Primary-Grade French Immersion in a Unilingual English-Canadian Setting: The Toronto Study through Grade 2

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Le rendement scolaire d'élèves de la maternelle à la deuxième année qui fréquentent un programme d'immersion en français à Toronto est mis en rapport avec le rendement d'élèves qui sont inscrits au programme normal donné en anglais. Les résultats indiquent qu'à la fin de la maternelle, les élèves au programme d'immersion sont aussi prêts à passer en première année que ceux inscrits au programme normal. A la fin de la première année scolaire, les élèves du programme d'immersion, qui ont appris à lire en français, révèlent un retard sur leurs camarades du programme normal pour ce qui est des habilités linguistiques anglaises ayant trait à la lecture. Cependant, ils font preuve d'un transfert partiel du français à l'anglais de leur capacité à la lecture. A la fin de la deuxième année, suite à l'introduction d'un cours d'anglais durant la deuxième moitié de l'année à raison de leçons quotidiennes de 25 minutes, les élèves au programme d'immersion ont rattrapé leurs camarades du programme normal par rapport à la plupart des tâches en langue anglaise, exception faite de l'orthographe. A chaque année considérée le rendement en mathématiques des élèves au programme d'immersion est équivalent ou supérieur à celui des élèves du programme normal. La compétence en français des élèves dans le programme d'immersion est de beaucoup supérieure à celle d'élèves d'un même niveau scolaire ou de grades plus élevés qui sont inscrits dans un programme anglais où l'on enseigne le français comme langue seconde à raison d'une leçon par jour, et correspond à celle d'élèves inscrits à un programme d'immersion dans un milieu bilingue. Le genre de programme auquel les élèves sont inscrits n'affecte pas leur niveau de développement cognitif. Les résultats de l'évaluation correspondent de très près à ceux des évaluations précédentes.

A significant educational innovation in Canada in recent years has been the establishment of bilingual education programs for English-speaking students. These programs involve the use of French as the language of instruction for all ("immersion") or part ("partial immersion") of the curriculum during one or more years of schooling. As an indication of their significance, it is interesting to note that in 1974/75 programs of this nature were in operation in all but one of Canada's ten provinces, and that in the bilingual centres of Montreal and Ottawa approximately 20 per cent of the English-speaking pupils beginning the Kindergarten year in the public school system were enrolled in French immersion classes, i.e. classes conducted entirely in French.

To a large extent, the impetus for the spread of these programs has come

from the recent emphasis on bilingualism in many aspects of Canadian society, and from the success of the pioneering program initiated in 1965 in St. Lambert, on the outskirts of Montreal, which has been carefully monitored over the years. (For salient evaluations, see Lambert & Macnamara, 1969; Lambert & Tucker, 1972; Lambert, Tucker, & d'Anglejan, 1973; Bruck, Lambert, & Tucker, 1974.) In that program, English-speaking pupils receive their schooling completely in French throughout Kindergarten and Grade 1. Beginning in Grade 2, English language arts are taught for approximately an hour a day. With each successive grade, the proportion of time taught in English is increased so that by the end of elementary schooling approximately half the curriculum is taught in English and half in French.

Very generally, the results of the evaluations of the St. Lambert experiment have shown that students in the program attain a high level of proficiency in French language skills while maintaining their native English language skills at a par with their peers in the regular English program once English language arts are introduced. Furthermore, when tested in English on subject material taught to them in French (e.g. mathematics) the bilingually educated pupils do as well as their English-instructed peers. Research findings concerned with French immersion programs across Canada are summarized in Swain (1974).

A program similar to the St. Lambert one was initiated by the Toronto Board of Education in September 1971 at Allenby Public School (see Sweet, 1974). In contrast to pupils in St. Lambert, who can benefit if they wish from the French readily available to them in their immediate environment, pupils in the Toronto program are largely restricted in their contact with French to the school situation. The question then arises whether the French immersion formula can prove as successful in a unilingual English environment as in a bilingual milieu.

The French immersion program at Allenby Public School in Toronto has been evaluated annually since its inception. The evaluation has been carried out by the Bilingual Education Project of the Modern Language Centre of the Ontario Institute for Studies in Education. The Bilingual Education Project is involved in the evaluation of several types of bilingual education programs in Ontario and is contributing to the development of curriculum materials for these programs (see Barik & Swain, 1974, 1975, in press).

