

Overview of literacy skills in Canada

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Concern about the literacy of Canadians has grown in the past several years. Inadequate literacy skills can have devastating economic effects, hindering Canada's ability to train and redeploy its work force to compete internationally. It can have severe social consequences as well, marginalizing large numbers of Canadians who find themselves unable to participate fully in society.

To determine the scope and nature of the literacy problem, the National Literacy Secretariat commissioned Statistics Canada to conduct a survey that would assess directly the functional reading, writing and numeracy skills of Canada's adult population. This article recapitulates the main findings of the reading and numeracy portions of the survey. It also outlines the methodology used to design and score the test.

The survey

The Survey of Literacy Skills Used in Daily Activities (LSUDA) is indebted to earlier research by the National Assessment of Educational Progress in the United States and on the first direct study of the subject in Canada, the Southam Literacy Survey conducted in 1987.

The LSUDA consisted of a series of face-to-face interviews administered to a representative sample of approximately 9,500 persons aged 16 to 69, pre-selected from respondents to the monthly Labour Force Survey. It included a survey questionnaire on the respondent's background, and a preliminary round of test questions. If the respondent passed the preliminary test, a main test was administered. The main test involved a series of tasks designed to assess an individual's capacity to deal with the type of reading, writing and numeracy activities commonly encountered in daily life.

The LSUDA defined functional literacy as "the information processing skills necessary to use the printed material commonly encountered at work, at home and in the community."

Four levels of reading ability were identified (see [*Definitions of the literacy levels*](#)). In this report,

Canadians at Levels 1 and 2 are described as having skills too limited to deal with everyday reading demands in either French or English. Canadians at Level 4 have reading skills sufficient to meet everyday requirements, while those at Level 3 have a proficiency enabling them to handle reading demands within a more limited range.

To fairly assess the abilities of the individuals, all the test items simulated real life tasks. For instance, in a typical reading Level 3 task, respondents were asked to read a text given to them by the interviewer and to determine the date on which they had to return a form to their child's school. Rather than simply find a word (as in Level 2), they had to understand a sentence and decide what action it required. In a more complex Level 3 item, respondents were given a package of sandpaper and asked to determine whether, based on the directions printed on the package, they could use that sandpaper for a particular kind of job.

The functional numeracy skills of Canadian adults (see [*Definitions of the literacy levels*](#)) were assessed by using commonly encountered documents such as a swimming pool schedule, a bank deposit slip and a catalogue order form. Level 1 involved identifying numbers, Level 2 performing a single numerical operation, and Level 3 required respondents to perform a series of numerical operations. The numeracy skills measured reflect not only the ability to perform numeric operations but also to apply them within the context of the written document; that is, to follow the directions, whether implicit or explicit, which tell the reader what to do.

The results: Reading skills

Two-thirds of Canadians meet everyday requirements

The majority of adult Canadians, a full 62%, have reading abilities that enable them to deal with most everyday reading requirements (Level 4). The real significance of this finding is that their skills enable them to acquire further knowledge using written materials.

However, 16% of Canada's adults - 2.9 million - possess reading skills too limited to allow them to deal with much of the written material they encounter every day. This group includes individuals whose abilities are classified at Levels 1 (5%) and 2 (9%), as well as people who did not attempt the test because they reported having no abilities in either English or French (2%).

Meanwhile, a further 22% of adults - 4.0 million - fall between proficiency and limited ability. They can carry out simple reading tasks within familiar contexts with materials that are clearly laid out (Level 3). However, they do not have sufficient skills to cope with more complex reading tasks, such as reading a chart defining eligibility requirements for an employee benefit plan.

Across all four categories, there is no significant difference in the proportion of men and women

exhibiting the same level of skill.

High school completion is key to good reading skills

The LSUDA shows a strong relationship between secondary school completion and everyday reading skills. Only 8% of Canadians with high school completion are at Levels 1 and 2, while 70% have skills that permit them to meet daily demands.

An even larger percentage of Canadians with postsecondary training possess the highest level of reading proficiency. The great majority of Canadians who attended university (89%) or community college (81%) have reading skills estimated at Level 4. This percentage increases to 93% for university graduates with a bachelor's degree or above, and to 84% for those holding a community college diploma or certificate.

