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ABSTRACT

The school performance of pupils in grades K-2 of the French immersion program in operation at Allenby Public School in Toronto is evaluated in comparison with that of pupils in the regular English program. The results indicate that by the end of kindergarten pupils in both programs are equally ready for beginning school work in grade 1. By the end of grade 1 immersion program pupils taught reading in French are found to lag behind their peers in the regular program in English language skills involving English reading, but they show some ability to transfer reading skills from French to English. By the end of grade 2, following the introduction of English Language Arts into the curriculum during the second half of the year for 25 minutes a day, immersion pupils have caught up to their regular program peers in most English language skills considered, except for spelling. Throughout grades K-2 pupils in the immersion program perform equivalently to or better than regular program pupils in mathematical skills. They also reveal a considerably higher level of proficiency in French than pupils of corresponding or higher grade levels receiving daily instruction in French as a second language, and perform as well in French as immersion pupils in a more bilingual milieu. The type of program in which the pupils are enrolled does not appear to affect their level of cognitive development. (Author)

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**Bilingual Education Project: Evaluation of the 1973-74
French Immersion Program in Grades K-2
at Allenby Public School, Toronto ^{1,2}**

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This report is concerned with the Spring 1974 evaluation of the French immersion program at Allenby Public School in Toronto, undertaken by the Bilingual Education Project of the Ontario Institute for Studies in Education. It details the results obtained from a battery of tests administered during April, May and June 1974 to Kindergarten, Grade 1 and Grade 2 classes.

The evaluation continues the investigation of the two basic questions asked by the school and by the Board of Education authorities at the start of the program in 1971:

1) Does instruction of the prescribed curriculum through the medium of a second language (French) have any harmful effects on native language (English) skills, on achievement in such basic academic skills as reading and arithmetic, or on the pupil's IQ and general cognitive development?

2) How beneficial is the French immersion program with regard to proficiency in French when compared with the regular school program in which French is taught as a regular school subject and all other instruction is in English?

To consider these questions, comparisons are made between pupils in the immersion program and pupils enrolled in the regular English program at Allenby Public School. With respect to Question 2 relating to French proficiency, however, the comparison is made with pupils in another locality (Ottawa; see Barik & Swain, 1974a), since French is not taught as a subject to pupils in the regular English program at Allenby until Grade 2 (from January to the end of May, twice a week, for periods of 25 minutes). A comparison of Allenby's two groups of pupils on French scores is thus not appropriate.

¹ For footnotes, see p. 24.

Description of the Allenby Immersion Program through Grade 2

A detailed description of the immersion program at Allenby Public School is to be found in the Appendix (p. 22). Briefly, all instruction in Kindergarten and Grade 1 is in French (except for a weekly Physical Education period given in English in Grade 1). In Grade 2, formal instruction in English Language Arts is introduced as of February 1 only, for 25 minutes per day, and the rest of the curriculum continues to be taught in French (except for the weekly Physical Education period, and an occasional library period given in English instead of French).

Summary of Previous Findings.

The Allenby French immersion program was started at the Kindergarten level in September 1971. Pupils entering the program at that time are referred to as Cohort I. At the end of the school year (Spring 1972), it was found that the immersion pupils had a significantly higher IQ score than pupils in the regular English Kindergarten program. Immersion pupils also scored significantly higher than comparison pupils on two tests of school readiness and early school achievement (Metropolitan Readiness Tests and Stanford Early School Achievement Test discussed subsequently) on the basis of unadjusted scores; however, the differences disappeared when the effect of age and IQ on the scores was removed through analysis of covariance. In French proficiency, pupils in the Allenby immersion program scored slightly lower than pupils in a similar program in Ottawa (which provides a bilingual milieu, in contrast to Toronto), but they scored much higher than both Kindergarten and Grade 1 pupils in the regular English program in Ottawa who received instruction in French as a second language for varying amounts of time (typically 20-30 minutes per day) in Kindergarten and Grade 1.

In September 1972 Cohort I began Grade 1, and a new stream of students, Cohort II, entered the Kindergarten program. In order to determine whether the end-of-year IQ difference between the two Cohort I groups implied a beneficial effect of the immersion program over the Kindergarten year or was attributable instead to an initial difference in the two groups with respect to that variable, the Cohort II Kindergarten groups were administered a mental ability test both toward the start of the year and at the end of the year. No significant difference between the two

groups was found at either administration. Thus it was concluded that the immersion program was having neither a beneficial nor a detrimental effect on cognitive development, and the Cohort I IQ difference at the end of Kindergarten was interpreted as reflecting an initial difference in the two groups on that factor. At the end of the year the Cohort II Kindergarten immersion group again obtained a significantly higher total raw score than the regular program group on the school readiness test, but the difference disappeared when scores were adjusted for age and IQ. There was no difference between the two groups on the early school achievement test. In French proficiency, Cohort II Kindergarten immersion pupils again scored slightly lower than comparable pupils in Ottawa, but substantially higher than pupils from K-2 in the regular English program in Ottawa receiving daily periods of instruction in French as a second language since Kindergarten. Except for end-of-year IQ, the Cohort II Kindergarten results thus generally paralleled those of Cohort I.

The end-of-year Cohort I Grade 1 results failed to reproduce the significant IQ difference noted with the two groups the previous year, though the finding did come very close to statistical significance in relation to pupils tested on both occasions. In English language skills requiring the reading of words or sentences in English, pupils in the immersion program, having received no formal instruction in English Language Arts in Grade 1, scored significantly lower than pupils in the regular English program, though they still showed a substantial amount of transfer of reading skills from French to English. In arithmetic skills evaluated in English, no difference was noted between the two groups; thus immersion pupils taught mathematical concepts in French learned them as adequately as pupils taught in English and could transfer the concepts from one language context to the other. In French comprehension, Grade 1 immersion pupils in the Allenby program scored equivalently to their peers in the Ottawa immersion program and much higher than pupils in the regular Ottawa Grade 1 or Grade 2 program receiving daily periods of instruction in French as a second language since Kindergarten. The Allenby immersion group also

scored adequately relative to native French-speaking Grade 1 students on tests of achievement in French and mathematics given in French and developed specifically for native French speakers. Their level of performance was equivalent to that of students in the Ottawa immersion program.

A detailed discussion of the findings of the evaluations prior to Spring 1974 (Kindergarten and Grade 1 of Cohort I, Kindergarten of Cohort II) is presented in Barik and Swain, 1974b.

Present Evaluation (1973-74)

Subjects and Procedure. Contrary to last year when only samples of students in each class were tested in the Spring evaluation, this year all students in Grades K, 1 and 2 in both regular and immersion programs were tested, in accordance with the testing procedure in Ottawa. (All Allenby students had likewise been tested in the initial year - Cohort I Kindergarten).

