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ABSTRACT

A study tested several possible explanations of why the reading literacy levels in Newfoundland and Labrador (Canada) are lower than those in the rest of Canada. Reading literacy was chosen as the focus of analysis for three reasons: (1) the reading score was the most consistent of the three direct measures of literacy; (2) the reading and numeracy scores were very highly correlated; and (3) the writing scores showed the lowest consistency of the three measures. Data on 4,030 native speakers of English (ages 16 to 69 years) born in Canada were taken from a large set of statistics gathered by Statistics Canada in October 1989, on behalf of the National Literacy Secretariat, to test for the following factors: the "brain drain," age, rurality, educational attainment, and parents' education. Results indicated that: (1) when the effects of each of the latter four factors on reading literacy were removed, the average reading literacy was still significantly lower than the average for every province except Prince Edward Island; (2) even when all four factors were taken together, the discrepancy between Newfoundland and Labrador and the nation was barely altered; and (3) the brain drain factor (many educated adults emigrate to other parts of Canada) appeared to be significant. Findings suggest that demographics cannot account for the lower than average reading literacy in Newfoundland and Labrador. (Eight tables and seven figures of data are included.) (RS)

Demographic Causes of Reading Literacy Levels in Newfoundland and Labrador

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Report Number 1

Summary Reports of Paths to Literacy and Illiteracy in Newfoundland and Labrador

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This study reports an analysis of data collected in October, 1989, by Statistics Canada on behalf of the National Literacy Secretariat. The data includes direct measures of the functional reading, writing, and numeracy skills, and a variety of demographic and socioeconomic information on a representative sample of people living in Canada at that time. The purpose of our analysis was to test several possible explanations of why the reading literacy levels of Newfoundland and Labrador are lower than those in the rest of Canada. Reading literacy was chosen as the focus of analysis for three reasons: (a) the reading score was the most consistent of the three direct measures of literacy; (b) the reading and numeracy scores were very highly correlated; and (c) the writing scores showed the lowest consistency of the three measures.

MOTIVATION

Literacy levels have proven lower in Newfoundland and Labrador than in the rest of the country in both the Southam survey (Southam Newspaper Group, 1987) and the Statistics Canada survey (1991). This fact has led to much speculation concerning its cause. Many proposed causes refer to the socioeconomic and demographic conditions of Newfoundland and Labrador. The data collected by Statistics Canada enables a number of these proposals to be examined. Since any attempt to increase literacy would benefit from knowing what diminishes it, the results presented herein should prove valuable.

DESCRIPTION OF STATISTICS CANADA SURVEY

Statistics Canada administered a questionnaire and the Survey of Literacy Skills Used in Daily Activities (1989) to a representative sample of approximately 9,500 persons aged 16 to 69 years. The questionnaire gathered information on demographic conditions, socioeconomic status, parents' education, and perceptions of literacy skills and needs. The Survey of Literacy Skills in Daily Activities is a direct assessment of reading, writing, and numeracy skills commonly needed to live in Canada.

Statistics Canada reported descriptive results of the study, including literacy levels in each part of the country and for various groups. No report was made on the causes of the differences in literacy levels that were found.

METHOD

Selection of Proposed Factors to Explore

Five proposed causes for the lower levels of literacy in Newfoundland and Labrador that could be tested using the Statistics Canada data were identified.

1. *The brain-drain factor* -- This proposal starts from the fact that many individuals born in the province emigrate to other parts of Canada. The proposal assumes that those who leave are the ones better able to find work elsewhere, because they are more literate. When individuals with higher than average literacy leave, the average literacy level of the population that remains is lowered.
2. *The age factor* -- Newfoundland and Labrador instituted compulsory education later than any other province in Canada. Furthermore, the law was not enforced properly until the middle 1950s. Also, before the middle 1950s, many individuals in the province had poor access to education. Thus, on average, those born in Newfoundland and Labrador before about 1950 had less educational opportunity than similarly aged individuals in the rest of Canada. With less educational opportunity, lower levels of literacy can be expected. Thus, an older cohort of less literate individuals lowers the province's overall literacy level. Coupled with this proposal is the assumption that younger individuals in Newfoundland and Labrador have literacy levels equal to the rest of the country.
3. *The rurality factor* -- This explanation proposes that Newfoundland and Labrador has a greater percentage of its population living in more rural areas. Since more rural areas tend to have lower literacy levels than more urban areas, the province's average literacy

level is reduced with respect to the rest of Canada.