Higher reading skills found among younger Canadians

The effect of the emphasis now placed on education, compared to several generations ago, can be seen in the literacy rates for the different age groups. Close to three-quarters of young Canadian adults aged 16 to 34 possess sufficiently well-developed reading skills to deal with most written material encountered in daily living. Among those aged 55 to 69, however, the proportion drops to about one-third.

The strong relationship between educational attainment and reading proficiency is illustrated in the performance of those who took the test in English compared with those who took it in French: only 13% of English-speaking respondents are classified at Levels 1 and 2 compared with 18% of the French-speaking respondents. Closer examination of the pattern shows that age is likely the reason for this discrepancy. There are no significant differences between the language groups among those aged 16 to 24; it is the inclusion of the older adults that pushes down the rate obtained for the French-speaking respondents. The only apparent reason for this is that a smaller proportion of the older Canadians who took the French test had completed high school.



Table 1 Percentage distribution of persons aged 16 to 69 by reading skill levels, Canada and provinces, 1989

Source: Survey of Literacy Skills Used in Daily Activities



Table 2 **Percentage distribution of Canadian adults aged 16 to 69 by highest level of schooling, showing reading skill level, Canada, 1989**

Source: Survey of Literacy Skills Used in Daily Activities

Surprisingly, almost one-quarter of the youngest adults, aged 16 to 24, only have abilities classified at Level 3. This may be due in part to the type of documents used in the test, which are probably more familiar to older adults, who encounter them day to day, than to younger Canadians, who lack experience in dealing with them.

The results: Numeracy skills

Given the structure of the test, in which respondents had to read instructions in order to perform the numeracy tasks, it is not surprising that the numeracy profile of Canadian adults virtually mirrors the reading profile.

The majority of adults, 62%, have numeracy skills advanced enough to deal with printed material requiring a sequence of numerical operations (Level 3). Skills at this level allow Canadians to meet the numeracy demands of most everyday documents. But almost one in seven Canadian adults - 14% - have limited numeracy abilities (Level 1); they can locate and recognize numbers in isolation or in a short text, but they cannot perform numerical operations consistently.



Chart Reading and numeracy skills by language, 1989.

Source: Survey of Literacy Skills Used in Daily Activities

Note: For charting purposes, Levels 1 and 2 reading skills have been combined to form Level 1.

As was the case with reading skills, about one-quarter of Canadians fall between the two extremes: they possess the necessary skills to deal with commonly encountered documents and perform simple numerical operations such as addition and subtraction (Level 2).



Table 3 **Percentage distribution of persons aged 16 to 69 by numeracy skill levels, Canada and provinces, 1989**

Source: Survey of Literacy Skills Used in Daily Activities

Numeracy closely associated with reading

As might be expected, not only are the general population profiles of numeracy and reading ability similar, one skill is closely linked to the other. Canadian adults with limited reading abilities also have weak numeracy skills: 97% of Canadians at reading Level 1 and 68% of those at reading Level 2 have only Level 1 numeracy skills. Furthermore, only 34% of Canadians with reading skills at Level 3 have numeracy abilities sufficient to meet most everyday demands (Level 3).

It is interesting to note that 18% of Canadians with reading skills assessed at Level 4 do not achieve Level 3 numeracy abilities. Explaining this anomaly requires further analysis.



Chart **Relationship between reading and numeracy skills, 1989.**

Source: Survey of Literacy Skills Used in Daily Activities

Numeracy skills closely linked to level of schooling

Having strong numeracy skills is clearly related to the individual's level of schooling. A full 83% of adult Canadians who had attended university were assessed as having Level 3 abilities, but almost half (46%) of those who reported elementary schooling or less had limited numeracy skills (Level 1 abilities). Further confirmation of this pattern can be seen at the secondary school level: 65% of secondary school graduates were categorized at Level 3 numeracy, compared with 47% of those who had not completed their secondary education.

Highest functional numeracy found among those aged 25 to 34

One in seven young adults - 14% of those aged 16 to 24 - was assessed as having limited numeracy

abilities (Level 1). A further 25% only have sufficient skills to perform a simple numerical operation (Level 2). Yet this was observed among those who had most recently attended an educational institution.