The numbers of classes and of students involved are as follows:

<u>Kindergarten-</u>	Immersion program:	2 classes; total 44 pupils
	Regular program:	2 classes; total 42 pupils
<u>Grade 1:</u>	Immersion program:	1 class and Grade 1 section of a "split" class combining Grade 1 and Grade 2 pupils; total 36 pupils.
	Regular program:	2 classes; total 50 pupils
<u>Grade 2:</u>	Immersion program:	1 class and Grade 2 section of "split" Grade 1-2 class; total 39 pupils
	Regular program:	2 classes; total 51 pupils.

Each complete class or (grade) section was tested separately in full (rather than being split into smaller testing groups). This once again was in accordance with the testing procedure in Ottawa).³

Testing was carried out either in a separate room set up specifically for this purpose or in the children's regular classroom. Some tests were administered in several sittings as specified in the test manuals. The tests were administered by a team of two trained female testers, one of whom gave the test, while the other ensured that the children were at the right place in the test and did not copy one another's work. For the English tests, the testers were native, or native-like speakers of English, while for the French tests, the directions were given by a fluently bilingual native-like speaker of French.

Although all pupils were included in the testing program, a number were subsequently eliminated from the analysis on the basis of several criteria, namely:

a) pupils who teachers indicated had special problems (e.g., serious

hearing or vision difficulties, emotional problems);

b) pupils who teachers indicated had a very limited ability to understand and express themselves in English (e.g., very recent immigrants);

c) pupils who were repeating a grade or conversely those who had entered their grade level only in January or later of the current school year.⁴

As a consequence of these criteria, the number of pupils involved in the analysis is as follows:

Grade	Program	
	Immersion	Regular
Kindergarten	40	35
Grade 1	33	42
Grade 2	39	49

Along similar lines, in the case of performance in French for immersion pupils, all French scores of any pupils who came from a home background where both French and English were spoken as a regular means of communication (as indicated from a linguistic code assigned by the teacher) were eliminated if the pupils placed among the top third of the class on a specific French test. There were, however, only three immersion pupils from French-English home backgrounds, and only one of these scored in the top third of his class on the French criterion test.

No pupil at Allenby came from a linguistic background where only French, or French and a language other than English were spoken at home.

Kindergarten Tests and Results (Cohort III)

The battery of tests completed by the Kindergarten children consisted of the same four tests as given in 1972 and 1973, each of which is of a pictorial nature. The results are summarized in Tables 1 and 4 located at the back of the report.

1. Otis-Lennon Mental Ability Test (Primary I Level, Form J). This general intelligence test measures the pupil's facility in reasoning and in dealing abstractly with verbal, symbolic and figural materials covering a broad range of cognitive abilities. Taking age into consideration, the raw scores are converted to standardized Deviation IQ scores (DIQ) which provide an index of mental ability.

As seen in Table 1, the mean IQ score of the Kindergarten immersion group is higher than that of the comparison (regular program) group (117.6 vs. 112.1). One-way analysis of variance reveals that this difference is not statistically significant (it does however reach the $p=.10$ level). This finding parallels that of last year with Cohort II.

In comparison with American population norms, the immersion group's score of 117.6 falls at the 87th percentile and the regular group's score of 112.1 at the 77th percentile. These results are slightly higher for both groups than in the Spring 1973 evaluation when the immersion group mean fell at the 82nd percentile and the regular group mean at the 69th percentile.

In terms of age, which along with DIQ is used as a covariate in subsequent analyses, there is no difference between the two groups, as seen in Table 1.

2. Metropolitan Readiness Tests (Form A). The Metropolitan Readiness Tests battery (MRT) is designed to measure the child's readiness for school work in Grade 1. The test consists of six sections: word meaning, a picture vocabulary test; listening, a test of phrase and sentence comprehension; matching, a test of visual perception involving the recognition of similarities; alphabet, a test of ability to recognize lower-case letters of the alphabet; numbers, a test of number knowledge; and copying, a test of visual perception and motor control.

As seen in Table 1, the immersion group scores significantly higher ($p<.01$) than the comparison group on the total test (unadjusted means) and on four of the six subtests.⁵ When scores are adjusted for age and IQ,

the difference between the two groups on the total test as well as on two subtests (word meaning and numbers) remains statistically significant ($p < .01$). This is in contrast to past evaluations where the MRT total score difference between the two groups, though significant on the basis of unadjusted scores, disappeared when scores were adjusted for age and IQ. On the basis of the test, it would thus appear that this year's immersion group shows a greater degree of readiness for beginning Grade 1 work than does the regular program group.

In terms of American norms, the present immersion group scores at the 77th percentile (on the basis of unadjusted scores) and the comparison group at the 59th percentile. Last year the two Cohort II groups scored at the 69th and 46th percentile, respectively. Thus this year's groups perform somewhat better than last year's.

The 1974 MRT results confirm previous findings that children who have spent a year in a French immersion Kindergarten are as ready to enter an English Grade 1 as are those children who have attended a regular English Kindergarten class.

3. Stanford Early School Achievement Test (Level I). The Stanford Early School Achievement Test (SESAT) is designed to provide a measure of the child's cognitive abilities, and consists of four parts. The first section, the environment, measures the degree of information the child has about his natural and social environments. The second section, mathematics, aims at measuring the development of numerical concepts learned from general experience rather than from direct intervention through teaching. The third section, letters and sounds, measures both the ability to recognize upper- and lower-case letters and the auditory perception of beginning sounds in English. The fourth section, aural comprehension, measures the child's ability to pay attention to, interpret, infer and retain what has been heard.

As seen in Table 1, there is no reliable difference between the two groups on the total SESAT test on the basis of either unadjusted or adjusted scores. The only significant difference noted is in relation to the aural comprehension section on which the immersion group scores significantly higher than the comparison group ($p < .05$) when raw scores are considered, but the difference disappears when scores are adjusted for age and IQ. The findings on this test thus generally parallel

last year's, in which no reliable difference was observed in relation to the test as a whole or any section, on the basis of either unadjusted or adjusted scores.

In terms of American norms, the immersion group's mean score of 103.7 falls at the 74th percentile and the comparison group's score of 99.6 at the 65th. In 1973 both groups scored lower, the immersion group of Cohort II scoring at the 60th percentile and the comparison group at the 56th percentile.

Thus it can be concluded as in previous years that the pupils in the French immersion Kindergarten are doing as well as the pupils in the regular English program in all areas of early school achievement tested in English, even though English is not their language of instruction.

4. French Comprehension Test - Kindergarten Level (1974 edition). The French Comprehension Test (FCT) is a test developed by the Bilingual Education Project to measure the child's comprehension of French since no other published tests of French as a second language has been found to be suitable for use in the early immersion classes. The 1974 editions of the FCT (both Kindergarten and Grade 1 Levels) were revised from the 1973 versions of the test through the elimination or revision of inadequate items (low discrimination index) revealed in the item analysis, and the addition of some new items. An attempt was made to increase the difficulty of the test relative to last year's version.

