

Update on French Immersion: The Toronto Study through Grade 3

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Cet article fait suite au compte-rendu de l'évaluation d'un programme d'immersion en français qui s'est tenu à Toronto et dont on a fait précédemment mention dans cette revue. On y compare les résultats scolaires des élèves de 1^{re}, 2^e et 3^e année qui sont inscrits au programme avec ceux de leurs camarades inscrits au programme régulier d'une école anglaise.

Au niveau de l'apprentissage de l'anglais, tous les élèves du programme d'immersion ont pris du retard dans un ou plusieurs domaines (il ne s'agit que de l'orthographe pour les élèves de 3^e année). Ces résultats peuvent s'expliquer par l'absence de cours d'anglais pour les élèves de 1^{re} et 2^e année et par leur petit nombre en 3^e année. Au niveau de l'apprentissage des mathématiques qui se fait en français en 1^{re} et 2^e année et en anglais en 3^e année, les résultats des élèves de 1^{re} année du programme d'immersion sont supérieurs à ceux de leurs camarades du programme régulier tandis que les résultats des élèves de 2^e et 3^e année sont semblables. Les tests mesurant la capacité intellectuelle des élèves ont démontré que le résultat des élèves de 1^{re} année est semblable, alors qu'il est supérieur pour les élèves de 2^e et 3^e année inscrits au programme d'immersion; on ne tient cependant pas compte de cet élément dans l'évaluation du développement cognitif des enfants inscrits au programme. Tous les élèves ont obtenu, au niveau de la compréhension orale du français, des résultats supérieurs aux élèves du programme régulier, qui suivent quelques cours de français. On peut comparer les résultats de ces élèves quant à la compréhension orale et écrite et à l'ensemble des autres matières à ceux des élèves inscrits à un programme d'immersion qui se tient dans un milieu plus bilingue. Les résultats de cette étude correspondent en gros aux résultats des études précédentes.

This paper presents the results of the last evaluation (1974/75) of the French immersion program in effect at Allenby Public School in Toronto, discussed up to grade 2 in previous articles (Barik & Swain, 1975a, 1976a). The study considers the same three cohorts of pupils (in both the immersion program and the regular English program, the latter constituting the comparison group) evaluated previously: Cohort I, which started in kindergarten in 1971 (the year in which the immersion program was initiated) and was in grade 3 in 1974/75; Cohort II, which began in 1972 and was in grade 2 in 1974/75; and Cohort III, which began in 1973 and was in grade 1 at the time of the present study. The evaluation was carried out by the Bilingual Education Project of the Ontario Institute for Studies in Education.

The Allenby immersion program has been described previously (Barik & Swain, 1975a, 1976). Participation in the program is optional, at the parents' choice. Briefly, all instruction in kindergarten and grade 1 is in

French. In 1974/75 this was also the case in grade 2, in contrast to the previous year when English language arts were introduced in the second half of the year (25 minutes per day as of February). In grade 3, for the year under consideration, the program changed to an approximately two-thirds French, one-third English formula with English language arts and mathematics taught in English and all other instruction being in French.¹ Of other activities outside the home classroom at Allenby Public School, physical education was given in French in grade 1 and in English in grades 2 and 3, while library periods were conducted mainly in French but occasionally in English.

The reader is referred to the earlier evaluations (Barik & Swain, 1975a, 1976) for the previous findings relating to Cohort I through grade 2, Cohort II through grade 1, and Cohort III in kindergarten. Comparisons of the present set of data with those from previous evaluations will be made in the course of the discussion.

SUBJECTS AND PROCEDURE

All pupils in grades 1, 2, and 3 of both the immersion program and the regular English program (comparison group) were tested. The number of pupils involved in the analysis were as follows (the data of 10 additional pupils were excluded from the analysis on the basis of several criteria, e.g. pupils with physical problems, recent immigrants with limited ability in English, repeaters):

Grade	Immersion Group	Comparison Group
1 (Cohort III)	41	42
2 (Cohort II)	35	50
3 (Cohort I)	36	55

These numbers differ slightly from the corresponding figures for the same cohorts the previous year, due to some pupils having moved out of the school district and new ones having transferred from other schools.² It should thus be borne in mind that there is some variation in the composition of the groups from one evaluation to the next.

