# Does French immersion improve reading achievement?

***by Mary Allen***

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French immersion programs were introduced into Canadian schools during the 1970s in order to encourage bilingualism across the country. Thirty years later, immersion programs exist to various degrees in every province, providing an alternative education stream for many students.

This article uses data from the 2000 Program for International Student Assessment (PISA) to compare the reading achievement of Canadian 15-year-olds enrolled in immersion and non-immersion programs in English-language school systems in the 10 provinces. It compares reading scores in immersion programs to those in non-immersion programs by gender, and looks at the influence of family socio-economic status and parental education on reading scores. However, it does not measure the relative influence of these factors on reading performance.

### Enrolment in French immersion differs widely by province

In 2000, while French immersion programs existed in English-language school systems in all 10 provinces, the percentage of 15-year-olds enrolled in

## CST What you should know about this study

The Programme for International Student Assessment (PISA) is a collaborative effort among member countries of the Organisation for Economic Co-operation and Development (OECD) to regularly assess the achievement of 15-year-olds in three domains — reading literacy, mathematical literacy and scientific literacy — through a common international test.

Thirty-two countries participated in PISA 2000. In Canada, approximately 30,000 15-year-old students from more than 1,000 schools took part, a large sample to enable reliable national and provincial estimates.

The PISA 2000 survey included a direct assessment of students' skills through reading, mathematics and science tests as well as questionnaires collecting background information from students and school principals and from parents in the Youth in Transition Survey, administered simultaneously in Canada.

Reading literacy is defined in PISA as the ability to understand, use and reflect on written texts in order to achieve one's goals, to develop one's knowledge and potential, and to participate effectively in society. This definition goes beyond the notion that reading literacy means decoding written material and literal comprehension. Literacy involves the ability of individuals to use written information to fulfill their goals and function effectively. PISA 2000 employed about 140 items representing the kinds of reading literacy that 15-year-olds would require in the future.

In this article, 15-year-old French immersion students include those whose parents reported that the student was currently enrolled in an immersion program (i.e. where 25% or more of instruction is in French).

these programs ranged widely, from 2% in British Columbia to 32% in New Brunswick.

Students may enter French immersion programs at different times. Many children begin immersion programs when they enter school in kindergarten or grade 1 while others start midway through elementary school and still others start at later grades. According to PISA, in most provinces, the majority of 15-year-old students had entered a French immersion program before grade 4; the exceptions were those in Nova Scotia and New Brunswick, with minorities of 21% and 39%, respectively, entering French immersion before grade 4.

One of the most noticeable characteristics of French immersion programs is the over-representation of girls. While the proportion of girls and of boys in non-immersion programs is roughly equal in all provinces, girls

**CST Percentage of students in English-language school systems who are currently enrolled in French immersion programs**

| | % currently enrolled in French immersion | % currently enrolled in immersion who started before grade 4 | % of students who are girls | |
|---|---|---|---|---|
| | | | Immersion | Non-immersion |
| Newfoundland and Labrador | 7 | 57 | 64 | 50 |
| Prince Edward Island | 20 | 59 | 58 | 51 |
| Nova Scotia | 12 | 21 | 58 | 49 |
| New Brunswick | 32 | 39 | 61 | 46 |
| Quebec | 22 | 74 | 52 | 48 |
| Ontario | 6 | 57 | 64 | 51 |
| Manitoba | 6 | 90 | 60 | 48 |
| Saskatchewan | 3 | 87 | 65 | 48 |
| Alberta | 4 | 80 | 59 | 47 |
| British Columbia | 2 | 55 | 61 | 49 |

Source: Statistics Canada, Programme for International Student Assessment, 2000.