The FCT continues to have the same format as the 1973 version and consists of four parts. The first part, words, requires the child to identify the picture referred to by a spoken French noun. The second, phrases, requires the child to choose the picture which illustrates a spoken French phrase or sentence. The third, questions, measures the child's ability to select the correct pictorial answer to a question in French. The fourth, stories, requires the child to choose the correct pictures in answer to questions concerning short stories which have been read aloud in French. There are 62 items altogether, administered in two sittings.

Table 4 presents the results of the Allenby Kindergarten immersion pupils on the FCT along with the scores of pupils in Grades 1-3 in the regular English program in Ottawa who have received daily periods of instruction in French as a second language since Kindergarten, and who took the same version of the test in the context of the evaluation of

the Ottawa immersion program (Barik & Swain, 1974a).⁶ There is no comparable Ottawa Kindergarten data, since that grade level was not tested.

The Allenby immersion total mean score of 36.5 compares favourably with the mean of 29.4 of the regular Grade 1 classes administered the test who have had 20-40 minutes⁷ of French a day for two years. The Allenby mean is slightly lower than the regular Grade 2 mean of 38.6 (after 20-40 minutes of French a day for three years), but higher than the regular Grade 3 mean of 31.1 (after 20 minutes of French a day for four years).⁸

No comparison with last year's data can be made, since the test used is not the same as in 1973. Although it had been intended to make the test somewhat more difficult than last year's, the level of performance of immersion pupils on the 1974 Kindergarten version - 36.5 out of 62 or 59% - is comparable to that of last year's immersion group on the 1973 version, who obtained a score of 61%. Last year, in contrast with the present results, Allenby immersion pupils scored higher than Ottawa Grade 2 regular program pupils; however, last year's Ottawa Grade 2 pupils who are the Grade 3 classes in this year's comparison would have had less French (a cumulative amount equivalent to 55-60 minutes a day for one school year) than this year's Grade 2 classes (60-110 minutes).

As in past years, children in the Allenby French immersion Kindergarten program are thus seen to be performing quite adequately in French comprehension in comparison with pupils of higher grade levels in a regular English program who have been receiving daily periods of instruction in French as a second language since Kindergarten and for up to four years. Their level of performance also seems comparable to that of previous cohorts.

Grade 1 Tests and Results (Cohort II)

The five tests administered at the Grade 1 level were the same as those given in 1973. The 1974 results are presented in Tables 2 and 4.

1. Otis-Lennon Mental Ability Test (Elementary I Level, Form J). This is the appropriate level for Grade 1 of the mental ability test given in Kindergarten. Test items of a pictorial nature are concerned with the mental processes of classification, following of directions, quantitative reasoning, comprehension of verbal concepts, and reasoning analogy. As with the Kindergarten level test, the raw scores are converted to standardized Deviation IQ scores on the basis of the child's age.

As shown in Table 2, the mean score of the Grade 1 immersion group is significantly higher than that of the Grade 1 regular group ($p < .01$). In 1973, however, when that same cohort was in Kindergarten, there was no significant difference between the two groups on IQ score. The change in the trend of the results may be attributable to the difference in the composition of the groups tested. In 1973, only samples of pupils from each Kindergarten class were tested, whereas this year the classes were tested in full. Moreover, there has been some change in the composition of the total cohort itself, since some pupils transferred from Allenby Public School after Kindergarten and others entered it in Grade 1. These various changes may account for the IQ difference in Grade 1 this year relative to Kindergarten last year. If in fact only pupils in last year's Kindergarten sample who have both (end of) Kindergarten and Grade 1 IQ scores are considered, no reliable difference is found in relation to either set of scores (i.e., Kindergarten or Grade 1 score), nor on the Grade 1 score when the Kindergarten score is employed as a covariate. It is therefore not warranted to interpret the significant IQ difference in favour of the immersion group at the end of Grade 1, when contrasted with the absence of such a trend in Kindergarten the previous year, as indicative of a beneficial effect of the immersion program on cognitive development in the course of Grade 1.

In terms of American population norms, the mean IQ score of the 1974 immersion Grade 1 falls at the 89th percentile and that of the regular program Grade 1 at the 74th percentile. These figures are relatively the same as those for last year's Grade 1's (84th and 72nd percentile, respectively).

It may be noted from Table 2 that there is no reliable difference between the two Grade 1 groups in chronological age.

2. Metropolitan Achievement Tests (Primary I Battery, Form B). This test (MAT) is concerned with reading and arithmetic skills taught in Grade 1, and consists of four sections. The first section, word knowledge, measures the child's sight vocabulary or word recognition ability in English. The child must select from four alternatives the proper word which refers to a given picture. The second section, word discrimination, measures the child's ability to select an orally presented English word from four alternative printed words bearing certain sound similarities, thus requiring both auditory and visual discrimination. The third section, reading, measures the child's reading comprehension of sentences and paragraphs in English. The fourth section, arithmetic concepts and skills, provides a comprehensive measure of the child's mastery of basic numerical and quantitative concepts, his ability to solve verbal problems, and to perform addition and subtraction exercises. No reading is involved in this section.

The form of the Test employed in 1974 (Form B) was different from the one used in 1973 (Form A), but the format is the same. Raw scores from each subtest are converted to standard scores in the analysis.

Since the first three sections of the test involve reading in English, it is not surprising that the French immersion pupils, who have had no formal training in English, do not do as well as the regular program pupils (see Table 2). On the basis of unadjusted scores, the difference is statistically significant ($p < .05$) with respect to reading, and a similar trend is observed on word knowledge and word discrimination ($p < .10$). When scores are adjusted for age and IQ, the differences on all three sections become significant at $p < .01$. These results parallel those of last year relative to adjusted scores. Similar findings have been obtained in the Ottawa evaluation with three successive cohorts.

Based on American norms, the mean scores of the Allenby immersion group on the three subtests fall at the 60th (word knowledge), 63rd (word discrimination) and 46th (reading) percentile (compared with the 58th, 50th and 40th percentile, respectively, in 1973), and those of the comparison group at the 74th, 76th and 69th percentile, respectively (compared with the 75th, 78th and 60th percentile in 1973). Thus even though the French immersion children have not yet learned to read in English at school, they still do better on these sections of the test than from about 45 to 65 percent of the Grade 1 school population for whom the test was

developed and who were taught to read in English. In terms of (American) grade equivalents, the mean of the immersion children is equal to the average score of pupils in the ninth month of Grade 1 (i.e., May, the time at which the test was in fact given) in word knowledge and reading and to the average score of pupils in the third month of Grade 2 in word discrimination. The immersion children, therefore, appear to be making an impressive transfer of reading skills from French to English without formal instruction.⁹ Their lag in English language skills relative to the regular program group (whose grade equivalents are in the Grade 2+ range) may thus be expected to be substantially reduced or disappear once formal instruction in English Language Arts is introduced, as the Grade 2 results discussed subsequently indicate.

