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1.0 Introduction

The data file in this package is a compilation of the IALS data sets received from the various participating countries. No changes to these data sets have been made from what was received from each country. The documentation for individual countries that is provided in this manual is the information that was provided by each IALS country. Further information on the individual data files or supporting documentation should thus be addressed to the appropriate study manager. Their contact information is given below. It should be noted that Australian IALS data is only available through the Australian Bureau of Statistics, for confidentiality reasons.

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2.0 Background

In recent years, adult literacy has come to be seen as crucial to the economic performance of industrialized nations. Literacy is no longer defined merely in terms of a basic threshold of reading ability which everyone growing up in developed countries is expected to attain. Rather, literacy is now equated with an individual's ability to use written information to function in society. Unlike their predecessors, adults today need a higher level of literacy to function well, because society has become more complex and low-skill jobs are disappearing. Inadequate levels of literacy in a broad section of the population may therefore have serious implications, even threatening a nation's economic strength and social cohesion.

Because of these high stakes, governments have a growing interest in understanding the level and distribution of literacy within their adult populations, and in learning what can be done to improve literacy. Accordingly, in recent years, many governments have tried for the first time to measure adult literacy directly. Pioneering studies (Kirsch and Jungeblut 1986; Kirsch and Mosenthal 1990; Statistics Canada 1991; Kirsch, Jungeblut, and Campbell 1992; Kirsch, Jungeblut, Jenkins, and Kolstad 1993) published in North America in the early 1990s revealed that significant percentages of adults lacked the literacy skills they were likely to need in everyday life. In 1992, the Organisation for Economic Co-operation and Development (OECD) concluded that low literacy levels were a serious threat to economic performance and social cohesion (OECD 1992). Yet a lack of comparable international data prevented a broader inquiry into literacy problems and consequent policy lessons across industrialized countries.


The International Adult Literacy Survey (IALS) was undertaken by thirteen governments¹ and three intergovernmental organizations² in a collaborative effort to fill this need for information. In this survey, large samples of adults (ranging from 1,500 to 6,000 per country) worldwide were given the same broad test of their literacy skills during between 1994 and 1996. The results provide the most detailed portrait ever created on the condition of adult literacy and its relationship with an array of background and demographic characteristics. The study's findings were summarized in a report published in December 1995, entitled *Literacy, Economy and Society: Results of the first International Adult Literacy Survey*³, and a subsequent report elaborating on the findings published in November 1997, entitled *Literacy Skills For The Knowledge Society: Further Results from the International Adult Literacy Survey*.⁴ Several countries have published

1 Canada, Switzerland (German), Switzerland (French), Germany, United States, Ireland, Netherlands, Poland, Sweden, New Zealand, Great Britain, Northern Ireland, and Belgium (Flanders).

2 OECD, European Union, and UNESCO.

3 *Literacy, Economy and Society: Results of the first International Adult Literacy Survey*. Organization for Economic Co-operation and Development and Minister of Industry, (Statistics Canada Catalogue no. 89-545-XPE), 1995.

4 *Literacy Skills For The Knowledge Society: Further Results from the International Adult Literacy Survey*. Organization for Economic Co-operation and Development and Human Resources Development Canada, 1997.



National Reports as well — the respective National study managers as outlined in the introduction should be contacted for additional details.

This document summarizes the survey concepts and operations of the international survey. It is important for users to become familiar with the contents of this document before publishing or otherwise releasing any estimates derived from the IALS microdata file.

3.0 Objectives

The IALS venture was initiated with two fundamental goals:

- 1) The first objective was to develop an assessment instrument that would permit useful comparisons of literacy performance across languages and cultures.
- 2) If such an assessment could be created, the second goal was to perform such comparisons, describing the literacy skills of people from different countries; each country's skill profile would be obtained by conducting a sample survey of households representative of the entire adult population.

The central element of the survey was the direct assessment of the literacy skills of respondents using commonplace tasks of varying degree of difficulty drawn from a range of topic and knowledge areas. This information was supported by the collection of background information on respondents. In addition, the background questionnaire included questions on the self-assessment of literacy skills of respondents, on the training which the respondent has taken in the year previous to the survey and on the perceived barriers to realizing enhanced literacy skill levels.

4.0

Concepts and Definitions

This chapter outlines concepts and definitions of interest to the users. Users are referred to section 9 of this document for a copy of the actual survey forms used.

4.1

Defining and Measuring Literacy

Many studies have treated literacy as a condition that adults either have or do not have, and thereby tried to count the number of illiterate members of the population. Such efforts typically define literacy in terms of the number of years of schooling completed, or by grade-level scores on school-based reading tests.

The IALS survey design team agreed that it would be undesirable to establish a single international standard for literacy. Such a standard would not only be arbitrary, but would also fail to acknowledge the multifaceted nature of literacy and the complexity of the literacy problem. Therefore, the participating countries concurred that, in common with recent North American and Australian surveys, the IALS would define literacy in terms of a mode of adult behaviour, namely:

Using printed and written information to function in society, to achieve one's goals, and to develop one's knowledge and potential.

This definition attempts to encompass a broad set of information-processing skills that adults may use in performing different types of tasks at work, at home, or in their communities. Some other types of knowledge and skill (including teamwork, interpersonal skills, and other communication skills) were also recognized as being important but could not be measured with the resources available.

According to the IALS definition, literacy is neither a single skill used in dealing with all types of text, nor an infinite set of skills, each particular to a different type of material. Thus, following the example of the North American studies noted earlier, the IALS team defined three domains of literacy:

- a) *Prose literacy*—the knowledge and skills needed to understand and use information from texts including editorials, news stories, poems, and fiction;
- b) *Document literacy*—the knowledge and skills required to locate and use information contained in various formats, including job applications, payroll forms, transportation schedules, maps, tables, and graphics; and
- c) *Quantitative literacy*—the knowledge and skills required to apply arithmetic operations, either alone or sequentially, to numbers embedded in printed materials, such as balancing a checkbook, calculating a tip, completing an order form, or determining the amount of interest on a loan from an advertisement.

Rather than define a threshold for competency—a standard that distinguishes the so-called “literate” from the “illiterate”—researchers constructed a scale from 0 to 500 in

each of these three literacy domains. Tasks of varying difficulty can be placed along these scales. A person's literacy ability in each domain is expressed by a score, which is the point on the scale at which he or she has an 80 percent chance of successfully performing a given literacy task. Individuals can then be grouped into five levels of literacy, defined by score ranges (Level 1 includes scores from 0 to 225, Level 2 contains scores from 226 to 275, and so on). These levels are useful in analyzing and reporting the survey results and in designing remedial programs.

The use of three parallel literacy scales makes it possible to profile and compare the various types and levels of literacy demonstrated by adults in different countries and by subgroups within those countries. The scales also help policy makers, business leaders, educators, and others to understand the broad and diverse nature of literacy.

4.2

Defining and Measuring Literacy Performance on Three Scales

The performance results for the 1994-1995 International Adult Literacy Survey (IALS) were reported on three scales – prose, document and quantitative – rather than on a single scale. Each scale ranges from 0 to 500. Scale scores have, in turn, been grouped into five empirically determined literacy levels. Each of these levels implies an ability to cope with a particular subset of reading tasks. This section explains in more detail how the proficiency scores can be interpreted, by describing the scales and the kinds of tasks that were used in the test, and the literacy levels that have been adopted.⁵

While the literacy scales make it possible to compare the prose, document and quantitative skills of different populations and to study the relationships between literacy skills and various factors, the scale scores by themselves carry little or no meaning. In other words, whereas most people have a practical understanding of what it means when the temperature outside reaches 10°C, it is not intuitively clear what it means when a particular group is at 287 on the prose scale, or 250 on the document scale, or at level 2 on the quantitative scale.

One way to gain some understanding about what it means to perform at a given point along a literacy scale is to identify a set of variables that can be shown to underlie performance on these tasks. Collectively, these variables provide a framework for understanding what is being measured in a particular assessment, and what knowledge and skills are being demonstrated by various levels of proficiency.

Toward this end, the text below begins by describing how the literacy scale scores were defined. Detailed descriptions of the prose, document and quantitative scales are then provided, along with definitions of the five levels. Sample tasks are presented to illustrate the types of materials and task demands that characterise the levels.

⁵ This text is partially reprinted from Chapter 2 in *Literacy, Economy and Society* (OECD and Statistics Canada, 1995).

4.3

Defining the Literacy Levels

The Item Response Theory (IRT) scaling procedures that were used in the IALS constitute a statistical solution to the challenge of establishing one or more scales for a set of tasks with an ordering of difficulty that is essentially the same for everyone.⁶ First, the difficulty of tasks is ranked on the scale according to how well respondents actually perform them. Next, individuals are assigned scores according to how well they perform on a number of tasks of varying difficulty.

The scale point assigned to each task is the point at which individuals with that proficiency score have a given probability of responding correctly. In this survey, an 80 per cent probability of correct response was the criterion used. This means that individuals estimated to have a particular scale score will perform tasks at that point on the scale with an 80 per cent probability of a correct response. It also means they will have a greater than 80 per cent chance of performing tasks that are lower on the scale. It does not mean, however, that individuals with given proficiencies can never succeed at tasks with higher difficulty values; they may do so some of the time. It does suggest that their probability of success is “relatively” low – i.e. the more difficult the task relative to their proficiency, the lower the likelihood of a correct response.

An analogy might help clarify this point. The relationship between task difficulty and individual proficiency is much like the high jump event in track and field, in which an athlete tries to jump over a bar that is placed at increasing heights. Each high jumper has a height at which he or she is proficient – that is, the jumper can clear the bar at that height with a high probability of success, and can clear the bar at lower heights almost every time. When the bar is higher than the athlete’s level of proficiency, however, it is expected that the athlete will be unable to clear the bar consistently.