4. *The educational attainment factor* -- The thinking here is that educational attainment in Newfoundland and Labrador is less than in the rest of Canada. Since educational attainment is assumed to be linked closely to literacy development, the lower educational attainment is assumed to lead to lower literacy in the province.

5. *The parents' education factor* -- This proposed explanation is not based on the educational attainment of the individuals surveyed, but on the educational attainment of their parents. The assumption is that the educational attainment of parents affects the literacy levels of their children. Since the historical average educational attainment in Newfoundland and Labrador is less than in the rest of Canada, the overall literacy levels of the province are expected to be lower on account of this.

Sample Selection

Not all of the Statistics Canada sample was used in our analysis. Provinces such as Ontario and British Columbia have much higher immigration than Newfoundland and Labrador. To include this great variety of immigrants would make findings much more difficult to interpret, since the Newfoundland and Labrador sample would be less comparable to the samples from other provinces. It was decided to include in the analysis only those individuals born in Canada.

Virtually all of the people in Newfoundland and Labrador are native speakers of English. Other provinces have higher proportions of French native speakers, and of non-English and non-French native speakers. Therefore, in order to make the samples from other provinces more comparable to Newfoundland and Labrador, it was decided to include in the sample only native speakers of English.

From each province there were individuals for whom data on their education and their parents' education was missing. Since having data on these two factors was crucial to our analysis, we excluded from the sample individuals with data missing on either.

Table 1 gives the number of individuals included for each province.

Table 1

Sample Size by Province

Province	Sample Size
NFLD	340
PEI	64
NS	385
NB	300
QUE	63
ONT	1161
MAN	188
SASK	234
ALTA	456
BC	839
TOTAL	4030

Hypothesis Testing Techniques

The brain-drain hypothesis was tested by comparing the literacy levels of persons born in Newfoundland and Labrador and living in the province to persons born in Newfoundland and Labrador but living in other provinces. A difference that favours those who live in other provinces would support the brain-drain hypothesis.

The other hypotheses were tested by determining the effects on literacy produced by the factors in question, removing these effects, and then looking at the literacy levels so adjusted to see whether differences in literacy levels between provinces still remain. Imagine, for example, that the educational attainment factor is under consideration. Suppose the higher people's educational attainment the higher tends to be their literacy. Suppose further that educational attainment in Newfoundland and Labrador is lower than in other provinces. If educational attainment is what accounts for any differences in literacy levels between Newfoundland and Labrador and the rest of the country, then when the effect of educational attainment on literacy is removed, there should be no differences in literacy levels between Newfoundland and Labrador and the other provinces. If the differences do disappear, then the educational attainment hypothesis is supported; if the differences remain, then the educational attainment hypothesis is challenged; if the differences are reduced but do not disappear, then educational attainment is one factor contributing to reduced literacy levels, but is not the entire story. But what if the differences do not disappear as a response to this technique? The question then arises: If the differences remain after examining them factor by factor, will they remain if all the factors are considered at once? If the differences do not disappear, then we shall have to look beyond demographic factors for an explanation.

RESULTS

Comparison of Provincial Literacy

Table 2 gives the average reading literacy score on the Survey of Literacy Skills Used in Daily Activities for each province. Note that there is a tendency for scores to increase from east to west in the country. Newfoundland and Labrador has the lowest average score.

Table 2

Average Reading Literacy Scores by Province

Province	Average Reading Literacy
NFLD	236
PEI	243
NS	258
NB	262
QUE	261
ONT	266
MAN	269
SASK	265
ALTA	273
BC	272
CANADA	264

Figure 1 shows how each province's average score compares to the average score for the entire country. The horizontal line marked "0" in the left-hand margin represents the average reading literacy score for Canada (the score is actually 264, as indicated at the right). The vertical bars represent the amount by which each province's average differs from the Canadian average. Bars above the line marked "0" indicate the amount by which a province's reading literacy exceeds the national average; bars below the line indicate how much a province's average reading literacy falls below the national average. Newfoundland and Labrador falls below the national average by about 28 points, or by over 10% of the national average score. Newfoundland and Labrador has a significantly lower average reading literacy than every province except Prince Edward Island.

These data raise the central question for this study: Why is the average reading literacy of Newfoundland and Labrador lower than the national average, and lower than the average for every province except Prince Edward Island?

