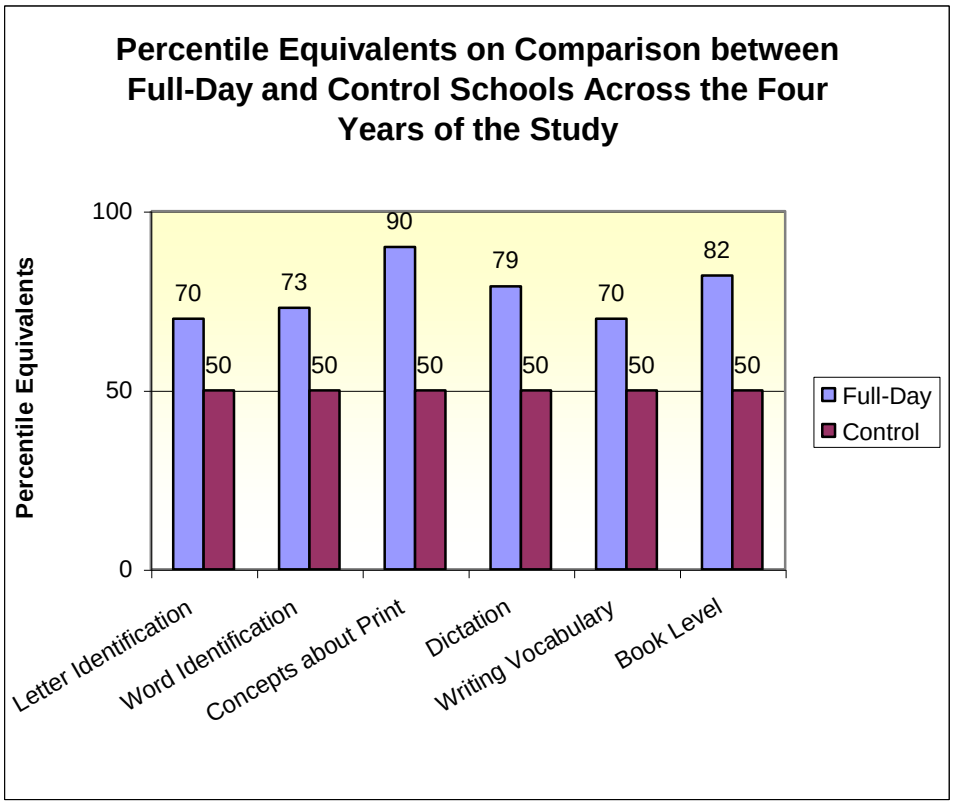

Dictation - Acoss the Years Adjusted Means for Full-Day vs Control (Max = 24)
Adjusted Mean Performance
35
30
25
20
15
10
5
0
28.67
20.51
Full-Day
Control
F (1,597) = 69.683, p < .001, g = .82 (79th %ile)


Dictation Pre-Test to Post-Test Growth between Full-Day and Control Groups over the Years
Mean Performance
30.00
25.00
20.00
15.00
10.00
5.00
0.00
Pre Test
Post Test
Full-Day
Control


Writing Vocabulary - Across the Years
Adjusted Means for Full-Day vs Control
Mean Performance
25.00
20.00
15.00
10.00
5.00
0.00
23.58
15.68
Full-Day
Control
F (1,598) = 27.476, p < .001, g = .51 (70th %ile)


Writing Vocabulary Pre-Test to Post-Test Growth between Full-Day and Control Groups over the Years
Mean Performance
25.00
20.00
15.00
10.00
5.00
0.00
Pre Test
Post Test
Full-Day
Control

The data for the comparisons of full-day and control conditions collapsed across the three years of data collections are illustrated in the following table showing the percentile equivalents associated with the respective effect sizes, with the control group set at the 50th percentile and the full-day program being compared to that standard.



Division-Wide Findings

This section of the report addressed the second question of the study: How does the reading performance of the full-day, every-day kindergarten classes compare to the other students in the division who attended a half-day program and were from more advantaged neighbourhoods than those who attended the full-day program?

Findings from Full/Half-Day Performance Comparisons Division Wide: 2003-2004

There were 169 students in the full-day, every-day kindergarten option classes and 285 students in half-day classes across the division in the 2003-2004 school year. An analysis of variance was used to determine the similarities and differences between the two groups in terms of emergent reading performance at the end of kindergarten. As summarized in the table on the next page, the 2003-2004 comparisons between the end-of-year performance of the full-day, every day kindergarten students with the end-of-year performance of the half-day students division-wide indicated that there was a statistically significant difference in favour of the half-day students on *letter identification*, there were statistical significant differences in favour of the full-day students on *concepts about print* and on *grade equivalent book level*. There were no statistically significant differences on the *word test* (although the trend was in favour of the full-day group), on *hearing and recording sounds* (dictation), and on *writing vocabulary*. The F-statistics were: (1) letter identification ($F_{(1,452)} = 4.669$, $p = .031$); word identification ($F_{(1,451)} = 2.996$, $p = .084$, approaching significance at the .05 level); concepts about print ($F_{(1,452)} = 5.116$, $p = .024$); and dictation ($F_{(1,451)} = .017$, $p = .898$), not significant. The statistics for writing vocabulary and book level respectively were: $F_{(1,451)} = 1.075$, $p = .30$, not significant, and for the SASI book level ($F_{(1,451)} = 4.330$, $p = .038$). In terms of the ability to recognize the important concepts related to printed material plus actual reading ability, the performance of students in the full-day group therefore exceeded that of their peers in half-day programs across the division, even though the students in the full-day target group attended schools in economically disadvantaged catchment areas. The following discussion elaborates on these findings by examining effect sizes.

- *Letter identification.* As depicted in the figures that appear at the end of this section that plot mean scores and report effect sizes, end-of-year mean performance levels were relatively similar for the two groups on letter identification. For *letter identification*, the respective end-of-year means were: $M = 49.74$ (full-day), $M = 51.33$ (half-day division-wide), with an effect size of $g = -.21$, indicating that the full-day students performed at the 42^{nd} percentile or 8 percentile points below their half-day counterparts division-wide. The maximum score for letter identification is 54.

- For *word identification*, the end-of-year mean scores were $M = 8.69$ (full-day), and $M = 7.83$ (half-day division-wide) with the effect size being g = .17. The end of school year performance of the full-day students compared to end of school year performance of the half-day students regarding the ability to identify words in isolation was at the 57^{th} percentile (7 percentile

points above that of the half-day students, division-wide). This difference approached statistical significance. The ability of the two groups on the word-naming task was therefore relatively similar, mastery expected by the end of Grade 1. Both kindergarten groups averaged approximately eight or nine of the 15 words.

- Similarly, an examination of end-of-year mean performance on *concepts about print*, as illustrated by the figure, indicates that in terms of effect size (g = .06), the full-day group performed at the 52nd percentile compared to the half-day group, division-wide. This difference was statistically significant. Thus the performance of the full-day kindergarten students at the end of the year was 2 percentile points above that (M = 17.31 full-day; M = 16.46, half-day) of students across the division. The maximum score for concepts about print is 24.

- For *dictation* (hearing and recording sounds) at the end-of-year, the mean performance level of the full-day students was M = 27.11 compared to the mean performance level of the half-day students, division-wide, (M = 26.98, g = .01). The analysis of variance findings suggested that these differences were not statistically significant at the .05 level. Compared to the half-day students across the division, based on the ability to transform sounds into symbols, the full-day option students performed at the 50th percentile, the ceiling level being 37, expected at the end of grade one.

- The full-day students, however, outperformed their counterparts, division-wide at the end of the school year on the *writing vocabulary* task, the respective mean performance levels being 25.07 (full-day) and 23.36 (half-day, division-wide), with scores falling within the range of 36 to 45 being satisfactory at the end of grade 1, although this difference was not statistically significant. The effect size was g = .10, the year-end performance of the kindergarten students in the full-day, every day option being at the 54th percentile compared to half-day kindergarten students across the division, consequently exceeding the performance of the half-day group by 4 percentile points.

These findings are summarized in the table that follows:

Comparison Between Full and Half-day Program Performance: Division-wide for 2003-2004

Variable	N	Mean (stand dev)	Effect Size	%-il Equiv	d/f	*F*-ratio	*p*-value
Letter Identification			-.21	42	1,452	4.669	.031*
Full-Day	169	49.74 (9.777)					
Half-Day	285	51.33 (5.942)					
Word Identification			.17	57	1,451	2.996	.084 ns‡
Full-Day	169	8.6923 (5.34522)					
Half-Day	284	7.8310 (4.98545)					
Concepts About Print			.06	52	1,452	5.116	.0241*
Full-Day	169	17.31 (4.179)					
Half-Day	285	16.46 (3.733)					
Dictation			.01	50	1,451	0.017	.898 ns
Full-Day	168	27.11 (10.845)					
Half-Day	285	26.98 (9.383)					
Writing Vocabulary			.10	54	1,451	1.075	.300 ns
Full-Day	168	25.07 (20.171)					
Half-Day	285	23.36 (14.700)					
Reading Level			.20	.58	1, 451	4.330	.038*
Full-Day	169	1.0488 (.70519)					
Half-Day	284	.9201 (.59264)					

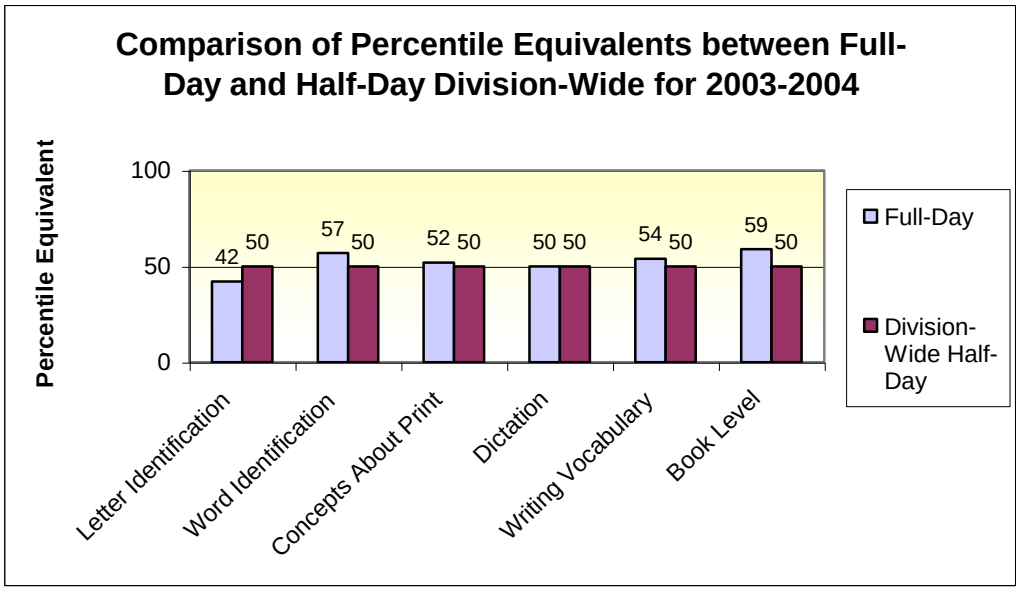
* $p < .05$
** $p < .01$
‡Approaching significance in favour of the Full-Day Group

- When end-of-year *reading achievement levels* were considered, the performance of the full-day students was superior to that of the half-day students across the division, the respective means being (M = 1.05, full-day; M = .920, half-day, division-wide). When effect sizes were calculated (g = .20), the results indicated that the full-day students outperformed the half-day students, division-wide, by 8 percentile points (58th percentile). These reading achievement levels are expressed as Grade Level Equivalents (SASI) used by the division and suggest that the full-day students were reading at early grade one levels.

Summary and Discussion of 2003-2004 Findings: Division-Wide Comparisons

The results of the 2003-2004 analysis of variance comparisons between the end-of-year reading performance levels of the full-day, every day kindergarten students with the end-of-year performance levels of the half-day students, division-wide, indicated that the performance of children in the two groups was relatively similar, thwarting indications that children from impoverished neighbourhoods are able to match the performance levels of their more affluent peers when enrolled in a compensatory, full-day kindergarten program. Although the *letter identification* performance of the students division-wide in the half-day option surpassed that of students in the full-day group at statistically significant levels, compared to students in the half-day option, the ability of students in the full-day group to recognize *words in isolation* was superior, and approached statistically significant levels. There were no statistically significant differences of students in the two groups on the *dictation* and *writing vocabulary* tasks, both groups performing at approximately similar levels. Nevertheless, the performance of students in the full-day, every day kindergarten surpassed that of students in the half-day option across the division at statistically significant levels on both *concepts about print* (the ability to understand the language pertaining to written text and directionality) as well as *reading level*, suggesting that the full-day option allowed students more time to gain experience with books, an important precursor of reading success.

These findings are highlighted in the following figure that depicts effect size percentile equivalents. This graph indicates that full-day students from disadvantaged catchment areas are benefiting from the compensatory program. As a result of the full-day program, their performance at the end-of the kindergarten year was approximately equal to or exceeded that of their peers from more advantaged neighborhoods.



Full-Day/Half-Day Division-Wide Performance Comparisons Across the Years

The second major set of analysis using half-day division-wide end-of-year performance data compared the statistical findings from previous years. Five years of data were available: data from 1999-2000, 2000-2001, 2001-2002, 2002-2003, and 2003-2004.

1999-2000. As described in previous reports and shown in the following table, the 1999-2000 findings on all measures, except concepts about print, indicated that the scores of students in the full-day, every day option were statistically significant when compared to the scores of their counterparts in the half-day program across the division. The scores of students in the full-day, every day option were superior on *letter* and *word identification*, *dictation*, *writing vocabulary* and *book level*.

The range of effect sizes for students in 1999-2000 was from -.30 (for *concepts about print*) to .87 (for the ability to match sounds with letters, the *dictation* task). Full-day students outperformed their half-day counterparts division-wide by 17 percentile points on *letter identification*, 16 percentile points on *word identification*, 31 percentile points on *dictation*, and 23 percentile points on both *writing vocabulary* and *reading ability.*

Full-Day Compared with Division-Wide Half-Day Performance Across the Years

Measure	1999-2000			2000-2001			2001-2002			2002-2003			2003-004		
	Sig (p-value)	Effect Size	%-ile	Sig (p-value)	Effect Size	%-ile	Sig (p-value)	Effect Size	%-ile	Sig (p-value)	Effect Size	%-ile	Sig (p-value	Effect Size	%-ile
Letter Identification	< .05	.43	67th	ns	.04	52nd	ns	-.08	47th	ns	- .14	45th	< .05	-.21	41st
Word Identification	< .05	.42	66th	ns	-.15	44th	< .05	.23	59th	ns	.03	51st	ns	.17	57th
Concepts About Print	ns	- .30	38th	ns	-.03	49th	ns	.09	54th	ns	-.06	48th	< .05	.06	52nd
Dictation	<. 001	.87	81st	< .05	.52	70th	ns	.06	52nd	.07ns	.18	57th	ns	.01	50th
Writing Vocabulary	< .001	.61	73rd	ns	-.02	49th	ns	-.02	49th	< .04	.18	57th	ns	.10	54th
Book Level	<.001	.61	73rd	< .001	.98	84th	< .01	.30	62nd	< .01	.25	60th	< .05	.20	58th

2000-2001. The results for 2000-2001 were less striking. There were no statistically significant differences between the performance of students in the full-day option and that of their counterparts in the division-wide half-day program, except on the *writing vocabulary* task (p = < .05) and *book level* (p = .001). The calculation of effect sizes showed, nonetheless, that the performance of the full-day option students surpassed that of their half-day peers across the division on *letter identification* (effect size g = .04, 52nd percentile level or 2 percentile points above), *dictation* (effect size g = .5, 70th percentile level or 20 percentile points above), and *reading* (book level g = .98, 84th percentile or 34 percentile points above). Performance on *word identification* (effect size g = *-15*), *concepts about print* (effect size g = - .03), and *writing vocabulary* (effect size g = -*.02*) were less heartening, the percentile range being from the 44th to the 49th percentile, which is respectively 6 and 1 percentile points below that of peers division-wide, with performance on *concepts about print* and *writing vocabulary* being approximately equal and performance on the *word identification* task being somewhat troublesome.