TEST BATTERY

The following two tests were administered in May–June 1975 to pupils in both programs in grades 1, 2, and 3. (For description of tests, see Barik & Swain, 1975a, 1976a):

- a) *Otis-Lennon Mental Ability Test* (Elementary I level at all grade levels, a different form being employed in grade 3), which yields a Deviation IQ (DIQ) measure;
- b) *Metropolitan Achievement Tests* (Primary I Battery in grade 1, Primary II Battery in grade 2, Elementary Battery in grade 3), measuring different aspects of English language and mathematical skills.

Pupils in the immersion program were in addition given the following tests:

c) *French Comprehension Test, Level 1* (Barik, 1975), the final version of the test of French aural comprehension employed in previous evaluations. The Level 1 test is intended primarily for grade 1 immersion pupils. In the absence of higher-level tests, it was employed with all three grades.

d) *Test de Rendement en Français*, a test of achievement in French employed by the Ministry of Education in Quebec with native French-speaking students. The grade 1 test was administered in early April and the grade 2 and 3 tests in late November 1974 to approximate the dates of administration of the test in Quebec and permit comparisons with test norms. (The versions of the tests employed were the same as in previous evaluations.)

e) *Test de Lecture*, a test of reading comprehension in French developed by the Bilingual Education Project and consisting of a number of texts, each followed by questions about its contents. The grade 2 and 3 levels of the test were administered to the grade 2 and 3 immersion pupils respectively.

Writing skills in French and English were also considered in grade 3, but the protocols have not been fully analysed. (See Swain, 1975, for previous evaluation relative to another immersion program.)

RESULTS

The data for all three grades are shown in Table 1. In the case of the Metropolitan Achievement Tests, the scores are those obtained when adjustment is made through analysis of covariance for initial differences between immersion and comparison groups in age and IQ measure.

Age

No reliable difference in the age of immersion and comparison pupils is found in grades 1 and 2, corresponding to the findings of the previous year (Barik & Swain, 1976a) when the groups were in kindergarten and grade 1 respectively. In grade 3, however, a significant difference is noted in contrast to the previous year's findings with the same cohort (Cohort I) in grade 2, where no reliable difference was observed. Since age changes by a constant value from one year to the next, the age difference in the present evaluation must be attributable to the slight changes in the composition of the groups noted previously. In the present case, the grade 3 comparison pupils are older than their immersion counterparts by about two months.

IQ

No reliable difference in IQ measure between the two groups is noted in grade 1, but a reliable difference favoring the immersion group is noted in both grade 2 and grade 3. Longitudinally, the grade 1 and 2 findings

Table 1 / Data for Grades 1, 2, and 3

	Grade 1			Grade 2			Grade 3					
	Immers. Group	Compar. Group	F	df _a	Immers. Group	Compar. Group	F	df _a	Immers. Group	Compar. Group	F	df _a
Age (mos., end yr.)	83.80	83.33	0.00	1/80	94.77	95.42	0.42	1/79	106.97	109.21**	6.62*	1/92
Otis-Lennon DIQ Metro. Achiev. Test (stand.sc.) ^a	119.05	115.79	1.68	1/74	122.57*	116.06	4.81*	1/76	120.53*	115.96	3.95*	1/86
Word Knowledge	56.18	58.54	2.60	1/65	57.83	62.50*	5.45*	1/71	69.75	72.56	1.71	1/80
Word Discrim./Anal.	53.34	56.79*	5.23*	1/66	53.65	58.07	2.99	1/71				
Reading	53.34	55.04	0.84	1/66	55.60	61.27*	4.61*	1/67	73.08	73.01	0.00	1/80
Total Reading (wk + r)					56.60	61.34*	5.36*	1/65	70.36	71.74	0.38	1/77
Spelling					48.39	63.84***	44.86***	1/70	66.72	71.24*	0.19	1/79
Language									73.39	72.50	4.32*	1/76
Maths. Comput. (Gr. 2, 3)			7.96**	1/69	55.79	53.45	1.19	1/69	67.79	68.79	0.30	1/82
Maths. Concepts					57.68	55.77	1.00	1/69	75.95	74.15	0.73	1/81
Maths. Probl. Solv.					59.48	58.24	0.32	1/67	74.05	74.52	0.04	1/83
verbal items (raw, max. = 17)			11.34***	1/69	10.93	10.74	0.07	1/67				
written items (raw, max. = 18)			4.95*	1/69	11.94	11.14	0.72	1/67				
Total Maths.	55.82	52.25			58.98	57.35	0.77	1/62	76.32	76.28	0.00	1/78
Gr. 1, verbal items (raw, max. = 33)	27.44***	25.30										
Gr. 1, comput. (raw, max. = 30)	29.00*	27.20										