The Brain-drain Hypothesis

Table 3 gives the average reading literacy scores for people born in Newfoundland and Labrador and living there, and those born in Newfoundland and Labrador and living elsewhere. The average for those living in the province is substantially less than the average for those living elsewhere. The average literacy of those born in the province and living elsewhere is less than the average literacy for the country, but only slightly so, and greater than or nearly equal to the average for four provinces. The brain-drain hypothesis is supported by these data.

FIGURE 1

Provincial Reading Literacy Compared to the Canadian Average

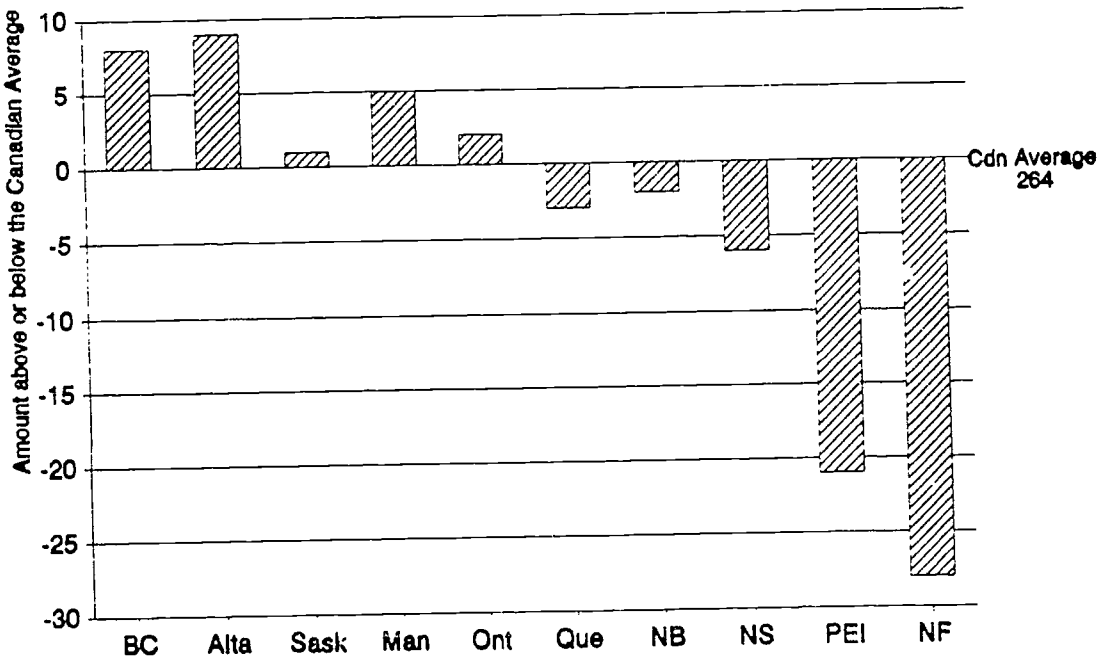


Table 3

Literacy Levels for Individuals Born in Newfoundland and Labrador

	Living in Newfoundland and Labrador	Living Elsewhere
Number	323	47
Average Literacy Score	235	260

The Age Hypothesis

Figure 2 compares the average reading literacy for different age groups in Newfoundland and Labrador to the average for these groups in the entire country. As the groups get older, literacy tends to decrease, both for Newfoundland and Labrador and Canada as a whole. The literacy levels in Newfoundland and Labrador are lower than Canada for all age groups. The differences between Newfoundland and Labrador and the Canadian average are less for the younger age groups, but even for the youngest group a significant difference remains. These data suggest that the age hypothesis is probably not valid. If it were valid, the younger groups in Newfoundland and Labrador would have literacy levels equal to their national counterparts.