On the arithmetic section of the MAT, the immersion group scores significantly higher ($p < .01$) than the comparison group on the basis of unadjusted scores. However, when scores are adjusted for age and IQ the difference disappears. This last finding parallels last year's and those obtained with three successive cohorts in Ottawa, which have failed to reveal any significant difference between immersion and regular program students on the arithmetic section of the test (on the basis of either unadjusted or adjusted scores).

The arithmetic section can be subdivided into two parts, one composed of items presented verbally and involving problem solving and the following of directions (33 items), and the other of items involving computation which do not require verbal presentation (30 items). The results for each part parallel those for the total section: the immersion group scores significantly higher ($p < .05$) than the comparison group on both verbal items and computation items when unadjusted scores are considered, but there is no reliable difference between the two groups on either part when scores are adjusted for age and IQ. It is to be noted that both groups score very high on the computation items, immersion pupils in fact obtaining a near-perfect score of 29.0 out of 30.

The results on the arithmetic section confirm the conclusion from the previous years that the Grade 1 French immersion children have mastered as much mathematical knowledge through French as the children in the English Grade 1 did through English, and that they can transfer this knowledge from one language context to the other. This, as seen, applies equally to the comprehension of verbal mathematical problems and to computation skills.

When compared with American norms, the mean of the immersion group on the arithmetic subtest falls at the 76th percentile and that of the regular group at the 64th percentile. (The Grade 1 groups in 1973 obtained scores in the 65-70th percentile range.)

3. French Comprehension Test - Grade 1 Level. Like the Kindergarten Level, the French Comprehension Test - Grade 1 Level has been revised from the 1973 version on the basis of the item analysis for the latter. The Grade 1 Level has the same format as the Kindergarten Level, consisting of four parts on words, phrases, questions and stories.

Table 4 shows the scores of the Allenby Grade 1 immersion pupils (as well as of the Grade 2 pupils to be discussed subsequently) in relation to those of Grade 1 (and Grade 2) immersion pupils in Ottawa, and of Grade 1, 2, and 3 pupils enrolled in the regular program in Ottawa, who have received daily instruction in French as a second language since Kindergarten, and who were administered the same test.

Considering only the Grade 1 immersion data, it is seen that the Allenby group scores the same as the Ottawa group (46.1 in both instances). There is likewise little difference between the two groups on any of the four sections of the tests, the groups scoring within 1-2 points of each other. These findings parallel last year's results, where little or no difference was noted between the Toronto and Ottawa scores. In relation to pupils in the regular program, the Allenby Grade 1 immersion group scores substantially higher than either Grade 1 (18.7), Grade 2 (22.2) or Grade 3 (24.8) pupils.¹⁰

Thus, as in previous years, children in the Allenby Grade 1 French immersion classes are maintaining a satisfactory level of performance in French comprehension when compared with children in Ottawa.

Comparisons between this year's immersion group's results on the French Comprehension Test with last year's again cannot be made since the test was not the same. The 1974 version of the Grade 1 Level test did prove to be a bit more difficult than the 1973 version, the Allenby immersion group scoring 71% on this year's test as opposed to 78% obtained on the 1973 version.

4. Test de Rendement en Français, Grade 1 (1971). This test has been developed by the Commission des Ecoles Catholiques de Montréal¹¹ and standardized on a population of Grade 1 children in Montreal whose native language is French. It consists of 30 items involving the identification of sounds, word definition, vocabulary, spelling and sentence comprehension in French. The Test de Rendement en Français (TRF) was administered completely in French to the immersion classes only.

The score of 13.97 shown in Table 4 for the Allenby Grade 1 group is comparable to that of 13.61 for Grade 1 immersion classes in Ottawa. Both scores however are lower than in 1973 when the Allenby immersion Grade 1 group had a mean of 15.9 and the Ottawa group one of 14.5. This may be attributed to the fact that the test was administered more than two months earlier in 1974 (start of April, vs. first half of June in 1973), to make the comparison with native French speakers (administered the test in late March) more valid.

In comparison with the norms established for French-speaking pupils in Montreal, Allenby's total mean score corresponds to a stanine of 3 which indicates that the French immersion children do as well as from 11 to 22 percent of the French-speaking children. The score for the Ottawa pupils falls in the same range. In comparison, last year's Allenby Grade 1 group obtained a stanine score of 4 (23-39%), but they benefitted from the more than two-month delay in administration (mentioned in preceding paragraph), relative to French students in Montreal and to this year's immersion group.¹²

Grade 2 Tests and Results (Cohort I)

The five tests administered at the Grade 2 level represent, for the most part, higher levels of the tests given in Grade 1. The results are presented in Tables 3-4.

1. Otis-Lennon Mental Ability Test (Elementary I Level, Form J). This is the same test as was administered to Grade 1 classes, but a higher raw score is necessary for an equivalent DIQ score since the DIQ scores are calculated according to age.

Although the mean DIQ score of the Grade 2 immersion group is slightly higher than that of the Grade 2 regular group (120.7 compared with 116.7), the difference between the two groups is not significant (Table 3). Similarly, in 1973, when this cohort of children was in Grade 1, there was no significant difference between the immersion and regular program groups, as tested on the basis of samples only.¹³

Compared with American population norms for the test, the mean of the Grade 2 immersion group falls at the 90th percentile while that of the comparison group falls at the 85th percentile.¹⁴

As Table 3 indicates, there is again no reliable difference between the two Grade 2 groups with respect to age.

2. Metropolitan Achievement Tests (Primary II Battery, Form F). This is the level of the MAT series designed for testing children at the end of Grade 2. The test consists of three sections measuring English language and reading skills, one measuring spelling ability, and three measuring fundamental arithmetic concepts and skills. The first subtest, word knowledge, measures the extent of the pupil's English reading vocabulary. Some items require the pupils to select from four word choices the one which identifies a given picture, while others require the pupils to identify a synonym, antonym, or classification for a given word. The second subtest, word analysis, measures the child's knowledge of sound-letter relationships or skill in decoding in English. A dictated word must be selected from four printed words which have similar configuration or sound patterns. The third subtest, reading, measures the child's comprehension of sentences and paragraphs in English. The fourth subtest, spelling, is a dictation-type measure of English spelling ability with each word being presented orally in a brief contextual sentence. The fifth subtest, mathematics: computation, measures the child's ability to

add, subtract and multiply. The sixth subtest, mathematics: concepts, measures the pupil's understanding of basic mathematical principles such as place value, measurement, laws and properties of number systems, arrays, sets and inequalities. The seventh subtest, mathematics: problem solving, measures the child's ability to apply knowledge in solving numerical problems. Approximately half the problem solving subtest consists of dictated items and half of problems which pupils read to themselves.¹⁵ The problems cover addition, subtraction, multiplication and division processes, rate, multiple-step problems and use of number sentences.