* $p \leq .05$ ** $p \leq .01$ *** $p \leq .001$ DIQ = Deviation IQ^aScores adjusted for age and DIQ.

correspond to those of the previous year for the same groups (Barik & Swain, 1976), but in grade 3 the findings again depart from those of the same cohort in grade 2, where no reliable difference in IQ was found. These differences in the data of the same cohort over the two years must again be attributed to variations in the composition of the groups tested, since, if one considers only those grade 3 pupils for whom previous grade 2 IQ scores are also available, no reliable difference is noted with regard to either their grade 2 or grade 3 score, nor for the grade 3 measure when the grade 2 score is employed as a covariate. This set of findings thus does not warrant the interpretation of the total-group grade 3 difference as indicative of a beneficial effect of the immersion experience on cognitive ability (as measured through IQ) in the course of grade 3.

The IQ scores of the groups in all three grades in the present evaluation are relatively similar to their scores of the previous year at the preceding grade level (the greatest change is in relation to the Cohort II comparison group, whose IQ score of 116.1 in grade 2 is 5.6 points higher than its score of 110.5 the previous year in grade 1). In terms of (American) norms for the test, the scores of the groups at all three grade levels fall in the vicinity of the 85th–90th percentile range.

English Language Skills

Table 1 indicates that at all three grade levels the immersion group lags behind the regular program group in one or more aspects of English language skills: in word discrimination in grade 1; in word knowledge, reading, total reading, and spelling in grade 2; and in spelling in grade 3.³

The present set of grade 1 results (Cohort III) is more positive than that of previous evaluations with Cohorts I (Barik & Swain, 1975a) and II (Barik & Swain, 1976) which showed the immersion group behind the comparison group in all English language skills measured (on the basis of adjusted scores) — as might be anticipated since there is no formal English instruction in the grade 1 immersion program. In terms of (American) norms (based on unadjusted scores, not shown in Table 1), the scores of the present grade 1 immersion group on the English language skills sections of the test fall in the vicinity of the 70th–80th percentile range (with grade equivalent measures on the various sections of 2.3–2.5 compared with their actual grade level of 1.9 at the time of testing) indicating a substantial transfer to English of reading skills acquired via French (but allowing for the possibility of some informal instruction in English reading in the home in some cases). As for the comparison group, their scores fall in the 75th–85th percentile range (with grade equivalents of 2.2–2.6).

The present grade 2 results (Cohort II) reveal a greater lag by immersion pupils in English language skills than was the case with Cohort I the previous year, where reliable differences between the two grade 2 groups were noted only in relation to two sections of the test (word analysis and spelling). However, as noted earlier, the previous grade 2 immersion group

received formal instruction in English language arts during the second half of the year, whereas the present group received no such instruction. The present grade 2 immersion pupils still score above average on the basis of test norms (55th–75th percentile range, grade-equivalent scores of 3.0–3.3 compared with their actual grade level of 2.9) on all English language skills sections except spelling (27th percentile, grade equivalent of 2.3), thus again indicating considerable transfer of reading skills from French to English. The regular program group scores on all sections in approximately the 75th–80th percentile range (grade equivalents of 3.3–3.5).

In grade 3 (Cohort I) both groups also score above average, the immersion group scoring in the 60th–80th percentile range (grade equivalents of 4.2–4.9) and the comparison group in approximately the 55th–75th range (grade equivalents of 4.3–4.7). The lag of the immersion group in spelling relative to the regular program group, though significant, is less pronounced than it was the previous year in grade 2 ($p \leq .001$).

Mathematics Skills

In mathematics, as seen in Table 1, there is a reliable difference between the two groups in grade 1 (in favor of immersion pupils) but not in grades 2 and 3.

The grade 1 results indicate that the immersion group taught mathematics in French scores higher on a test given in English than regular program pupils taught mathematics in their native language. This applies equally to both subsections of the arithmetic test: the “verbal” section involving the following of arithmetical instructions and problem solving, and the computational items involving addition and subtraction. Immersion pupils are thus able to acquire mathematical concepts as well via French as their counterparts in the regular program do via English, and can transfer this knowledge from one language context to the other. The present set of grade 1 results differs from those of the two previous cohorts, for whom no reliable differences were observed in arithmetic skills at the end of grade 1 on the basis of adjusted scores (Barik & Swain, 1975a, 1976). In terms of norms for the test, the present grade 1 immersion group scores at the 80th percentile on the arithmetic section and the comparison group at the 70th percentile (grade equivalents of 2.5 and 2.1 for the two groups respectively).