2001-2002. This pattern of more equal performance on the part of the full-day option students carried over into 2001-2002 in which, in a similar fashion, the end-of-year performance of the full-day students was superior to that of the half-day students on two measures, but in this instance on *word identification* (effect size g = .23, 59th percentile or 9 percentile points above peers division-wide), and again on *book level* (effect size g = .30, 62nd percentile or 12 percentile points above division-wide peers). Effect size calculations indicated, in addition, that the performance levels of students in the full-day program surpassed that of their peers on *concepts about print* (effect size g = .09. 54th percentile or 4 percentile points above), and *dictation* (g = .06, 52nd percentile or 2 percentile points above). Performance levels were approximately equal on the two remaining tasks (*letter identification*: effect size g = - .08, 47th percentile or 3 percentile points below) and *writing vocabulary* (effect size g = - .02, 49th percentile or 1 percentile point below).

2002-2003. As indicated previously, when end-of year comparisons were made between the performance of full and half-day kindergarten students across the division,

findings in 2002-2003 differed again from previous years (1999-2000, 2000-2001, and 2001-2002). In 2002-2003, significant differences favouring students in the full-day program were found for *reading achievement*, and *writing vocabulary* (the ability to produce words from memory). Performance on all other measures was non-significant, although performance on the *dictation* task was in the expected direction ($p = .07$). These data suggest possibly that the curricular focus in the half-day programs was becoming more and more academically similar to the program focus in the full-day programs, with more emphasis on small group work and emergent literacy tasks, perhaps at the expense of traditional kindergarten programming.

2003-2004 As indicated in the preceding table, when end-of-year comparisons were made between the performance of full and half-day kindergarten students across the division, findings indicated that the half-day students from more advantaged neighbourhoods exceeded the performance of their full-day counterparts from more disadvantaged neighbourhoods on only one measure, *letter identification*. On all other measures, the full-day group from disadvantaged neighbourhoods either equalled or exceeded the performance of their more advantaged peers.

The trends across the years would indicate that the full-day program, in general, was operating as a successful compensatory program for those children in disadvantaged neighbourhoods. On virtually all of the measures across the years, the disadvantaged students were performing as well as or better than their half-day counterparts in more advantaged neighbourhoods. The following section explores those relationships more fully by collapsing the data from both full- and half-day groups across the years.

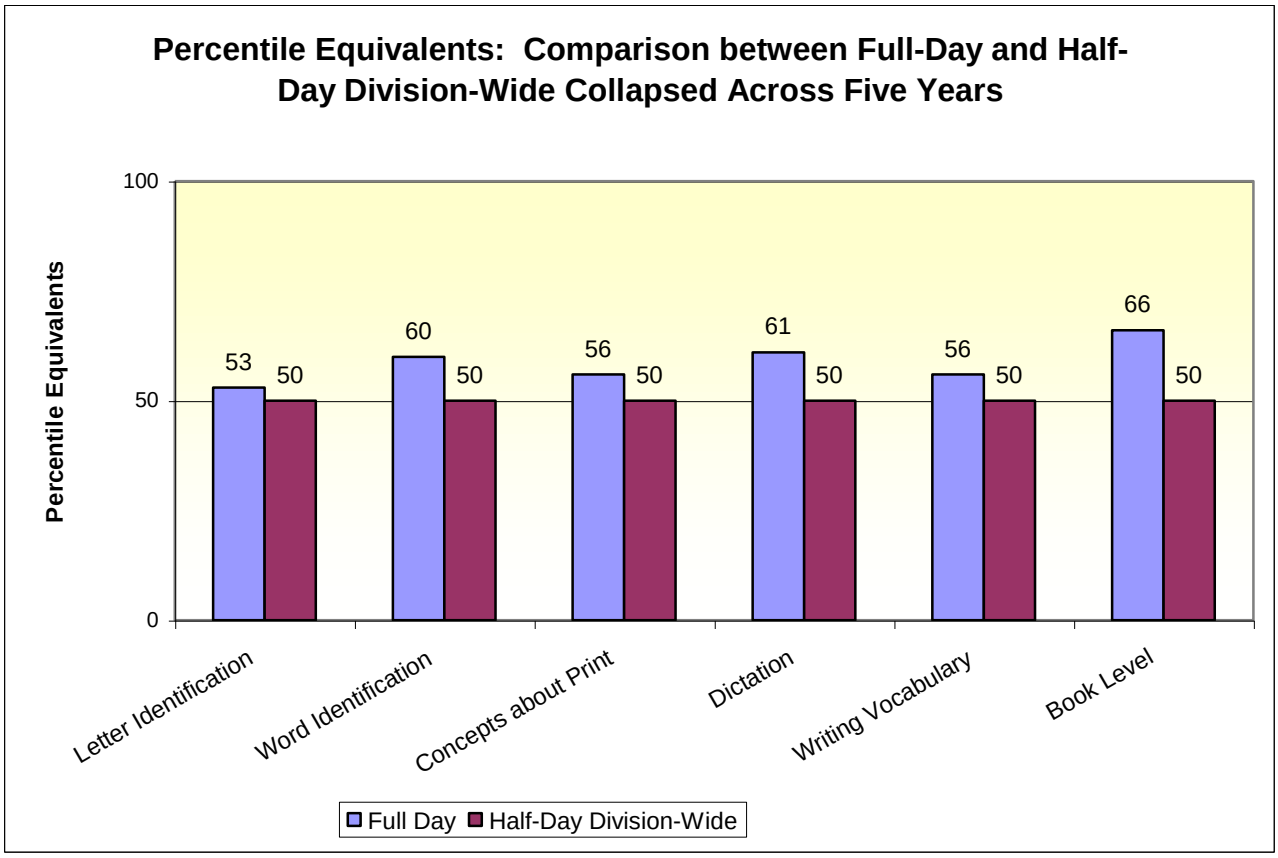
Full-Day/Half-Day Division-Wide Comparisons: Collapsed Across Five Years

When the data comparing the achievement of students in the full-day program with that of their peers in half-day programs division-wide were collapsed across the five years (1999-2000, 2000-2001, 2001-2002, 2002-2003, and 2003-2004) as shown in the following table, findings indicated that the performance of the full-day option students was superior to that of students division-wide on all measures *except letter identification*. Year-by-year effect size calculations indicated that there were some anomalies in which the performance of the half-day students division-wide surpassed that of their full-day program peers (*for concepts about print* in 1999-2000 (38^{th} percentile or 12 percentile points below level); for *word identification* in 2000-2001 (44^{th} percentile or 6 percentile points below level); for *letter identification* in 2001-2002 (47^{th} percentile or 3 percentile points below level); and in 2002-2003 for *letter identification* (45^{th} percentile or 3 percentile points below level). When the data were collapsed overall, findings showed that the half-day students were able to keep pace with or surpass the performance levels of their more affluent peers, thereby supporting the efficacy of the full-day program for students in economically disadvantaged areas where performance levels would be expected to be lower. The table and figure that follows show these findings in which data were collapsed across the four years to illustrate, in graphic form, comparisons between the performance of full- and half-day kindergarten students division-wide on all of the Clay measures.

Reading Achievement Comparisons between Full-Day/Half-Day Students Division-Wide: Data Collapsed across Five Years

Measure	Condition	N	Mean (stand dev)	Effect Size	% rank	d/f	F-ratio	p-value
Letter Identification	**Full-Day**	697	50.40 (9.080)	.07	53rd	1,2260	2.062	.151ns
	Half-Day Division-Wide	1565	49.85 (8.102)					
Word Identification	**Full-Day**	697	8.1385 (5.31027)	.25	60th	1,2232	29.122	.000**
	Half-Day Division-Wide	1537	6.8536 (5.16940)	.				
Concepts About Print	**Full-Day**	695	17.38 (4.349)	.14	56th	1,2256	8.766	.003*
	Half-Day Division-Wide	1563	16.81 (4.096)					
Dictation	**Full-Day**	694	28.17 (10.410)	.28	61st	1,2257	38.723	.000**
	Half-Day Division-Wide	1565	26.37 (9.634)					
Writing Vocabulary	**Full-Day**	696	23.39 (17.331)	.15	56th	1,2257	17.207	.000**
	Half-Day Division-Wide	1563	20.46 (14.603)					
Book Level‡								
	Full-Day	697	1.0402 (.62321)	.40	66th	1,2260	77.598	.000***
	Half-Day Division-Wide	1565	.7829 (.64949)					

‡SASI Equivalents are stated in Grade Levels



As indicated in the figure, division-wide comparisons using data collapsed across the years indicates that the performance of full-day students from economically disadvantaged catchments matched the performance of the half-day students division-wide. What stands out is overall reading performance levels in which the achievement levels of the full-day students is superior to that of their half-day counterparts from more affluent neighbourhoods. These findings are compelling, supporting the case for the efficacy of the full-day kindergarten in economically disadvantaged school areas.

Assessing Division-Wide Performance across the Years

Implementation of a more academically focussed full-day kindergarten appears to have had an impact on the performance of all kindergarten students in the division. There appears to be a steady increase in the reading attainment of students, not only in the target schools, but also in schools that had not implemented the full-day program. This may be accounted for by an increasingly academic focus in all kindergartens in the division.

In attempt to test this hypothesis, we analyzed the data from all non-target, English schools in the division across the seven years of the study using the data from Clay's (1979) *Observation Survey.* Our analysis looked for patterns across the seven years, employing an analysis of variance with year as the independent variable. End-of-year half-day kindergarten outcomes on all measures are listed in the following table.

A perusal of the table below indicates increases in the performance of the half-day students on all measures across the seven years—for *letter identification* from 44.83 in 1997-1998 to 50.74 in 2003-2004; for *word identification* from approximately 3 words to more than 8; and for *concepts about print* from scores of 13.68 to scores of 16.78. Even more dramatic, perhaps, are the increases in *dictation* from 15.9 to 27.03, for *writing vocabulary* from 10.37 to 23.99, and *reading level* from .38 to .97. The data from the seven years (1997-1998 to 2003-2004) in the non-target, English schools is listed below:

Performance Across the Years in Half-Day Kindergartens

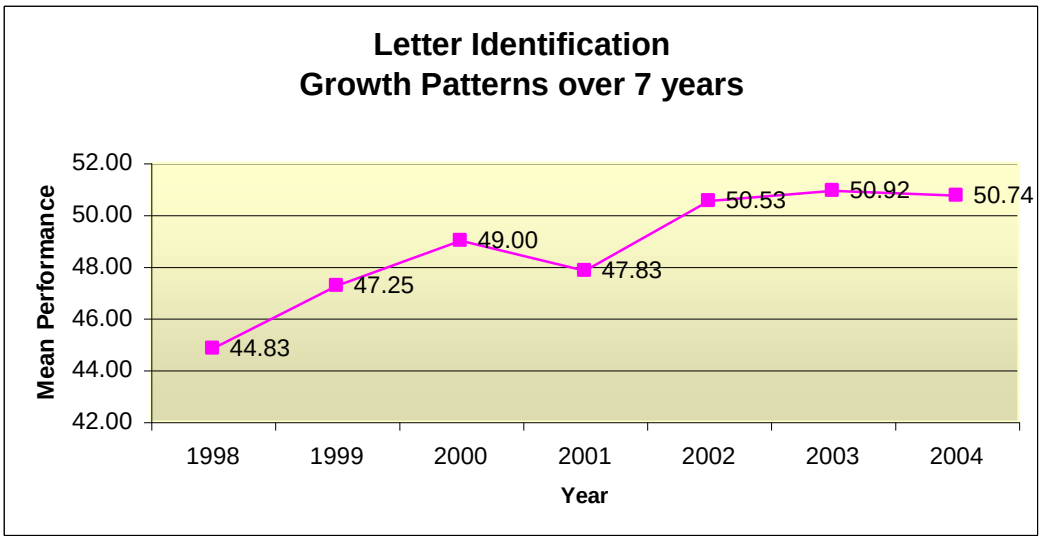
	1997-1998	**1998-1999**	**1999-2000**	**2000-2001**	**2001-2002**	**2002-2003**	**2003-2004**
Letter Identification	44.83 (12.551)	47.25 (9.921)	49.00 (8.216)	47.83 (11.397)	50.53 (7.874)	50.92 (7.958)	50.74 (7.628)
Word Identification	3.3673 (3.96074)	4.8693 (4.76971)	5.3502 (4.62073)	6.7128 (5.21605)	7.8668 (5.45718)	8.4309 (5.21156)	8.1523 (5.13372)
Concepts About Print	13.68 .(4.024)	15.58 (4.097)	16.42 (3.564)	16.25 (4.848)	17.59 (4.551)	17.70 (4.131)	16.78 (3.922)
Dictation	15.90 (11.384)	19.46 (11.038)	24.66 (9.805)	24.35 (11.033)	26.06 (10.568)	27.34 (9.574)	27.03 (9.939)
Writing Vocabulary	10.37 (7.672)	14.63 (11.667)	17.20 (11.767)	18.84 (13.432)	23.87 (19.606)	21.79 (13.906)	23.99 (16.934)
Reading Level	.3807 (.48251)	.5322 (.69387)	.7792 (.74219)	.7138 (.55021)	.8948 (.66230)	.9441 (.58162)	.9681 (.63923)

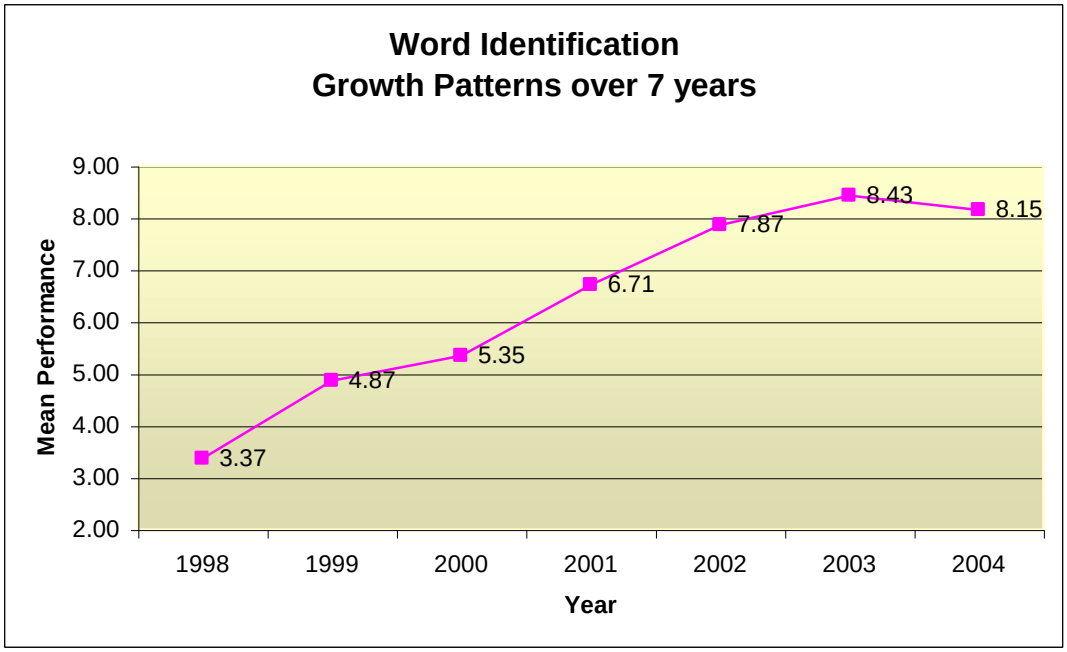
The accompanying table indicates that these increases in reading performance levels for half-day students across the years from 1997-1998 to 2003-2004 were