Once the literacy tasks are placed along each of the scales using the criterion of 80 per cent, it is possible to see to what extent the interactions among various task characteristics capture the placement of tasks along the scales. Analyses of the task characteristics which include the materials being read and the type of questions asked about these materials reveal that ordered sets of information-processing skills appear to be called into play to successfully perform the various tasks displayed along each scale (Kirsch and Mosenthal, 1993).

To capture this order, each scale is divided into five levels reflecting the empirically determined progression of information-processing skills and strategies. While some of the tasks were at the low end of a scale and some at the very high end, most had values in the 200-to-400 range. It is important to recognise that these levels were selected not as a result of any inherent statistical property of the scales, but rather as the result of shifts in the skills and strategies required to succeed at various tasks along the scales, ranging from simple to complex.

The remainder of this section describes each scale in terms of the nature of task demands at each of the five levels. Sample tasks are presented and the factors

⁶ The reader is referred to Murray, Kirsch and Jenkins (1997) for a complete description of the scaling procedures used in this assessment.

contributing to their difficulty discussed. The aim is to facilitate interpretation of the results and data analyses.

4.4

Interpreting the Literacy Levels

This section describes each scale in terms of the nature of task demands at each of the five levels. For each scale, the factors contributing to their difficulty are discussed. The aim of the section is to provide meaning to the scales and to facilitate interpretation of the results.

4.4.1

Prose Literacy

The ability to understand and use information contained in various kinds of text is an important aspect of literacy. The study therefore included an array of prose selections, including text from newspapers, magazines and brochures. The material varied in length, density of text, content, and the use of structural or organisational aids such as headings, bullets and special typefaces. All prose samples were reprinted in their entirety with the original layout and typography unchanged.

Each prose selection was accompanied by one or more questions asking the reader to perform specific tasks. These tasks represent three major aspects of information-processing: locating, integrating and generating. Locating tasks require the reader to find information in the text based on conditions or features specified in the question or directive. The match may be literal or synonymous, or the reader may need to make an inference in order to perform successfully. Integrating tasks ask the reader to pull together two or more pieces of information in the text. The information could be found in a single paragraph, or in different paragraphs or sections. With the generating tasks, readers must produce a written response by processing information from the text and by making text-based inferences or drawing on their own background knowledge.

In all, the prose literacy scale includes 34 tasks with difficulty values ranging from 188 to 377. These tasks are distributed by level as follows: Level 1, 5 tasks; Level 2, 9 tasks; Level 3, 14 tasks; Level 4, 5 tasks; and Level 5, 1 task. It is important to remember that the tasks requiring the reader to locate, integrate and generate information extend over a range of difficulty as a result of combining other variables, including:

- the number of categories or features of information the reader must process;
- the extent to which information given in the question or directive is obviously related to the information contained in the text;
- the amount and location of information in the text that shares some of the features with the information being requested and thus appears relevant, but that in fact does not fully answer the question (these are called “distractors”);
- the length and density of the text.

The five levels of prose literacy are defined as follows.

Prose level 1 Score range: 0 to 225

Most of the tasks at this level require the reader to locate one piece of information in the text that is identical to or synonymous with the information given in the directive. If a plausible incorrect answer is present in the text, it tends not to be near the correct information. The tasks require the respondents to use three types of information-processing skills: locating, integrating and generating.

Typically the match between the task and the text is literal, although sometimes a low-level inference may be necessary. The text is usually brief or has organisational aids such as paragraph headings or italics that suggest where the reader can find the specified information. Generally, the target word or phrase appears only once in the text.

The easiest task in level 1 (difficulty value of 188) directs respondents to look at a medicine label to determine the “maximum number of days you should take this medicine”. The label contains only one reference to number of days and this information is located under the heading “DOSAGE”. The reader must go to this part of the label and locate the phrase “not longer than 7 days”.



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Prose level 2 Score range: 226 to 275

Tasks at this level generally require the reader to locate one or more pieces of information in the text, but several distractors may be present, or low-level inferences may be required. Tasks at this level also begin to ask readers to integrate two or more pieces of information, or to compare and contrast information.

As with level 1, most of the tasks at level 2 ask the reader to locate information. However, more varied demands are made in terms of the number of responses the question requires, or in terms of the distracting information that may be present. For example, a task based on an article about the impatiens plant asks the reader to determine what happens when the plant is exposed to temperatures of 14°C or lower. A sentence under the section “General care” states that “When the plant is exposed to temperatures of 12-14°C, it loses its leaves and won’t bloom anymore.” This task received a difficulty value of 230, just in the level 2 range.

What made this task somewhat more difficult than those identified at level 1 is that the previous sentence in the text contains information about the requirements of the

impatiens plant in various temperatures. This information could have distracted some readers, making the task slightly more difficult.

IMPATIENS

Like many other cultured plants, impatiens plants have a long history behind them. One of the older varieties was sure to be found on grandmother's windowsill. Nowadays, the hybrids are used in many ways in the house and garden.

Origin: The ancestors of the impatiens, *Impatiens sultani* and *Impatiens holstii*, are probably still to be found in the mountain forests of tropical East Africa and on the islands off the coast, mainly Zanzibar. The cultivated European plant received the name *Impatiens walleriana*.

Appearance: It is a herbaceous bushy plant with a height of 30 to 40 cm. The thick, fleshy stems are branched and very juicy, which means, because of the tropical origin, that the plant is sensitive to cold. The light green or white speckled leaves are pointed, elliptical, and slightly indented on the edges. The smooth leaf surfaces and the stems indicate a great need of water.

Bloom: The flowers, which come in all shades of red, appear plentifully all year long, except for the darkest months. They grow from "suckers" (in the stem's "armpit").

Assortment: Some are compact and low-growing types, about 20 to 25 cm. high, suitable for growing in pots. A variety of hybrids can be grown in pots, window boxes, or flower beds. Older varieties with taller stems add dramatic colour to flower beds.

General care: In summer, a place in the shade without direct sunlight is best; in fall and spring, half-shade is best. When placed in a bright spot during winter, the plant requires temperatures of at least 20°C; in a darker spot, a temperature of 15°C will do. When the plant is exposed to temperatures of 12-14°C, it loses its leaves and won't bloom anymore. In wet ground, the stems will rot.

Watering: The warmer and lighter the plant's location, the more water it needs. Always use water without a lot of minerals. It is not known for sure whether or not the plant needs humid air. In any case, do not spray water directly onto the leaves, which causes stains.

Feeding: Feed weekly during the growing period from March to September.

Repotting: If necessary, repot in the spring or in the summer in light soil with humus (prepacked potting soil). It is better to throw the old plants away and start cultivating new ones.

Propagating: Slip or use seeds. Seeds will germinate in ten days.

Diseases: In summer, too much sun makes the plant woody. If the air is too dry, small white flies or aphids may appear.

A similar task involving the same text asks the reader to identify "what the smooth leaf and stem suggest about the plant". The second paragraph of the article is labelled "Appearance" and contains a sentence that states, ". . . stems are branched and very juicy, which means, because of the tropical origin, that the plant is sensitive to cold." This sentence distracted some readers from the last sentence in that same paragraph: "The smooth leaf surfaces and the stems indicate a great need of water." This task received a difficulty value of 254, placing it in the middle of level 2.

Prose level 3 Score range: 276 to 325

Tasks at this level generally direct readers to locate information that requires low-level inferences or that meets specified conditions. Sometimes the reader is required to identify several pieces of information that are located in different sentences or paragraphs rather than in a single sentence. Readers may also be asked to integrate or to compare and contrast information across paragraphs or sections of text.

PROPER FRAME FIT

RIDER MUST BE ABLE TO STRADDLE BICYCLE WITH AT LEAST 2 cm CLEARANCE ABOVE THE HORIZONTAL BAR WHEN STANDING.

NOT LESS THAN 2cm

NOT LESS THAN 2cm

NOTE: Measurement for a female should be determined using a men's model as a basis.

PROPER SIZE OF BICYCLE

FRAME SIZE	LEG LENGTH OF RIDER
430mm	660mm-760mm
460mm	690mm-790mm
480mm	710mm-790mm
530mm	760mm-840mm
560mm	790mm-860mm
580mm	810mm-890mm
635mm	860mm-940mm

OWNER'S RESPONSIBILITY

1. **Bicycle Selection and Purchase:** Make sure this bicycle fits the intended rider. Bicycles come in a variety of sizes. Personal adjustment of seat and handlebars is necessary to assure maximum safety and comfort. Bicycles come with a wide variety of equipment and accessories . . . make sure the rider can operate them.
2. **Assembly:** Carefully follow all assembly instructions. Make sure that all nuts, bolts and screws are securely tightened.
3. **Fitting the Bicycle:** To ride safely and comfortably, the bicycle must fit the rider. Check the seat position, adjusting it up or down so that with the sole of rider's foot on the pedal in its lowest position the rider's knee is slightly bent.

Note: Specific charts illustrated at left detail the proper method of determining the correct frame size.

The manufacturer is not responsible for failure, injury, or damage caused by improper completion of assembly or improper maintenance after shipment.

One level 3 task (with a difficulty value of 281) refers the reader to a page from a bicycle owner's manual to determine how to ensure the seat is in the proper position. The reader must locate the section labelled "Fitting the bicycle" and then identify and summarise the correct information in writing, making sure the conditions stated are contained in the summary.

A second level 3 task, receiving a difficulty value of 310, directs the reader to look at a set of four film reviews to determine which review was least favourable. Some reviews rate films using points or some graphic such as stars; these reviews contain no such indicators. The reader needs to glance at the text of each review to compare what is said in order to judge which film received the worst rating.