The grade 2 (Cohort II) results parallel those obtained with Cohort I the previous year. Thus, through grade 2 also, immersion pupils taught in French learn mathematics as well as regular program pupils taught in English, and can transfer their knowledge from a French to an English context.

It is to be noted from Table 1 that there is no difference between the two groups on either subsection of the problem-solving subtest, one consisting of items presented orally which do not require any reading and

the other of problems in written English which the pupils read to themselves. Thus even though the grade 2 immersion pupils have not yet received any formal instruction in English, they are still able to read, comprehend, and solve mathematical problems in English as adequately as pupils in the regular program.

In terms of norms for the test, the total mathematics score of the immersion pupils falls at about the 65th percentile (with a percentile range from about 55 to 70 on the three subtests) and the comparison group at the 50th percentile (with a range from about 45 to 55). These scores are compatible with the grade level of the pupils (grade-equivalent scores of 3.0–3.1 for the immersion group and 2.7–2.9 for the comparison group). Relative to norms, the performance level of both grade 2 groups on total mathematics is somewhat lower than it was the previous year in grade 1 (75th and 65th percentiles for immersion and comparison pupils respectively — Barik & Swain, 1976).

The grade 3 results are relatively similar for both groups. Thus switching instruction in mathematics in grade 3 of the immersion program from French to English does not have any negative effect on their level of performance in the subject. Both grade 3 groups score near the 70th percentile on total mathematics (grade equivalent of 4.3), with scores on the three mathematics subtests falling approximately between the 65th and 75th percentiles (grade equivalents of 4.1–4.9 for the immersion group and 4.1–4.7 for the comparison group). The total mathematics performance level of the immersion group is somewhat lower than its grade 2 level the previous year (80th percentile) while that of the comparison group is unchanged.

French Performance

As in previous evaluations, the performance in French of pupils in the Toronto immersion program is compared with that of pupils in a similar (but more widespread) program in Ottawa, also evaluated by the Bilingual Education Project (Barik & Swain, in press). The Ottawa pupils have the advantage of living in a more bilingual milieu and thus of having greater opportunity for contact with French outside the classroom than pupils in Toronto. The Ottawa program differs somewhat from the Toronto one since, in the former, instruction in English language arts is introduced in most instances in grade 2 (for one hour per day) and this formula is continued through grade 3 (with mathematics taught in French). Thus Toronto pupils have more contact time with French than Ottawa pupils in grade 2 but less contact time in grade 3. Comparisons in French comprehension are also made with pupils in the regular English program in Ottawa, who have received daily periods of instruction in French as a second language since kindergarten. (Such comparisons are not possible with the Toronto regular program pupils since French instruction in that program begins only in the second half of grade 2.)

On the *French Comprehensive Test*, as can be seen from Table 2, the Toronto immersion pupils at all three grade levels score approximately the same as their Ottawa counterparts (31.7 versus 28.6 in grade 1, 36.7 versus 38.4 in grade 2, 41.0 versus 40.0 in grade 3) and considerably higher than grade 3 regular-program pupils (14.2), who obtained the highest score among grade 2-4 pupils tested in that program. In terms of Canadian norms for grade 1 immersion, the grade 1 pupils in Toronto score at approximately the 65th percentile.⁴

On the *Test de Rendement en Français*, no comparison is possible in the present evaluation between Toronto and Ottawa pupils, since, except for French aural comprehension, grade 1 immersion pupils were not tested in Ottawa. The Toronto group's score of 19.1 is nevertheless substantially higher than the score of 14.0 obtained the previous year by Toronto Cohort II, and places them in the stanine 5 range relative to norms for the test, indicating that they do as well as from 40%–59% of native French-speaking grade 1 pupils for whom the test was developed. This is an improvement over the previous year's grade 1 group which scored in the stanine 3 (11%–22%) range. The present grade 2 and 3 groups, as seen from Table 2, score approximately the same as their Ottawa counterparts, with the Toronto grade 2 score slightly higher than the Ottawa score. In terms of norms for the test, both grade 2 and 3 groups score in the stanine 4 range, indicating a level of performance equivalent to that of from 23%–39% of native French-speaking pupils of the same grade level in Montreal. For grade 2 pupils, this level of performance is comparable to that obtained by the preceding cohort (Cohort I) the previous year, who however benefited from a later administration of the test (by four months) in comparison with the present group.