The present paper discusses the findings from the evaluation of the Allenby French immersion program in Toronto carried out in Spring 1974 at the Kindergarten and Grades 1 and 2 levels. The Grade 2 pupils entered the program at its inception in 1971; they are referred to as Cohort I. The Grade 1 pupils entered the program in 1972 and are referred to as Cohort II. The Kindergarten pupils began the program in September 1973 and constitute Cohort III. (The design of the Bilingual Education Project calls for the evaluation of three successive cohorts at each grade level.) In 1973/

74, Kindergarten and Grade 1 pupils received all their instruction in French, except for a weekly physical education period given in English in Grade 1. In Grade 2, formal instruction in English language arts was introduced in the latter part of the year (as of February 1) for periods of 25 minutes per day. The rest of the curriculum was taught in French except again for the weekly physical education period and an occasional library period given in English instead of French.

The evaluation addresses itself to two basic questions asked by the school and by the Board of Education authorities at the start of the program:

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 general cognitive development, as measured through IQ tests?
2. How beneficial is the French immersion program with regard to proficiency in French when compared with regular school programs 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. These two groups are not strictly equivalent, since participation in the immersion program is optional at the parents' choice. However, the groups are generally comparable with respect to linguistic and socio-economic backgrounds, which can be characterized as middle to upper-middle class, as well as with respect to other demographic characteristics. With regard to proficiency in French, since instruction in French as a second language is not introduced in the regular English program at Allenby Public School until the second half of Grade 2, the performance of pupils in the immersion program is compared with that of pupils in another locality, Ottawa, where instruction in French as a second language begins in the regular program at the Kindergarten level. The immersion program there is also being evaluated by the Bilingual Education Project (Barik & Swain, Note 1), a situation which permits the additional comparison of the level of proficiency in French attained by immersion pupils in a unilingual English milieu (Toronto) with that of immersion pupils in a bilingual milieu (Ottawa).

PREVIOUS FINDINGS

The results of the evaluations of the Toronto French immersion program carried out prior to Spring 1974 (covering Cohort I through Kindergarten and Grade 1, and Cohort II through Kindergarten) are described elsewhere (Barik & Swain, 1976). They may be summarized as follows:

At the end of Kindergarten, both Cohort I and Cohort II immersion pupils scored at least equivalently to (and in the case of Cohort I significantly higher than) pupils in the regular program on a test of mental ability

(IQ). The two immersion groups also scored significantly higher than regular program comparison pupils on measures of school readiness or early school achievement; however, the differences on these measures disappeared when the scores were adjusted for initial age and IQ differences. Thus Kindergarten pupils were as ready as regular program pupils for beginning school work. In French comprehension, Kindergarten immersion pupils in Toronto scored substantially higher than pupils in Kindergarten, Grade 1, or Grade 2 (the highest level tested) in a regular English program (in Ottawa) who had received daily periods of instruction in French as a second language in varying amounts (20–40 minutes) since Kindergarten. The French scores of the Toronto Kindergarten immersion pupils were only slightly lower than those of the corresponding Kindergarten group of immersion pupils in Ottawa.

At the end of Grade 1, the immersion pupils (Cohort I) scored equivalently to their regular program peers on the test of mental ability. 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 employ the concepts in both languages. In French comprehension, Grade 1 immersion pupils in the Toronto 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 Toronto immersion group also scored adequately relative to the native French-speaking Grade 1 pupils on tests of achievement in French and mathematics given in French and developed specifically for native French speakers. Their level of performance on these tests was equivalent to that of pupils in the Ottawa immersion program.

SPRING 1974 EVALUATION

Subjects and Procedure

All pupils in Kindergarten and Grades 1 and 2 in both immersion and regular programs were tested, though the data of a few (relating to children with physical or learning disabilities) were subsequently excluded from the analysis. The number of pupils retained in the analysis was as follows:

Grade	*Immersion Group*	*Comparison Group*
K	40	35
1	33	42
2	39	49

The regular program involved two classes at each grade level. In the

immersion program there were two Kindergarten classes, while in Grades 1 and 2 there was a class at each grade level and one additional "split" Grade 1–2 class which combined pupils of the two levels.

The testing was carried out over a six-week period in May–June, except for one test given in early April, as discussed subsequently. The pupils were tested either in their own classroom or in a room set up specifically for this purpose by a team of two specially trained testers. 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.