FIGURE 2

Newfoundland and Labrador Reading Literacy Compared to Canadian Average by Age

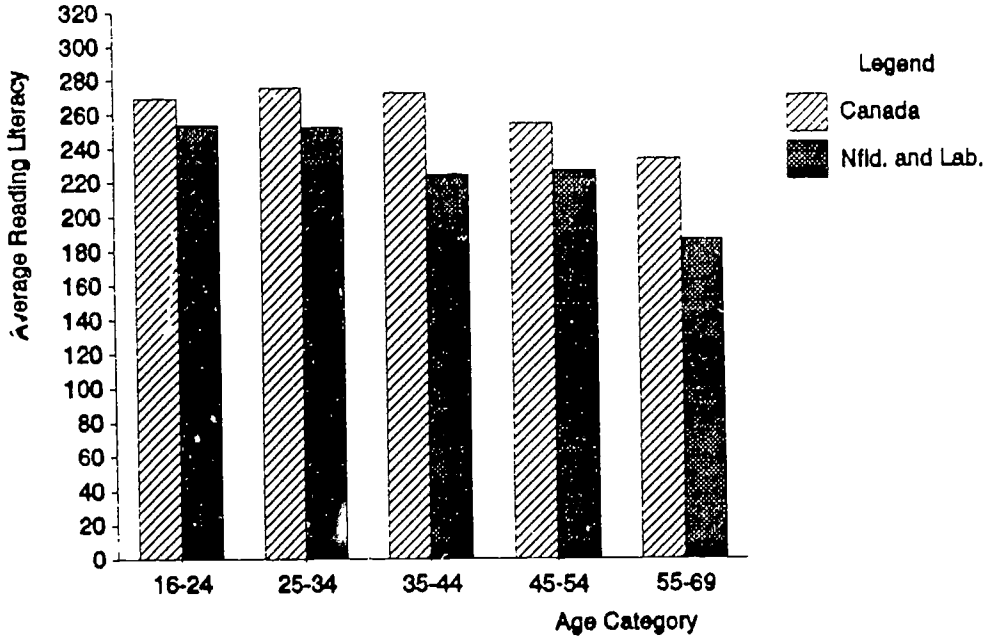


Table 4 gives the average literacy scores by age for each province and for the entire country. The data support the conclusion that for every province age has a negative effect on reading literacy. A one-step increase in the age scale leads to about an 8.5 point decrease in reading literacy score. The negative effect exists for all provinces, but is stronger in Newfoundland and Labrador, Prince Edward Island, and Quebec than in the other provinces. Figure 3 shows how much each province's average reading literacy differs from the national average after the effects of age are removed. By comparison with Figure 1, it can be seen that removing the effect of age on literacy makes very little difference. Newfoundland and Labrador is still farther below the national average than any other province, and still has a reading literacy that is significantly lower than all other provinces except Prince Edward Island. Thus, while age accounts for a small amount of the difference in reading literacy between Newfoundland and Labrador and the rest of the country, the proportion is so small that the age hypothesis is not very viable.

Table 4

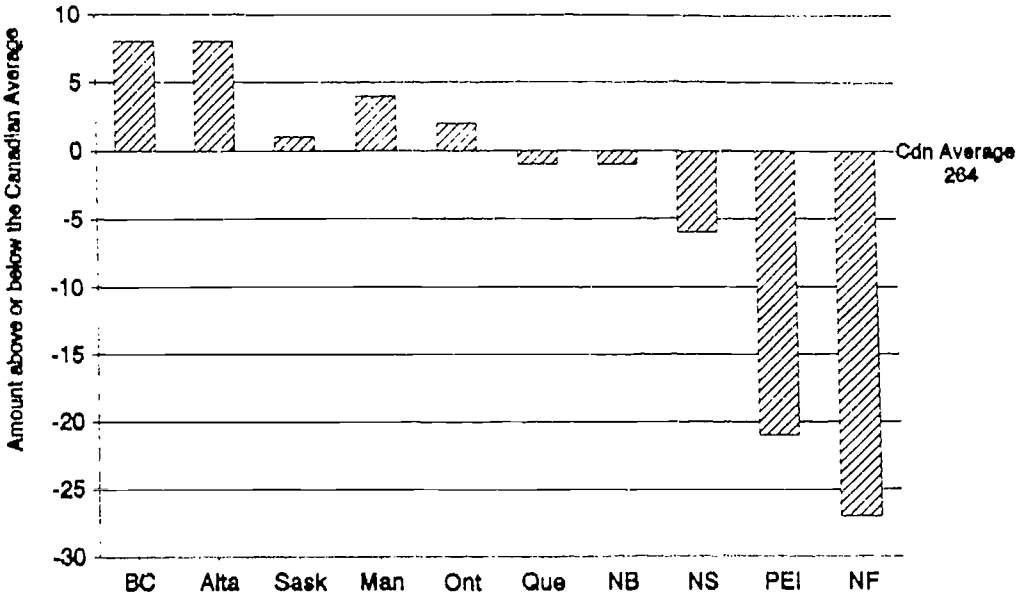
Literacy Levels by Age and Province

Age	NFLD	PEI*	NS	NB	QUE	ONT	MAN	SASK	ALTA	BC	CAN
16-24	254	268	263	260	273	269	269	272	274	276	269
25-34	252	274	272	270	279	278	281	269	281	282	276
35-44	242	224	268	270	275	277	275	271	286	280	273
45-54	227	198	242	254	281	255	266	268	265	267	255
55-69	187	192	225	240	218	239	245	241	246	245	234

* For PEI the small number of individuals in each age group make the literacy scores unreliable.