With respect to French reading skills, Table 2 indicates that grade 2 and 3 pupils in the Toronto immersion program score equivalently to their peers in Ottawa on the *Test de Lecture*. Comparisons with native French

Table 2 / Performance in French, Grades 1-3

	Toronto Immersion			Ottawa Immersion ^a			Ottawa Regular Program ^{a, b}		
	Gr. 1	Gr. 2	Gr. 3	Gr. 1	Gr. 2	Gr. 3	Gr. 1	Gr. 2	Gr. 3
French Comp. Test (max. = 45)	31.69	36.68	41.00	28.64	38.39	40.03	8.15	10.58	14.20
Test de Rend. en Français (max. = 30/30/30) ^c	19.10	15.93	15.91		13.82	15.96			
Test de Lect. (max. = —/19/28) ^c		13.07	21.26		12.83	19.73			

a. Data for Grade 1 taken from unpublished data (unit of analysis = individual);

Data for Grades 2 and 3 taken from Barik & Swain (in press) (unit of analysis = class).

b. Amount of daily French instruction in regular program = 20-40 min./day from kindergarten on.

c. Different tests employed at each grade level; maximum shown in parentheses.

speakers are not available on this test, but the scores obtained by immersion pupils have been judged satisfactory by consultants to the French immersion program. The Toronto grade 2 score of 13.1 is slightly lower than that obtained by Cohort I the previous year (15.0).

In general, then, French immersion pupils at all grade levels in Toronto perform equivalently in French to pupils in a similar program in Ottawa, which offers a more bilingual environment.

CONCLUSIONS

The results of the 1974/75 evaluation in grades 1-3 of the French immersion program in operation at Allenby Public School in Toronto lead to the following conclusions, which reinforce those from previous evaluations:

1. There is no indication that participation in the immersion program has any detrimental effect on the cognitive ability of the children, as reflected in IQ score.
2. Pupils in the immersion program through grade 3 lag behind their peers in the regular English program in some aspects of English language skills measured, notably spelling, but show a considerable transfer of reading skills from French to English, even in the absence of any formal instruction in English.
3. Pupils in the immersion program master mathematical skills via French to the same extent as (or even better than) pupils in the regular program taught via English, and can apply these skills in one language context or the other. Furthermore, there is no indication that changing the mathematics curriculum from French to English (in Grade 3) creates any difficulties.
4. In measures of French proficiency (aural comprehension, achievement, reading) pupils in the Toronto immersion program perform as well as pupils in a similar program in Ottawa, who have the advantage of a bilingual environment.

The immersion model initiated to date primarily in bilingual milieus or where bilingualism is a critical issue (Barik & Swain, 1975b; Edwards & Casserly, 1976; Genesee & Chaplin, Note 1; Lambert & Tucker, 1972) thus appears generalizable to unilingual settings. The increasingly urgent need is for material development to accompany this major curricular innovation. As pointed out elsewhere (Swain & Barik, 1976) researchers must begin to turn their attention to questions of an applied sociolinguistic and psycholinguistic nature which will provide input to the complex issues of curriculum planning and curriculum development. Similar conclusions were reached in the context of a special conference on French immersion programs (Swain & Bruck, 1976).

NOTES

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1. In that respect, it differs from the immersion programs in other areas such as Ottawa (Barik & Swain, 1976b), where mathematics continues to be taught in French in grade 3 (the only English instruction being one hour per day of English language arts, introduced in either grade 2 or grade 3). The Toronto program has since changed, however, with mathematics taught in French in grade 3.
2. The above figures for the comparison group are up by 6–8 pupils at each grade level from the corresponding figures for the same cohorts the previous year (Barik & Swain, 1976a). This points to the imbalance which can develop over time in the immersion-to-regular-program ratio, since some immersion pupils move out of the school district but students new to the district can only register in the regular program unless they transfer from another immersion program (there were a few such cases at Allenby Public School in 1974/75). There tend to be few transfers from the immersion to the regular program: in the present set of figures, three pupils in the kindergarten immersion program in 1973/74 transferred to the grade 1 regular program in 1974/75, and one similar transfer was noted from grade 1 to grade 2. None occurred from grade 2 to grade 3.
3. On the basis of unadjusted scores, not shown in Table 1, none of the differences between the two groups are statistically significant in grades 1 and 3, while in grade 2 they are so in relation to word analysis and spelling only. As for mathematics, to be discussed subsequently, findings on the basis of unadjusted scores parallel those based on adjusted scores presented in the paper.
4. The Toronto pupils formed part of the norming population for the test.

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