## CST Effect size

Effect sizes are one method for standardizing and comparing differences between groups. An effect size compares the difference between groups to how different the people *within each group* are from each other. The effect size used in this paper, Cohen's *d*, is calculated by dividing the difference between the group means (e.g. average reading scores of immersion and non-immersion students) by the pooled standard deviation of the groups.[1]

Previous research using data from PISA 2000 has found significant effect sizes in the small to medium range (0.2 to 0.5).[2] Effect sizes less than 0.2 are considered trivial, as they suggest that less than 1% of the variation in the variable being studied can be explained by group membership. Although still small, an effect size of 0.2 represents the minimum difference that is interpretable. An effect size greater than 0.5 in the context of student characteristics or performance in PISA is large.

1. Cohen, J. 1988. *Statistical Power Analysis for the Behavioural Sciences* (2nd edition). Hillsdale, NJ: Lawrence Erlbaum Associates.

2. Bussière, P., F. Cartwright, R. Crocker, X. Ma, J. Oderkirk, Y. Zhang. 2001. *Measuring up: The Performance of Canada's Youth in Reading, Mathematics and Sciences, OECD PISA Study — First Results for Canadians Aged 15* (Statistics Canada Catalogue no. 81-590-XIE); Organisation for Economic Co-operation and Development (OECD). 2001. *Knowledge and Skills for Life — First Results from the OECD Programme for International Student Assessment (PISA) 2000*. OECD: Paris, France. www.pisa.oecd.org/knowledge/download.htm.

substantially outnumber boys in immersion programs, comprising about 60% of the immersion students in all provinces except Quebec.

### French immersion students outperform non-immersion students in the PISA reading assessment

In every province except Manitoba, students in French immersion programs performed significantly better in reading than students in non-immersion programs. While nearly all immersion students other than Manitobans wrote the PISA assessment in English, about one quarter of immersion students in Manitoba were tested in French. However, language of the test assessment alone did not account for the Manitoba results. Among those Manitoba students who took the test in English, there was still no significant difference in the reading achievement of non-immersion and immersion students.

The over-representation of girls in French immersion programs may contribute to the higher reading performance of students in immersion programs as girls outperform boys in reading. However, this explains only a small part of the high performance of French immersion students. According to PISA, on average, both boys and girls in immersion outperform their counterparts in non-immersion programs (except in Manitoba).

### French immersion students are more likely to be from high socio-economic backgrounds

In general, students in French immersion programs come from higher socio-economic backgrounds than non-immersion students. One way to determine the socio-economic status of students is in terms of the socio-economic status of parental occupations and by looking at what proportion of students are from families in the top quartile of the parental occupation scale.[1] In fact, French immersion students are more likely to be from families in the top socio-economic quartile in all provinces, but this advantage is not statistically significant in Quebec, Ontario, Manitoba, Saskatchewan and British Columbia.[2]

Other studies have shown a strong relationship between socio-economic status and student achievement. Therefore, one might expect that differences in family socio-economic status contribute to the high reading achievement of students in French immersion programs. However, the advantage held by French immersion students is not so straightforward.

Looking only at students from families in the top quartile of socio-economic status, there is still a substantial difference in the achievement of students in immersion and non-immersion programs in many provinces. These differences are statistically significant in Newfoundland and Labrador, Prince Edward Island, New Brunswick, Alberta and British Columbia.[2]

**CST Fifteen-year-olds in immersion programs have higher reading scores in most provinces**

| | Reading achievement | | |
|---|---|---|---|
| | Immersion | Non-immersion | |
| | Score | | Effect size[1] |
| Newfoundland and Labrador | **608** | **510** | **1.21** |
| Prince Edward Island | **558** | **509** | **0.57** |
| Nova Scotia | **567** | **517** | **0.60** |
| New Brunswick | **550** | **495** | **0.63** |
| Quebec | **566** | **537** | **0.32** |
| Ontario | **570** | **533** | **0.42** |
| Manitoba | 533 | 533 | 0.00 |
| Saskatchewan | **570** | **529** | **0.54** |
| Alberta | **601** | **548** | **0.64** |
| British Columbia | **610** | **537** | **0.88** |

1. Cohen's *d*, which compares the difference between groups to the difference between people within each group.

Note: Items in bold indicate significant differences between immersion and non-immersion students with $p<0.05$ and effect size$>0.20$.