KINDERGARTEN (COHORT III)

Test Battery

The Kindergarten pupils in both French immersion and regular programs were administered the same battery of tests as were used with the two previous cohorts, consisting of the following (described in greater detail in Barik & Swain, 1975, 1976; see Appendix for list of tests):

a) *Otis-Lennon Mental Ability Test (Primary I level)*, a general non-verbal test of intelligence which covers a broad range of cognitive abilities and provides an IQ measure;

b) *Metropolitan Readiness Tests* (MRT), a test battery which was designed to measure the child's readiness for school work in Grade 1 and which consists of six sections: *word meaning, listening, matching, alphabet, numbers,* and *copying*;

c) *Stanford Early School Achievement Test* (SESAT), a test designed to provide a measure of the child's cognitive abilities and consisting of four sections identified as *environment* (measuring the degree of information the child has about his natural and social environments), *mathematics, letters and sounds,* and *aural comprehension.*

Pupils in the French immersion program *only* were given an additional test:

d) French Comprehension Test, Kindergarten Level (FCT–K, 1974 experimental edition), a test of listening comprehension in French developed by the Bilingual Education Project. (No published test of French as a second language was judged suitable for use in early-grade immersion classes.) The FCT–K requires the pupil to select appropriate pictorial responses to items based on French vocabulary, phrases, questions, and stories. The test consists of 62 items.

Results

The Kindergarten (Cohort III) data are found in Table 1.

IQ and Age

As seen from Table 1, the mean IQ score of the Kindergarten immersion group is higher than that of the comparison or regular program group

Table 1 / Unadjusted and Adjusted Means, Kindergarten (Cohort III)

	Unadjusted Means				Adjusted Means (covariates = age + DIQ)			
	Immersion Group	Comparison Group	*F* ratio	*df*[a]	Immersion Group	Comparison Group	*F* ratio	*df*[a]
Age (in months at end of year)	71.50	70.83	0.70	1/73				
Otis-Lennon DIQ (end yr.)	117.61	112.06	2.72	1/69				
Metro. Readiness Total[b] ($mx = 102$)	67.86	58.81	7.91**	1/64	66.98	60.96	9.96**	1/58
Word meaning ($mx = 16$)	11.21	9.59	9.77**	1/70	11.08	9.82	7.90**	1/64
Listening ($mx = 16$)	10.92	9.56	5.05*	1/70	10.83	9.97	2.95	1/64
Matching ($mx = 14$)	9.39	7.66	3.05	1/68	9.08	8.14	1.04	1/62
Alphabet ($mx = 16$)	14.74	13.42	6.08*	1/69	14.64	13.92	2.59	1/60
Numbers ($mx = 26$)	16.11	13.24	8.60**	1/69	15.97	13.74	8.73**	1/63
Copying ($mx = 14$)	5.55	4.94	0.96	1/69	5.44	5.17	0.22	1/63
SESAT Total[b] ($mx = 126$)	103.71	99.60	1.26	1/63	102.04	102.06	0.00	1/57
Environment ($mx = 42$)	34.97	34.35	0.16	1/71	34.45	34.61	0.01	1/65
Mathematics ($mx = 28$)	22.66	20.84	3.29	1/68	22.22	21.60	0.92	1/62
Letters/Sounds ($mx = 28$)	23.05	22.50	0.24	1/70	22.78	23.32	0.39	1/64
Aural Comprehension ($mx = 28$)	22.63	20.60	5.15*	1/66	22.20	21.17	2.41	1/60

**$p < .01$ *$p < .05$ DIQ = Deviation IQ

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

b. Total and subtest scores are based on all available data. 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 slight difference between tabulated total score and sum of subtest scores.

(117.6 vs. 112.1). However, the difference between the two groups is not statistically significant as analyzed through one-way analysis of variance. There is, thus, no indication of any harmful effect of the immersion experience on cognitive development at the end of Kindergarten relative to the regular program, a finding similar to that of previous years.

In terms of American population norms for the test, the immersion group scores at slightly above the 85th percentile and the comparison group at slightly above the 75th percentile, so that both groups are above average in mental ability in terms of the norms for the test.

There is also no reliable difference between the two groups in chronological age, which along with IQ is used as a covariate in subsequent analyses.

School Readiness

Table 1 shows that the immersion group scores significantly higher ($p < .01$) than the comparison group on the total MRT test (unadjusted means) and on four of the six subtests (word meaning, listening, alphabet, and numbers). 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 the Cohort III 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 immersion group scores in the vicinity of the 75th percentile (on the basis of unadjusted scores) and the comparison group at about the 60th percentile.