Another level 3 question involves an article about cotton diapers. Here readers are asked to write three reasons why the author prefers to use cotton diapers over disposable ones. This task is relatively difficult (318) because of several variables. First, the reader has to provide several answers requiring text-based inferences. Nowhere in the text does the author say, "I prefer cotton diapers because ...". These inferences are made somewhat more difficult because the type of information requested is a "reason" rather than something more concrete such as a date or person. And finally, the text contains information that may distract the reader.

Prose level 4 Score range: 326 to 375

These tasks require readers to perform multiple-feature matching or to provide several responses where the requested information must be identified through text-based inferences. Tasks at this level may also require the reader to integrate or contrast pieces of information, sometimes presented in relatively lengthy texts. Typically, these texts contain more distracting information, and the information requested is more abstract.

One task falling within level 4 (338) directs readers to use the information from a pamphlet about hiring interviews to “write in your own words one difference between the panel interview and the group interview”. Here readers are presented with brief descriptions of each type of interview; then, rather than merely locating a fact about each or identifying a similarity, they need to integrate what they have read to infer a characteristic on which the two types of interviews differ. Experience from other large-scale assessments reveals that tasks in which readers are asked to contrast information are more difficult, on average, than tasks in which they are asked to find similarities.

The Hiring Interview

Preinterview

Try to learn more about the business. What products does it manufacture or services does it provide? What methods or procedures does it use? This information can be found in trade directories, chamber of commerce or industrial directories, or at your local employment office.

Find out more about the position. Would you replace someone or is the position newly created? In which departments or shops would you work? Collective agreements describing various standardized positions and duties are available at most local employment offices. You can also contact the appropriate trade union.

The Interview

Ask questions about the position and the business. Answer clearly and accurately all questions put to you. Bring along a note pad as well as your work and training documents.

The Most Common Types of Interview

One-on-one: Self explanatory.

Panel: A number of people ask you questions and then compare notes on your application.

Group: After hearing a presentation with other applicants on the position and duties, you take part in a group discussion.

Postinterview

Note the key points discussed. Compare questions that caused you difficulty with those that allowed you to highlight your strong points. Such a review will help you prepare for future interviews. If you wish, you can talk about it with the placement officer or career counsellor at your local employment office.

Prose level 5 Score range: 376 to 500

Tasks at this level typically require the reader to search for information in dense text that contains a number of plausible distractors. Some require readers to make high-level inferences or to use specialised knowledge.

There is one level 5 task in this assessment, with a difficulty value of 377. Readers are required to look at an announcement from a personnel department and “list two ways in which CIEM (an employee support initiative within a company) helps people who will lose their jobs because of a departmental reorganisation.” Responding correctly requires readers to search through this text to locate the embedded sentence “CIEM acts as a mediator for employees who are threatened with dismissal resulting from reorganisation, and assists with finding new positions when necessary.” This task is difficult because the announcement is organised around information that is different from what is being requested in the question. Thus, while the correct information is located in a single sentence, this information is embedded under a list of headings describing CIEM’s activities for employees looking for other work. This list of headings serves as an excellent set of distractors for the reader who does not search for or locate the phrase containing the conditional information stated in the directive – that is, those who lose their jobs because of a departmental reorganisation.

4.4.2

Document Literacy

Adults often encounter materials such as schedules, charts, graphs, tables, maps and forms at home, at work, or when travelling in their communities. The knowledge and skills needed to process information contained in these documents is therefore an important aspect of literacy in a modern society. Success in processing documents appears to depend at least in part on the ability to locate information in a variety of displays, and to use this information in a number of ways. Sometimes procedural knowledge may be required to transfer information from one source to another, as is necessary in completing applications or order forms.

Thirty-four tasks are ordered along the IALS document literacy scale from 182 to 408, as the result of responses of adults from each of the participating countries. These tasks are distributed as follows: Level 1, 6 tasks; Level 2, 12 tasks; Level 3, 13 tasks; Level 4, 2 tasks; and Level 5, 1 task. By examining tasks associated with these proficiency levels, characteristics that are likely to make particular document tasks more or less difficult can be identified. There are basically four types of questions associated with document tasks: locating, cycling, integrating and generating. Locating tasks require the reader to match one or more features of information stated in the question to either identical or synonymous information given in the document. Cycling tasks require the reader to locate and match one or more features of information, but differ from locating tasks in that they require the reader to engage in a series of feature matches to satisfy conditions given in the question. The integrating tasks typically require the reader to compare and contrast information in adjacent parts of the document. In the generating tasks, readers must produce a written response by processing information found in the document and by making text-based inferences or drawing on their own background knowledge.

As with the prose tasks, each type of question extends over a range of difficulty as a result of combining other variables:

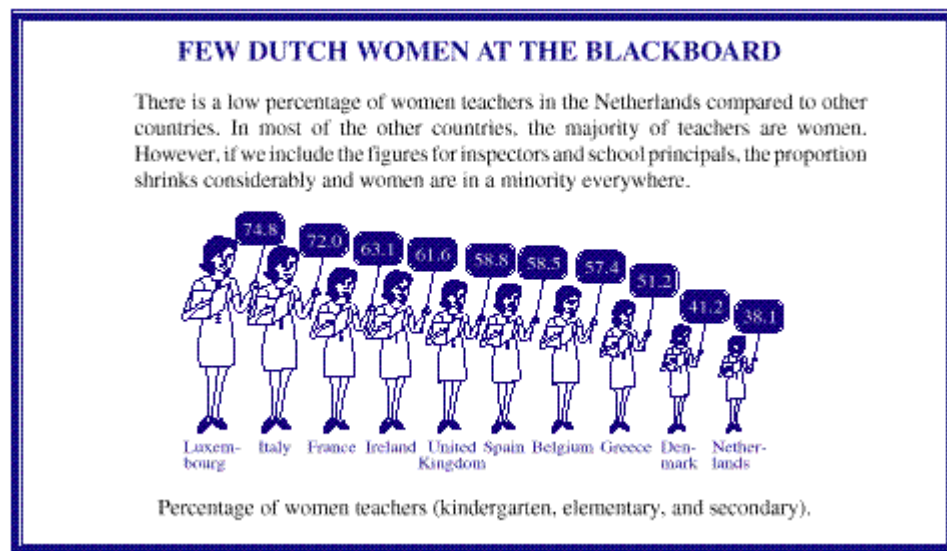
- the number of categories or features of information in the question the reader must process or match;
- the number of categories or features of information in the document that seem plausible or correct because they share some but not all of the information with the correct answer;
- the extent to which the information asked for in the question is clearly related to the information stated in the document;
- the structure and content of the document.

A more detailed discussion of the five levels of document literacy follows.

Document level 1 Score range: 0 to 225

Most of the tasks at this level require the reader to locate a single piece of information based on a literal match. Distracting information, if present, is typically located away from the correct answer. Some tasks may direct the reader to enter personal information onto a form.

One document task at this level (with a difficulty value of 188) directs the reader to identify from a chart the percentage of teachers from Greece who are women. The chart displays the percentages of women teachers from various countries. Only one number appears on the chart for each country.



A similar task involves a chart from a newspaper showing the expected amounts of radioactive waste by country. This task, which has a difficulty value of 218, directs the reader to identify the country that is projected to have the smallest amount of waste by the year 2000. Again, there is only one percentage associated with each country; however, the reader must first identify the percentage associated with the smallest amount of waste, and then match it to the country.

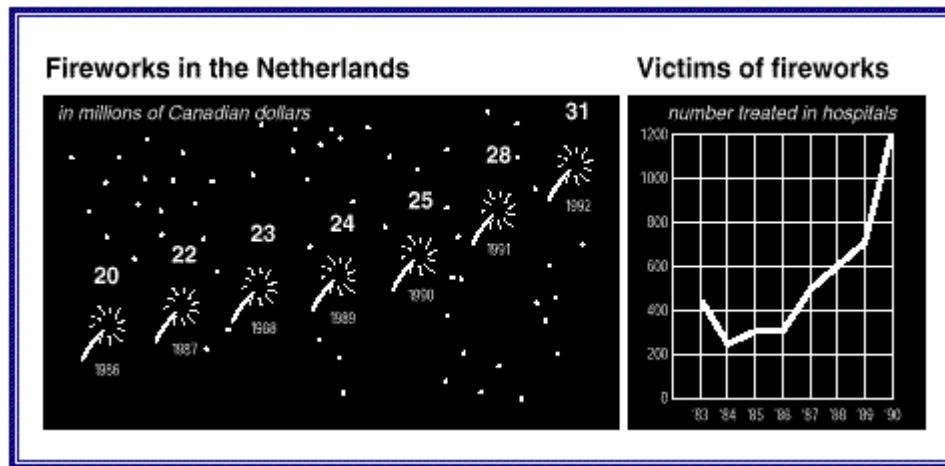
Document level 2 Score range: 226 to 275

Document tasks at this level are a bit more varied. While some still require the reader to match a single feature, more distracting information may be present or the match may require a low-level inference. Some tasks at this level may require the reader to enter information onto a form or to cycle through information in a document.

One level 2 task on the document scale (242) directs the reader to look at a chart to identify the year in which the fewest people in the Netherlands were injured by fireworks. Part of what perhaps makes this task somewhat more difficult than those in level 1 is that

two charts are presented instead of just one. One, labelled “Fireworks in the Netherlands”, depicts years and numbers representing funds spent in millions of Canadian dollars, whereas the other, “Victims of fireworks”, uses a line to show numbers of people treated in hospitals. It is worth noting that in a second version of the assessment this label was changed to read “number injured.”