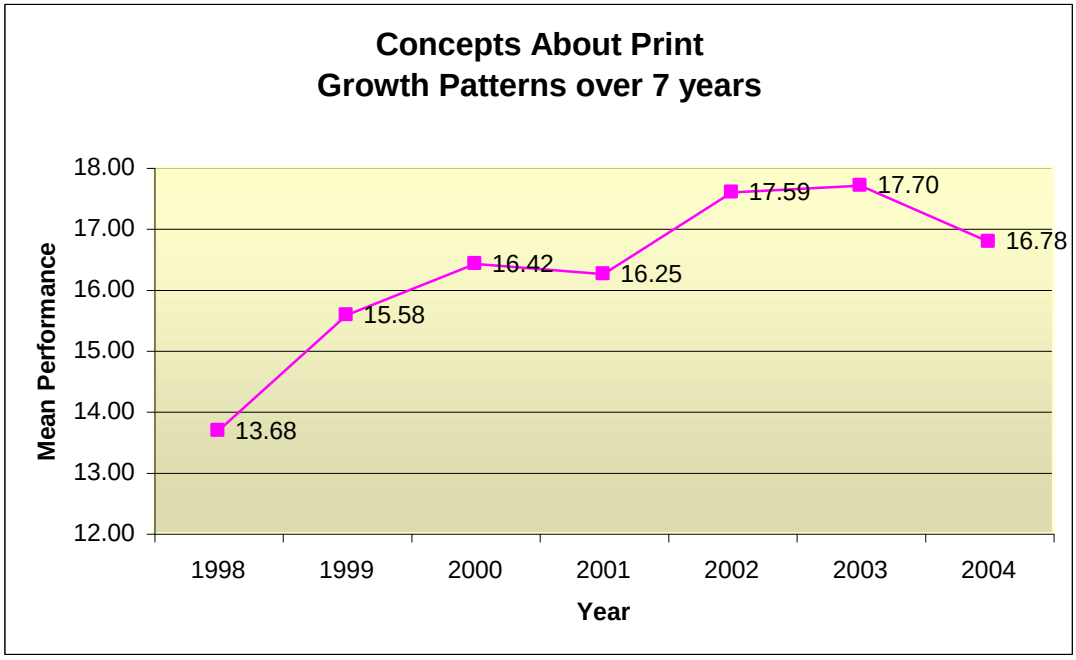
statistically significant, with effect sizes that ranged form .57 for letter identification to .78 for concepts about print, and for word identification, dictation, writing vocabulary, and reading level, from .98 to 1.04. These findings are illustrated task by task in the figures that follow the table.

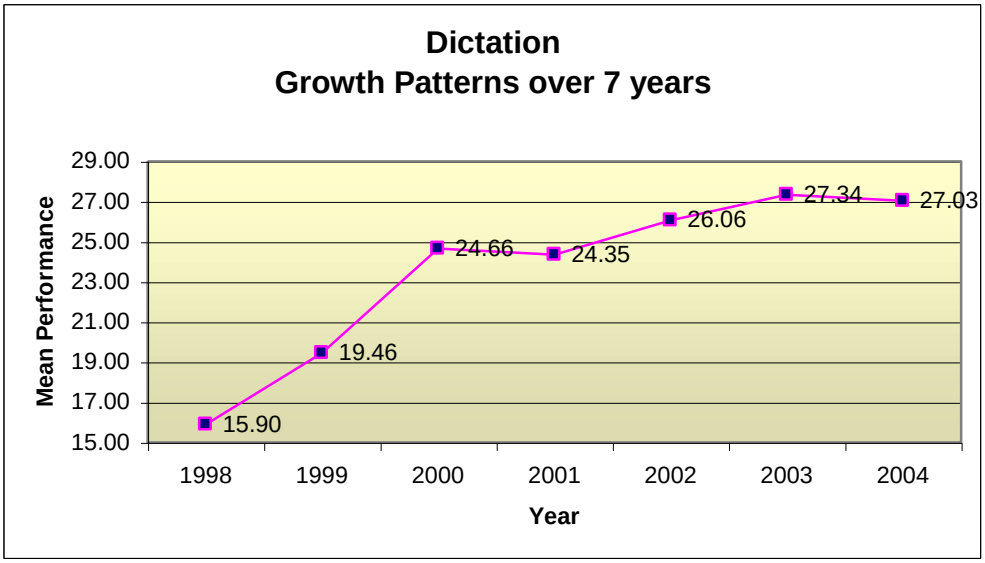
Analysis of Variance Table for Performance Across the Years in Half-Day Kindergartens

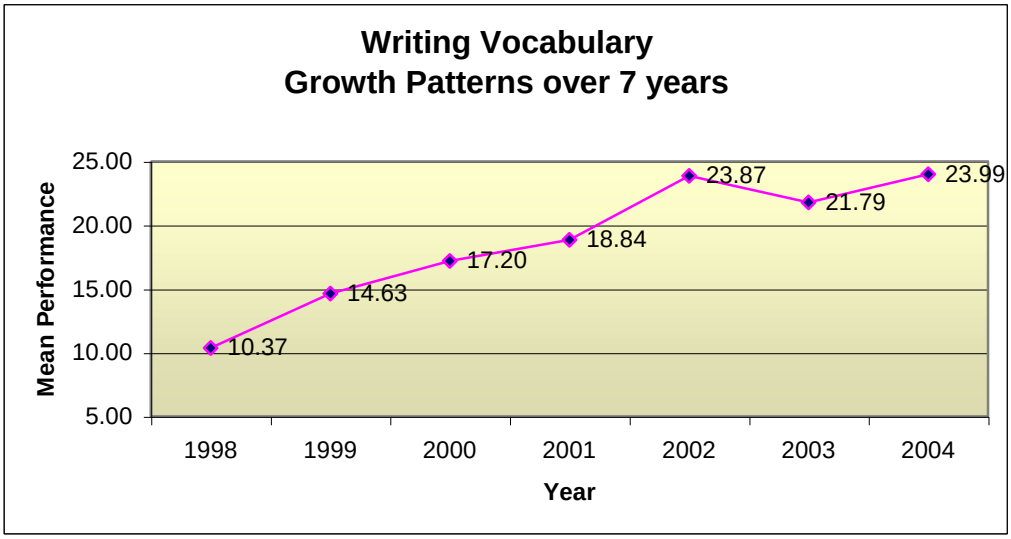
	d/f	F-ratio	p-value	Effect Size from 1998 to 2004
Letter Identification	6,3391	25.454	< .001	0.57 (72nd %ile)
Word Identification	6,3363	69.699	< .001	1.04 (85th %ile)
Concepts About Print	6,3385	48.559	< .001	0.78 (78th %ile)
Dictation	6,3385	77.000	< .001	1.04 (85th %ile)
Writing Vocabulary	6,3388	60.296	< .001	1.03 (85th %ile)
Reading Level	6,2915	38.329	< .001	0.98 (84th %ile)

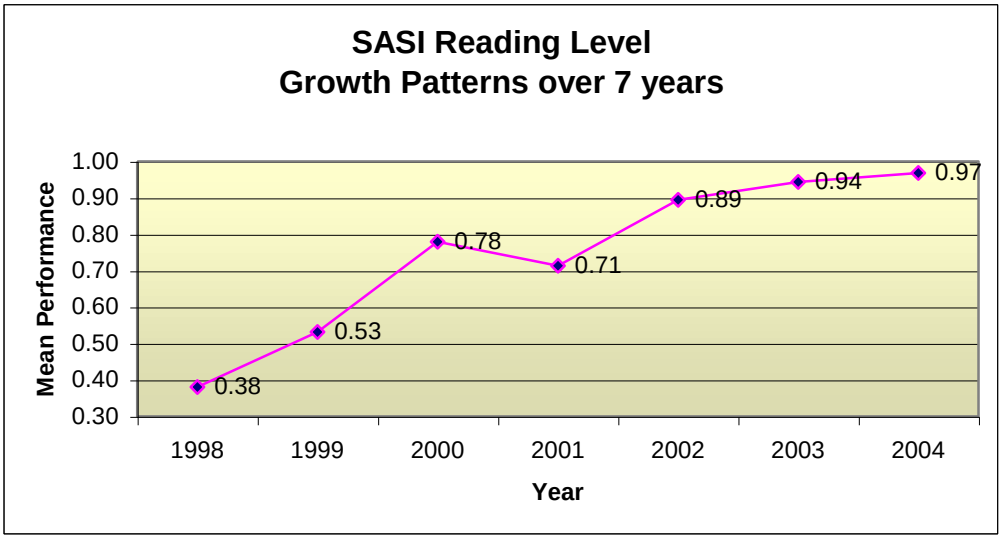



Word Identification
Growth Patterns over 7 years
Mean Performance
9.00
8.00
7.00
6.00
5.00
4.00
3.00
2.00
3.37
4.87
5.35
6.71
7.87
8.43
8.15
1998
1999
2000
2001
2002
2003
2004
Year


Concepts About Print
Growth Patterns over 7 years
Mean Performance
18.00
17.00
16.00
15.00
14.00
13.00
12.00
13.68
15.58
16.42
16.25
17.59
17.70
16.78
1998
1999
2000
2001
2002
2003
2004
Year


Dictation
Growth Patterns over 7 years
Mean Performance
29.00
27.00
25.00
23.00
21.00
19.00
17.00
15.00
15.90
19.46
24.66
24.35
26.06
27.34
27.03
1998
1999
2000
2001
2002
2003
2004
Year


Writing Vocabulary
Growth Patterns over 7 years
Mean Performance
25.00
20.00
15.00
10.00
5.00
10.37
14.63
17.20
18.84
23.87
21.79
23.99
1998
1999
2000
2001
2002
2003
2004
Year


SASI Reading Level
Growth Patterns over 7 years
Mean Performance
1.00
0.90
0.80
0.70
0.60
0.50
0.40
0.30
0.38
0.53
0.78
0.71
0.89
0.94
0.97
1998
1999
2000
2001
2002
2003
2004
Year

Cohort Group Findings:
Data Collapsed across the Years

This section of the report addresses the third research question regarding the performance of the full-day, every-day kindergarten classes in comparison to students in the same schools before the program was implemented.

This analysis compared the end-of year performance of students in the full-day, every day program with the end-of-year performance of students from the same schools when half-day programs were in effect. The following chart identifies the schools and the years for which half-day cohort group data were available. For each school, the half-day cohort groups are identified by the green shading, while the blue shading represents the year in which the full-day, every day option was initiated. The three-quarter day option schools (initiated in one school in 1999-2000 and offered in a total of three schools in 2000-2001) are shown in the green boxes. The three-quarter day option was dropped in the 2001-2002 school year because compared to findings from the analysis of the full-day option, findings regarding the effectiveness of this alternative were not compelling.

The comparisons for Brooklands School were between the 1997-1998 half-day cohort and all of the full-day classes across the years from 1998-1999 to 2003-2004. For Stevenson Britannia, the comparisons were between the half-day cohorts from 1997-1998 to 1998-1999 and the full-day option program from 1999-2000 to 2003-2004. For Crestview, the comparisons were between the half-day kindergarten classes from the years 1997-1998 and 1998-1999 and the full-day classes from 2001-2002 to 2003-2004. Comparisons for both Buchanan and Heritage were between the half-day programs in 1997-1998 to 1999-2000 with the full-day programs in 2001-2002, 2002-2003, and 2003-2004. Lakewood school served as the control group school in 2001-2002, 2002-2003, and 2003-2004.

Cohort Groups

	Brooklands	Stevenson-Britannia	Crestview	Buchanan	Heritage	Lakewood (2001-2004 Control)
1997-1998	**Half-Day**	**Half-Day**	**Half-Day**	**Half-Day**	**Half-Day**	**Half-Day**
1998-1999	**Full-Day**	**Half-Day**	**Half-Day**	**Half-Day**	**Half-Day**	**Half-Day**
1999-2000	**Full-Day**	**Full-Day**	**Three-Quarter**	**Half-Day**	**Half-Day**	**Half-Day**
2000-2001	**Full-Day**	**Full-Day**	**Three-Quarter**	**Three-Quarter**	**Three-Quarter**	**Half-Day**
2001-2002	**Full-Day**	**Full-Day**	**Full-Day**	**Full-Day**	**Full-Day**	**Half-Day**
2002-2003	**Full-Day**	**Full-Day**	**Full-Day**	**Full-Day**	**Full-Day**	**Half-Day**
2003-2004	**Full-Day**	**Full-Day**	**Full-Day**	**Full-Day**	**Full-Day**	**Half-Day**

The data comparing the end-of-year performance of full-day kindergarten students with their half-day cohort groups from the same schools in the years preceding the implementation of the full-day option on each of Clay's measures were collapsed across schools. Findings are presented in the table on the next page and reviewed in the following discussion.

The analysis of variance showed that the performance of the full-day, every day students was statistically significantly higher on all measures compared to the performance of the half-day students in the same schools before the full-day option was initiated. As shown in the table below, the statistic for *letter identification* was $F_{(1,1175)} = 73.178$. $p < .001$; for *word identification* $F_{(1,1175)} = 267.907$, $p < .001$; for *concepts about print*, $F_{(1,1171)} = 71.350$, $p < .001$; for *dictation* $F_{(1,1170)} = 437.618$, $p < .001$; for *writing vocabulary* $F_{(1,1174)} = 191.435$, $p < .001$; and *for reading achievement* as measured by the SASI equivalent, $F_{(1,054)} = 260.165$, $p < .001$).