Early School Achievement

Table 1 reveals that although the immersion group obtains a slightly higher total SESAT score than the comparison group, the difference is not statistically significant. 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 ($p < .05$) on the basis of raw scores, but not on scores adjusted for age and IQ. The findings on the test generally parallel the previous year's findings on Cohort II, which showed no reliable difference 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 score on the test falls at approximately the 75th percentile and the comparison group's score at the 65th percentile.

The findings on both the MRT and the SESAT are similar to those from previous years (Barik & Swain, 1976) in showing that the pupils in the Kindergarten French immersion program are doing at least as well as

the pupils in the regular English program in all areas of school readiness and early school achievement *tested in English*, even though English is not their language of instruction.

French Comprehension

The French performance data for all grades are to be found in Table 2, where the Toronto French immersion group's scores are placed in relation to those obtained by groups of pupils in both immersion and regular programs in Ottawa (data taken from Barik & Swain, Note 1). Although Kindergarten pupils were not tested in Ottawa, the FCT–K was administered there to pupils in Grades 1, 2, and 3 of the regular English program, who had received instruction in French as a second language for varying amounts from 20 minutes to 40 minutes a day since Kindergarten.

It is seen from Table 2 that the Toronto Kindergarten French immersion group scores higher on the test (36.5) than both Grade 1 (29.4) and Grade 3 (31.1) pupils in the regular English program in Ottawa, and slightly lower than the Grade 2 pupils (38.6).[1]

Children in the Toronto French immersion Kindergarten program thus perform 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 for up to four years. Similar findings were noted in previous years.

Table 2 / Performance in French, Grades K–2

	Toronto Immersion			Ottawa Immersion[a]		Ottawa Regular Program[a,b]		
	K	Gr. 1	Gr. 2	Gr. 1	Gr. 2	Gr. 1	Gr. 2	Gr. 3
French Comp. Test								
K Level ($mx = 62$)	36.51					29.41	38.59	31.13
Gr. 1 Level ($mx = 65$)		46.10	53.41	46.11	53.14	18.73	22.25	24.79
Test de Rendement en Français								
Gr. 1 Level ($mx = 30$)		13.97		13.61				
Gr. 2 Level ($mx = 30$)			17.08		14.94			
Test de Lecture								
Gr. 2 ($mx = 19$)			14.97		11.58			

Note: For Toronto data and Ottawa Grade 3 data, unit of analysis = individual. For Ottawa Grades 1 and 2, unit of analysis = class.

a. Data taken from Barik & Swain, Note 1.

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

GRADE 1 (COHORT II)

Test Battery

The test battery administered to the Grade 1 pupils was the same as the previous year. Pupils in both immersion and comparison groups received an intelligence test (*Otis-Lennon Mental Ability Test, Elementary I Level*) and an English language skills and mathematical achievement test (*Metropolitan Achievement Tests, Primary I Battery*). That test (MAT) consists of four sections: three English skills sections (*word knowledge, word discrimination,* and *reading*) which require the reading of words or sentences in English, and one mathematics section (*arithmetic concepts and skills*) which does not require any reading. The tests are described more fully elsewhere (Barik & Swain, 1975).

Pupils in the Grade 1 immersion program were given in addition two tests of French performance, the *French Comprehension Test, Grade 1 Level* (FCT–1, 1974 experimental edition), a higher level of the test employed in Kindergarten and having the same format, and the *Test de Rendement en Français, Grade 1* (TRF–1, 1971 edition), a test of French achievement developed by the Commission des Ecoles Catholiques de Montréal and employed with native French-speaking Grade 1 pupils in the province of Quebec. The test consists of 30 items involving the identification of sounds, word definition, vocabulary, spelling, and sentence comprehension in French and is administered completely in French. It is employed in the evaluation of the immersion program to provide a measure of comparison of pupils in the program with pupils whose native language is French.

Results

The Grade 1 (Cohort II) data are found in Tables 2 and 3.

IQ and Age

As seen from Table 3, the mean IQ score of the immersion group is higher than that of the regular program group (120.1 vs. 110.5). This time, the difference is statistically significant ($p < .01$). Data obtained the previous year when the same cohort of children was in Kindergarten showed no significant difference in the IQ scores of the two groups (Barik & Swain, in press-b). It therefore might be inferred that in the course of Grade 1 the immersion experience has had a more beneficial effect on the cognitive development of the children than has the regular program experience. This inference, however, is not warranted. The composition of the groups tested the previous year at the end of Kindergarten and in the current evaluation at the end of Grade 1 differed due to the fact that only samples were tested the previous year, as contrasted with the total population in Grade 1. If only pupils having both end-of-Kindergarten and end-of-Grade-1 IQ scores are considered, no reliable difference is obtained with respect to either set of scores (Kindergarten or Grade 1 score), or on the Grade 1 score when the previous year's (Kindergarten) score is employed as a covariate. It may thus