FIGURE 3

Provincial Reading Literacy Compared to the Canadian Average with Effects of Age Removed



The Rurality Hypothesis

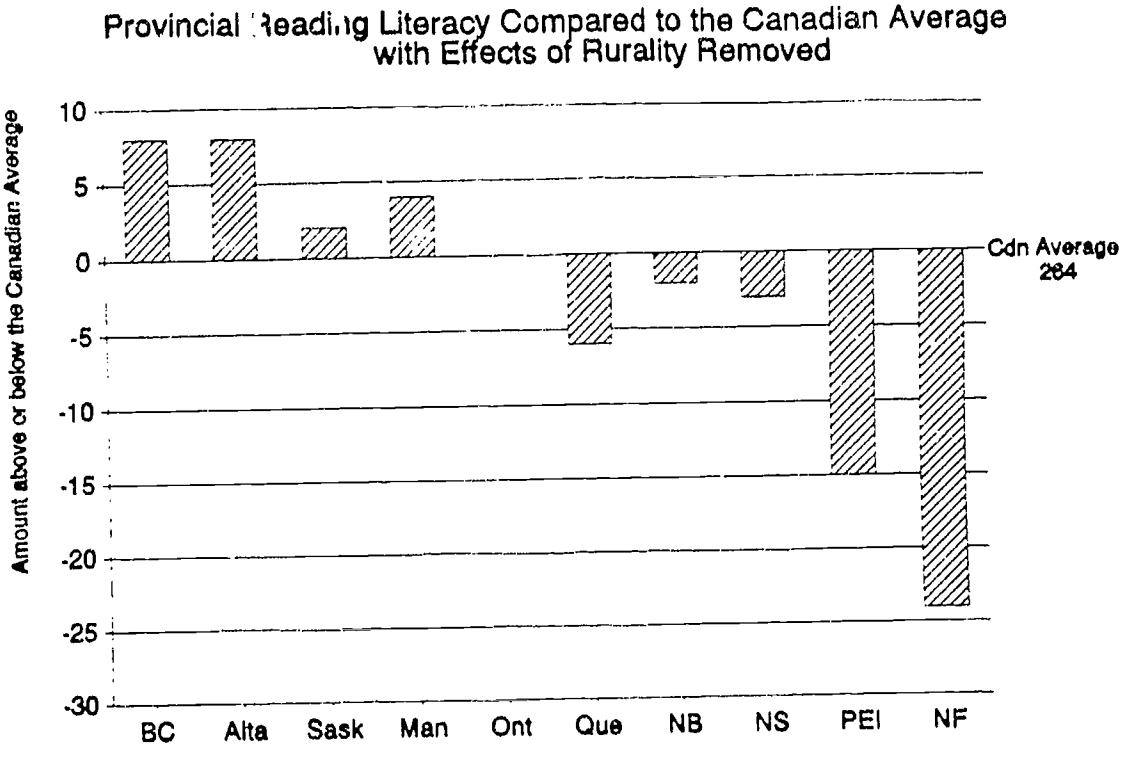
Table 5 shows that reading literacy decreases as urban areas in the country become smaller, and is lowest for rural areas. Figure 4 shows how the average literacy levels for the provinces compare after the effects of rurality on literacy are removed. Comparing to Figure 1, Newfoundland's and Labrador's average reading literacy is still less than the national average, but by a slightly smaller amount. Thus, like the age hypothesis, the rurality hypothesis receives little support from the data.