Effect sizes, that provide information over and above analysis of variance findings which are limited because they only identify whether the differences between the variables are statistically significant, were $g = 0.51$ (percentile equivalent 70^{th}) for *letter identification*; $g = .98$ (percentile equivalent 84^{th}) for *word identification*; $g = .51$

Overall Cohort Analysis: Data Collapsed Across Schools

Overall Cohort Analysis								
Variable	**Mean**	**Stand Dev**	**N**	**Effect Size**	**%_il Equiv**	**d/f**	***F* ratio**	***p*_value**
Letter Identification				0.51	70th	1,1175	73.178	0.000**
Full-Day	50.39	9.002	722					
Half-Day – Cohort	45.04	12.429	455					
Word Identification				0.98	84th	1,1175	267.907	0.000**
Full-Day	8.08	5.30411	722					
Half-Day – Cohort	3.31	4.09591	455					
Concepts About Print				0.51	70th	1,1171	71.350	0.000**
Full-Day	17.31	4.380	722					
Half-Day – Cohort	15.07	4.480	454					
Dictation				1.25	89th	1,1170	437.618	0.000**
Full-Day	28.09	10.384	718					
Half-Day –Cohort	14.83	10.849	454					
Writing Vocabulary				0.83	80th	1,1174	191.435	0.000**
Full-Day	23.17	17.199	721					
Half-Day – Cohort	10.85	10.141	455					
Book Level				1.05	85th	1,1054	260.165	0.000**
Full-Day	1.04	.62321	697					
Half-Day – Cohort	0.45	.42993	359					

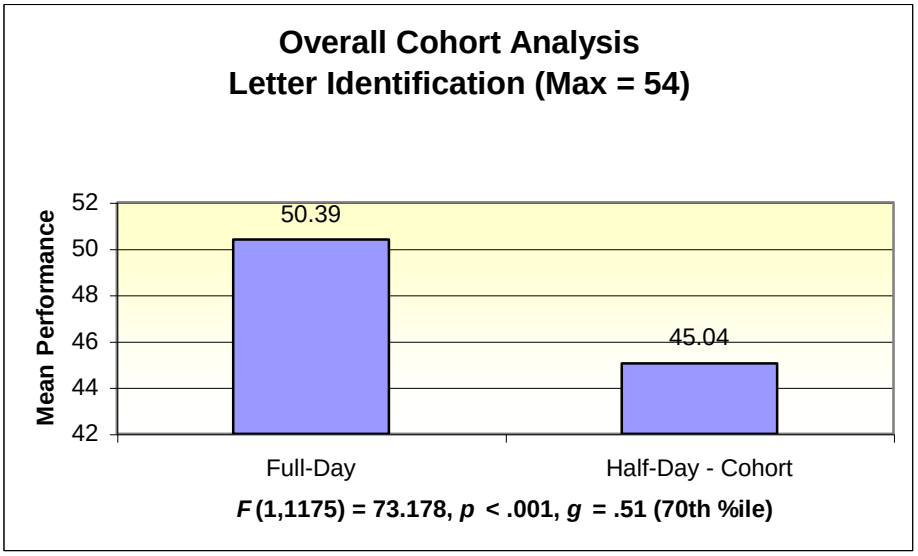
** $p < .001$

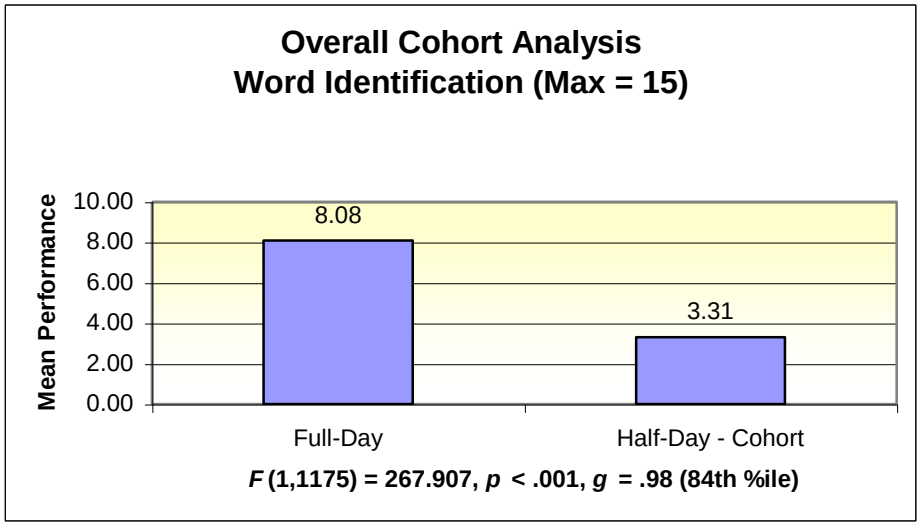
(percentile equivalent 70th) for *concepts about print*; $g = 1.25$ (percentile equivalent 89th) for *dictation*; $g = .83$, (percentile equivalent 80th) for *writing vocabulary*; and $g = 1.05$ (percentile equivalent 85th) for *SASI or book level*. In terms of percentile points, these effect sizes denote the strength of the relationship between the performance of the full-day option students compared to that of their previous half-day counterparts.

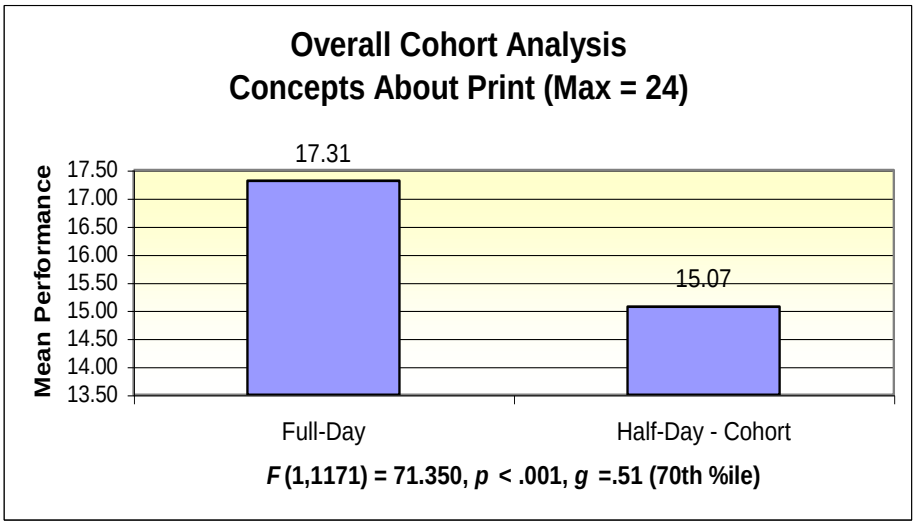
The *letter name knowledge* of students in the full-day option, compared to students in the same school when the half-day program was in effect was 20 percentile points higher; for *word identification*, 34 percentile points higher, for *concepts about print*, 20 percentile points higher, for *dictation*, 39 percentile points higher, and for *writing vocabulary*, 30 percentile points higher. The *ability to read* whole text (book level) was 35 percentile points higher than the ability of previous peers in the same schools who attended kindergarten half-days. Furthermore, the data indicate that at the end of kindergarten, students who received the full-day program were reading at the

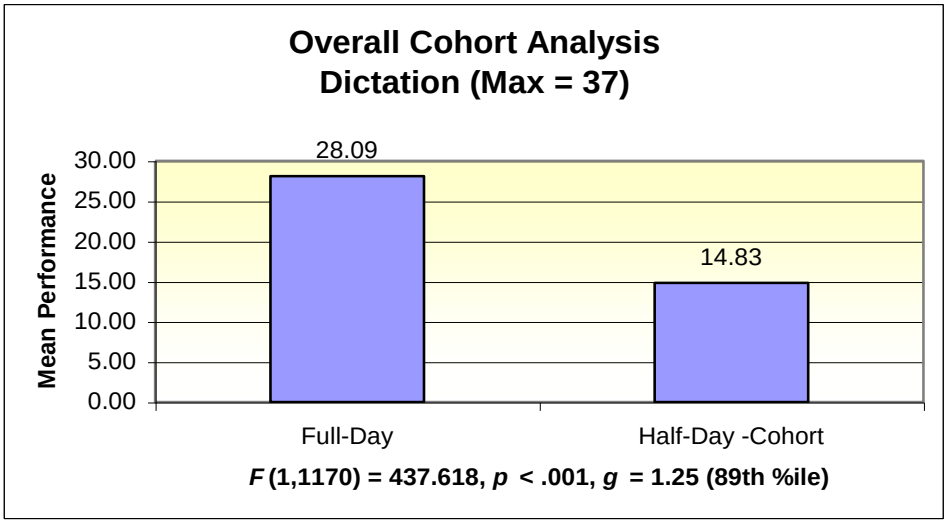
beginning grade 1 level; they appeared to be ready to start school on approximately the same footing as their more advantaged peers.

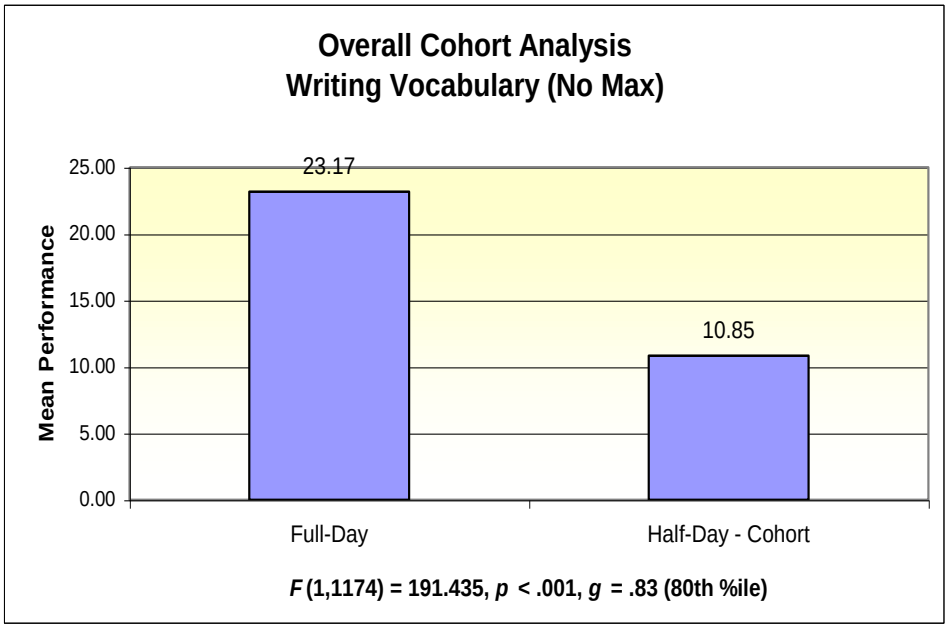
These findings are dramatically highlighted in the following measure-by-measure figures that illustrate the overall cohort means of students in the two options. Differences are particularly striking for *dictation* (matching sounds and letters), *writing vocabulary* (the ability to write words from memory) and actual *reading ability* (book level).

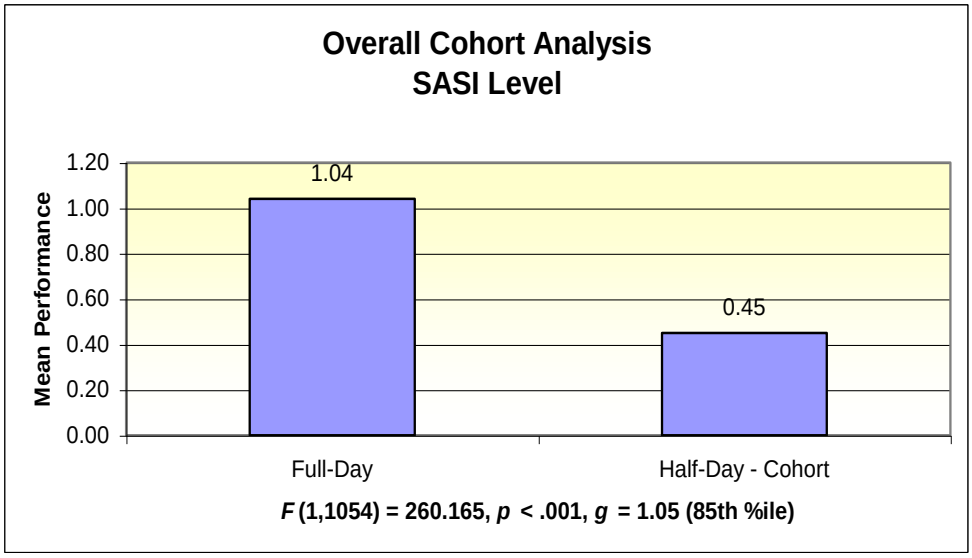





Overall Cohort Analysis
Concepts About Print (Max = 24)
Mean Performance
17.50
17.00
16.50
16.00
15.50
15.00
14.50
14.00
13.50
17.31
15.07
Full-Day
Half-Day - Cohort
F (1,1171) = 71.350, p < .001, g =.51 (70th %ile)

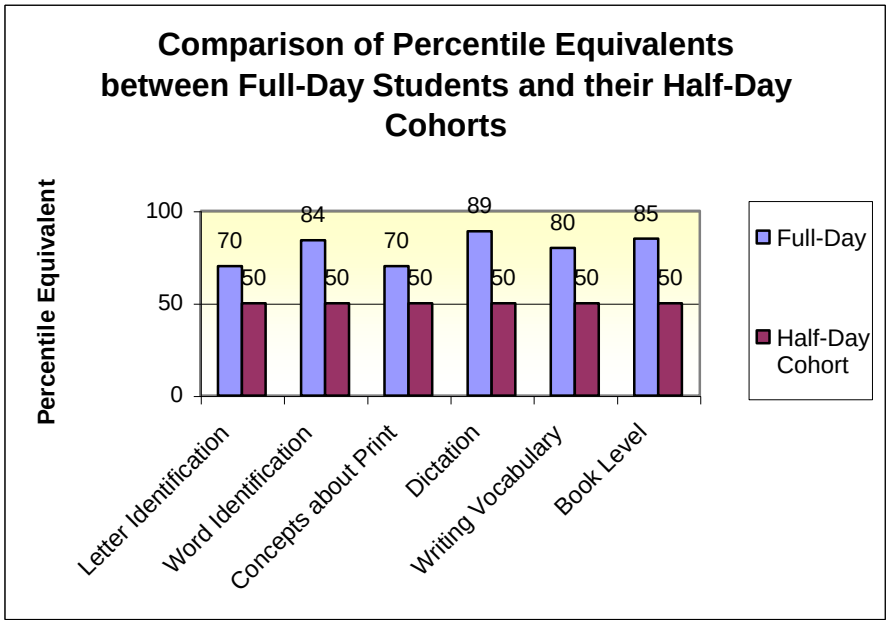

Overall Cohort Analysis
Dictation (Max = 37)
Mean Performance
30.00
25.00
20.00
15.00
10.00
5.00
0.00
28.09
14.83
Full-Day
Half-Day -Cohort
F (1,1170) = 437.618, p < .001, g = 1.25 (89th %ile)


Overall Cohort Analysis
Writing Vocabulary (No Max)
Mean Performance
25.00
20.00
15.00
10.00
5.00
0.00
23.17
10.85
Full-Day
Half-Day - Cohort
F (1,1174) = 191.435, p < .001, g = .83 (80th %ile)



The final figure compares the percentile equivalents of the effect sizes of the target (full-day) students and those of their cohorts in the same schools in years prior to the implementation of the full-day program. As can be seen in the figure, full-day students outperformed the cohort students on every measure, the range being from 20 percentile points for letter identification and concepts about print, to 39 percentile points for dictation.

The following final figure compares the percentile equivalents of the effect sizes of the target (full-day) students and those of their cohorts in the same schools in years prior to the implementation of the full-day program. As can be seen in the figure, full-day students outperformed the cohort students on every measure, the range being from 20 percentile points for letter identification and concepts about print, to 39 percentile points for dictation.



Findings from the overall cohort analysis in which comparisons were made between the performance of half-day students in the same schools before the introduction of the full-day program and the performance of the full-day students after the introduction of the program (data from all schools collapsed across the years) showed that the performance of the full-day students was superior to that of the half-day cohort group on all measures: letter and word identification, understanding concepts about print, knowledge of the symbol/sound correspondence (dictation), the ability to write words from memory (*writing vocabulary*), and actual reading achievement (book level).

These results support the wisdom of instituting full-day kindergarten options in economically disadvantaged areas in order to resolve the mismatch in school preparedness between children from middle and upper income families and children from less affluent homes.