Numeracy abilities are strongest among adults aged 25 to 34, with 69% of them classified at Level 3. The differences between the two age groups may be explained in part by the more limited exposure to everyday printed material among the youngest adults.

Literacy skills highest in the West

A definite geographic pattern can be observed in both reading and numeracy proficiency. The proportion of Level 4 readers is highest in Western Canada, and declines steadily from west to east. Future research might show that this is related to the migration patterns of the past decades, in which younger and better-educated Canadians moved west seeking more advantageous economic opportunities.



Table 4 Percentage distribution of persons aged 16 to 69 by highest level of schooling, showing numeracy skill level, Canada, 1989

Source: Survey of Literacy Skills Used in Daily Activities

Well over two-thirds of Canadians aged 16 to 69 in British Columbia, Alberta and Saskatchewan have Level 4 reading skills; British Columbia (70%) and Alberta (72%) also claim the highest proportions of numerically proficient adults. Reading results from Manitoba and Ontario indicate that 65% and 62% of their adult populations respectively have Level 4 abilities, and over 60% possess numeracy skills that enable them to meet most everyday demands.



Chart Reading and numeracy skills by age group, 1989.

Source: Survey of Literacy Skills Used in Daily Activities

Note: For charting purposes, Levels 1 and 2 reading skills have been combined to form Level 1.

Proficiency drops in the eastern regions of Canada. In Nova Scotia, New Brunswick and Quebec, between 15% and 20% of adults read at Level 1 or 2, while close to 57% exhibit the full range of Level 4

reading skills. Newfoundland, with almost one-quarter of its population at Levels 1 and 2 and another one-third at Level 3, registers the lowest estimated reading skills in Canada.

Consistent with the results of reading skills, the highest distribution of Canadians with limited functional numeracy skills (Level 1) is found in the east, with percentages ranging from 29% for Newfoundland to 19% for Quebec.

Higher income associated with higher literacy levels

It is difficult to assess the dollar cost of inadequate literacy skills - lost competitiveness, some industrial accidents, unemployment, poverty. Attempts by some researchers to quantify the loss both to business and to society have produced widely differing estimates. However, survey results show that people with limited literacy skills earn less than those with stronger abilities.

In general, a higher proportion of Canadians with above average incomes exhibit greater reading abilities. Only half of those with an income of \$10,000 or less tested at a Level 4 reading ability, while more than four-fifths of those with incomes over \$40,000 possess Level 4 skills.

This finding is not surprising. Many studies have shown that there is a strong positive relationship between education and income. So it might be expected, given the positive connection between literacy and education, that there is also a strong link between literacy and income.

Conclusion

The LSUDA results show that a majority of Canadian adults - two in every three - have reading and numeracy skills that are sufficiently well-developed to enable them to function capably at work, at home and in the community.

Another one-quarter have a more limited capacity, but are still able to function in a less demanding environment in which the materials they must read or calculate are familiar.

However, a significant minority of Canadian adults struggle with basic literacy tasks: 16% have difficulty reading and 14% have trouble performing numeric functions.

Proficiency diminishes with age and it rises with educational qualifications. Literacy rates decline steadily from west to east: the highest literacy levels are recorded in British Columbia, Alberta and Saskatchewan and the lowest are reported in Newfoundland.

LSUDA methodology: Assessing literacy in Canada

Identifying literacy skills

Recent research suggests that functional literacy is dependent on two connected skills: how to decode relatively small, but not necessarily related, chunks of text or numbers; and how to apply the information gained from reading that text to solve a problem. Thus, any assessment of functional literacy must take into account both decoding and decision criteria.

Furthermore, it is generally recognized that functional literacy skills do not fall neatly into categories, but rather form a continuum. At the same time, certain points along the continuum are worthy of particular attention because they reflect significant differences in literacy abilities. The literacy levels used by the LSUDA are simply points along the continuum that should be useful in identifying the types of programs and services needed to deal with Canada's literacy problem.

Choosing and scoring the test items

The LSUDA designers chose certain points along the literacy continuum in order to guide the development of test items. For example, items that were to distinguish the difference between Level 1 and Level 2 reading skills required only the ability to recognize and point out key words or short phrases in the text.