In the scoring, the three mathematics subtests are combined to yield a total mathematics score. Likewise the word knowledge and reading subtests (only) are combined to yield a total reading score. The raw scores for each section are converted to standard scores for analysis.

As Table 3 shows, on the English language skills sections of the test, immersion pupils score significantly lower than regular program pupils only in spelling ($p < .001$) on the basis of unadjusted scores, with word analysis added ($p < .05$) when scores are adjusted for age and IQ. There is no difference in the scores of the two groups on word knowledge and reading (as well as total reading score). These results are particularly encouraging when it is recalled that formal instruction in English Language Arts was begun in the immersion program only in February of the Grade 2 year, and for periods of only 25 minutes per day.¹⁶

Normwise, both immersion and comparison groups score in the vicinity of the 75-85th percentile range on word knowledge and reading, with the total reading score falling at approximately the 80th percentile. On word analysis the range is in the vicinity of the 65-70th percentile. The main difference occurs in spelling, the regular program group scoring at the 70th percentile and the immersion group at the 38th percentile. In terms of grade equivalents (G.E.), both groups show a level of performance beyond their grade level, their scores falling in the 3.1-3.6 G.E. range except for the immersion group on spelling, whose score corresponds to a level of performance for pupils in the sixth month of Grade 2.

In mathematics, as seen in Table 3, there is no reliable difference between the two groups on any of the three subtests or on the total mathematics score, whether or not scores are adjusted for age and IQ.

(The difference on the total mathematics score, favouring the immersion group, is significant at $p < .10$ with unadjusted scores but not with adjusted scores.) The findings thus show that immersion pupils continue through Grade 2 to acquire mathematical concepts via French as well as their counterparts in the regular program do via English, and can transfer these concepts from one language context to the other.

When the problem solving subtest is divided into two sections, one consisting of those items presented orally which do not require any reading (17 items) and the other of written problems (18 items), results (on the basis of raw scores) show the immersion group scoring significantly higher ($p < .05$) than the comparison group on the former on the basis of unadjusted scores but not when scores are adjusted for age and IQ. There is no reliable difference between the two groups on the written problems component of the subtest, on the basis of either unadjusted or adjusted scores (see Table 3). The latter results thus indicate that immersion pupils are able to read, comprehend and solve mathematical problems in English as adequately as pupils in the regular program.

In terms of American norms, the total mathematics score of the immersion group falls at the 80th percentile and that of the comparison group at the 71st percentile. Scores on the three subtests fall approximately between the 70th and 85th percentile for the immersion group, and between the 60th and 80th percentile for the comparison group, as shown in Table 3. Grade equivalent-wise, the performance of the two groups in mathematics is similar to that noted for the English skills sections, their scores falling in the Grade 3.1-3.6 range.

The overall results of the Metropolitan Achievement Tests indicate that by the end of Grade 2 pupils in the Allenby immersion program are performing similarly to their peers in the regular program in most areas of the English language skills investigated, and are at a par with them in mathematics. These findings suggest that if the need arose, a child completing Grade 2 of the French immersion program should have no difficulty transferring into a regular English program in Grade 3.

3. French Comprehension Test - Grade 1 Level. Because of the lack of a suitable test for measuring oral French comprehension in the early grade levels, the Grade 1 Level of the French Comprehension Test was administered to the Grade 2 immersion classes.

The scores are presented in Table 4 along with those of pupils in the Ottawa evaluation. As with the Grade 1 data, the score of the Allenby Grade 2 immersion group is almost identical to that of Ottawa

Grade 2 immersion classes: 53.4 to 53.1. This level of consistency is also found in relation to each section of the test, the scores of the two groups being within 1-2 points of each other. The scores of the Grade 2 immersion groups in both localities are higher than those of the Grade 1 immersion groups (82% vs. 71% on the test) and obviously considerably higher than those of pupils in the regular Grade 1-3 program in Ottawa.

The children in the Allenby Grade 2 French immersion classes thus continue to achieve as high a level of performance in French comprehension as their peers in the federal capital area where there is perhaps more opportunity for contact with the French language and culture than in Toronto. In comparisons on French performance, however, the Allenby Grade 2 group may be at a slight advantage over the Ottawa group since less of their class time in Grade 2 is devoted to English Language Arts than is the case in Ottawa, and they thus benefit from more exposure to French.

4. Test de Rendement en Français, Grade 2 (1972). This is the test of achievement in French developed for French-speaking Grade 2 pupils by the Commission des Ecoles Catholiques de Montréal. The test consists of 30 items involving vocabulary, spelling, the identification of sounds, synonyms and antonyms, and sentence comprehension in French.

This test was administered completely in French to the immersion classes. Interestingly, as shown in Table 4, the Allenby total mean score of 17.1 is somewhat higher than the score of 14.9 obtained with Grade 2 immersion classes in Ottawa (but note comment above concerning more exposure to French by Allenby pupils).

A direct comparison with norms for the test cannot be made since the Grade 2 test is in fact administered to French-speaking pupils in the first half of the year, in late November, whereas the immersion pupils were administered the test in early April. Bearing in mind this 4-4 1/2 month lag in their favour in the administration of the test, the Allenby Grade 2 pupils score in the stanine 4 range on the test, which means that they are doing as well on it as from 23 to 39% of French-speaking Grade 2 pupils (who took the test in November). A similar performance level is recorded for the Ottawa pupils (though their score just "makes it" when it is rounded off, the stanine 4 range being 15-18).

5. Test de Lecture (2e année). This is an experimental reading test developed by the Bilingual Education Project to evaluate the reading skills of French immersion pupils at the Grade 2 level. The test consists of a number of short passages (9), each of which is followed by a series of questions on the content of that passage. (There are 19 questions altogether). The test was based on the recommendations of consultants to the French immersion program concerning the reading objectives of the program.

The results presented in Table 4 show that the Allenby group obtains a score of approximately 15.0 on the test. Grade 2 immersion pupils in Ottawa, in comparison, score lower at 11.6. Comparable data from native French-speaking pupils being educated in French would provide a useful yardstick against which to evaluate these levels of performance. Such data may be collected in the future. At present, the only statement that can be made is that on the basis of consultants' opinions, the level of reading ability demonstrated by immersion pupils on the test is satisfactory.