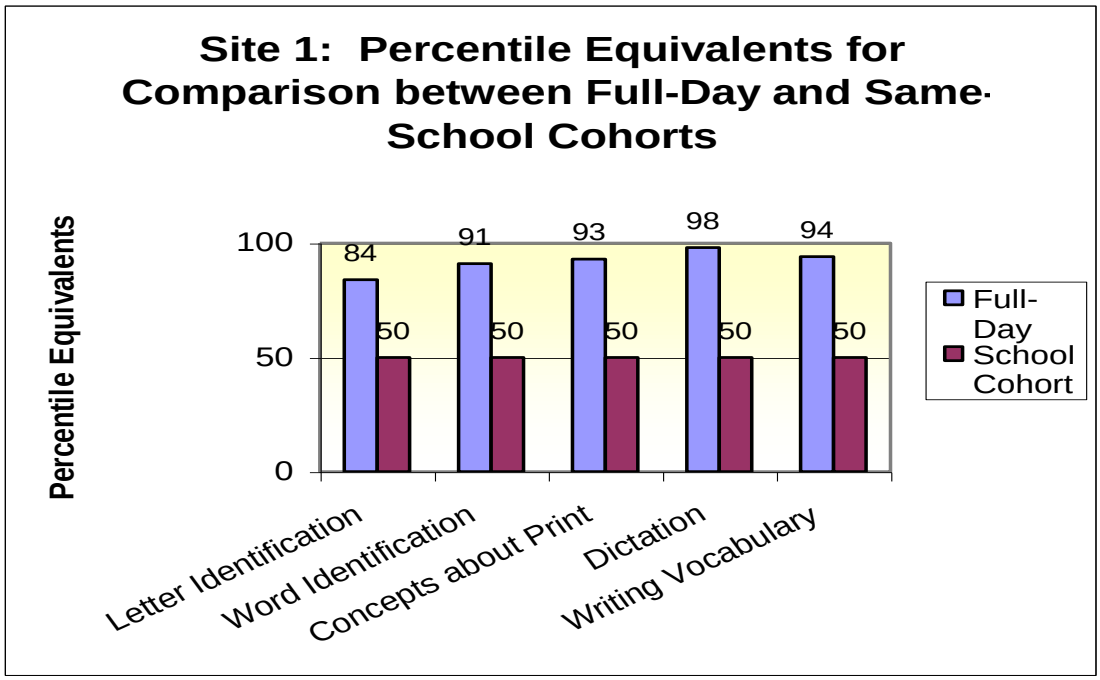
School By School Analysis: Cohort Group Data Collapsed Across the Years

A second probe examined this data in more depth by analyzing results, school by school. The following section presents these findings, with schools being identified by number to maintain confidentiality. The question of interest was whether or not there were statistically significant differences in the performance of full-day kindergarten students compared to kindergarten students in the half-day cohort groups in the same schools prior to the introduction of the full-day option. A table that summarizes these finding may be found at the end of this section.

Site One

When the 2004 end-of-year performance of students at *Site One* was compared to the performance of the half-day cohort group before the introduction of the full-day option, findings from the analysis of variance were statistically significant on all measures as depicted in the accompanying table. The statistical findings for each of Clay's (1993) tasks were as follows: (1) *letter identification* – $F_{(1,187)=}$ 23.725, $p <$ .001; effect size g = .98, percentile equivalent = 84 (achievement being 34 percentile points above that of half-day students before the introduction of the full-day program); (2) *word identification* – $F_{(1,187)}$ = 43.725, $p <$ .001; effect size g = 1.33, percentile equivalent = 91 (achievement being 41 percentile points above that of half-day students before the introduction of the full-day program); (3) *concepts about print* – $F_{(1,186)}$ = 52.539, $p <$ .001; effect size g = 1.46, percentile equivalent = 93 (achievement being 43 percentile points above that of half-day students before the introduction of the full-day program); (4) *dictation* – $F_{(1,186)}$ = 115.499, $p <$ .001; effect size g = 2.16, percentile equivalent = 98 (achievement being 48 percentile points above that of half-day students before the introduction of the full-day program); and (5) *writing vocabulary* – $F_{(1,187)}$ = 60.599, $p <$ .001; effect size = 1.56, percentile equivalent = 94 (achievement being 44 percentile points above that of half-day students before the introduction of the full-day

program). *Book level* data were unavailable for this site. These effect size comparisons are presented in the following figure.



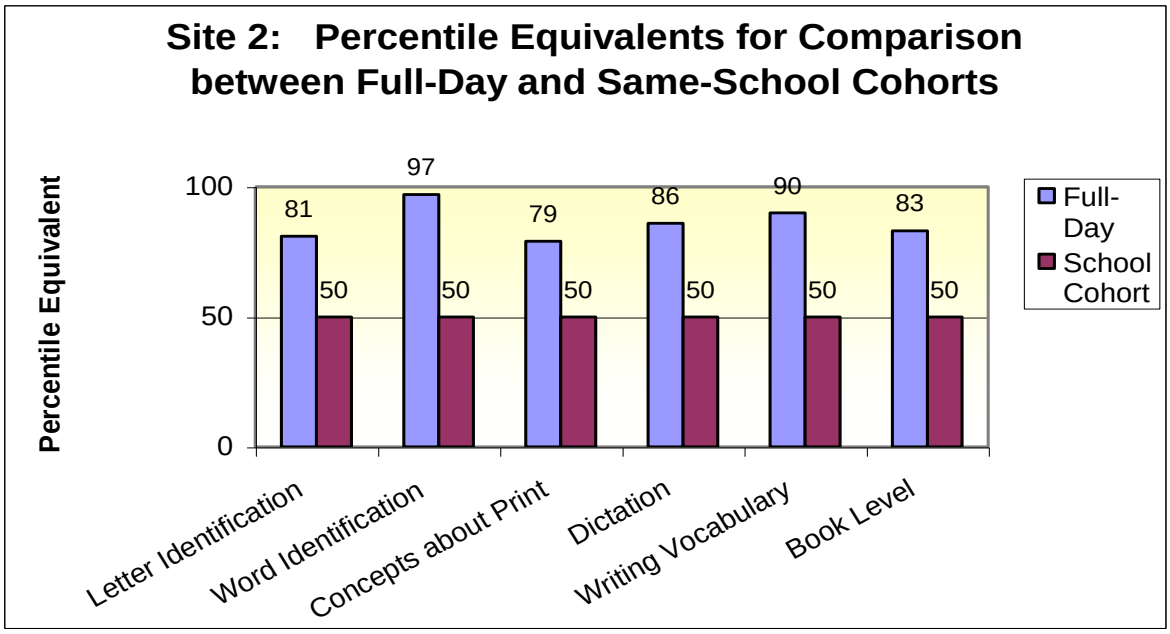
The bar graphs shown above indicate that the performance of the full-day students was strikingly better than the performance of students in the half-day program in the same school before the full-day kindergarten program was introduced. The range of percentile equivalents is from 84 for letter identification (superior by 34 percentile points) to 98 for dictation (superior by 48 percentile points).

Summary. In *Site One*, the introduction of the full-day, every day program resulted in remarkable improvement in terms of early literacy development. In comparison with their half-day counterparts in previous years, students in the full-day target group at *Site One* were better able to name the letters of the alphabet, identify words in isolation, understand concepts related to print, understand the sound/symbol correspondence as evidenced by their ability to write dictated sentences, write words from memory (*writing vocabulary*), and read whole text (*book level*).

Site Two

The results from *Site Two* were similar. An end-of-year comparison of the performance of the full-day cohort group with the performance of half-day students in the same school in previous years showed that, on all measures, the performance of the full-day students was significantly higher than their half-day counterparts in previous years. These findings are summarized below as well as being shown in the accompanying figure: (1) *letter identification* – $F_{(1,241)} = 45.518$, $p < .001$; effect size $g = .87$, percentile equivalent = 81 (achievement being 31 percentile points above that of

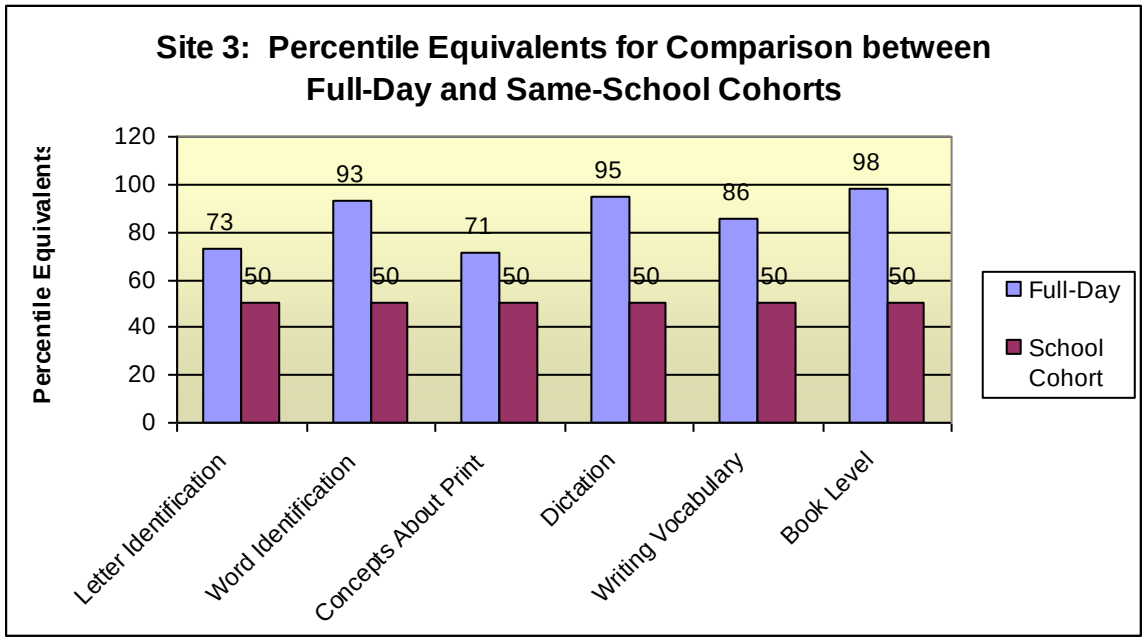
half-day students before the introduction of the full-day program); (2) *word identification* – $F_{(1,241)} = 225.362$, $p < .001$; effect size $g = 1.93$, percentile equivalent = 97 (achievement being 47 percentile points above that of previous half-day students; (3) *concepts about print* – $F_{(1,241)} = 39.383$, $p < .001$; effect size $g = .81$, percentile equivalent = 79 (achievement being 29 percentile points above that of half-day students before the introduction of the full-day program); (4) *dictation* – $F_{(1,241)} = 68.170$, $p < .001$, effect size $g = 1.06$, percentile equivalent = 86 (achievement being 36 percentile points above that of half-day students before the introduction of the full-day program); (5) *writing vocabulary* – $F_{(1,240)} = 103.556$, $p < .001$; effect size $g = 1.31$, percentile equivalent = 90 (achievement being 40 percentile points above that of half-day students before the introduction of the full-day program); and (6) *book level* $F_{(1,241)} = 55.40$, $p < .001$; effect size $g = .96$, percentile equivalent = 83 (achievement being 33 percentile points above that of half-day students before the introduction of the full-day program).



Summary. These results are similar to the findings at *Site One*. Compared to previous years when the half-day option was in effect, the introduction of the full-day, every day kindergarten at *Site Two* significantly enhanced the performance of students in this economically disadvantaged catchment area. This was true for all measures, letter and word identification, the understanding of concepts related to print, the ability to associate sounds with their corresponding letters, and the ability to write words from memory. The increase in reading ability, both to read whole text, identify isolated words, and write words from memory was particularly striking when compared to the abilities of students in the same school in previous years.

Site Three

The comparisons between the end-of-year performance of full-day students at *Site Three* with the performance of half-day students in the same schools prior to the introduction of the full-day option showed statistically significant gains on all measures, as follows: (1) *letter identification* – $F_{(1,199)} = 19.786$, $p < .001$; effect size $g = .63$, percentile equivalent = 74 (meaning that the performance of full-day students was 24 percentile points above that of the half-day students in the previous half-day program); (2) *word identification* – $F_{(1,199)} = 114.957$, $p < .001$; effect size $g = 1.51$, percentile equivalent = 93 (achievement being 43 percentile points above that of half-day students before the introduction of the full-day program); (3) *concepts about print* – $F_{(1,199)} = 15.687$, $p < .001$; effect size $g = .56$, percentile equivalent = 71 (achievement being 21 percentile points above that of half-day students before the introduction of the full-day program); (4) *dictation* – $F_{(1,199)} = 134.902$, $p < .001$, effect size $g = 1.64$, percentile equivalent = 95 (achievement being 45 percentile points above that of half-day students before the introduction of the full-day program); (5) *writing vocabulary* – $F_{(1,199)} = 58.913$, $p < .001$; effect size $g = 1.08$, percentile equivalent = 86 (achievement being 36 percentile points above that of half-day students before the introduction of the full-day program); and (6) *book level* -- $F_{(1,199)} = 223.348$, $p < .001$, effect size $g = 2.11$, percentile equivalent = 98 (achievement being 48 percentile points above that of half-day students before the introduction of the full-day program).

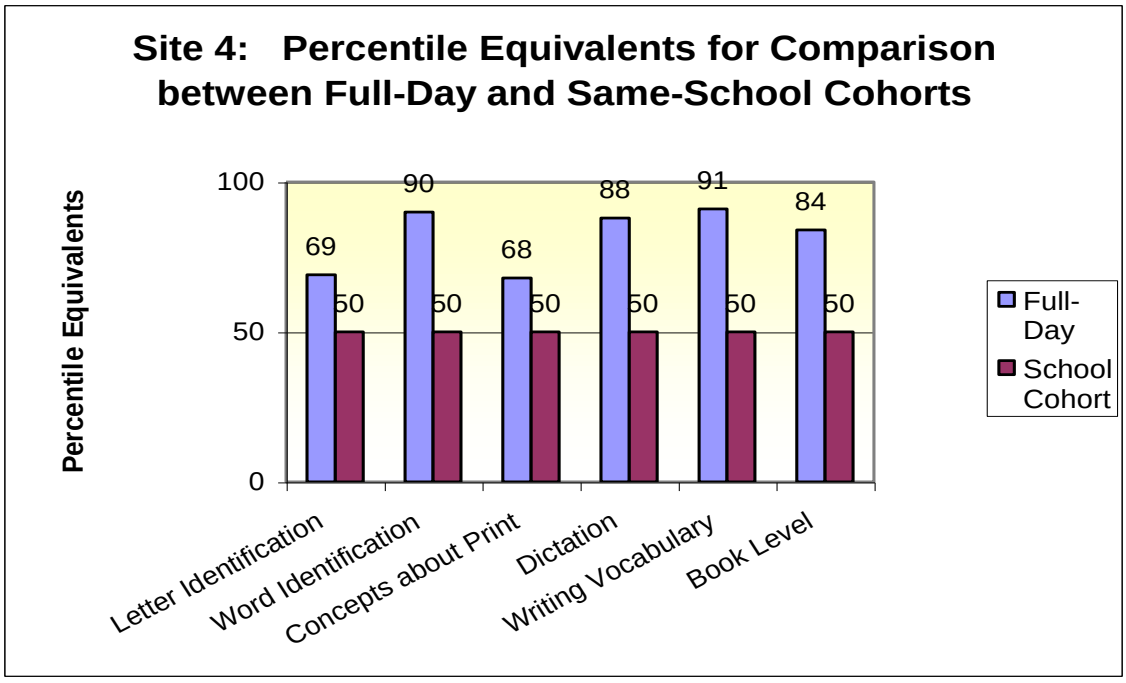


Summary. As was the case at *Sites One* and *Two*, the introduction of the full-day, every day kindergarten option at *Site Three*, was highly beneficial. The level of student performance improved on all measures, but was especially dramatic on the following variables: *word identification*, *dictation*, *writing vocabulary* and reading whole text (*book level*).

Site Four

Site four is located in a more middle class neighbourhood than the other target schools. The performance of students in the full-day option on all measures was superior to the performance of students in the half-day option in the same school before the full-day program was introduced. The end-of year mean performance on the *letter identification* task for students in the full-day kindergarten option in 2003-2004 was 52.36 (with a standard deviation of 3.82), while the mean for the half-day students in previous years was 48.12 (with a standard deviation of 11.81). The ANOVA statistics for *letter identification* comparisons were $F_{(1,221)} = 13.253$, $p < .001$, effect size $g = .49$, percentile equivalent = 69 (achievement being 19 percentile points above that of half-day students before the introduction of the full-day program).