Table 5

Average Reading Literacy by Population of Area of Residence

Population	Average Reading Literacy
urban 500,000 or over	274
urban 100,000 - 499,999	272
urban 30,000 - 99,999	269
urban 29,999 or less	259
rural	256

FIGURE 4



The Educational Attainment Hypothesis

Differences in educational attainment are often cited as the most important reason why literacy levels in Newfoundland and Labrador are lower than in the rest of the country. Educational attainment was measured on a seven-point scale as in Table 6. Table 7 displays the average educational attainment for each province. The average for Newfoundland and Labrador is lower than for every province except Prince Edward Island, which it equals at between "secondary school certificate or diploma" and "some trade or vocational training; some community college, technical institute, teachers' college, or nursing school". The average for the highest province, Quebec, is "some trade or vocational training; some community college, technical institute, teachers' college, or nursing school".

Table 6

Levels of Educational Attainment

Level	Description
1	no school or kindergarten only
2	elementary school; some secondary school
3	secondary school certificate or diploma
4	some trade or vocational training; some community college, technical institute, teachers' college, or nursing school
5	trade or vocational certificate or diploma; community college, technical institute, teachers' college, or nursing school certificate or diploma
6	some university; certificate or diploma below bachelor's level
7	bachelor's degree or above

Table 7

Average Educational Attainment by Province

NFLD	3.5
PEI	3.5
NS	3.7
NB	3.8
QUE	4.0
ONT	3.7
MAN	3.6
SASK	3.8
ALTA	3.8
BC	3.7

As shown in Figure 5, the Statistics Canada data support the belief that education has a strong effect on literacy, both for Canada as a whole, and for Newfoundland and Labrador. For all of Canada, an increase in educational attainment of one point on the scale, say from elementary school to a secondary school certificate, leads to about an 11-point increase in the reading literacy score. This is greater than the difference in reading literacy for more than half of the possible pairs of provinces. Although not apparent from Figure 5, the effect of educational attainment on reading literacy varies for provinces from 9.2 for Alberta to 15.6 for Newfoundland and Labrador. Newfoundland and Labrador has the lowest average educational attainment (with Prince Edward Island), but it is the province where educational attainment has the greatest effect on literacy levels. Even at the highest levels of educational attainment, however, the literacy of Newfoundland and Labrador is lower than the national average. What if, one might ask, the effect of educational attainment on literacy were removed? Would the literacy of Newfoundland and Labrador equal that of the rest of the country?