Summary

The results of the testing program carried out in Spring 1974 at the Kindergarten and Grade 1 levels at Allenby Public School correspond closely to those of previous years. The findings at each grade level may be summarized as follows:

1. At the end of the Kindergarten year, pupils in the French immersion program:
 - a) are as ready to enter an English Grade 1 as are pupils who have attended an English Kindergarten with respect to English pre-reading skills, numerical skills, visual perception and motor control, and other factors measured;
 - b) have not suffered any setback in general mental and cognitive development relative to their peers in the regular English program;
 - c) demonstrate a greater comprehension of spoken French than pupils of higher grade levels (Grades 1 and 3) enrolled in a regular English program who have been receiving instruction in French as a second language for amounts from 20-40 minutes per day for up to four years.
2. At the end of Grade 1, pupils in the French immersion program:
 - a) are behind their English-speaking peers attending the regular English program in English language skills which involve reading (word knowledge, word discrimination and sentence or paragraph reading). However, their level of achievement in such tasks indicates a substantial amount of transfer of reading skills from French to English, even without formal instruction in English;
 - b) have mastered as much mathematical knowledge via French as the pupils attending the regular English program have via English, and can transfer this knowledge from French to English;
 - c) show no evidence of a decrease in general mental ability and cognitive development relative to their peers in the regular English program;
 - d) although not at a par with their native French-speaking peers in terms of French achievement, demonstrate a level of proficiency in French comprehension far superior to that of pupils in Grades 1-3 of a regular English program who have been receiving 20-40 minutes a day of instruction in French as a second language since Kindergarten.

3. At the end of Grade 2, pupils in the French immersion program:

- a) after the introduction of formal instruction in English Language Arts during the last 5 months of the year for periods of only 25 minutes per day, perform as well as Grade 2 children attending the regular English program on most aspects of the English language skills tested, including reading. The only substantial lag noted is with respect to English spelling, and to a lesser extent word analysis (decoding of sound-letter relationships);
- b) continue to show that they are learning as much mathematics via French as their peers instructed in English, and that they can transfer this knowledge from French to English. Furthermore, they comprehend written mathematical problems in English to the same extent as their English-instructed peers;
- c) show the same level of cognitive development as pupils in the regular English program;
- d) although still not at par with their native French-speaking peers in French achievement, exhibit a level of proficiency in French comprehension superior to that of pupils in Grades 1-3 of a regular English program involving daily periods of instruction in French as a second language from Kindergarten on. They also show a satisfactory level of performance in French reading.
- e) With respect to both Grade 1 and Grade 2, pupils in the Allenby immersion program perform in a manner very comparable to that of pupils in a similar program in the bilingual milieu of Ottawa. The main difference in the two programs occurs at the Grade 2 level, pupils in the Ottawa program begin formal instruction in English language Arts at the beginning of the year, for 60 minutes per day. Yet the Allenby Grade 2 pupils who start English instruction in February only, and for shorter periods, perform similarly to the Ottawa group in English language skills (and equally or better than them in French language skills), indicating that the time of introduction of formal instruction in English into the immersion program is flexible.

The overall impression which emerges from the findings of the Spring 1974 evaluation of the French immersion program at Allenby Public School is one of optimism concerning its viability and the attainment of the objectives for which it was designed.

APPENDIX

Description of the French Immersion Program
at Allenby Public School

(Prepared by G. Lake)

During the 1973-74 school year the French immersion program at Allenby Public School was offered at the Kindergarten, Grade 1 and Grade 2 levels. The program is a total French immersion program basically following the St. Lambert model (Lambert & Tucker, 1972) with the exception that the study of English Language Arts is introduced in the latter half, as opposed to the beginning, of Grade 2.

The P₁J₁ Curriculum Guidelines (1971) of the Ontario Department of Education providing guidelines for use by the Ontario Elementary School teachers for curriculum taught in the elementary grades of Ontario schools are followed in the immersion classes. Thus the aims and objectives of the curriculum and the general philosophy of education pursued in both the regular English classes and the immersion classes are the same.

The text materials used in the immersion classes are in French. These materials are, for the most part, materials which have been prepared for native speakers of French. In addition, supplementary materials are used which have been developed specifically for use in the immersion program. These materials have been prepared by the class teachers, by consultants and by the Bilingual Education Project staff at the Ontario Institute for Studies in Education.

The teachers in all of the immersion classes at Allenby Public School are native speakers of French who also speak English.

Kindergarten

The Kindergarten children attend the program for one half day each school day, so that the same teacher has one group in the morning and a second group in the afternoon. From the first day of school, the teacher addresses the children exclusively in French; during the year the children respond in English or French. Throughout the year a natural development of the use of French by the child is fostered; the children are not forced to speak French at any time.

Grade 1

With the exception of one 50-minute period per week of swimming which is given by an English-speaking Physical Education teacher, French is the language of instruction for all subjects, including one 25-minute library period which is given by one of the French immersion teachers.

During Grade 1 the use of French is encouraged in class. By November of this year (1973-74), the Grade 1 children were sufficiently comfortable with the French language that the use of French in class was made compulsory, except for such situations as when a child wished to ask for a specific word in French corresponding to a particular word in English. During the Grade 1 year the children are taught to read and write in French. The "Méthode Dynamique" program (Centre de Pédagogie Dynamique, Auteuil, P.Q.) is followed for French Language Arts.

Grade 2

During Grade 2, French continues to be the language of instruction for all subjects except for one weekly period of swimming (50 min.) given by an English-speaking Physical Education teacher and one weekly period of library (25 min.) which is usually given in French by one of the French immersion teachers, but sometimes in English by the librarian. Also, formal instruction in English Language Arts is introduced in Grade 2. As of February 1, the Grade 2 children receive formal instruction in English Language Arts for 25 minutes per day. In the English Language Arts classes the "Language Experience Approach" is followed. This method of teaching Language Arts is based on the child's concrete experiences. For example, after a field trip the child tells a story, followed by the writing and reading of this story. The English Language Arts classes were given by a Grade 4 English classroom teacher on the school staff, who exchanged classes with the French immersion teacher for the English periods.

Footnotes

¹ Thanks are expressed to the Principal and teachers of Allenby Public School for their cooperation in this study, to Edna Nwanunobi for her assistance in the analysis of the data, and to Grace Lake, who prepared the Appendix and acted as liaison with the school.

² The research reported in this paper was funded in part by a Grant-in-Aid of Educational Research from the Ministry of Education for the Province of Ontario.

³ Of the split Grade 1-2 immersion class, however, both sections were tested together for the Otis-Lennon Mental Ability Test and the French Comprehension Test (Grade 1 Level), since the same test applied to both.

⁴ The evaluation is directed at pupils who are progressing at a "normal" pace in the curriculum, hence the exclusion of these children from the overall evaluation.

Another criterion was specified for excluding data from the analysis, but did not apply to any of the Allenby cases, namely, pupils who had switched from one program to the other (immersion or regular) as of a specified date, depending upon the grade level.

⁵ The mean scores reported in Table 1 and subsequent tables are based on the scores of all the pupils who took a particular test or subtest. Due to occasional absenteeism in relation to sections of a test given in more than one sitting, the composition of the groups is not constant across subtests, accounting for the difference between tabulated total score and sum of subtest scores (MRT and SESAT in Table 1, FCT in Table 4).

⁶ The number of classes involved in the Ottawa evaluation makes it possible to employ the class rather than the individual as the unit of analysis. The scores for the Ottawa groups in Table 4 thus refer to averages of class means. The exception is in relation to the Grade 3 regular program samples administered the French Comprehension Test (Kindergarten and Grade 1 Levels). Since only 2 and 3 classes were administered the two forms, respectively, the averages have been based on individual scores rather than class averages.