Several other tasks falling within level 2 direct the reader to use information given to complete a form. In one case they are asked to fill out an order form to purchase tickets to see a play on a particular day and at a particular time. In another, readers are asked to complete the availability section of an employment application based on information provided that included: the total number of hours they are willing to work, the hours they are available, how they heard about the job, and the availability of transportation.



Document level 3 Score range: 276 to 325

Tasks at this level are varied. Some require the reader to make literal or synonymous matches, but usually the reader must take conditional information into account or match on the basis of multiple features of information. Some require the reader to integrate information from one or more displays of information. Others ask the reader to cycle through a document to provide multiple responses.

One task falling around the middle of level 3 in difficulty (with a value of 295) involves the fireworks charts shown earlier (see Document level 2). This task directs the reader to write a brief description of the relationship between sales and injuries based on the information shown in the two graphs. A second task, falling at high end of level 3 (321), involves the use of a quick copy printing requisition form that might be found in the workplace. The task asks the reader to state whether or not the quick copy centre would make 300 copies of a statement that is 105 pages long. In responding to this directive, the reader must determine whether conditions stated in the question meet those provided in the requisition form.

QUICK COPY Printing Requisition FILL IN ALL INFORMATION REQUESTED

GUIDELINES: This requisition may be used to order materials to be printed **BLACK INK** only, and in the quantities that are listed at the right.

SINGLE SHEET PRINTED 1 OR 2 SIDES — 2000 copies maximum
 MORE THAN ONE SHEET UP TO 100 PAGES — 400 copies maximum
 OVER 100 PAGES — 200 copies maximum

1. PROJECT TO BE CHARGED 2. TODAY'S DATE

3. TITLE OR DESCRIPTION 4. DATE DELIVERY REQUIRED

5. **DO NOT MARK IN SHADED BOXES**

<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	X	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	=	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>
NUMBER OF ORIGINALS		NUMBER OF COPIES TO BE PRINTED		TOTAL NUMBER OF IMPRESSIONS

6. NUMBER OF SIDES TO BE PRINTED (Check one box.) 1 One side 2 BOTH sides

7. COLOR OF PAPER (Fill in only if NOT white.) _____

8. SIZE OF PAPER (Fill in only if NOT 8 1/2 x 11) _____

9. Check any that apply:

COLLATE

BINDING: One staple at upper left
 Two staples in left margin
 BIND-FAST: Black Brown
 3-hole punch

Other instructions _____

AUTHORIZATION AND DELIVERY

10. Project Director (print name) _____

11. Requisitioner (print your own name and phone no.) _____

12. Check one:

Requisitioner will PICK UP completed job. MAIL STOP

Mail completed ROOM NO.

job to: _____

13. **KEEP PINK COPY at least 3 months.** When requesting information, you must refer to the requisition number printed here.

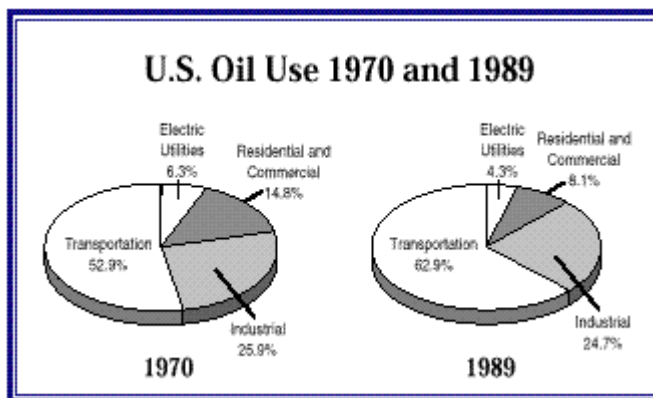
140468

D1320-09116 • 000000 • 000000

Document level 4 Score range: 326 to 375

Tasks at this level, like those at the previous levels, ask the reader to match on the basis of multiple features of information, to cycle through documents, and to integrate information; frequently, however, these tasks require the reader to make higher-order inferences to arrive at the correct answer. Sometimes the document contains conditional information that must be taken into account by the reader.

One of the two tasks falling within this level (341) asks the reader to look at two pie charts showing oil use for 1970 and 1989. The question directs the reader to summarise how the percentages of oil used for different purposes changed over the specified period. Here the reader must cycle through the two charts, comparing and contrasting the percentages for each of the four stated purposes, and then generate a statement that captures these changes.



Document level 5 Score range: 376 to 500

Tasks at this level require the reader to search through complex displays of information that contain multiple distractors, to make high-level inferences, process conditional information, or use specialised knowledge.

The only level 5 task in this international assessment (with a difficulty value of 408) involves a page taken from a consumer magazine rating clock radios. The reader is asked for the average advertised price for the “basic” clock radio receiving the highest overall score. This task requires readers to process two types of conditional information. First, they need to identify the clock radio receiving the highest overall score while distinguishing among the three types reviewed: “full-featured”, “basic” and those “with cassette player”. Second, they need to locate a price. In making this final match, they need to notice that two are given: the suggested retail price, followed by the average advertised price.

The same document is used for a second and considerably easier task that falls at the low end of level 4 (327). The reader is asked “which full-featured radio is rated the highest on performance”. Again, it is necessary to find the correct category of clock radio, but the reader needs to process fewer conditions. All that is required is to distinguish between the rating for “Overall Score” and that for “Performance.” It is possible that some adults note the distractor (“Overall Score”) rather than the criterion specified in the question, “Performance”. Another factor that likely contributes to this task’s difficulty is that “Overall Score” is given a numerical value while the other features are rated by a symbol. Also, some adults may find the correct category (“Performance”) but select the first radio listed, assuming it performed best. The text accompanying the table indicates that the radios are rated within a category by an overall score; it is easy to imagine that some people may have equated overall score with overall performance.

4.4.3

Quantitative Literacy

Since adults are frequently required to perform arithmetic operations in everyday life, the ability to perform quantitative tasks is another important aspect of literacy. These skills may at first seem to differ fundamentally from those associated with prose and document literacy, and therefore to extend the concept of literacy beyond its traditional limits. Experience in North America with large-scale assessments of adults indicates that the processing of printed information plays an important role in affecting the difficulty of tasks along the quantitative scale (Montigny et al., 1991; Kirsh et al., 1993).

In general, it appears that many individuals can perform single arithmetic operations when both the numbers and operations are made explicit. However, when the numbers to be used must be located in and extracted from different types of documents that contain other similar but irrelevant information, when the operations to be used must be inferred from printed directions, and when multiple operations must be performed, the tasks become increasingly difficult.

The IALS quantitative literacy scale contains 33 tasks ranging from 229 to 408 in difficulty. These tasks are distributed as follows: Level 1, 1 task; Level 2, 9 tasks; Level 3, 16 tasks; Level 4, 5 tasks; and Level 5, 2 tasks. The difficulty of these tasks – and therefore, their placement along the scale – appears to be a function of several factors including:

- the particular arithmetic operation the task requires;
- the number of operations needed to perform the task successfully;

- the extent to which the numbers are embedded in printed materials;
- the extent to which an inference must be made to identify the type of operation to be performed.

RATINGS

Clock radios

Listed by types; within types, listed in order of overall score. Differences in score of 4 points or less were not deemed significant.

- 1** Brand and model. If you can't find a model, call the company. Phone numbers are listed on page 736.
- 2** Price. The manufacturer's suggested or approximate retail price, followed by the average advertised price.
- 3** Dimensions. To the nearest centimeter.
- 4** Overall score. A composite, encompassing all our tests and judgments. A "perfect" radio would have earned 100 points.
- 5** Convenience. This composite judgment reflects such things as the legibility of the display, the ease of tuning the radio and setting the alarm, and the presence or absence of useful features.
- 6** Performance. An overall judgment reflecting performance in our tests of: sensitivity and selectivity; tuning ease; capture ratio, the ability to bring in the stronger of two stations on the same frequency; image rejection, the ability to ignore signals from just above the band, resistance to interference from signals bouncing off aircraft and such.
- 7** Sensitivity. How well each radio received a station with little interference.
- 8** Selectivity. How well each radio received clearly a weak station next to a strong one on the dial.
- 9** Tone quality. Based mainly on computer analysis of the speaker's output and on listening tests, using music from CDs. No model produced high-fidelity sound.
- 10** Favorable time-setting. This useful feature makes setting clock and alarm times easy. If you overshoot the desired setting, you simply back up.
- 11** Dual alarm. Lets you set two separate wake-up times.