FIGURE 5

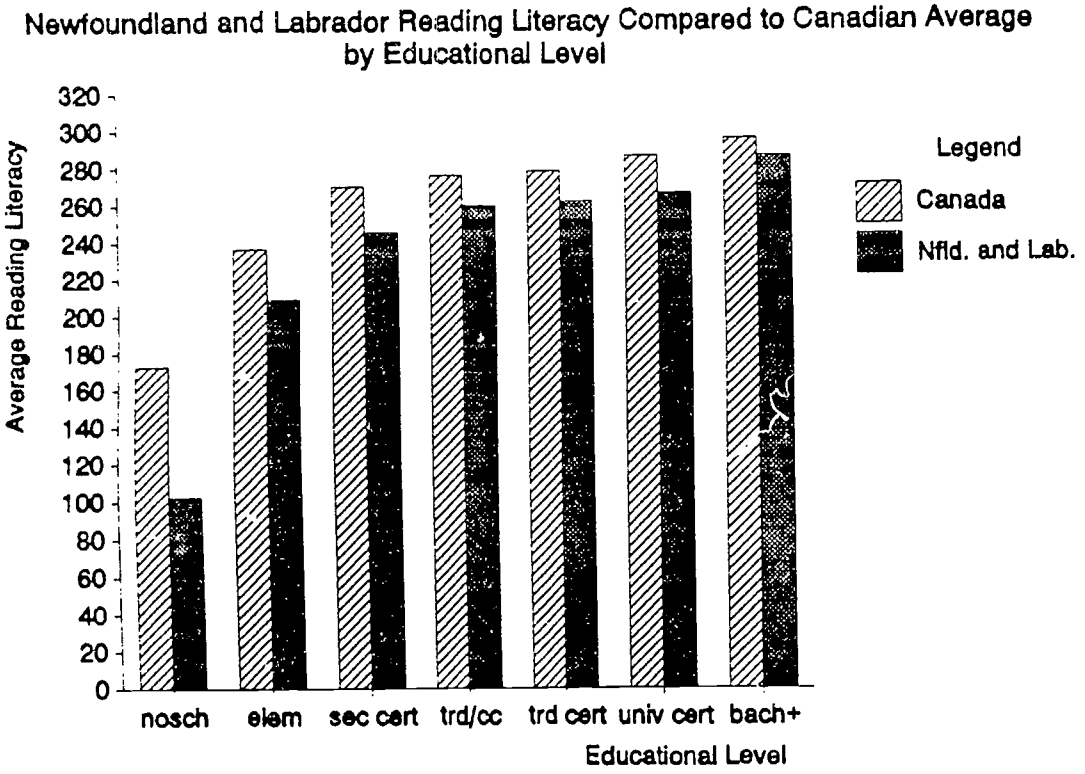
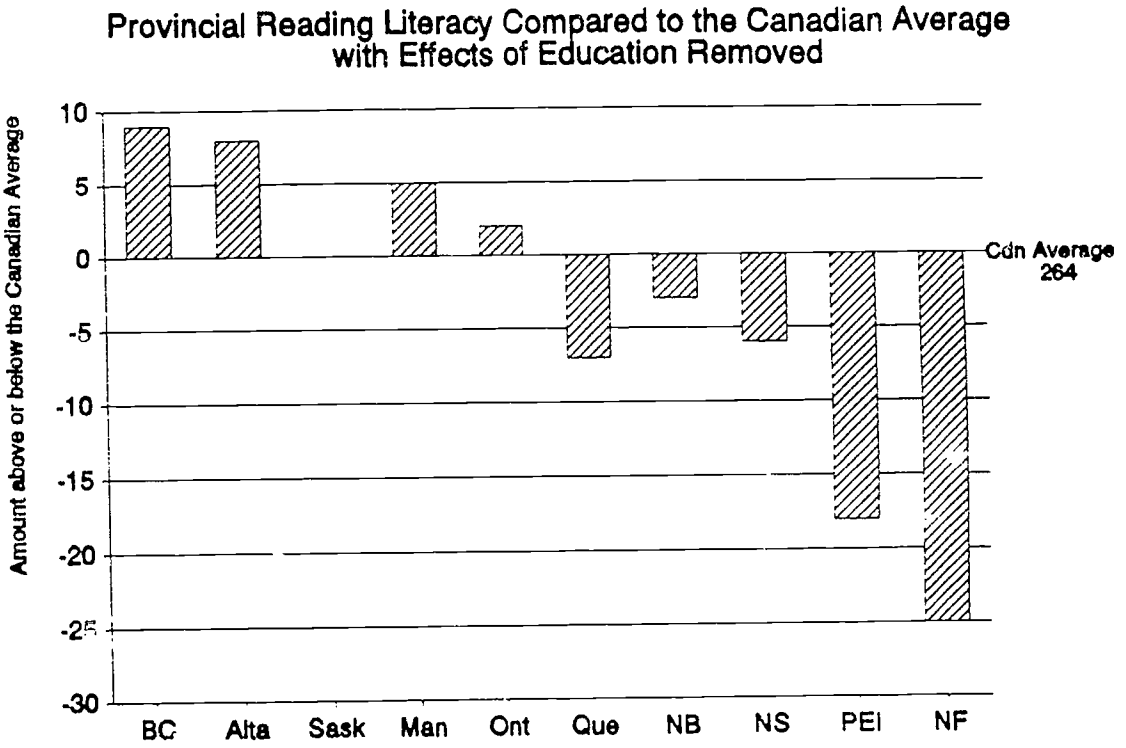


Figure 6 compares the average reading literacy scores for each province after the effects of educational attainment have been removed. After the adjustment, the average reading literacy score of Newfoundland and Labrador is 25 rather than 28 points below the national average. Thus, removing the effect of differences in educational attainment by no means eliminates the difference in literacy between Newfoundland and Labrador and Canada. It makes very little difference. Therefore, the educational attainment hypothesis is not supported well by these data.

FIGURE 6



The Parents' Education Hypothesis

Table 8 shows the average level of parents' education for each province according to the same scale used to rate the educational levels of participants. The numbers are higher than for the individuals because they represent the sum of fathers' and mothers' education. The level for Newfoundland and Labrador is lower than for any other province. For the country as a whole and for each province taken individually, parents' education has a significant positive effect on reading literacy attainment. For the country as a whole, increasing parent's education by one point on the scale leads on average to about a five-point increase in literacy level. Figure 7 shows what happens to the comparison of Newfoundland and Labrador literacy levels with the national average when the effect of parents' education is removed. The reading literacy of Newfoundland and Labrador is still significantly lower than that of every province except Prince Edward Island and is still 24 points below the national average. The parents' education hypothesis is not supported.