There is in fact little difference between Ottawa scores obtained using the class or the individual as the unit of analysis.

⁷ The Ottawa evaluation involves two school boards. Each prescribes a different amount of French instruction in Grades K-2 of the regular curriculum, as indicated by the set of figures for each grade level. The majority of classes tested receive the greater amount of instruction.

⁸ The higher score of the regular Grade 2 group relative to the Grade 3 group may be attributable to the different amounts of French instruction associated with the two grade levels. The majority of Grade 2 classes - 5 out of 7 - have received 30/40/40 minutes of French per day in Grades K/1/2 respectively, for a cumulative amount equivalent to 110 minutes of French per day for one year. (The other two classes had a cumulative amount of 60 minutes following a 20 minute program throughout Grades K-2.) For the Grade 3 pupils, the corresponding amount was 75-80 minutes (15-20/20/20/20 minutes in Grades K through 3). On the average, the Grade 2 classes have thus had more French, given in longer periods, than the Grade 3 classes.

⁹ The possibility must be recognized that some informal instruction in English reading occurs at home in the case of some pupils enrolled in the immersion program.

¹⁰ In contrast to the results on the Kindergarten Level test, it may be noted that on the Grade 1 Level test the Ottawa regular program Grade 3 pupils score slightly higher than the regular program Grade 2 group. Since in the present case also, Grade 3 pupils have had less French on the average than Grade 2 pupils, this finding somewhat weakens the explanation proposed in footnote 8 to account for the Kindergarten Level results relative to these two groups.

¹¹ The Tests de Rendement of the C.E.C.M. have become the property of the Ministère de l'Education of the Province of Quebec, which now administers them. Thanks are expressed to both organizations, and notably to M. Guy Huot of the C.E.C.M. and M. Nérée Bujold of the Ministère de l'Education, for their cooperation and for permission to use the tests in the evaluation.

¹² In 1973, a French test of achievement in mathematics, the Test de Rendement en Mathématiques, was also administered. The test was dropped from the battery in 1974, since achievement in mathematics is measured through the Metropolitan Achievement Tests.

¹³ As stated previously (p. 2), however, a significant difference in IQ was observed between the two groups when tested two years earlier in Kindergarten. The changes over the years can be attributed to alterations in the composition of the cohort due to the transfer of pupils to and from the school, and variations in the samples tested. If only pupils in this year's Grade 2 population who were also in the Kindergarten testing program two years earlier and for whom an IQ score was recorded at the time are considered no reliable difference between immersion and regular program pupils is found with respect to either their Kindergarten or Grade 2 score on the test.

¹⁴ Even though the composition of the samples is not constant over testing periods, it is worth noting that the average IQ of both groups shows a general increase over the years, as follows:

	Immersion Group	Comparison Group
Cohort I Kindergarten (1971-72)	110.7	102.8
Grade 1 (1972-73)	116.3	109.5
Grade 2 (1973-74)	120.7	116.6

This pattern may be attributable in part to increased familiarity with the types of items encountered in the tests. The test form given in Grade 2 is the same as was given in Grade 1.

A similar pattern is emerging with Cohort II. In Kindergarten (1972-73) the immersion and comparison groups obtained IQ scores of 114.5 and 107.8, respectively. In Grade 1 these had increased to 120.1 and 110.8.

¹⁵ Reading of verbal or verbal-numerical answer choices is also required with some items in the mathematics concepts subtest.

¹⁶ It is worth pointing out that the Allenby immersion results are in fact more positive than those obtained in Ottawa (Barik & Swain, 1974a), where pupils begin formal instruction in English Language Arts at the

start of Grade 2 for periods of 60 minutes per day. The Ottawa results show a significant difference in favour of the pupils in the regular program only in relation to spelling when unadjusted scores are considered; however, when scores are adjusted for age and IQ, significant differences in favour of the regular program group also arise with respect to word knowledge and reading (as well as total reading score). This is not to suggest that the Allenby formula is superior to the one followed in Ottawa. The data do indicate however that the introduction of English Language Arts into the immersion curriculum can be delayed until the second half of Grade 2 (or even Grade 3 as is done in the Ottawa Roman Catholic Separate School Board program, Edwards & Casserly, 1973) without any apparent harmful effects on English language skills development.

References

- Barik, H.C., & Swain, M. **Bilingual Education Project: Evaluation of the 1973-74 French Immersion Program in Grades 1-3 in the Federal Capital's Public Schools.** Toronto: Ontario Institute for Studies in Education, 1974 (mimeo) (a).
- Barik, H.C., & Swain, M. **Early Grade French Immersion Classes in a Unilingual English Canadian Setting.** Toronto: Ontario Institute for Studies in Education, 1974 (mimeo) (b).
- Edwards, H.P., & Casserly, M.C. **Evaluation of Second Language Programs in the English Schools: Annual Report 1972-73.** Ottawa: The Roman Catholic Separate School Board, 1973 (mimeo).
- Lambert, W.E. & Tucker, G.R. **Bilingual Education of Children.** Rowley, Mass.: Newbury House Publishers, 1972.
- Ontario Ministry of Education. **Curriculum Guidelines, Primary and Junior Divisions.** Toronto: Ontario Ministry of Education, 1971.

TABLE 1
Unadjusted and Adjusted Means, Kindergarten (Allenby 1973-74)

	Immersion Group	Unadjusted Means Comparison Group	F ratio	df ^a	Immersion Group	Adjusted Means Comparison Group	F ratio	df ^a	Percentile Rank (Unadj. X) Immersion Group	Percentile Rank (Unadj. X) Comp. Group
Age (mos., May '74)	70.50	69.83	0.70	1/73					87	77
Oris-Lennon DIQ (end yr.)	117.61	112.06	2.72	1/69						
Metro. Reading Tot. ^b (n=102)	67.86	58.81	7.91 ^{***}	1/64	66.98	60.96	9.96 ^{***}	1/58	77	59
Word meaning (n=16)	11.21	9.59	9.77 ^{***}	1/70	11.08	9.82	7.90 ^{***}	1/64		
Listening (n=16)	10.92	9.56	5.05 [*]	1/70	10.83	9.97	2.95	1/64		
Matching (n=14)	9.39	7.66	3.05	1/68	9.08	8.14	1.04	1/62		
Alphabet (n=16)	14.74	13.42	6.08 [*]	1/69	14.64	13.92	2.59	1/60		
Numbers (n=26)	16.11	13.24	8.60 ^{***}	1/69	15.97	13.74	8.73 ^{***}	1/63		
Copying (n=14)	5.55	4.95	0.96	1/69	5.44	5.17	0.22	1/63		
SESAT Total ^b (n=126)	103.71	99.60	1.26	1/63	102.04	102.06	0.00	1/57	76	65
Environment (n=42)	34.97	34.35	0.16	1/71	34.45	34.61	0.01	1/65	56	52
Mathematics (n=28)	22.66	20.84	3.29	1/68	22.22	21.60	0.92	1/62	69	56
Letters/Sounds (n=28)	23.05	22.50	0.24	1/70	22.78	23.32	0.39	1/64	72	70
Aural Comprehension (n=28)	22.63	20.60	5.15 [*]	1/66	22.20	21.17	2.41	1/60	73	55

*** p < .001 ** p < .01 * p < .05

^a Unadjusted means based on all cases for whom relevant scores available, including cases missing covariate data; hence differences (in excess of 2 df's) in within-groups number of df's between unadjusted and adjusted columns.