Since the LSUDA was primarily interested in the skills that underlie and generate the responses rather than the responses themselves, a measurement system that evaluated these underlying skills was necessary.

But the nature of simple "item correct" scoring - where the item is marked right or wrong - is such that it can easily reward a lucky guess and penalize a casual mistake. For the purposes of the LSUDA, it was important to have some ability to control for guessing and accidental errors. This was one of the several advantages of choosing Item Response Theory (IRT) for the LSUDA scoring procedures.

Selecting the levels on the continuum

The virtue of IRT is that the item difficulties and individual abilities are defined in terms of each other. To explain briefly, an item's difficulty can be defined as the level of ability an individual needs if he or she is to have a certain chance of answering the item correctly; similarly, an individual's ability is defined as the level of difficulty of those items which that individual has a certain chance of answering correctly.

Because we are interested in a rigorous and realistic standard, we have defined that chance as 80%.

Therefore, an individual's level is defined as the difficulty of the most difficult item that the individual has an 80% chance of answering correctly; that is, an individual's level is the highest level at which he or she can perform consistently.

At the same time that the levels were set, a technique known as cluster analysis was used to group the literacy test items. This type of analysis uses several statistical verification procedures to find the most natural groupings of objects, in this case the test items. The groups of items thus derived matched those formulated by the theory adopted by the test's designers. This convergence of evidence demonstrating that the levels chosen are appropriate strengthened confidence that they had been properly identified.

A detailed methodological report on the design and scoring technique used by the LSUDA is available from the authors.

Definitions of the literacy levels

The LSUDA designers selected certain points along the functional literacy continuum as representing significant characteristics of literacy. These levels, defining the capabilities exhibited by the respondents, are described below.

It should be noted that neither the reading nor the numeracy results include a full complement of respondents. About 2% of the respondents did not take any part of the test because they reported having no skills in either official language. These people were classified to reading Level 1 for inclusion in the general results. However, because no data were collected for them, they are excluded from all subsequent analysis by demographic or socio-economic characteristics.

An additional 3% of respondents, representing about 500,000 Canadians, failed the preliminary test. The numeracy results therefore exclude these people because the numeracy component was contained in the main test. Thus population counts in the tables showing the reading and the numeracy results are not the same.

Assessment of reading skills

Level 1: Canadians who have difficulty dealing with printed materials. They most likely identify themselves as people who cannot read.

Level 2: Canadians who can use printed materials only for limited purposes such as finding a familiar word in a simple text. They would likely recognize themselves as having difficulties with common reading materials.

Level 3: Canadians who can use reading materials in a variety of situations provided the material is simple, clearly laid out and the tasks involved are not too complex. Although these people generally do not see themselves as having major reading difficulties, they tend to avoid situations requiring reading.

Level 4: Canadians who meet most everyday reading demands. This is a large and diverse group which exhibits a wide range of reading skills.

Assessment of numeracy skills

Level 1: Canadians who are able, at most, to locate and recognize numbers in isolation or in a short text.

Level 2: Canadians who can perform a simple numerical operation such as addition or subtraction.

Level 3: Canadians who can perform sequences of numerical operations which enable them to meet most everyday demands.

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Source

Perspectives on Labour and Income, Winter 1990, Vol. 2, No. 4 (Statistics Canada, Catalogue 75-001E). This is the third of six articles in the issue.

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Table 1
Percentage distribution of persons aged 16 to 69 by reading skill levels, Canada and provinces, 1989

| | Population | Reading skills | | | |
|----------------------|---------------|----------------|----------|-----------|-----------|
| | | Level 1 | Level 2 | Level 3 | Level 4 |
| | '000 | % | | | |
| Canada | 18,024 | 7 | 9 | 22 | 62 |
| Atlantic | 1,546 | 6 | 13 | 30 | 52 |
| Newfoundland | 384 | 7 | 17 | 36 | 39 |
| Prince Edward Island | 85 | -- | -- | -- | -- |
| Nova Scotia | 594 | 5 | 10 | 28 | 57 |
| New Brunswick | 483 | 6 | 12 | 26 | 56 |
| Quebec | 4,721 | 6 | 13 | 25 | 57 |
| Ontario | 6,689 | 9 | 8 | 21 | 62 |
| Prairies | 2,984 | 4 | 7 | 19 | 70 |
| Manitoba | 703 | 5 | 7 | 23 | 65 |
| Saskatchewan | 632 | 3 | 5 | 19 | 72 |
| Alberta | 1,649 | 4 | 7 | 17 | 71 |
| British Columbia | 2,084 | 5 | 7 | 19 | 69 |