Findings at *Site Four* for all other measures (*word identification*, *concepts about print*, *dictation*, *writing vocabulary and book level*) were statistically significant at the $p < .001$ level. These statistics are reported in detail as follows: *Word identification* – $F_{(1,221)} = 91.042$, $p < .001$, effect size $g = 1.27$, percentile equivalent = 90 (achievement being 40 percentile points above that of half-day students before the introduction of the full-day program); *concepts about print* – $F_{(1,221)} = 11.388$, $p < .001$; effect size $g = .46$, percentile equivalent = 68 (achievement being 18 percentile points above that of half-day students before the introduction of the full-day program); *dictation* – $F_{(1,220)} = 75.418$, $p < .001$, effect size $g = 1.16$, percentile equivalent = 88 (achievement being 38 percentile points above that of half-day students before the introduction of the full-day program); *writing vocabulary* – $F_{(1,221)} = 103.751$, $p < .001$, effect size $g = 1.36$, percentile equivalent = 91 (achievement being 41 percentile points above that of half-day students before the introduction of the full-day program); and *book level* $F_{(1,193)} = 46.778$, $p < .001$, effect size g = .99, percentile equivalent = 84 (achievement being 34 percentile points above that of half-day students before the introduction of the full-day program).



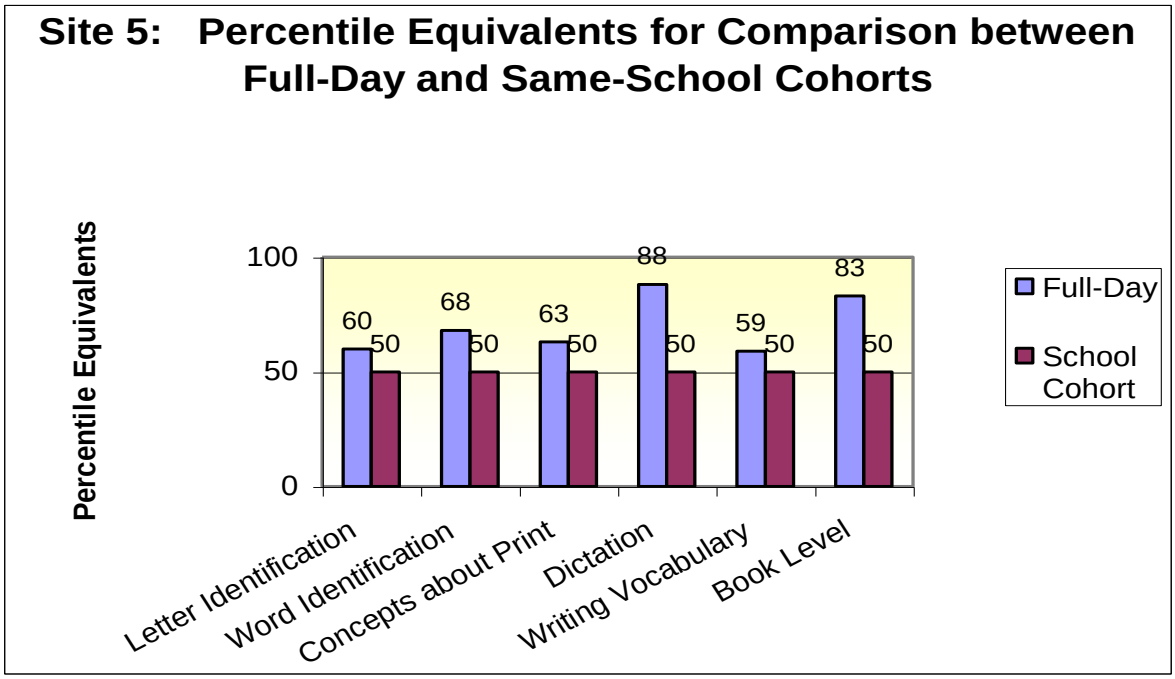
Summary. Perhaps the most telling statistic in this school was in the standard deviation for letter identification, which supports the advantage of the full-day compared to the half-day option. In the full-day program scores clustered around the mean, but there was much more variance in the performance of students in the half-day program prior to the introduction of the full-day option. The full-day program thus enhanced the letter naming ability of all students and there were fewer outliers. Thus on all measures, the full-day students in this school surpassed the achievement of their half-day counterparts in the same school before the introduction of the full-day program, supporting the efficacy of the full-day program.

Site Five

The comparisons between the performance of students in the full-day option compared to the performance of students in previous years when the half-day program was in effect yielded somewhat uneven results in this school. Findings were positive for all measures, and were significant beyond the .05 probability level on five of the six measures (letter and word identification, concepts about print, dictation and reading achievement). The one measure that did not yield significance was writing vocabulary, which, nonetheless, yielded a probability value of .062.

For *letter identification*, the analysis of variance comparing the letter identification scores of students in the two groups (full-day versus previous half-day students) indicated that the differences between the two groups were significant at the .05 level ($F_{(1,319)} = 4.197$, $p = .041$, effect size $g = .26$, percentile equivalent = 60 (achievement being 10 percentile points above that of half-day students before the

introduction of the full-day program). For w*ord identification*, the analysis of variance comparing the word identification scores of students in the two groups (full-day versus previous half-day students) indicated that the differences between the two groups were significant beyond the .01 level ($F_{(1,319)} = 15.011$, $p < .001$, effect size $g = .48$, percentile equivalent = 68 (achievement being 18 percentile points above that of half-day students before the introduction of the full-day program). The performance differences on the *concepts about print* task at *Site Five* were not as positive for the full-day, every day option as they were in the other four schools ($F_{(1,316)} = 6.589$, $p = .011$, effect size $g = .32$, percentile equivalent = 63 (achievement still being 13 percentile points above that of half-day students before the introduction of the full-day program). There were, however, no significant differences in the ability of students in the two options (before and after the introduction of the full-day program) to write words from memory (*writing vocabulary task*), although this measure approached the .05 level of significance with $F_{(1,319)} = 3.505$, $p = .062$, effect size $g = .23$, percentile equivalent = 59 (achievement of the full-day students still being 9 percentile points above that of half-day students before the introduction of the full-day program). Findings from the analysis of both dictation and book level scores were more encouraging, however. The performance comparisons on the *dictation task* were statistically significant ($F_{(1,316)} = 92.55$, $p < .001$), effect size $g = 1.20$, percentile equivalent = 88 (achievement being 38 percentile points above that of half-day students before the introduction of the full-day program). The results for *SASI book level* were similar ($F_{(1,279)} = 32.955$, $p = .001$, effect size $g = .90$, percentile equivalent = 82 (achievement being 32 percentile points above that of half-day students before the introduction of the full-day program).



Summary. Findings at this site, as assessed by letter and word identification, concepts about print, dictation and book level, support the efficacy of the full-day program, although the finding that there were no significant differences in the ability to write words from memory (*writing vocabulary* task) is worrisome and suggests that there needs to be more emphasis on writing in this school to ensure mastery of the sound/symbol relationship.

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Incidence of Low Performance

Another way of viewing the data is to examine those children whose performance on the Clay measures was in the lowest categories. In order to carry out this analysis, students in the target schools were compared before and after implementation of the full-day program; that is, students who received the full-day program were compared to their half-day counterparts (cohort) before implementation of the program for the years in which data were collected (1997-1998 through to 2003-2004).

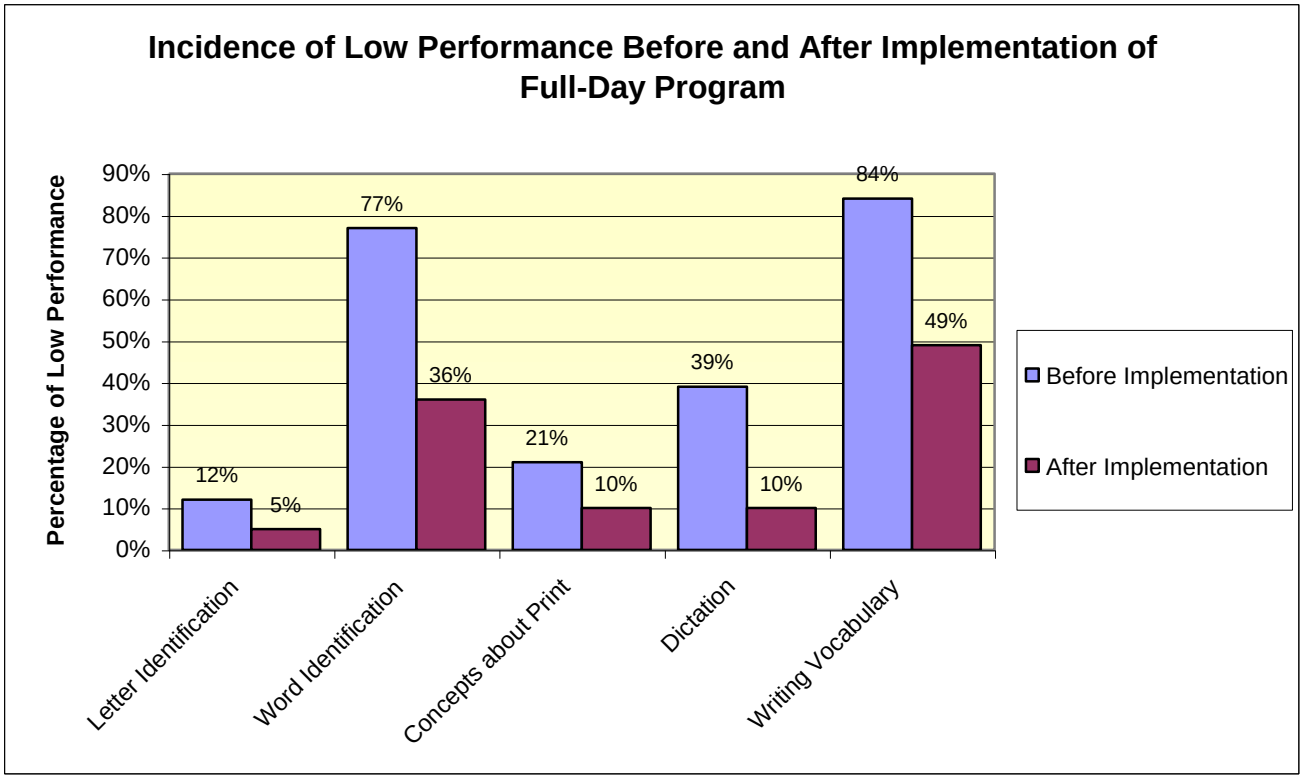
The analysis of the incidence of low performance was based on Clay's (1993) stanine equivalents based on the normal distribution curve, with students who performed at stanine levels 1 or 2 being considered low-achievers. The analysis used each school's performance indicators (Clay, 1993) before and after implementation of the full-day kindergarten option and made frequency counts to tally the number and percentage of students whose scores fell within these low stanine levels.

Data presented in the following table indicate that participation in full-day kindergarten in fact did reduce the incidence of low achievement.

Incidence of Low Performance Before and After Full-Day Program Implementation in Target Schools

Subtest	**Before Implementation (Half-Day Cohort)**		**After Implementation (Full-Day Program)**	
Letter Identification	N = 455	53 (12%)	N = 722	37 (5%)
Word Identification	N = 455	351 (77%)	N = 722	306 (36%)
Concepts about Print	N = 454	94 (21%)	N = 719	70 (10%)
Dictation	N = 454	179 (39%)	N = 718	75 (10%)
Writing Vocabulary	N = 455	383 (84%)	N = 721	353 (49%)

The following chart illustrates the decreases in the incidence of low performance after the implementation of the full-day kindergarten program.



With the exception of *writing vocabulary* (from 84 to 49 percent), the across-the-years data in the preceding table indicates that in every instance, participation in the full-day, every day kindergarten program resulted in lowering the frequency of low performance by at least 50 percent. The results tallying the percentage of students who performed below expected levels were: for *letter identification*, reductions from 12% to 5 %; for *word identification*, reductions from 77% to 36%; *for concepts about print*, reductions from 21% to 10%; for dictation, reductions from 39% to 10%, and for *writing vocabulary*, reductions from 84% to 49%. These findings suggest that full-day kindergarten program students were achieving higher levels of mastery on all emergent literacy indicators than their half-day counterparts in the same schools before the introduction of the full-day program.

Long-Term Effects of the Program

This section of the report addressed the fourth research question concerning the long term effects of the full-day kindergarten program, whether the reading performance of students who participated in the full-day, every-day program when they were in kindergarten equalled or exceeded the reading performance levels of students who attended kindergarten half-days as students proceeded upward through the grades.

One of the major questions associated with providing full-day, every-day kindergarten options in economically disadvantaged areas is whether the benefits are sustained. End-of-year reading levels assessed through the use of the *Benchmark Kit* were available through the division office for students across the division at the end of grade one, at the end of grade two, and the end of grade three. Using these data, a series of comparisons of the reading performance of the full and half-day students was made to assess the longer-term efficacy of the program.

The first analysis consisted of comparisons of the performance of full- and half-day students in the target schools only. Because of inequalities in socio-economic status between target schools and other schools in the division, this analysis compared the grade one, two, and three end-of-year reading performance of those students in the target schools who attended full-day, every day kindergarten with the grade one, two, and three reading performance of students who had subsequently transferred into the target schools and who had attended half-day kindergartens in their previous schools. The results of the grades one and two analysis from the 2002-2003 school year are also reported.

The second analysis examined the reading performance of students who had received the full-day program in kindergarten in comparison to students in the division who received a half-day kindergarten program, comparisons being made at each of the grade levels, one, two, and three, between the full-day students and (1) students in half-day English-only programs and (2) all half-day students in the division including French Immersion students.

Target School Comparisons

As shown in the following table, the first set of comparisons that tracked the reading performance of the full-day kindergarten students into grades one, two and three compared the performance of the full-day program students with that of students who had transferred into the target schools having participated in a half-day kindergarten program in the schools they attended previously. This analysis allowed comparisons between the reading performance of full- and half-day students with that of students from the same socio-economic backgrounds.

Target School Comparisons

Grade 1	Condition	N	Mean (stand dev)	Effect Size	%ile Rank	d/f	F-ratio	p-value
2002-2003	Full-Day	143	2.23 (1.073)	.39	65	1,179	5.104	.025*
	Half-Day	38	1.79 (1.006)					
2003-2004	Full-Day	160	2.09 (.880)	.22	59	1,195	1.502	.222 (ns)
	Half-Day	37	1.88 (1.16)					
Grade 2	**Condition**	**N**	**Mean (stand dev)**	**Effect Size**	**%ile Rank**	**d/f**	**F-ratio**	**p-value**
2002-2003	Full-Day	113	3.41 (1.043)	.09	54	1,202	.621	.432 (ns)
	Half-Day	91	3.28 (1.367)					
2003-2004	Full-Day	124	3.47 (1.235)	.24	59	1,180	3.130	.079‡
	Half-Day	58	3.13 (1.216)					
Grade 3	**Condition**	**N**	**Mean (stand dev)**	**Effect Size**	**%ile Rank**	**d/f**	**F-ratio**	**p-value**
2003-2004 Only	Full-Day	110	4.15 (1.009)	-.11	46	1, 190	.511	.476
	Half-Day	82	4.26 (1.083)					

*$p < .05$
‡ Approaching significance

Grade 1. Grade one in 2002-2003: $F_{(1,179)} = 5.104$, $p = .025$, effect size $g = .39$, percentile rank = 65th, the end-of grade one reading achievement of the full-day kindergarten students being 15 percentile points above that of transfer-in half-day peers, the respective end-of-grade one mean reading performance levels being $M = 2.23$ (full-day) and $M = 1.79$ (half-day).