Source: Statistics Canada, Programme for International Student Assessment, 2000.

1. The PISA International Socio-Economic Index of Occupational Status (ISEI) was derived from student responses on parental occupation. The index captures the attributes of occupations that convert parents' education into income. For more information on the methodology, see Ganzeboom, H.B.G., P. de Graaf and D.J. Treiman with J. De Leeuw. 1992. "A standard international socio-economic index of occupational status," *Social Science Research* 2, 1: 1-56. The PISA ISEI is based on either the father's or the mother's occupation, whichever is the higher.
2. The test for statistical significance for French immersion students is very sensitive to the small sample sizes of French immersion students in this study. The effect of small sample sizes is further amplified when only the top socio-economic quartile of students is considered. Although there are large apparent differences in reading scores between French immersion and non-immersion students among the top quartile, these differences are not statistically significant in several provinces because of the small sample of French immersion students in the top socio-economic quartile.

## CST French immersion students are more likely to be from the top quartile of family socio-economic status

| | Students in top quartile of family socio-economic status | | |
|---|---|---|---|
| | Immersion | Non-immersion | |
| | % of all 15-year-old students | | Effect size[1] |
| Newfoundland and Labrador | **41** | **13** | **0.67** |
| Prince Edward Island | **26** | **17** | **0.23** |
| Nova Scotia | **34** | **18** | **0.37** |
| New Brunswick | **31** | **16** | **0.36** |
| Quebec | 36 | 27 | 0.18 |
| Ontario | 35 | 27 | 0.19 |
| Manitoba | 21 | 18 | 0.07 |
| Saskatchewan | 26 | 19 | 0.18 |
| Alberta | **43** | **25** | **0.39** |
| British Columbia | 27 | 24 | 0.07 |

1. Cohen's *d*, which compares the difference between groups to the difference between people within each group.

Note: Items in bold indicate significant differences between immersion and non-immersion students with $p<0.05$ and effect size$>0.20$.

Source: Statistics Canada, Programme for International Student Assessment, 2000.

## CST Among students in the top quartile of family socio-economic status, reading achievement is significantly higher for French immersion students than non-immersion students in half the provinces

| | Students in top quartile of family socio-economic status | | |
|---|---|---|---|
| | Reading achievement | | |
| | Immersion | Non-immersion | |
| | Score | | Effect size[1] |
| Newfoundland and Labrador | **629** | **559** | **0.87** |
| Prince Edward Island | **584** | **546** | **0.44** |
| Nova Scotia | 583 | 561 | 0.29 |
| New Brunswick | **566** | **543** | **0.28** |
| Quebec | 594 | 574 | 0.22 |
| Ontario | 591 | 570 | 0.27 |
| Manitoba | 542 | 565 | 0.33 |
| Saskatchewan | 578 | 554 | 0.37 |
| Alberta | **617** | **583** | **0.45** |
| British Columbia | **635** | **567** | **0.91** |

1. Cohen's *d*, which compares the difference between groups to the difference between people within each group.

Note: Items in bold indicate significant differences between immersion and non-immersion students with $p<0.05$ and effect size$>0.20$.

Source: Statistics Canada, Programme for International Student Assessment, 2000.

### French immersion students are more likely to have parents with a postsecondary education

French immersion students were significantly more likely to have a parent with a postsecondary education in all provinces except Quebec, Ontario, Manitoba and British Columbia. As with family socio-economic background, these differences do not entirely explain the high reading achievement of students in French immersion programs. Among students who have a parent with a postsecondary education, French immersion students had significantly higher reading scores than non-immersion students did in all provinces except Quebec and Manitoba.