1	2	3	4	5	6	7	8	9	10	11	Advantages	Disadvantages	Comments
Full-featured clock radios													
RCA RP-3690	\$50/\$40	8x25x18	86	●	●	●	●	●	✓	✓	12	A,B,D,H,J,L,O,T,U	A
Sony ICF-C303	50/45	5x20x15	84	●	●	●	●	●	✓	✓	12	C,E,F,I,N,T	C
Panasonic RC-X220	50/45	10x28x13	82	●	●	●	●	●	✓	✓	12	A,G,K,M,O,S,T,U	b,c A
Realistic 272	50/30	5x28x15	79	●	●	●	●	●	✓	✓	3	A,G,H,K,O,T	D
Magnavox AJ3900	65/—	15x38x13	78	●	●	●	●	●	—	✓	3	D,G,K,M,O,R,T	b,g B
Emerson AK2745	39/20	8x28x15	70	●	●	●	●	●	✓	✓	3	G,O	g K
Soundesign 3753	20/20	8x23x13	62	●	●	●	●	●	✓	✓	3	J,Q	d,h J
Basic clock radios													
Realistic 263	28/18	10x20x10	74	●	●	●	●	●	—	—	3	A,D,H,O,P,U	h —
Soundesign 3622	12/10	5x20x13	68	●	●	●	●	●	—	—	3	U	d I
Panasonic RC-6054	18/15	5x20x13	67	●	●	●	●	●	—	—	12	—	b,c —
General Electric 7-4612	13/10	5x20x10	66	●	●	●	●	●	—	—	12	A,D	a,g —
Lloyds CR001	20/15	5x18x13	64	●	●	●	●	●	—	—	3	U	—
Sony ICF-C240	15/13	5x18x15	63	●	●	●	●	●	—	—	12	—	f,g —
Emerson AK2720	19/10	5x20x13	61	●	●	●	●	●	—	—	3	D,T	e K
Gran Prix D507	15/10	5x18x10	54	●	●	●	●	●	—	—	3	—	d —
Clock radios with cassette player													
General Electric 7-4965	60/50	10x30x15	85	●	●	●	●	●	✓	✓	12	A,D,G,H,K,O,S,T	— B,E
Panasonic RC-X250	71	10x33x13	76	●	●	●	●	●	✓	✓	12	A,G,K,O,R,U	b,c A,H
Sony ICF-CS650	75/65	15x28x15	74	●	●	●	●	●	✓	✓	12	G,R,T,U	c,f I A,F,H
Soundesign 3B44MGY	40/30	13x30x13	62	●	●	●	●	●	—	—	3	G,K,J,S,U	F,G,I,M

1 Discontinued. Replaced by RC-X260, \$79 list and \$60 average advertised sale price.

Features in Common

All: • Permit snooze time of about 8 min. • Retain time settings during short power failures.
 Except as noted, all have: • Battery backup for clock and alarm memory. • Red display digits 1 cm. high.
 • Sleep-time radio play for up to 60 min. before automatic shutoff. • Switch to reset alarm.

Keys to Advantages

A—Alarm works despite power failure.
 B—Shows actual time plus up to 2 alarm times.
 C—Twin alarms settable for 2 different stations.
 D—Tone alarm has adjustable volume control.
 E—Memory needs no battery.
 F—Digital tuner with presettable stations.
 G—Tuner can receive in stereo.
 H—Battery strength indicator.
 I—Illuminated tuning dial.
 J—Illuminated tuning pointer.

Key to Disadvantages

a—Possible to reset time by accident.
 b—Controls for time-setting or dimmer inconveniently located on radio's bottom or rear.
 c—Display dimmer than most in brightly lit room.
 d—Radio volume must be turned completely down for alarm buzzer to sound.
 e—Lacks alarm buzzer; radio is sole alarm.

Key to Comments

A—Display shows green digits.
 B—Display shows blue digits.
 C—Display uses LCD (liquid crystal) digits.
 D—Terminal for external antenna.
 E—3-position graphic equalizer.
 F—Cassette player lacks Record function.
 G—Cassette player lacks Rewind function.
 H—Model permits make-up to cassette play.
 I—Cassette-deck flutter worse than most.
 J—Warranty repairs cost \$3 for handling.
 K—Warranty repairs cost \$3.00 for handling.
 L—Warranty repairs cost \$6 for handling.
 M—Warranty repairs cost \$10 for handling.

Key to Features

K—Earphone jack.
 L—Nap timer.
 M—Audio input for tape deck or CD player.
 N—Display can show date and time.
 O—Display can show date and time.
 P—Display has high/low brightness switch.
 Q—Night light—adjusts for room light.
 R—Bass-boost tone control.
 S—Treble-cut tone control.
 T—Better than most in tuning ease.
 U—Better than most in image rejection.

Key to Features

I—Lacks indication alarm is set.
 g—Lacks alarm-reset button.
 h—Time-setting lacks fast reverse.
 i—No slow forward; fast reverse for time setting.

The five levels of quantitative literacy are described in detail below.

Quantitative level 1 Score range: 0 to 225

Although no quantitative tasks used in the assessment fall below the score value of 225, experience suggests that such tasks would require the reader to perform a single, relatively simple operation (usually addition) for which either the numbers are clearly noted in the given document and the operation is stipulated, or the numbers are provided and the operation does not require the reader to find the numbers.

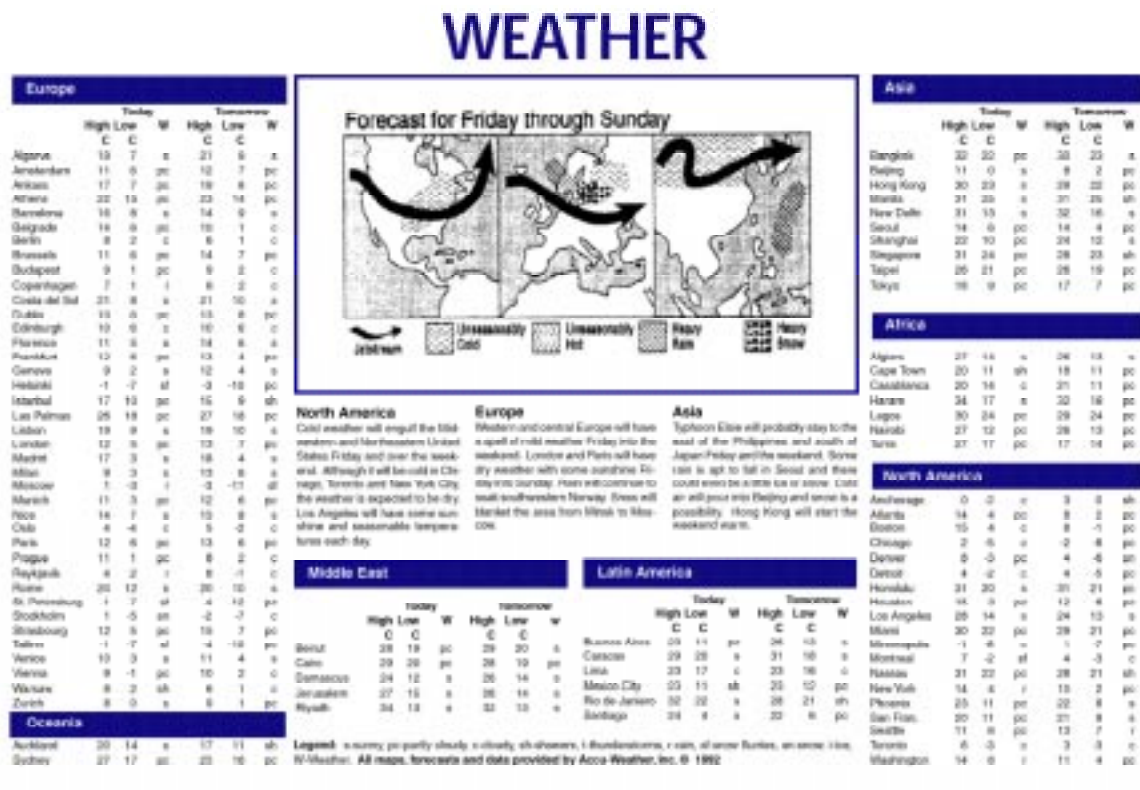
The easiest quantitative task (225) directs the reader to complete an order form. The last line on this form says "Total with Handling". The line above it says "Handling Charge \$2.00". The reader simply has to add the \$2.00 to the \$50.00 entered on a previous line to indicate the cost of the tickets. In this task, one of the numbers is stipulated; the operation is easily identified from the word "total"; and the operation does not require the reader to perform the "borrow" or "carry-over" function of addition. Moreover, the form itself features a simple column format, further facilitating the task for the reader.

Quantitative level 2 Score range: 226 to 275

Tasks at this level typically require readers to perform a single arithmetic operation (frequently addition or subtraction), using numbers that are easily located in the text or document. The operation to be performed may be easily inferred from the wording of the question or the format of the material (for example, a bank deposit or order form).

A typical level 2 task on the quantitative scale directs the reader to use a weather chart in a newspaper to determine how many degrees warmer today's high temperature is expected to be in Bangkok than in Seoul. Here the reader must cycle through the table to locate the two temperatures and then subtract one from the other to determine the difference. This task received a difficulty value of 255.

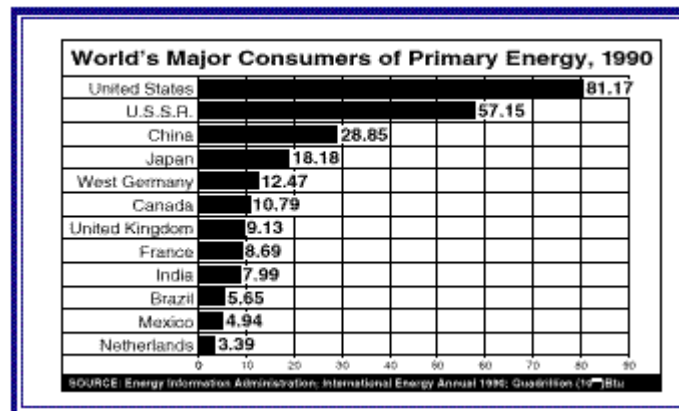
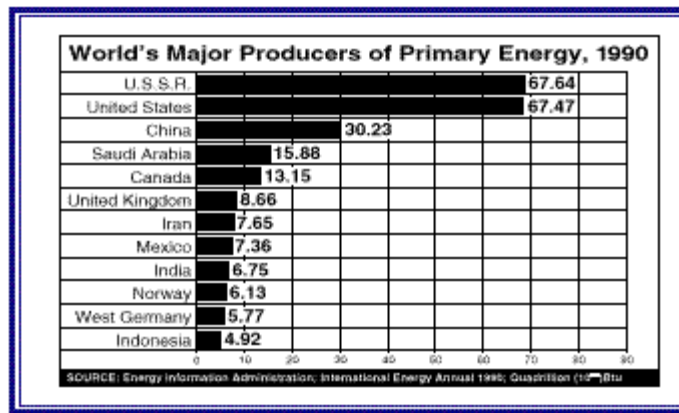
A similar but slightly more difficult task (268) requires the reader to use the chart about women in the teaching profession that is displayed in level 1 for the document scale. This task directs the reader to calculate the percentage of men in the teaching profession in Italy. Both this task and the one just mentioned involve calculating the difference between two numbers. In the former, however, both temperatures could be identified in the table from the newspaper. For the task involving male teachers in Italy, the reader needs to make the inference that the percentage is equal to 100 per cent minus the percentage of female teachers.