^b See footnote 5 of text.

TABLE 2
Unadjusted and Adjusted Means, Grade 1 (Allenby 1973-74)

	Immersion Group	Unadjusted Means		F ratio	df ^a	Adjusted Means (covs. age*DIQ)		df ^a	Percentile Rank (Unadj. \bar{X})
		Comparison Group	Group			Immersion Group	Comparison Group		
Age (mos., May '74)	81.67	81.59	0.01	1/72					89
Otis-Lennon DIQ (end yr)	120.06	110.46	10.69**	1/69					74
Metro. achiev. Test (stand. sc.) ^b									
Word knowledge (20-65)	51.03	54.68	3.35	1/67	49.12	55.47	10.51**	1/61	60
Word discrimination (21-64)	52.34	55.37	2.95	1/68	50.78	56.37	9.65**	1/62	63
Reading (20-67)	47.17	52.41	4.25 ^o	1/67	44.71	53.79	13.09***	1/61	46
Arithmetic (18-68)	54.34	50.46	8.80**	1/66	52.95	51.12	2.39	1/60	76
a) Verbal Items (raw, nx=33)	26.07	24.44	4.77 ^o	1/67	25.31	24.95	0.29	1/61	
b) Computation (raw, nx=30)	29.03	26.92	5.98 ^o	1/67	28.41	27.20	1.71	1/61	

*** p<.001 ** p<.01 ^o p<.05

^a Unadjusted means based on all cases for whom relevant scores available, including cases missing covariate data; hence differences (in excess of 2 df's) in within-groups number of df's between unadjusted and adjusted columns.

^b Range of standard score scale given in parentheses.

TABLE 3
Unadjusted and Adjusted Means, Grade 2 (Allenby 1973-74)

	Immersion Group	Unadjusted Comparison Group	F ratio	df ^a	Immersion Group	Adjusted Means Comparison Group	F ratio	df	Percentile Rank (Unadj. \bar{X})
Age (mos., May '74)	93.92	94.90	1.48	1/85					90 85
Otis-Lennon DIQ (end yr)	120.75	116.67	1.63	1/76					
Metro. Achiev. Test (stand. sc.) ^b									
a. Word knowledge (14-87)	62.33	62.84	0.05	1/78	61.23	63.70	1.18	1/67	81 84
b. Word analysis (12-72)	55.40	58.21	2.37	1/76	54.66	58.85	4.31 [*]	1/65	64 71
c. Reading (9-86)	60.57	59.89	0.08	1/80	59.65	60.92	0.26	1/68	79 77
d. Total Reading (a-c) (2-94)	61.69	61.00	0.08	1/75	60.28	62.09	0.59	1/64	82 80
e. Spelling (35-76)	53.86	62.33	18.10 ^{***}	1/79	53.87	62.76	17.35 ^{***}	1/68	38 70
f. Maths Comput. (25-89)	62.66	60.34	1.75	1/80	62.68	60.87	1.09	1/68	84 78
g. Maths Concepts (23-97)	64.94	61.82	1.92	1/78	63.93	62.96	0.24	1/66	76 64
h. Maths Probl Solv. (21-94)	62.43	59.67	1.63	1/75	61.24	60.64	0.08	1/62	70 60
i) Verbal items (raw, nx=17)	11.34	9.86	5.17 [*]	1/75	11.04	10.13	1.72	1/62	
ii) Written items (raw, nx=18)	13.43	12.98	0.30	1/75	12.95	13.27	0.16	1/62	
1. Total Maths (i-b) (6-102)	66.30	62.56	3.16	1/72	65.52	63.71	0.92	1/61	80 71

*** p < .001 * p < .05

^a Unadjusted means based on all cases for whom relevant scores available, including cases missing covariate data; hence differences (in excess of 2 df) in within-groups number of df's between unadjusted and adjusted columns.

^b Range of standard score scale given in parentheses.

TABLE 4
Performance in French, Grades K-2 (Allenby 1973-74)

	Allenby Immersion		Ottawa Immersion ^a		Ottawa Reg. Prog. ^{a, b}			
	K	Gr. 1	Gr. 2	Gr. 1	Gr. 2	Gr. 1	Gr. 2	Gr. 3
French Comp. Test, K Level								
Total^d (nx=62)		36.51				29.41	38.99	31.13
Words (nx=12)		8.11				6.18	7.28	7.25
Phrases (nx=28)		15.50				14.38	17.55	13.61
Questions (nx=9)		4.89				3.33	5.18	3.35
Stories (nx=13)		7.94				5.33	8.70	7.15
French Comp. Test, Gr. 1 Level								
Total^d (nx=65)		46.10	53.41	46.11	53.14	18.73	22.25	24.79
Words (nx=10)		8.81	9.56	7.74	8.90	3.41	4.02	3.95
Phrases (nx=30)		19.50	22.19	21.08	23.30	8.87	9.66	10.67
Questions (nx=10)		6.53	8.24	6.58	8.05	2.26	3.04	2.94
Stories (nx=15)		11.27	13.18	10.71	12.92	4.17	5.51	7.21
Test de Rendement en Français								
Gr. 1 Level (nx=30)		13.97		13.61				
Gr. 2 Level (nx=30)			17.08		14.94			
Test de Lecture, 2e (nx=19)								
			14.97		11.58			

^a Data taken from Barik & Swain, 1974a.
(Unit of analysis for Grades 1 and 2 = class; unit of analysis for Grade 3 = individual).

^b Amount of daily French instruction in regular program:
Grade 1: 20-30/20-40 min. in K/Gr. 1
Grade 2: 20-30/20-40/20-40 min. in Grades K-2
Grade 3: 15-20/20/20/20 min. in Grades K-3

^c Number of classes/pupils involved:
Ottawa Gr. 1 Immersion: 15 classes throughout
" Gr. 2 Immersion: 10 classes on FCT, 14 classes elsewhere
" Gr. 1 Regular: 6 classes of FCT-K, 7 classes on FCT-1
" Gr. 2 Regular: 7 classes on both FCT's
" Gr. 3 Regular: 28 pupils on FCT-K, 55 pupils on FCT-1

^d See footnote 5 of text