Source: Survey of Literacy Skills Used in Daily Activities

Table 2

Percentage distribution of Canadian adults aged 16 to 69 by highest level of schooling, showing reading skill level, Canada, 1989

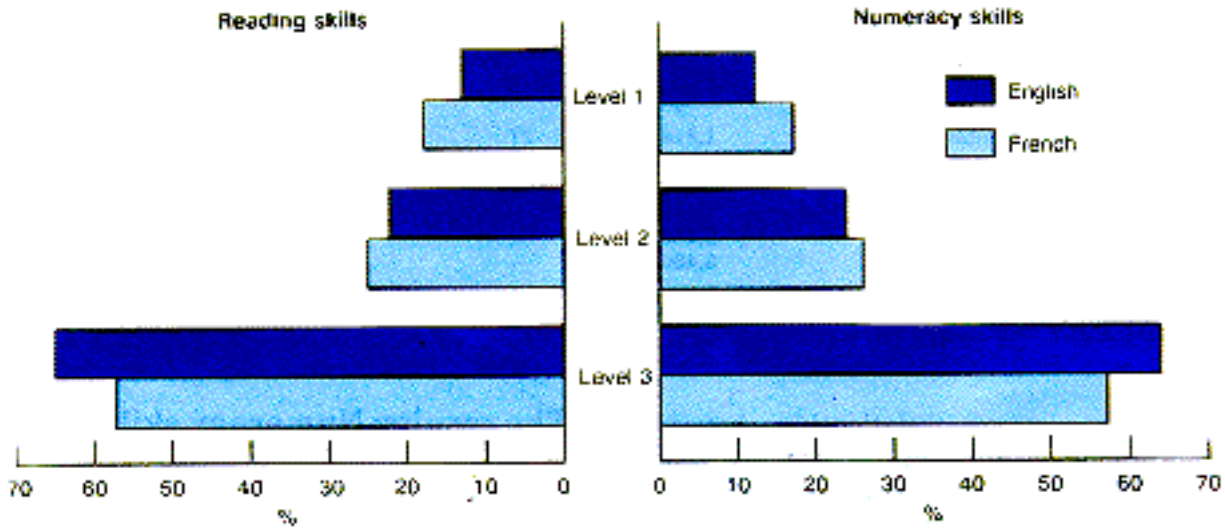
| | Population | Reading skills | | | |
|----------------------------|---------------|----------------|-----------|-----------|-----------|
| | | Level 1 | Level 2 | Level 3 | Level 4 |
| | '000 | % | | | |
| Canada* | 17,705 | 5 | 10 | 22 | 63 |
| No schooling or elementary | 1,818 | 27 | 33 | 28 | 12 |
| Some secondary | 4,427 | 3 | 13 | 35 | 48 |
| Secondary completed | 4,181 | -- | 6 | 22 | 70 |
| Trade school | 1,133 | -- | -- | 25 | 63 |
| Community college | 2,458 | -- | -- | 15 | 81 |
| University | 3,456 | -- | -- | 8 | 89 |

Source: Survey of Literacy Skills Used in Daily Activities

** Total includes "Not Stated" level of schooling.*

Reading and numeracy skills by language, 1989

Those who took the test in English attained higher skills levels, due to the greater proportion of high school graduates among these respondents.



Source: Survey of Literacy Skills Used in Daily Activities

Note: For charting purposes, Levels 1 and 2 reading skills have been combined to form Level 1.