Quantitative level 3 Score range: 276 to 325

Tasks at this level typically require the reader to perform a single operation. However, the operations become more varied – some multiplication and division tasks are included. Sometimes the reader needs to identify two or more numbers from various places in the document, and the numbers are frequently embedded in complex displays. While semantic relation terms such as “how many” or “calculate the difference” are often used, some of the tasks require the reader to make higher-order inferences to determine the appropriate operation.

One task located at 302 on the quantitative scale directs the reader to look at two graphs containing information about consumers and producers of primary energy. The reader is asked to calculate how much more energy Canada produces than it consumes. Here the operation is not facilitated by the format of the document; the reader must locate the information using both bar graphs. Another task involving this document directs the reader to calculate the total amount of energy in quadrillion (10^{15}) BTU (British Thermal Unit) consumed by Canada, Mexico and the United States. This task, which falls at 300 on the scale, requires the reader to add three numbers. Presenting two graphs likely increases the difficulty; some respondents may perform the appropriate calculation for the three countries specified using the producer energy chart rather than the consumer energy chart.



Another task at this level involves the fireworks chart shown previously for the document scale. The reader is asked to calculate how many more people were injured in 1989 than in 1988. What contributes to this task receiving a difficulty value of 293 is that one of the numbers is not given in the line graph; the reader needs to interpolate the number from information provided along the vertical axis.

A task located at 280 on the scale asks readers to look at a recipe for scrambled eggs with tomatoes. The recipe gives the ingredients for four servings: 3 tablespoons of oil, 1

garlic clove, 1 teaspoon of sugar, 500 grams of fresh red tomatoes and 6 eggs. They are then asked to determine the number of eggs they will need if they are using the recipe for six people. Here they must know how to calculate or determine the ratio needed. This task is somewhat easier than might be expected given others at the same level, perhaps because people are familiar with recipes and with manipulating them to fit a particular situation.

Another question using this recipe asks the reader to determine the amount of oil that would be needed if the recipe were being used for two people. This task received a value of 253 on the scale; a larger percentage of respondents found it easier to halve an ingredient than to increase one by 50 per cent. It is not clear why this is so. It may be that some of the respondents have an algorithm for responding to certain familiar tasks that does not require them to apply general arithmetic principles.

Quantitative level 4 Score range: 326 to 375

With one exception, the tasks at this level require the reader to perform a single arithmetic operation where typically either the quantities or the operation are not easily determined. That is, for most of the tasks at this level, the question or directive does not provide a semantic relation term such as “how many” or “calculate the difference” to help the reader.

One task at this level involves a compound interest table. It directs the reader to “calculate the total amount of money you will have if you invest \$100 at a rate of 6 per cent for 10 years.” This task received a difficulty value of 348, in part because many people treated this as a document rather than a quantitative task and simply looked up the amount of interest that would be earned. They likely forgot to add the interest to their \$100 investment.

Compound Interest Compounded Annually											
Principal	Period	4%	5%	6%	7%	8%	9%	10%	12%	14%	16%
\$100	1 day	0.011	0.014	0.016	0.019	0.022	0.025	0.027	0.033	0.038	0.044
	1 week	0.077	0.096	0.115	0.134	0.153	0.173	0.192	0.230	0.268	0.307
	6 mos	2.00	2.50	3.00	3.50	4.00	4.50	5.00	6.00	7.00	8.00
	1 year	4.00	5.00	6.00	7.00	8.00	9.00	10.00	12.00	14.00	16.00
	2 years	8.16	10.25	12.36	14.49	16.64	18.81	21.00	25.44	29.86	34.56
	3 years	12.49	15.76	19.10	22.50	25.97	29.50	33.10	40.49	48.15	56.09
	4 years	16.99	21.55	26.25	31.08	36.06	41.16	46.41	57.35	68.90	81.06
	5 years	21.67	27.63	33.82	40.26	46.93	53.86	61.05	76.23	92.54	110.03
	6 years	26.53	34.01	41.85	50.07	58.69	67.71	77.16	97.38	119.50	143.64
	7 years	31.59	40.71	50.36	60.58	71.38	82.80	94.87	121.07	150.23	182.62
	8 years	36.86	47.75	59.38	71.82	85.09	99.26	114.36	147.60	185.26	227.84
	9 years	42.33	55.13	68.95	83.85	99.90	117.19	135.79	177.31	225.19	280.30
	10 years	48.02	62.89	79.06	96.72	115.89	136.74	159.37	210.58	270.72	341.14
	12 years	60.10	79.59	101.22	125.22	151.82	181.27	213.84	289.60	381.79	493.60
15 years	80.09	107.89	139.66	175.90	217.22	264.25	317.72	447.36	613.79	826.55	
20 years	119.11	165.33	220.71	286.97	366.10	460.44	572.75	864.63	1,274.35	1,846.08	

Another task at this level requires respondents to read a newspaper article describing a research finding linking allergies to a particular genetic mutation. The question directs the reader to calculate the number of people studied who were found to have the mutant gene. To answer the question correctly, readers must know how to convert the phrase “64 per cent” to a decimal number and then multiply it by the number of patients studied (400). The text provides no clues on how to tackle this problem.

A third task involves a distance chart. Readers are asked to “calculate the total number of kilometres travelled in a trip from Guadalajara to Tecomán and then to Zamora”. Here a semantic relation term is provided, but the format is difficult and the quantities are not easily identified. As a result, this task received a difficulty value of 335. In a level 3 task using the same chart, respondents are asked to determine how much less the distance from Guadalajara to Tecomán is than the distance from Guadalajara to Puerto Vallarta. In that task (308), the quantities are relatively easy to locate.

TABLE OF APPROXIMATE DISTANCES (in kilometres)

Colima					
224	Guadalajara				
98	322	Manzanillo			
371	340	273	Puerto Vallarta		
45	269	62	330	Tecomán	
244	171	342	515	289	Zamora

Quantitative level 5 Score range: 376 to 500

These tasks require readers to perform multiple operations sequentially, and they must locate features of the problem embedded in the material or rely on background knowledge to determine the quantities or operations needed.

One of the most difficult tasks on the quantitative scale (381) requires readers to look at a table providing nutritional analysis of food and then, using the information given, determine the percentage of calories in a Big Mac® that comes from total fat. To answer this question, readers must first recognise that the information about total fat provided is given in grams. In the question, they are told that a gram of fat has 9 calories. Therefore, they must convert the number of fat grams to calories. Then, they need to calculate this number of calories as a percentage of the total calories given for a Big Mac®. Only one other item on this scale received a higher score.

Nutritional Analysis

	Serving Size	Calories	Protein (g)	Carbohydrates (g)	Total Fat (g)	Saturated Fat (g)	Monounsaturated Fat (g)	Polysaturated Fat (g)	Cholesterol (mg)	Sodium (mg)		
Sandwiches												
Hamburger	102 g	255	12	30	9	5	1	3	37	490		
Cheeseburger	116 g	305	15	30	13	7	1	5	50	725		
Quarter Pounder™	166 g	410	23	34	20	11	1	8	85	645		
Quarter Pounder™ w/Cheese	194 g	510	28	34	28	16	1	11	115	1110		
McLean Deluxe™	206 g	320	22	35	10	5	1	4	60	670		
McLean Deluxe™ w/Cheese	219 g	370	24	35	14	8	1	5	75	890		
Big Mac™	215 g	500	25	42	26	16	1	9	100	890		
Filet-O-Fish™	141 g	370	14	38	18	8	6	4	50	730		
McChicken™	187 g	415	19	30	19	9	7	4	50	830		
French Fries												
Small French Fries	68 g	220	3	26	12	8	1	2.5	0	110		
Medium French Fries	97 g	320	4	36	17	12	1.5	3.5	0	150		
Large French Fries	122 g	400	6	46	22	15	2	5	0	200		
Salads												
Chef Salad	265 g	170	17	8	9	4	1	4	111	400		
Garden Salad	189 g	50	4	6	2	1	0.4	0.6	65	70		
Chunky Chicken Salad	255 g	150	25	7	4	2	1	1	78	230		
Side Salad	106 g	30	2	4	1	0.5	0.2	0.3	33	35		
Cronons	11 g	50	1	7	2	1.3	0.1	0.5	0	140		
Bacon Bits	3 g	15	1	0	1	0.3	0.2	0.5	1	95		
Soft Drinks												
	Coca-Cola Classic™				diet Coke™				Sprite™			
	Small	Medium	Large	Jumbo	Small	Medium	Large	Jumbo	Small	Medium	Large	Jumbo
Calories	140	190	260	380	1	1	2	3	140	190	260	380
Carbohydrates (g)	38	50	70	101	0.3	0.4	0.5	0.6	36	48	66	96
Sodium (mg)	15	20	25	40	30	40	60	80	15	20	25	40

4.5

Estimating Literacy Performance Across the Levels

The literacy levels not only provide a means for exploring the progression of information-processing demands across each of the scales, but also can be used to help explain how the proficiencies individuals demonstrate reflect the likelihood they will respond correctly to the broad range of tasks used in this assessment as well as to any task that has the same characteristics. In practical terms, this means that individuals performing at 250 on each scale are expected to be able to perform the average level 1 and 2 tasks with a high degree of proficiency – i.e. with an average probability of a correct response at 80 per cent or higher. It does not mean that they will not be able to perform tasks in levels 3 or higher. They would be expected to do so some of the time, but not consistently.