Grade one in 2003-2004: $F_{(1,195)} = 1.502$, $p = .222$ (ns), effect size $g = .22$, percentile rank = 59th, the end-of grade one reading achievement of the full-day kindergarten students being 9 percentile points above that of transfer-in half-day peers, the respective end-of-grade one mean reading performance levels being $M = 2.09$ (full-day) and $M = 1.88$ (half-day).

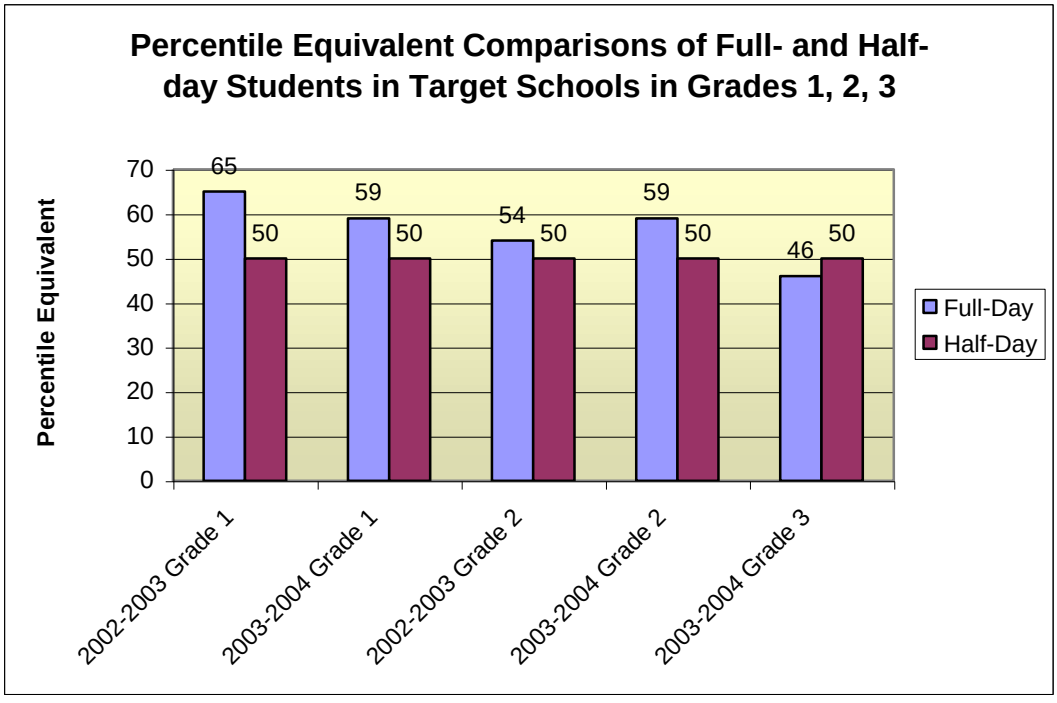
Grade 2. As indicated by the analysis of variance comparisons, these positive findings seemed to break down by the end of grade two in 2002-2003 ($F_{(1,202)} = .621$, $p = .432$). When effect sizes that show the extent of the differences were calculated, however, the effect size ($g = .09$, percentile rank = 54th) the reading performance of the full-day students was 4 percentile points above that of their half-day peers.

The analysis of variance comparisons in 2003-2004 resulted in a non-significant difference between the groups, though the difference approached significance in favour of the full-day students ($F_{(1,180)} = 3.13$, $p = .079$). When effect sizes that show the extent of the differences were calculated, however, the effect size ($g = .24$, percentile rank = 59th) revealed that the reading performance of the full-day students was 9 percentile points above that of their half-day peers.

Grade 3. Data for grade three was only collected in 2003-2004. The results of the analysis indicated that there was no significant difference between the reading performance of the students who received a full-day kindergarten program and those who transferred into the target schools after kindergarten ($F_{(1,190)} = .511$, $p = .476$). When effect sizes that show the extent of the differences were calculated, the effect size ($g = -.11$, percentile rank = 46th) indicated that the reading performance of the full-day students was 4 percentile points below that of their half-day peers.

Summary: End of grades one, two, and three. The comparisons of end-of-grade one reading achievement levels between target school students and those who had and had not participated in the full-day program in kindergarten showed that there was a significant difference between the two groups in favour of the full-day students in 2002-2003, but not in 2003-2004.

These results are illustrated in the following figure that shows percentile equivalents.



Division-Wide Comparisons

Half-day English programs – grade one. As illustrated in the table that follows, when the comparisons were made between the end-of-year grade one reading performance of students who had attended English-only, full-day kindergarten and students division-wide who had participated in English-only half-day programs, there were no significant differences in performance levels in 2002-2003 ($F_{(1,516)} = 3.652$, $p = .057$), effect size g = -.18, percentile equivalent = 43, the end-of grade one achievement of the full-day students being 7 percentile points below that of half-day students division-wide. In 2003-2004, however, there was a significant difference in favour of the half-day English students division wide over the full-day target students group ($F_{(1,516)} = 7.132$, $p < .001$), effect size $g = -.26$, percentile equivalent = 40^{th}.

Half-day English and French Immersion programs – grade one. Findings were similar when the reading performance of full-day kindergarten students was compared with that of all the other students in the division, both those in English programs and those in French Immersion programs. The *F* statistics for 2002-2003 were: $F_{(1,663)} = 2.718$, $p = .10$, effect size $g = -.15$, percentile rank = 44, the end-of grade one achievement of the full-day students being 6 percentile points below that of half-day students division-wide. For 2003-2004, the statistics were: $F_{(1,629)} = 4.985$, $p = .026$ (significant), effect size $g = -.79$, percentile rank = 21, indicating that the full-day students from the target schools were performing 29 percentile points below the division-wide mean for English and French Immersion schools.

Half-day English programs – grade two. When comparisons were made between the end-of-year grade two reading performance of students who had attended English-only, full-day kindergarten and students division-wide who had participated in English-only half-day programs, in 2002-2003, there was significant difference in favour of the half-day students division-wide ($F_{(1,538)} = 6.836$, $p < .001$), effect size g = -.23, percentile rank = 41, the end-of grade two achievement of the full-day students being 9 percentile points below that of all students.

In 2003-2004, however, there was no significant difference between the two groups ($F_{(1,506)} = .980$, $p = .323$), effect size $g = -.10$, percentile equivalent = 46, the end-of grade two reading achievement of the full-day students being 4 percentile points below that of half-day students division-wide.

Half-day English and French Immersion programs – grade two. Findings were similar when the reading performance levels of full-day kindergarten students were compared with that of all the other students in the division, both those in English programs and those in French Immersion programs. There was a significant difference between the groups in favour of the half-day students. The *F* statistics for 2002-2003 were: $F_{(1,727)} = 11.385$, $p < .001$, effect size $g = -.28$, percentile rank = 39, the end-of grade two achievement of the full-day students being 11 percentile points below that of half-day students division-wide. For 2003-2004, there were no significant differences between the two groups. The statistics were: $F_{(1,646)} = 1.375$, $p = .241$, effect size $g = -.13$, percentile rank = 45, indicating that the full-day students from the target schools

were performing 5 percentile points below the division-wide mean for students in English and French Immersion schools.

Half-day English programs – grade three. Data from 2002-2003 were not available for the end-of-year at grade 3; data were only available for 2003-2004. When comparisons were made between the end-of-year grade three reading performance of students who had attended English-only, full-day kindergarten and students division-wide who had participated in English-only half-day programs, there was a significant difference in favour of the half-day students division-wide ($F_{(1,564)} = 22.412$, $p < .001$), effect size g = -.50, percentile rank = 31, the end-of grade two reading achievement of the full-day students being 19 percentile points below that of all students.

These findings are summarized in the table that follows:

English and French-Immersion Division-Wide Performance Comparisons: Grades One, Two, and Three

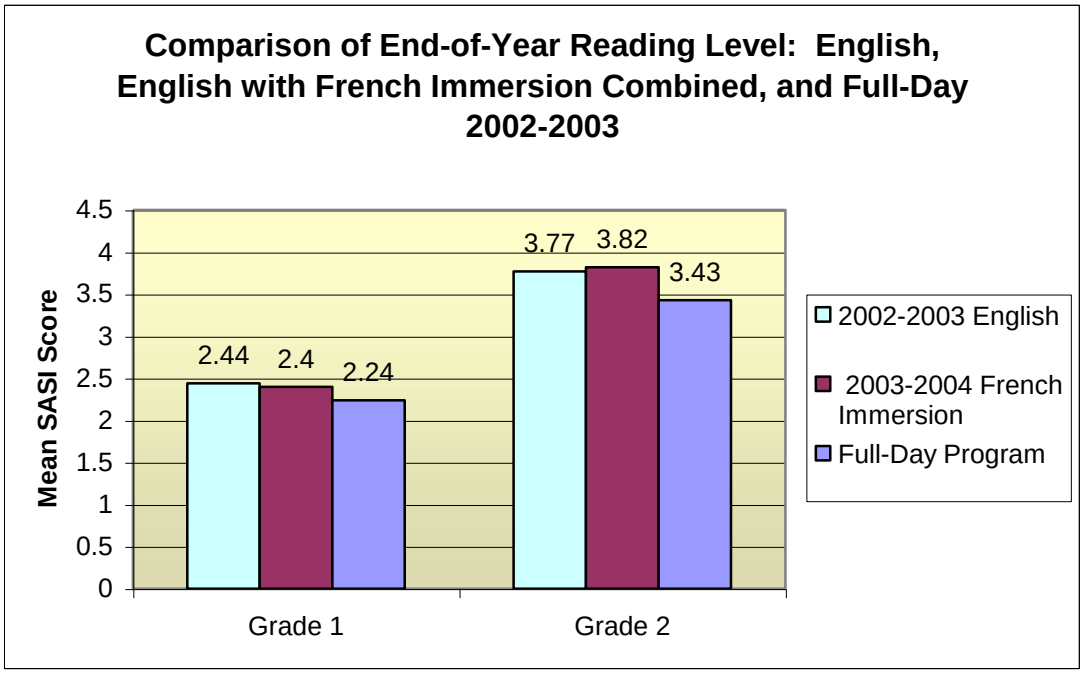
Grade 1	Condition	N	Mean (stand dev)	Effect Size	%ile Rank	d/f	F-ratio	p-value
2002-2003	Half-Day (English Only)	369	2.44 (1.064)	-.18	43	1,516	3.652	.057
	Half-Day (with French Immersion)	515	2.40 (1.005)	-.15	44	1,663	2.718	.10
	Full-Day	150	2.24 (1.073)					
2003-2004	Half-Day (English Only)	328	2.31 (.865)	-.26	40	1,489	7.132	<.001**
	Half-Day (with French Immersion)	466	2.78 (.886)	-.79	21	1,629	4.985	.026*
	Full-Day	163	2.08 (.872)					
Grade 2	**Condition**	**N**	**Mean (stand dev)**	**Effect Size**	**%ile Rank**	**d/f**	**F-ratio**	**p-value**
2002-2003	Half-Day (English Only)	462	3.77 (1.250)	-.23	41	1,583	6.836	.000
	Half-Day (with French Immersion)	603	3.82 (1.213)	-.28	39	1,727	11.385	.001
	Full-Day	126	3.43 (1.046)					
2003-2004	Half-Day (English Only)	380	3.58 (1.089)	-.10	46	1,506	.980	.323
	Half-Day (with French Immersion	519	3.61 (1.060)	-.13	45	1,646	1.375	.241
	Full-Day	128	3.47 (1.228)					
Grade 3	**Condition**	**N**	**Mean (stand dev)**	**Effect Size**	**%ile Rank**	**d/f**	**F-ratio**	**p-value**
2003-2004	Half-Day (English Only)	450	4.72 (1.095)	-.50	31	1,564	22.412	<.001**
	Half-Day (with French Immersion	580	4.71 (1.045)	-.51	31	1,696	24.940	<.001**
	Full-Day	116	4.18 (1.028)					

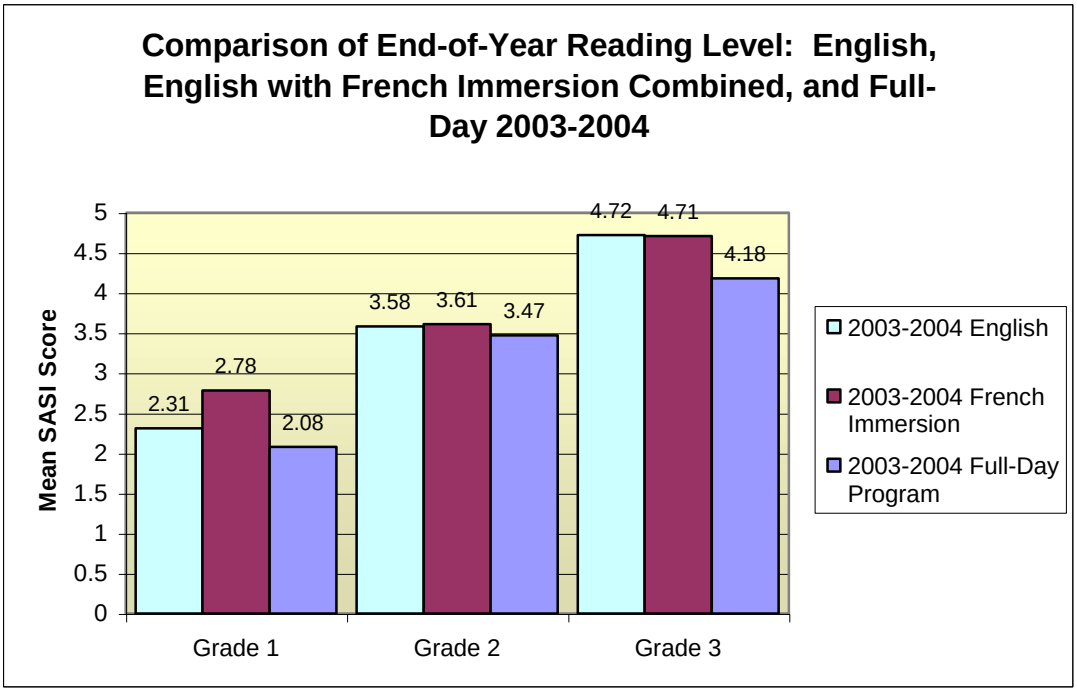
*p < .05
** p < .001

Half-day English and French Immersion programs – grade three. Findings were similar when the reading performance of the full-day kindergarten students was compared with that of all the other students in the division, both those in English programs and those in French Immersion programs. There was a significant difference between the groups in favour of the half-day students. The *F* statistics for 2003-2004 were: $F_{(1,696)} = 24.94$, $p < .001$, effect size $g = -.51$, percentile rank = 31, the end-of

grade three reading achievement of the full-day students being 19 percentile points below that of half-day students division-wide.

The following figures illustrate the performance differences between the two groups by showing percentile rankings:





Summary of Findings

End of Kindergarten Year Performance Across the Years

Control Group Comparisons

- Beginning and end-of year reading performance measures were used to assess the benefits of participating in the full-day, every day kindergarten program by examining *full-day* and *control group* achievement scores separately for 2003-2004, each year from 2000-2001 to 2003-2004, and across the years, all data collapsed. Findings showed that in both 2000-2001 and 2001-2002, the first years for which control group pretest data were available, the performance of the target group students compared to the performance of students in the *control group* surpassed that of their half-day peers on all early reading measures.