Table 3 / Unadjusted and Adjusted Means, Grade 1 (Cohort II)

	Unadjusted Means				Adjusted Means (covariates = age + DIQ)			
	Immersion Group	Comparison Group	*F* ratio	*df*[a]	Immersion Group	Comparison Group	*F* ratio	*df*[a]
Age (in months at end of year)	82.67	82.59	0.01	1/72				
Otis-Lennon DIQ (end yr.)	120.06	110.46	10.69**	1/69				
Metro. Achiev. Test[b]								
Word knowledge (20–65)	51.03	54.68	3.35	1/67	49.12	55.47	10.51**	1/61
Word discrimination (21–64)	52.34	55.37	2.95	1/68	50.78	56.37	9.65**	1/62
Reading (20–67)	47.17	52.41	4.25*	1/67	44.71	53.79	13.09***	1/61
Arithmetic (18–68)	54.34	50.46	8.80**	1/66	52.95	51.12	2.39	1/60
Verbal Items (raw, $mx = 33$)	26.07	24.44	4.77*	1/67	25.31	24.95	0.29	1/61
Computation (raw, $mx = 30$)	29.03	26.92	5.98*	1/67	28.41	27.20	1.71	1/61

***$p < .001$ **$p < .01$ *$p < .05$ DIQ = Deviation IQ

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

b. Range of standard score scale given in parentheses.

be more appropriate to interpret the significant end-of-Grade-1 difference on the mental ability test between immersion and regular program pupils as due to differences in the composition of the groups tested on the two occasions than to the effect of the type of program in which the pupils are enrolled.

In terms of American norms, the mean IQ score of the immersion Grade 1 group falls in the vicinity of the 90th percentile and that of the regular program group in the vicinity of the 75th percentile.

As seen in Table 3, there is no reliable difference between the two Grade 1 groups in chronological age.

English Language Skills

The results on all three English language skills sections of the MAT (*word knowledge*, *word discrimination*, and *reading*) reveal that the French immersion group scores significantly lower ($p < .01$) than the regular program group in each instance when scores are adjusted for age and IQ (Table 3). This is not unexpected, since the immersion pupils have not yet received any formal training in English language arts in Grade 1. The results parallel those of the previous year with Cohort I, and those obtained consistently in other evaluations (Barik & Swain, 1975, Note 1).

Based on American norms, the mean scores of the Toronto immersion group on the three subtests fall approximately between the 45th and 65th percentile and those of the comparison group between the 70th and 75th percentile. 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 45 to 65 per cent 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. (The possibility is recognized that some informal instruction in English reading may be occurring at home in some cases.) 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 to be discussed subsequently indicate.

Arithmetic

As seen in Table 3, on the basis of unadjusted scores the immersion group scores significantly higher ($p < .01$) than the comparison group on the

arithmetic concepts and skills section of the MAT. However, when scores are adjusted for age and IQ, the difference disappears. This last finding parallels the previous year's with Cohort I and the findings from other evaluations which have failed to reveal any significant difference between immersion and regular-program students on the arithmetic section of the test.

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 (Table 3) 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 approximately the 75th percentile and that of the regular group at approximately the 65th percentile. In terms of American grade equivalents, both groups are ahead of their own level by from 2 to 4 months.

French Performance

The scores of the Toronto Grade 1 immersion pupils on both the FCT–1 and the TRF–1 are found in Table 2, in relation to those of comparable groups in Ottawa.

Considering the FCT–1, it is seen that the Toronto Grade 1 immersion group scores the same as the corresponding Ottawa group (46.1 in both instances). These findings parallel the previous year's results, where little or no difference was noted between the Toronto and Ottawa scores (Barik & Swain, 1975). In relation to pupils in the Ottawa regular program who receive instruction in French as a second language, the Toronto Grade 1 immersion group scores substantially higher than either Grade 1 (18.7), Grade 2 (22.3), or Grade 3 (24.8) pupils. Grade 1 immersion pupils at Allenby Public School are thus well ahead of pupils of their own or higher grade levels who are taking French as a regular school subject with respect

to French comprehension, and are doing as well as immersion pupils in a more bilingual milieu.