The three charts given in Tables 4.1 to 4.3 display the probability that individuals performing at selected points on each of the scales will give a correct response to tasks of varying difficulty. For example, a reader whose prose proficiency is 150 has less than a

50 per cent chance of giving a correct response to the level 1 tasks. Individuals whose proficiency score is 200, in contrast, have about an 80 per cent probability of responding correctly to these tasks.

In terms of task demands, it can be inferred that adults performing at 200 on the prose scale are likely to be able to locate a single piece of information in a brief text when there is no distracting information, or if plausible but incorrect information is present but located away from the correct answer. However, these individuals are likely to encounter far more difficulty with tasks in levels 2 through 5. For example, they would have only a 40 per cent chance of performing the average level 2 task correctly, an 18 per cent chance of success with tasks in level 3, and no more than a 7 per cent chance with tasks in levels 4 and 5.

In contrast, respondents demonstrating a proficiency of 300 on the prose scale have about an 80 per cent chance or higher of succeeding with tasks in levels 1, 2 and 3. This means that they demonstrate success with tasks that require them to make low-level inferences and with those that entail taking some conditional information into account. They can also integrate or compare and contrast information that is easily identified in the text. On the other hand, they are likely to encounter difficulty with tasks where they must make more sophisticated text-based inferences, or where they need to process more abstract types of information. These more difficult tasks may also require them to draw on less familiar or more specialised types of knowledge beyond that given in the text. On average, they have about a 50 per cent probability of performing level 4 tasks correctly; with level 5 tasks, their likelihood of responding correctly decreases to 40 per cent.

Similar kinds of interpretations can be made using the information presented for the document and quantitative literacy scales. For example, someone who is at 200 on the quantitative scale has, on average, a 67 per cent chance of responding correctly to level 1 tasks. His or her likelihood of responding correctly decreases to 47 per cent for level 2 tasks, 21 per cent for level 3 tasks, 6 per cent for level 4 tasks and a mere 2 per cent for level 5 tasks. Similarly, readers with a proficiency of 300 on the quantitative scale would have a probability of 92 per cent or higher of responding correctly to tasks in levels 1 and 2. Their average probability would decrease to 81 per cent for level 3 tasks, 57 per cent for level 4 and 20 per cent for level 5.

Table 4.1
Average probabilities of successful performance, prose scale

Prose level	Selected proficiency scores				
	150	200	250	300	350
			%		
1	48	81	95	99	100
2	14	40	76	94	99
3	6	18	46	78	93
4	2	7	21	50	80
5*	2	6	18	40	68

* Based on one task
Source: Adult Literacy Survey (1994).

Table 4.2
Average probabilities of successful performance, document scale

Document Level	Selected proficiency scores				
	150	200	250	300	350
			%		
1	40	72	94	99	100
2	20	51	82	95	99
3	7	21	50	80	94
4	4	13	34	64	85
5*	<1	1	3	13	41

* Based on one task
 Source: Adult Literacy Survey (1994).

Table 4.3
Average probabilities of successful performance, quantitative scale

Quantitative level	Selected proficiency scores				
	150	200	250	300	350
			%		
1*	34	67	89	97	99
2	21	47	76	92	98
3	7	21	51	81	94
4	1	6	22	57	86
5	1	2	7	20	53

* Based on one task
 Source: Adult Literacy Survey (1994).

5.0 Survey Methodology

The survey Methodology section details the methodology used in each of the twelve IALS countries in terms of target population, frame coverage and sample design.

5.1

Target Population and Frame Coverage

As noted earlier, each country participating in the IALS was required to draw a probability sample from which results representative of the civilian non-institutionalized population aged 16 to 65 could be derived. Countries were also permitted to sample older adults, and several did so. All IALS samples excluded full-time members of the military and people residing in institutions such as prisons, hospitals, and psychiatric facilities.

In all countries, the survey was carried out in the national language or languages. In Canada, respondents were given a choice of English or French. In Switzerland, samples drawn from French-speaking and German-speaking cantons were required to respond in those respective languages. (Italian and Rhaeto-Romanic-speaking regions were excluded from this survey.) When respondents could not speak the designated language, attempts were made to complete the background questionnaire so that their literacy level could be estimated and the possibility of distorted results would be reduced.

Table 5.1 presents information on the ages sampled and language of the test for each IALS country. Table 5.2 reports the percentage of the population aged 16 to 65 covered in each country and lists excluded populations.

Table 5.1: Ages sampled and language of test, by country

Country	Ages sampled	Language of test
Belgium (Flanders)	16 to 65	Dutch
Canada	16 and older	English French
Germany	16 to 65	German
Great Britain	16 to 65	English
Ireland	16 to 65	English
Netherlands	16 to 74	Dutch
New Zealand	16 to 65	English
Northern Ireland	16 to 65	English
Poland	16 to 65	Polish
Sweden	16 and older	Swedish
Switzerland	16 and older	French German
United States	16 to 65	English

Source: Statistics Canada and Educational Testing Service, International Adult Literacy Survey, 1994.

Table 5.2: Survey coverage, by country

Country	Coverage (%)	Exclusions
Belgium (Flanders)	99	Residents of institutions and the Brussels region
Canada	98	Residents of institutions, persons living on Indian reserves, members of the armed forces, residents of the Yukon and Northwest Territories Francophone residents in the province of Ontario who lived in geographic regions where less than 20 persons were Francophone
Germany	98	Residents of institutions
Great Britain	97	Residents of institutions; the Scottish Highlands and islands north of the Caledonian Canal
Ireland	100	None
Netherlands	99	Residents of institutions
New Zealand	99	Residents of institutions; offshore islands, onshore islands, waterways and inlets
Northern Ireland	97	Residents of institutions
Poland	99	Persons residing in Poland for less than three months
Sweden	98	Persons living in institutions (including those doing their military service), persons living abroad during the survey period
Switzerland	89	Persons in Italian and Rhaeto-Romantic regions, persons in institutions, persons without telephones
United States	97	Members of the armed forces on active duty, those who reside outside the United States, those with no fixed household address

Source: Statistics Canada and Educational Testing Service, International Adult Literacy Survey, 1994.

More detailed information about the target populations, excluded groups, and sampling frames for individual IALS countries is provided below.

Belgium (Flanders)


Belgium's target population included all persons aged 16 to 65. All residents of institutions (e.g. hospitals, nursing homes, homes for elderly, prisons, offices, businesses, government buildings, etc.) and the Brussels region were excluded from the target population. These exclusions were estimated to be less than 1 percent. Belgium's total-in-scope population was 3,692,116 persons.

The Belgium IALS-sample is representative of the "Flemish Region", excluding Brussels. Therefore, the name Flanders is used throughout, rather than the more conventional "Flemish Community".

An area frame was used to select the sample.

Canada

Canada's target population consisted of all household residents aged 16 and over. Excluded from the population were residents of the Yukon and Northwest Territories, residents of institutions, persons living on Indian reserves, and members of the armed forces. Also excluded were Francophone residents of the province of Ontario who lived in geographic regions where less than 20 persons were Francophone. Together these exclusions represent about 2 percent of the Canadian population aged 16 years and over. Canada's total in-scope population was 21,307,893 persons.



Canada used two separate frames to select its sample. The first was the 1991 Census file used to select the sample of Francophones from the province of Ontario. A separate literacy estimate for Franco-Ontarians was required, but because this population represented only about 5 percent of Ontario's population, a census frame was deemed most appropriate.

The second frame was the Labour Force Survey sample file used to select all other Canadians in the IALS sample. This file consisted of approximately 73,000 dwellings. After excluding dwellings found to be vacant, demolished or converted to non-residential uses, dwellings under construction, and seasonal dwellings, about 63,000 dwellings remained which were occupied by eligible persons. For these dwellings, the Labour Force Survey file contained demographic and labor force information for approximately 140,000 civilians aged 15 years and over.

Germany

In Germany, only those persons aged 16 to 65 years of age living in private households were included in the study. Residents of institutions, who represent less than 2 percent of the population, were excluded. Both East and West Germany were included, and no geographical regions were excluded. The total in-scope population was 53,826,289 persons.

An area frame was used to cover the target population.

Great Britain

Great Britain's target population included all persons aged 16 to 65. Residents of institutions, the Scottish Highlands, and islands north of the Caledonian Canal were also excluded. These exclusions represent less than 3 percent of the population. The total-in-scope population of Great Britain was 36,324,303 persons.

In Great Britain, the post code address file (PAF) was used to select the initial sample of addresses by postal code sectors.

Ireland

Ireland's target population consisted of persons aged 16 to 65 years of age. There were no exclusions and 100 percent of the population was covered. The total-in-scope population of Ireland was 2,174,380 persons.

Ireland used an area frame to select their IALS sample.

Netherlands

The Netherlands target population consisted of those persons aged 16 to 74 years of age living in non-institutionalized dwellings. All residents of institutions (e.g. hospitals, nursing homes, homes for elderly, prisons, offices, businesses, government buildings, etc.) were excluded from the target population. These exclusions were estimated to be less than 1 percent. The total in-scope population of the Netherlands was 11,495,719 persons.