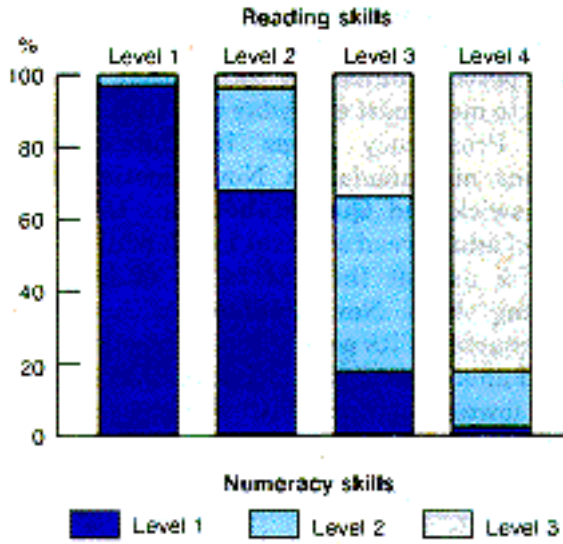
Table 3
Percentage distribution of persons aged 16 to 69 by numeracy skill levels, Canada and provinces, 1989

| | Population | Numeracy skills | | |
|----------------------|---------------|-----------------|-----------|-----------|
| | | Level 1 | Level 2 | Level 3 |
| | '000 | % | | |
| Canada | 17,206 | 14 | 24 | 62 |
| Atlantic | 1,497 | 24 | 24 | 52 |
| Newfoundland | 369 | 29 | 26 | 45 |
| Prince Edward Island | 79 | -- | -- | -- |
| Nova Scotia | 581 | 21 | 23 | 56 |
| New Brunswick | 468 | 22 | 24 | 54 |
| Quebec | 4,577 | 19 | 27 | 54 |
| Ontario | 6,228 | 11 | 25 | 64 |
| Prairies | 2,888 | 10 | 22 | 68 |
| Manitoba | 678 | 13 | 26 | 61 |
| Saskatchewan | 620 | 9 | 26 | 65 |
| Alberta | 1,589 | 8 | 20 | 72 |
| British Columbia | 2,015 | 9 | 22 | 70 |

Source: Survey of Literacy Skills Used in Daily Activities

Relationship between reading and numeracy skills, 1989

Skills needed to read and to perform arithmetic functions are interdependent.



Source: Survey of Literacy Skills Used in Daily Activities

Table 4

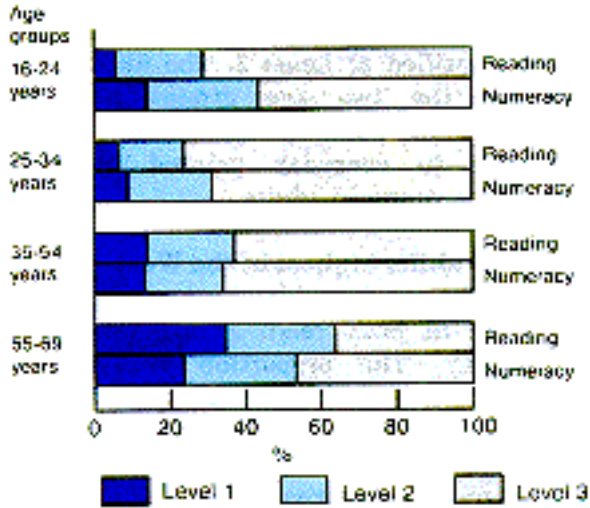
Percentage distribution of persons aged 16 to 69 by highest level of schooling, showing numeracy skill level, Canada, 1989

| | Population | Numeracy skills | | |
|---------------------------------|---------------|-----------------|-----------|-----------|
| | | Level 1 | Level 2 | Level 3 |
| | '000 | % | | |
| Canada | 17,206 | 14 | 24 | 62 |
| No schooling or elementary only | 1,518 | 46 | 32 | 22 |
| Some secondary | 4,363 | 20 | 33 | 47 |
| Secondary completed | 4,123 | 10 | 26 | 64 |
| Trade school | 1,095 | 12 | 23 | 65 |
| Community college | 2,446 | 5 | 19 | 76 |
| University | 3,451 | 3 | 14 | 83 |

Source: Survey of Literacy Skills Used in Daily Activities

Reading and numeracy skills by age group, 1989

The high proportion of young adults with lower skills levels is probably due to their unfamiliarity with everyday documents.



Source: Survey of Literacy Skills Used in Daily Activities
 Note: For charting purposes, Levels 1 and 2 reading skills have been combined to form Level 1.