On the TRF–1, as can be seen from Table 2, the Toronto Grade 1 immersion pupils obtain a score of approximately 14.0 out of 30, which is very similar to the score of 13.6 obtained by the Grade 1 immersion pupils in Ottawa. In terms of norms for the *Test de Rendement*, the score of the Toronto (as well as of the Ottawa) pupils correspond to a stanine value of 3, which indicates that the French immersion pupils do as well as from 11 to 22 per cent of French-speaking Grade 1 pupils on the test. Immersion pupils are thus not on a par with their French-speaking counterparts in French achievement, as might well be expected, but are still doing better than a segment of the French-speaking Grade 1 population on a test of French achievement. The present set of scores on the TRF–1 is slightly lower than that obtained the previous year (when Cohort I scored in the stanine 4 range on the test), but this may be attributed to the fact that the test was administered more than two months earlier in the present evaluation than in the last one (start of April, versus first half of June with Cohort I), to make the comparison with native French speakers (tested in late March) more valid.

GRADE 2 (COHORT I)

Test Battery

The battery of tests administered to Grade 2 pupils consisted of the following:

a) *Otis-Lennon Mental Ability Test (Elementary I Level)*, administered to both immersion and comparison groups. This is the same level of the test as employed with Grade 1 classes, but a higher raw score is necessary for an equivalent Deviation IQ (DIQ) score, since age is taken into consideration in the transformation from raw to standardized score.

b) *Metropolitan Achievement Tests (Primary II Battery)*, also administered to both groups. 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 (*word knowledge, word analysis,* and *reading*, corresponding to the three English skills sections in the Grade 1 test), one measuring *spelling* ability, and three measuring fundamental arithmetic concepts and skills. The latter are as follows: *computation*, which measures the child's ability to add, subtract, and multiply; *concepts*, which measures the pupil's understanding of basic mathematical principles; and *problem solving*, which measures 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. 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.

Table 4 / Unadjusted and Adjusted Means, Grade 2 (Cohort I)

	Unadjusted Means				Adjusted Means (covariates = age + DIQ)			
	Immersion Group	Comparison Group	*F* ratio	*df*[a]	Immersion Group	Comparison Group	*F* ratio	*df*[a]
Age (in months at end of year)	94.92	95.90	1.48	1/85				
Otis-Lennon DIQ (end yr.)	120.75	116.67	1.63	1/76				
Metro. Achiev. Test[b]								
Word knowledge (14–87)	62.33	62.84	0.05	1/78	61.23	63.70	1.18	1/67
Word analysis (12–72)	55.40	58.21	2.37	1/76	54.66	58.85	4.31*	1/65
Reading (9–86)	60.57	59.89	0.08	1/80	59.65	60.92	0.26	1/68
Total Reading (WK + R) (2–94)	61.69	61.00	0.08	1/75	60.28	62.09	0.59	1/64
Spelling (35–76)	53.86	62.33	18.10***	1/79	53.87	62.76	17.35***	1/68
Maths Comput. (25–89)	62.66	60.34	1.75	1/80	62.68	60.87	1.09	1/68
Maths Concepts (23–97)	64.94	61.82	1.92	1/78	63.93	62.96	0.24	1/66
Maths Prob. Solv. (21–94)	62.43	59.67	1.63	1/75	61.24	60.64	0.08	1/62
Verbal items (raw, $mx = 17$)	11.34	9.86	5.17*	1/75	11.04	10.13	1.72	1/62
Written items (raw, $mx = 18$)	13.43	12.98	0.30	1/75	12.95	13.27	0.16	1/62
Total Maths (6–102)	66.30	62.56	3.16	1/72	65.52	63.71	0.92	1/61

***$p < .001$ *$p < .05$ DIQ = Deviation IQ

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

b. Range of standard score scale given in parentheses.

Pupils in the immersion program were in addition administered the following three tests:

c) *French Comprehension Test, Grade 1 Level* (FCT–1), as described earlier for Grade 1.

d) *Test de Rendement en Français, Grade 2* (TRF–2, 1972 edition), the appropriate level of the test used in Grade 1 and developed for native French-speaking pupils. The Grade 2 test consists of 30 items involving vocabulary, spelling, the identification of sounds, synonyms and antonyms, and sentence comprehension in French.

e) *Test de Lecture, Grade 2.* 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, each of which is followed by a series of questions on the content of that passage. There are nine passages and 19 questions altogether. The test was based on the recommendations of consultants to the French immersion program concerning the reading objectives of the program.

Results

The Grade 2 (Cohort I) results are shown in Tables 2 and 4.