### Many factors influence differences in reading scores between French immersion and non-immersion students

In every province, except Manitoba, French immersion students programs performed significantly better in the PISA reading assessment than their counterparts in non-immersion programs. In fact, in all 10 provinces, students in French immersion programs performed at levels equal to or better than the Canadian national reading score average (534).

A number of factors may contribute to the high achievement of 15-year-olds in French immersion. Parents of immersion students are generally from higher socio-economic backgrounds and are more likely to have a postsecondary education (factors related to high student performance). There is also a higher proportion of girls in immersion programs.

However, when gender, socio-economic background and parents' education are each taken into account (individually), French immersion students still outperform their counterparts in non-immersion programs. No one of these factors alone explains the high performance of these students.

**Among students with a postsecondary-educated parent, French immersion students have higher reading scores then non-immersion students in most provinces**

| | Students with at least one parent with a postsecondary education | | | | | |
|---|---|---|---|---|---|---|
| | As a percent of all 15-year-old students | | | Reading achievement | | |
| | Immersion | Non-immersion | | Immersion | Non-immersion | |
| | % | | Effect size[1] | Score | | Effect size[1] |
| Newfoundland and Labrador | **83** | **57** | **0.60** | **607** | **529** | **0.97** |
| Prince Edward Island | **74** | **60** | **0.29** | **567** | **524** | **0.51** |
| Nova Scotia | **77** | **59** | **0.39** | **575** | **532** | **0.52** |
| New Brunswick | **70** | **53** | **0.35** | **560** | **512** | **0.56** |
| Quebec | 73 | 65 | 0.17 | 571 | 555 | 0.18 |
| Ontario | 77 | 68 | 0.20 | **577** | **546** | **0.36** |
| Manitoba | 61 | 56 | 0.11 | 541 | 545 | 0.05 |
| Saskatchewan | **71** | **58** | **0.27** | **571** | **540** | **0.42** |
| Alberta | **86** | **63** | **0.54** | **606** | **561** | **0.54** |
| British Columbia | 63 | 64 | 0.02 | **610** | **550** | **0.74** |

1. Cohen's *d*, which compares the difference between groups to the difference between people within each group.

Note: Items in bold indicate significant differences between immersion and non-immersion students with $p<0.05$ and effect size$>0.20$.

Source: Statistics Canada, Programme for International Student Assessment, 2000.

Instead, other factors may contribute to the high reading performance of French immersion students. Firstly, more information is needed to understand how student environment contributes to how students live and learn. French immersion programs may be more readily available in communities that are more affluent.

Moreover, selection and attrition in French immersion programs may influence reading scores. Schools and parents may screen students to ensure their readiness for immersion programs. This may mean that students who have less developed language skills are not encouraged to enter immersion programs, especially early immersion. This may be one reason for the unequal gender distribution in these programs, as girls tend to develop language skills earlier than boys do and may therefore demonstrate a greater aptitude for language learning when they are considered for entry into early immersion programs.

In addition, there may also be a tendency for less-skilled and less well-adjusted students to transfer out of immersion programs if there is a concern about their ability to learn in the second language. By the time students are assessed by PISA, at age 15, this academic attrition may be significant.

It is also possible that French immersion programs assist student learning in other ways by providing an enriched learning environment. There may be a positive peer effect when students with high potential for achievement are grouped together. Other research has investigated the possibility that bilingualism itself contributes to the learning of students.[3] Nevertheless, a better understanding of the reading achievement of French immersion students can be found by further exploration of the home and school environments, and community, family and student characteristics.

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3. Cummins, J. 1998. "Immersion education for the millennium: What have we learned from 30 years of research on second language immersion?" in M.R. Childs and R.M. Bostwick (eds.). *Learning Through Two Languages: Research and Practice*. Second Katoh Gakuen International Symposium on Immersion and Bilingual Education. p. 34-47. Katoh Gakuen, Japan.