- The trend in 2002-2003 and 2003-2004 indicated more equal performance levels generally. No statistically significant differences were found between the performance of students in the two groups in 2002-2003, except on *reading ability* in which case the reading performance of the full-day students was superior. As shown by effect sizes, increased performance levels on the part of the half-day students were evident in regard to: (1) *letter identification*—especially in 2003-2004 where the letter naming ability of *control group* students surpassed that of the full-day target group students by eighteen percentile points, and (2) *dictation*--control group students in 2003-2004 were better than full-day target group students at matching sounds and letters by four percentile points. In the year 2003-2004, however, the performance of target group students exceeded that of control group students at statistically significant levels on three important measures: *word identification*, *concepts about print* and actual *book reading*.

- When *target and control group* were collapsed across the years, findings revealed statistically significant performance levels on all reading measures, the performance of the full-day target students surpassing that of their peers in the half-day program.

- It was also evident from *control group* beginning/end-of-year comparisons on all measures that, in general, the full-day students from less affluent areas entered school less ready to learn.

While in 2002-2003, there were eighteen students in one class in the control group school, in 2003-2004, there were 36 students in two classes in that school. The control group comparisons therefore need to be interpreted with caution because they are tempered both by small numbers and by ranking on the Division's income factor scale which suggested that students from the control group school came from a relatively more affluent area. While in the years previous to 2003-2004 parents in the division had the option of enrolling their children in any division school (and this meant some children from more affluent areas attended target group schools because kindergarten

was full-day, every day rather than half-day), this opportunity was withdrawn beginning with the 2003-2004 school year. At the present time (2004-2005), students are required to attend schools in their own catchment areas, regardless of whether the kindergarten program in their home school is full or half-day.

Division-Wide Comparisons

- *Division-wide* findings echoed the trend found in control group comparisons. Findings from 2003-2004 indicated that there were no statistically significant differences between the full-day kindergarten students and their half-day counterparts across the division on the *dictation*, and *writing vocabulary* tasks. Contrary to the expectation that students from impoverished neighborhoods would be at risk, however, end-of-year comparisons in 2003-2004 showed that the performance of the full-day, every day students exceeded that of the half-day students division-wide on *concepts about print*, *reading level*, and approached statistical significance on the *word identification* task. These division wide findings are similar to those established by the 2003-2004 control group comparisons.

- Again the year-by-year division-wide analysis indicated that the reading performance of the half-day students division wide continued to improve, similar to findings from the year-by-year analysis of control group performance. While the half-day students excelled at *letter identification*, especially in more recent years (2001-2002, 2002-2003, and 2003-2004), the performance of students in the full-day group was either equal to or surpassed the performance levels of the half-day students, division-wide, on all other measures. These finding were consistent, year-by-year, and were especially interesting in regard to *word identification* and *reading performance* indicators.

- Findings when division-wide data were collapsed across the years confirmed these results. While the half-day students were superior in terms of letter naming, the performance of the full-day students on all other measures (*word identification, concepts about print, dictation, writing vocabulary* and *book level*) exceeded that of their half-day peers.

Cohort Group Comparisons

Cohort group comparisons collapsed across schools that examined the performance of the full-day students in comparison to students in the same schools before program implementation showed that there were statistically significant performance differences on all reading measures at the end of the kindergarten year. These findings were further supported by effect size comparisons. Thus at the beginning of grade one, students who had participated in the full-day kindergarten were now on approximately the same footing as their more affluent peers across the division, closing expected economic disadvantage performance gaps.

- Findings from the examination of across the years cohort group data, school by school, indicated that the introduction of the full-day, every day kindergarten program resulted in remarkable improvement in reading performance especially for students at sites one, and two. While, as shown by effect sizes, findings were a little less striking at sites three and four (especially in regard to *letter identification* and *concepts about print*), and at site five (in relation to *letter identification*, *concepts about print* and *writing vocabulary*), performance on all measures, except for *writing vocabulary* at site five, was still statistically significant, supporting the efficacy of the full-day program in less affluent areas of the division.

Across the Years Performance of the Half-Day Students

- A statistical analysis that examined the division-wide performance of the half-day kindergarten students only across the years indicated that the performance outcomes of students in the half-day program increased significantly on all reading measures in which records were available. This contrasted with the performance of students in the full-day program, which remained relatively constant and suggests that there was an increasingly more academic focus in the half-day kindergarten program.

Incidence of Low Performance

- The across-the-years analysis of indicators of low performance showed that except for writing vocabulary scores which reduced the incidence of low achievement by 35 percent, participation in the full-day every day kindergarten program reduced the frequency of low performance on all other measures by approximately 50 percent, suggesting that participation in the full-day program helped increase performance levels on all reading tasks.

Long Term Effects to the End of Grade Three

End of Grade One

- The overall analysis of *end of grade one* reading achievement levels division-wide showed that in both 2002-2003 and 2003-2004 there were statistically significant differences between the performance of the full-day students compared to their counterparts in the half-day English program in favour of the half-day students. Although statistically the half-day students from more affluent neighborhoods were better readers at the end of grade one than their full-day counterparts, the full-day students were still reading above grade placement level.

- While the reading performance of the full-day and French immersion students at the end of grade one in 2002-2003 was statistically no different from that of the

of their full-day counterparts, in 2003-2004 compared to the performance of the full-day students, the performance of the French immersion students was statistically superior, although similar in regard to grade placement levels.

- When inequities in socio-economic status were explored by comparing the end of grade one reading performance of students who participated in the full-day kindergarten program with that of students who had transferred into the division after having attended half-day kindergartens in their previous schools, findings showed that while the end of grade one reading achievement of the full-day students was significantly higher than that of their half-day peers from other schools in 2002-2003, these difference were not apparent in 2003-2004. Effect sizes at the end of grade one in 2003-2004 nevertheless indicated that the reading achievement level of the full-day, every day students was higher then their transferred-in peers by 9 percentile points.

End of Grade Two

- The end of grade two, division-wide findings from 2003-2004 differed from the findings in 2002-2003. While the 2002-2003 end of year reading performance levels of students in grade two who had participated in the two alternative kindergarten programs were different at statistically significant levels in favour of students in both the English and French programs, students in all groups were reading above grade placement level. Findings from the 2003-2004 analysis showed, however, that the reading achievement of the full-day kindergarten group was equal to that of their half-day peers from more affluent areas. This finding applied to both the English and French programs.

- When target group comparisons were carried out contrasting the end of grade two reading achievement of students who had participated in the full-day, every day kindergarten program with that of students who had transferred in to the division after having attended half-day kindergarten programs in other divisions (cohort group), findings in 2002-2003 showed no statistically significant differences in reading ability. The 2003-2004 statistical findings were nevertheless in the expected direction. That is, compared to the end-of-grade two reading performance of the half-day students who had transferred in to the division, the end-of-grade two reading performance of the full-day kindergarten students approached statistical significance.

End of Grade Three

- End-of-grade three data were only available for 2003-2004. Based on these reading performance data for both English and French immersion students who had been enrolled in half-day programs when they attended kindergarten compared to the end-of-grade three reading performance levels of their counterparts who had been enrolled in the full-day kindergarten program, there were statistically significant findings in favour of both the half-day English and

half-day French immersion students. Although the differences between the groups were statistically significant, the end-of-grade three reading performance of the full-day students from less affluent catchments was still above grade placement level.

- Target group comparisons, that took into account inequities in socio-economic status by comparing the performance of students in the full-day every day kindergarten program with that of students who transferred in to the division after participating in half-day kindergarten programs elsewhere, indicated that in 2003-2004 there were no statistically significant differences between the reading performance of students who had participated in the full-day kindergarten program and those who had attended kindergarten half-days only. The reading performance of the students in the two groups was approximately equal.

Conclusions and Discussion

- The year-by-year analysis of control group, division-wide, and cohort group data, as well as data collapsed across the years make a compelling case for maintaining the full-day, every day kindergarten program in less affluent neighborhoods in the division by reducing school entry performance disparities. This conclusion is also supported by the incidence of low achievement data that showed reductions in low performance. Kindergarten students from less affluent neighborhoods enrolled in the full-day, every day program also made greater beginning to the end of the year gains than their half-day counterparts on all reading measures. When collapsed across-the-years cohort data were analyzed at the kindergarten level, findings were statistically significant, again supporting the efficacy of the full-day program.

- The school by school analysis of the effectiveness of the full-day kindergarten program, that compared the performance of the full-day students to that of students in the same schools when a half-day program was in effect, indicated superior performance levels on all tasks since the introduction of the full-day program, although performance at site five, especially on the concepts about print, letter identification and writing vocabulary tasks were not as striking as at the other four sites.

- The long term data analysis across the school years from 1997-1998 to 2003-2004 indicated that the performance of students in the *half-day kindergarten program* division-wide increased at statistically significant levels year by year on all measures, suggesting that the curriculum in the *half-day program* may now have a more academic focus than in the years previous to the implementation of the full-day program. This finding suggests that the full-day program has had an influence on the kindergarten program in the division as a whole, which is somewhat worrisome because these classes meet only half-days. As a result, the curriculum in the half-day classes may have too narrow a focus.

This finding is somewhat troublesome in the light of research evidence (NICHD, 2005; Stickland and Shanahan, 2004) which indicates that as well as playing with letters and sharing alphabet books, working with rhymes, playing language games with letter sounds, and linking letters to the sounds they represent, young children need to take part in singing and story reading activities, draw and write independently for enjoyment, engage in dialogue with others, and become involved in discussions that are stimulating, not only at meta-linguistic levels, but cognitively, and linguistically as well. While there are strong relationships between oral language development, alphabetic and print knowledge, and future success in reading, one activity must not be carried out at the expense of the others. Young children need to become engaged, unhurried, in all of these kinds of stimulating activities that support learning.

- Although results varied somewhat across the three years for which long term data were available, a common thread throughout the analysis was that as students from less affluent neighborhoods who had been enrolled in the full-day kindergarten program progressed through grades one, two and three, they were able to keep pace with the reading performance of their peers who had participated in the half-day kindergarten program. At the end of the respective school years, the full-day kindergarten students were reading above grade placement levels in each of the years, at the end of grade one, the end of grade two, and the end of grade three.

Torgeson (2002) questions the long held basic standard that all children be expected to reach levels of reading comprehension that correspond with their level of listening comprehension. He suggests that this expectation is unrealistic because it implies that all children should have average verbal ability, a premise that has been refuted by decades of research into the effects of special instruction. Allington (2005), on the other hand, finds Torgeson's views disconcerting because of the effect such an outlook may have in lowering classroom expectations. Still, the fact that the students in this study from disadvantaged neighborhoods whose performance upon kindergarten entry was lower than that of their control group peers were able to read above grade placement level at the end of grade three speaks well for the quality of the early years program in the division.

Recommendations

Kindergarten Program

1. Performance gains across the kindergarten year as well as long-term cohort group data, that compared the performance of students in the full-day, every day program with that of their peers in the same schools before the introduction of the full-day program who attended kindergarten for half-days only, support the efficacy of the full-day program, which should therefore be maintained. In addition to closing the academic performance gap between children from advantaged and disadvantaged catchments, goals of the full-day program should include: (1) increasing our understanding of children's home cultures and using

that understanding to build bridges between home and school, and (2) helping children experience literacy as part of everyday life, thereby helping to reduce income-based learning disparities

2. Continue to monitor curriculum implementation in the full-day program, especially at site five to ensure that the curriculum includes a writing component, and in conjunction with the writing reinforces the correspondence between sounds and letters, concepts about print and letter name knowledge. Writing activities can be integrated across the curriculum, the curricular goal being to address issues and questions that are important to children and that use literacy to empower children "to do important life work" (Harris, 2005, p.4).

3. As indicated by research (NICHD, 2005), the ability to match sounds and letters (as measured by the dictation task) is fundamental to future success in school. At the same time that care must be taken to ensure that the kindergarten program is well-rounded and includes varied activities that integrate music, art, physical education, science and social studies with the language arts and helps children relate new learning to their own lives, students must come to understand that spoken words are made up of individual sounds and be able to put these sounds together seamlessly and quickly. In view of these realities, continue to monitor students as they move into grades one, two and three to ensure that their understanding of the speech to print match and knowledge of the alphabetic principle has been consolidated. Turn tacit knowledge into conscious awareness and application.

4. The analysis of the performance of half-day students indicating statistically significant gains on all end-of-year reading measures across the years suggests that the curriculum in the half-day program may be too narrow in focus. Consider extending all kindergartens in the division from half- to full-day, every day programs to ensure a more balanced program that provides for many integrated language and literacy opportunities and builds competence in oral language as well as metalinguistics as suggested by Strickland and Shanahan (2004) and Harris (2005). "Children need to do more than break the phonics code" (Harris, 2005, p.4).

Program Upward Through the Grades

The long-term effects of the full-day kindergarten were rewarding. Contrary to expectations, students from more impoverished areas of the city were able to read beyond grade placement level to the end of grade three. While this effect was gratifying, a related question addresses the issue of why the full-day kindergarten students were unable to maintain the reading performance edge they held at the end of their kindergarten year. While activities that support literacy learning may not be available in homes where overwhelming living conditions and related problems may take precedence over engaging in literacy activities, as students progress upward through the grades, educators must assume responsibility for monitoring progress and

ensuring that all children have opportunities to engage in linguistically and cognitively stimulating dialogues.
There may, however, be instructional anomalies both within and across schools in the division. It is therefore advised that:

1. Under the guidance of the language arts consultant and reading clinician, teachers monitor student progress on an on-going basis. Students should continue to be engaged in small group learning activities to enhance expressive language as well as cognition by providing background information, clarifying meaning, and reinforcing the alphabetic principle as it applies to word identification. Meta-linguistic and cognitive knowledge must continue to be monitored closely by analyzing assessment data available through conducting ongoing running records. As selections are read, teachers can examine whether individual students are more successful at word identification or comprehension and use this information to inform subsequent instruction.

2. In conjunction with this recommendation, consider reducing teacher/pupil ratios at the grade one and two level and/or re-assigning or adding staff to ensure consolidation of word recognition and comprehension skills. While only expert teachers provide instruction to the most needy, a core of volunteers could also enrich schooling by making more individualized attention possible.

3. The success of the school program is, in part, dependent upon the home literacy environment. Without sustained parental support, learning gains may dissipate as children proceed upward through the grades. Ground may also be lost over the summer months. Continue and extend the *Literacy Links* program to ensure continued dialogue between home and school and that parents understand the importance of communicating with their children.

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BOOK LEVEL EQUIVALENCE CHART[†]

	Grade	S.A.S.I.[‡] Equivalents	PM Benchmark Kit Level	Fountas & Pinnell Letter Level	Reading Recovery (Clay)
Emergent	Kindergarten Grade 1	0.50	1	A	1
Early	Kindergarten Grade 1	0.75	2	B	2
	Kindergarten Grade 1	0.90	3,4	C	3,4
	Grade 1	1.10	5,6	D	5,6
	Grade 1	1.30	7,8	E	7,8
	Grade 1	1.50	9,10	F	9,10
	Grade 1	1.60	11,12,	G	11,12
Transitional	Grade 1	1.75	13,14	H	13,14
	Grade 1 Grade 2	1.90	15,16	I	15,16,17
	Grade 2	2.10	17,18	J	18,19,20
	Grade 2	2.50	19,20	K	
	Grade 2	2.90	21,22	L	
	Grade 2 Grade 3	3.10	23	M	
Self-Extending	Grade 3	3.50	24	N	
	Grade 3	3.90	25	O	
	Grade 3 Grade 4	4.10	26	P	
	Grade 4	4.50	27	Q	
	Grade 4	4.90	28	R	
Advanced	Grade 4	5.50	29	S	
	Grade 5	5.90	30	T	