IQ and Age

As Table 4 shows, although the mean IQ score of the Grade 2 immersion group is slightly higher than that of the Grade 2 regular group (120.7 vs. 116.7) the difference between the two groups is not statistically significant. This finding is similar to the one obtained the previous year with the same cohort at the end of Grade 1. There thus does not appear to have been any differential effect of the two types of programs on the cognitive development of the children in the course of Grade 2.

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

As Table 4 indicates, there is likewise no reliable difference between the two Grade 2 groups with respect to age.

English Language Skills

As seen in Table 4, on the English language skills sections of the MAT, 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). In view of the fact 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, these

results appear to be particularly encouraging, showing that the immersion pupils can quickly catch up in English language skills once some formal instruction in English is introduced in their program.

In terms of American norms for the test, both immersion and comparison groups score in the vicinity of the 75th–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 65th–70th percentile. The main difference occurs in *spelling*, the regular program group scoring at the 70th percentile and the immersion group near the 40th percentile. On the basis of grade equivalents (GE), both groups show a level of performance beyond their grade level, their scores falling in the 3.1–3.6 GE 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.

Mathematics

Table 4 shows that 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 findings thus show that immersion pupils continue through Grade 2 to acquire mathematical concepts via French as well as do their counterparts in the regular program 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 (Table 4). 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. 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 for the test, the *total mathematics* score of the immersion group falls at the 80th percentile and that of the comparison group at about the 70th percentile. With respect to grade equivalents, 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 Toronto French 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.

French Performance

The French performance data for Grade 2 immersion pupils are presented in Table 2.

As can be seen, in French comprehension (FCT–1), the score of the Toronto Grade 2 immersion group is almost identical to that of Ottawa Grade 2 immersion classes: 53.4 to 53.1, paralleling the Grade 1 results. The scores of the Grade 2 immersion groups in both localities are higher than those of the Grade 1 immersion groups and considerably higher than those of pupils in the regular Grade 1–3 program in Ottawa.

The children in the Toronto Grade 2 French immersion classes thus continue to achieve as high a level of performance in French comprehension as their peers in another locality where there is more opportunity for contact with the French language and culture. In comparisons on French performance, however, the Toronto 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, where such instruction is begun at the *start* of Grade 2, for *60* minutes per day.[2] Toronto immersion pupils thus benefit from more exposure to French in Grade 2 than do the Ottawa pupils.

On the measure of French achievement (TRF–2, Table 2), the Toronto group's score of 17.1 is somewhat higher than the score of 14.9 obtained by Grade 2 immersion pupils in Ottawa (but note comment above concerning more exposure to French by Toronto 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 Montreal during the first half of the year, in late November, whereas the immersion pupils were tested in early April. The score of the Toronto pupils on the test corresponds to a stanine value of 4, which indicates a level of performance equivalent to or better than that of from 23 to 39 per cent of French-speaking Grade 2 pupils, but the 4½-month lag in the administration of the test to Toronto immersion pupils relative to French-speaking pupils must be borne in mind in interpreting these results.

As for reading in French, the results in Table 2 (*Test de Lecture*) again show that the Toronto Grade 2 immersion pupils score somewhat higher than the Ottawa pupils (approximately 15.0 to 11.6 out of 19), but the question of greater exposure to French in the case of the Toronto group again applies. Comparable data from native French-speaking pupils being taught in French would provide a useful yardstick against which to evaluate these levels of performance. Lacking such data, the only statement that can be made at present is that on the basis of the opinion of consultants to the French immersion program, the level of reading ability demonstrated by immersion pupils on the test is satisfactory.

Thus, in all aspects of French performance measured – comprehension, achievement, and reading – the Toronto Grade 2 immersion pupils, even though limited in their contact with French by the unilingual nature of

their environment, are doing as well as pupils in a similar program in a more bilingual milieu.

SUMMARY

The present set of results suggests that the total French immersion formula at the early grade levels can achieve results in a unilingual English setting comparable to those obtained in a bilingual environment.[3]

The results of the evaluation in Kindergarten and Grades 1 and 2 may be summarized as follows:

1. At the end of the Kindergarten year, pupils in the French immersion program (Cohort III):

a) show the same degree of readiness for beginning school work in Grade 1 as pupils who have attended an English Kindergarten with respect to English pre-reading skills, numerical skills, visual perception and motor control, and other skills measured;

b) are not lagging behind their peers in the regular English program in general mental ability;

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 20–40 minutes per day for up to four years.