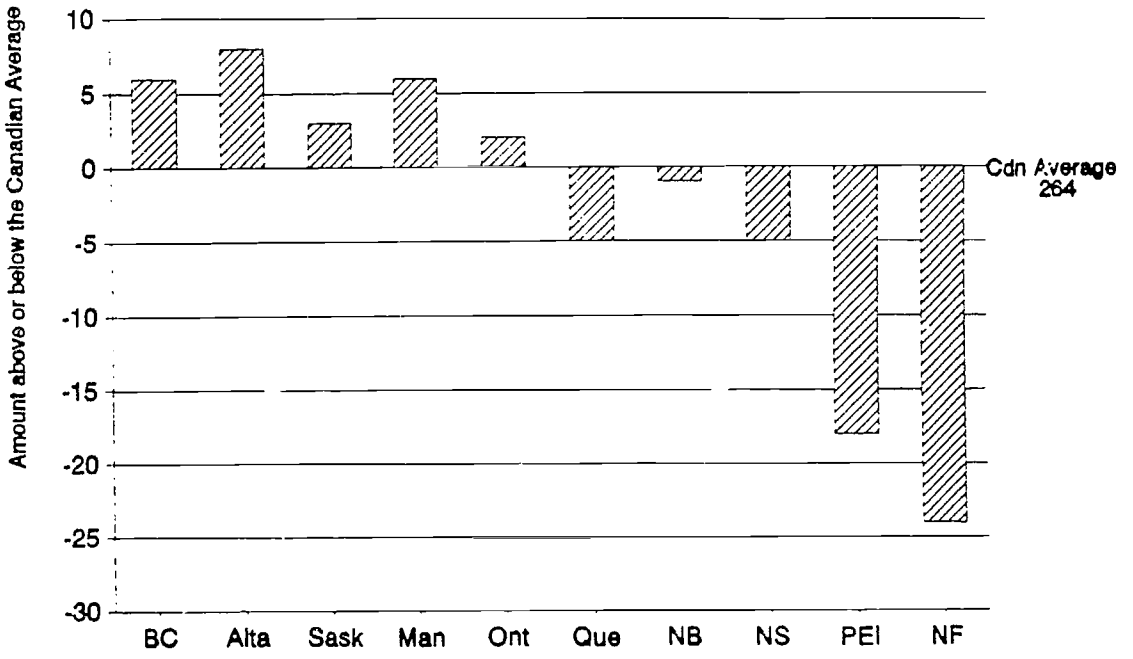
Table 8

Parents' Educational Level by Province

NFLD	4.9
PEI	5.3
NS	5.5
NB	5.5
QUE	6.2
ONT	5.9
MAN	5.5
SASK	5.4
ALTA	6.0
BC	6.3

FIGURE 7

Provincial Reading Literacy Compared to the Canadian Average with Effects of Parent's Education Removed



The All-factor Hypothesis

The all factor hypothesis fares like all the others. Literacy in Newfoundland and Labrador is still 24 points below the national average even when age, rurality, educational attainment, and parents' education are all taken into account at once. The combined effect of all these demographic factors cannot account for the difference in literacy between Newfoundland and Labrador and the Canadian average.

SUMMARY AND CONCLUSIONS

The Statistics Canada data provides an opportunity to test whether a number of demographic factors account for the lower literacy found in Newfoundland and Labrador compared to the rest of Canada. We focused on five factors: brain-drain, age, rurality, educational attainment, and parents' education. When the effects of each of the latter four factors on reading literacy were removed, the average reading literacy of Newfoundland and Labrador was still significantly lower than the national average (though slightly less below), and still significantly lower than the average for every province except PEI. Even when all of the latter four factors are taken together, the discrepancy between Newfoundland and Labrador and the nation is barely altered.

The brain-drain factor does, however, seem to be significant. Individuals born in Newfoundland and Labrador and living elsewhere in the country had a reading literacy equal to the average for the country. With more data on emigration it would be possible to estimate how much the average reading literacy of Newfoundland and Labrador would be increased if all

its Newfoundland and Labrador born emigrants returned.

Overall, the results suggest that demographics cannot account for the lower than average reading literacy in Newfoundland and Labrador. Something else must be examined. One factor that comes to mind is the cultural value system of Newfoundland and Labrador. If the culture is such that literacy is given less value than it is in the rest of the county, then this might account for the differences that are found. But this is speculation at this point.

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