2. At the end of Grade 1, pupils in the French immersion progam (Cohort II):

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 suggests that a substantial amount of transfer of reading skills from French to English takes place, 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 employ this knowledge in French and 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 (Cohort I):

a) after the introduction of formal instruction in English language arts during the last five 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 apply this knowledge to both French and English contexts;
c) show the same level of mental ability as pupils in the regular English program;
d) although 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, and also show a satisfactory level of performance in French reading.

The overall impression which emerges from the findings of the evaluation of the French immersion program at Allenby Public School in Toronto is one of optimism concerning its viability and the attainment by the students of the academic and linguistic skills for which it was designed.

NOTES

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1. The better score of the Grade 2 pupils relative to the Grade 3 pupils may be attributed to the fact that on the average the Grade 2 pupils have had more French through Grades K–2 than Grade 3 pupils have through Grades K–3, due to differences in the French program associated with the two cohorts. The same pattern, however, is not repeated on the Grade 1 level test.

2. It is worth pointing out, however, that relative to their own comparison group the Toronto immersion pupils do just as well, and in some cases even better, than the Ottawa immersion pupils relative to their comparison group on the English language skills sections of the MAT (on the basis of data presented in Barik & Swain, Note 1), even though they have had less exposure to formal instruction in English language arts in the course of Grade 2. This is not to suggest that the Toronto formula is superior to the one followed in Ottawa. The data 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, Note 2) without any apparent harmful effects on English language skills development.

3. It should be recognized that in the two localities both parents and administrators were strongly supportive of the French immersion programs.

REFERENCE NOTES

1. 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).

2. Edwards, H. P., & Casserly, M. C. *Evaluation of second language programs in the English schools: Annual report 1972–73*. Ottawa: The Ottawa Roman Catholic Separate School Board, 1973.

REFERENCES

Barik, H. C., & Swain, M. English-French bilingual education in the early grades: The Elgin Study. *The Modern Language Journal*, 1974, *58*, 392–403.

Barik, H. C., & Swain, M. Three-year evaluation of a large scale early grade French immersion program: The Ottawa Study. *Language Learning*, 1975, *25*, 1–30.

Barik, H. C., & Swain, M. A Canadian experiment in bilingual education at the grade eight and nine levels: The Peel Study. *Foreign Language Annals*, in press.

Barik, H. C., & Swain, M. Early grade French immersion classes in a unilingual English-Canadian setting: The Toronto Study. *Scientia Paedagogica Experimentalis*, 1976, *13*, 153–176.

Bruck, M., Lambert, W. E., & Tucker, G. R. Bilingual schooling through the elementary grades: The St. Lambert Project at grade seven. *Language Learning*, 1974, *24*, 183–204.

Lambert, W. E., & Macnamara, J. Some cognitive consequences of following a first-grade curriculum in a second language. *Journal of Educational Psychology*, 1969, *60*, 86–96.

Lambert, W. E., & Tucker, G. R. *Bilingual education of children: The St. Lambert experiment*. Rowley, Mass.: Newbury House Publishers, 1972.

Lambert, W. E., Tucker, G. R., & d'Anglejan, A. Cognitive and attitudinal consequences of bilingual schooling: The St. Lambert Project through grade five. *Journal of Educational Psychology*, 1973, *65*, 141–159.

Swain, M. French immersion programs across Canada: Research findings. *Canadian Modern Language Review*, 1974, *31*, 117–129.

Sweet, R. J. The pilot immersion program at Allenby Public School, Toronto. *Canadian Modern Language Review*, 1974, *31*, 161–168.

APPENDIX

List of Tests Employed

French Comprehension Test (experimental edition, Kindergarten and Grade 1 levels). Toronto: Bilingual Education Project, The Ontario Institute for Studies in Education, 1974.

Metropolitan Achievement Tests (Primary I Battery, Form B, 1958; Primary II Battery, Form F, 1970). New York: Harcourt Brace Jovanovich.

Metropolitan Readiness Tests (Form A). New York: Harcourt Brace & World, 1964.

Otis-Lennon Mental Ability Test (Primary I and Elementary I Levels, Form J). New York: Harcourt Brace & World, 1967.

Stanford Early School Achievement Test (Level I). New York: Harcourt Brace Jovanovich, 1969.

Test de Lecture (experimental edition, Grade 2 and Grade 3 levels). Toronto: Bilingual Education Project, The Ontario Institute for Studies in Education, 1974.

Test de Rendement en Français (Grade 1 level, 1971–72 edition; Grade 2 level, 1972–73 edition). Montreal: La Commission des Ecoles Catholiques de Montréal.