The initial sampling frame was a postal code file consisting of all postal codes in the country.

Northern Ireland

Northern Ireland's target population consisted of persons aged 16 to 65 years of age. The total-in-scope population of Northern Ireland was 1,012,875 persons.

In Northern Ireland a list of all private addresses was used to select the initial sample.

New Zealand

New Zealand's target population included all those aged 16 to 65 years of age. Residents of institutions, offshore islands, onshore islands, waterways, and inlets were excluded from the survey's target population. These exclusions were estimated to amount to less than 1 percent of New Zealand's population. The total-in-scope population of New Zealand was 2,264,849 persons.

The sampling frame was a list of "meshblocks" that fell within the geographical coverage of the survey. A meshblock is the smallest geographical statistical unit for which data is collected and processed by the New Zealand Department of Statistics. The meshblocks cover the country entirely.

Poland

Poland's target population consisted of Polish citizens aged 16 to 65. Poland's total in-scope population was 24,475,650 persons.

Poland used the Polish National Register of Citizens (PESEL) as a frame for selecting the IALS sample. The PESEL covers all Polish residents living permanently (i.e., for longer than three months) in Poland. The register is continually updated for births, deaths, emigration, and change of permanent residence.

Sweden

The Swedish target population included all persons aged 16 years and over who were permanent residents of Sweden on 1 October 1994. Persons living in institutions, including those completing their military service, and persons living abroad during the survey period (1 October 1994 to 1 February 1995) were excluded. The total in-scope population of Sweden is approximately 6.9 million persons.

A register covering the total Swedish population, known as the "DAFA" register, was used as the frame.

Switzerland

The target population for Switzerland consisted of inhabitants of the country aged 16 years and over in the French- and German-speaking regions of the country. Excluded from this population were residents of the Rhaeto-Romanish and Italian speaking regions of the country (4.8 percent of the Swiss population) and residents of institutions (approximately 3.4 percent of the population).

An electronic telephone file was used as the sampling frame. This frame covers virtually the whole Swiss population since it is mandatory for persons with telephones to be registered on this file, and approximately 98 to 99 percent of all households have phones. The only exclusions from the frame are VIPs, whose numbers are not published for security reasons. A low percentage of households have more than one telephone line.

United States

The target population for the United States consisted of civilian non-institutionalized residents aged 16 to 65 years in the 50 states and the District of Columbia. Excluded from this group were members of the armed forces on active duty, those residing outside the United States, and those with no fixed household address (i.e., the homeless or residents of institutional group quarters such as prisons and hospitals). The total in-scope population of the United States was 165,301,676 people.

The sample for the American component of IALS was selected from persons in the Current Population Survey (CPS). The frame for the CPS consisted of 1990 Decennial Census files, which are continually updated for new residential construction and are adjusted for undercount, births, deaths, immigration, emigration, and changes in the armed forces.

5.2

Sample Design

The IALS criteria specified that each country was to draw a high-quality probability sample representing the adult non-institutional civilian population aged 16 to 65. Within these guidelines, each country designed its sample selection according to what was most efficient for that country.

Table 5.3 summarizes the sample designs employed by the various IALS countries.

Country	1st stage of sampling	2nd stage of sampling	3rd stage of sampling
Belgium (Flanders)	statistical sectors	individuals	level of education
Canada	Labour Force Survey,	LFS households	1 person/household
Germany	electoral districts	households	1 person/household
Great Britain	postal codes	addresses	1 person/household
Ireland	District Electoral Divisions	households	1 person/household
Netherlands	postal codes	addresses	1 person/household
New Zealand	meshblocks	dwelling	1 person/household
Northern Ireland	addresses	1 person/household	
Poland	cities/counties	individuals	
Sweden	municipalities	individuals	
Switzerland	telephone numbers	1 person/household	
United States	Current Population Survey	CPS primary sampling units	individuals

Source: Statistics Canada and Educational Testing Service, International Adult Literacy Survey, 1994.

The detailed sample designs employed by the individual IALS countries are described below.

Belgium

The designated area of Flanders was divided into statistical sectors, from which 200 were selected with the probability proportional to size. Then 40, persons were chosen from a complete list of persons for each of the selected sectors. Finally, in order to get an equal distribution of persons by education level, the chosen persons were then selected into the final sample based on their level of education. Those people who were not sampled due to their education level were given a short questionnaire but these results were not included as part of the sample. This explains, in part, the relatively low response rate. The resulting number of respondents in the final sample was 2,261 persons.

Canada

The Canadian Labour Force Survey (LFS) sample, from which the IALS sample was selected, was based upon a stratified, multi-stage design employing probability sampling at all stages of the design. The design principles were the same for each province. Each province consists of a number of economic regions, areas of similar economic structure formed on the basis of federal-provincial agreements. Each province is divided into Economic Regions, which are then organized into Self-Representing Units (SRUs) and Non-Self-Representing Units (NSRUs). SRUs are cities whose population generally exceeds 15,000 persons or whose unique characteristics demand their establishment as self-representing units. NSRUs are those areas lying outside the SRUs.

The use of LFS respondents was advantageous in that the LFS includes information about persons' ages and education, and this information made it possible to tailor the IALS sample to meet the survey requirements. The LFS population was further stratified using the age and education variables.


Literacy estimates were required at the national level as well as for six target groups. To provide reliable literacy estimates, a sample of at least 700 persons was allocated to each group. These target groups were:

- i) In-school youth, aged 16 to 24
- ii) Out-of-school youth, aged 16 to 24
- iii) Seniors
- iv) Unemployment Insurance Recipients
- v) Social Assistance Recipients
- vi) Francophones from the province of Ontario

In the Labour Force sample, SRUs and NSRUs are delineated into Primary Sampling Units (PSUs), which are areas that can be visited conveniently by an interviewer. A sample of PSUs is randomly selected. Selected PSUs are then delineated into clusters of dwellings, which correspond to blocks or block faces. A sample of the clusters is selected, and all private dwellings in selected clusters are listed by field enumerators.

Within each selected cluster, a sample of dwellings is selected from the list of dwellings. Within each selected dwelling, labor force information is obtained for each civilian household member 15 years of age or older.

The IALS sample was selected as a subsample of this Labour Force Survey sample. A total sample of 6,427 persons aged 16 years and older was selected using stratified



random sampling from the May 1994 LFS file. Only one person per household was randomly selected in order to keep the household response burden to a minimum.

The sample of Francophones from the province of Ontario was selected from 1991 Census files. The Census geographic areas were stratified according to whether they had a high, medium or low percentage of adult Francophones in their population, as of the 1991 Census. The sample was proportionately allocated into these strata based on the size of their Francophone populations.

The sample of Ontario Francophones was selected in a three-stage sample. In the first stage, equal-sized random samples of the geographic areas in Ontario were selected from the three strata (high, medium, and low density of Francophones). The second stage consisted of a systematic sample of 2,285 households from within the selected geographic areas. For each of the selected households, the interviewer determined which, if any, of the household members was Francophone and then selected one of these persons using the Kish random selection grid provided by Statistics Canada.

Germany

In Germany, different master samples have been constructed through the cooperation of several market research agencies. Each master sample is representative of either East or West Germany and contains 210 electoral districts in each of which there are approximately 800 to 1,200 dwellings. Using systematic sampling, the electoral districts are selected for the master samples with probability proportional to the number of households. The electoral districts are classified by region, district, community size, district council, quarter, and vote area.

For IALS, two master samples were used in West Germany and a representative half-sample in East Germany. Interviewers were to complete five acceptable interviews per electoral district. To this end, interviewers selected 23 addresses beginning at a given starting point and following a predetermined random route.

The interviewer verified that selected households were not vacant or seasonal dwellings. In a face-to-face interview, all eligible household members aged 16 to 65 were listed on a roster in order of decreasing age. In addition to recording the total number of eligible persons, the interviewers also listed their genders.

On each survey form, a random listing of the digits 1 - 9 (e.g., 437219856) was printed. The interviewer interviewed the person designated by the first digit in that series which was less than or equal to the number of eligible persons.

Great Britain

The Postcode Address File (PAF) was stratified by region and socio-economic group.

Postcode sectors (or groups of sectors) were used as the primary sampling units (PSUs). 237 PSUs were selected with a cluster of about 35 addresses within each.

At each of these addresses a Kish grid was used to select the final stage of one person per household.

Ireland

Ireland was initially divided into 22 strata. The first level of stratification was by region where 4 regions were used: County Dublin, the rest of Leinster, Munster and Connaught/Ulster. Within each of these 4 regions, further stratification by area type was done by: county boroughs, towns with population in excess of 10,000 inhabitants, towns with populations of between 5,000 and 10,000 inhabitants, towns with populations between 1,500 and 5,000 inhabitants and rural areas (those areas comprising dispersed populations or population clusters amounting to less than 1,500 inhabitants). As well, further stratification within the Dublin County Area was done to create 5 sub-strata.

Within each of the 22 strata, the primary sampling units (PSUs) were District Electoral Divisions and Wards, or combinations of these. From these 1,000 PSUs, 236 were selected probability proportional to size.

The second stage of selection used Ireland's Electoral Registers for the selected PSUs. Electors listed in respect of their business were excluded since the elector would also have been listed for his/her home address. Following this step, a sample of the remaining electors was drawn on the basis of equal probability, the number of names and addresses so selected being equal to the number of contacts required for the PSU in question. It should be noted that since the list of electors contained only the names of those persons 18 years and older, the electoral list was used to provide a list of target households.

The selection of households was carried out on the basis of a systematic constant interval within the entire electoral roll for the area under review, thus ensuring thorough geographical distribution within the PSU. Within each PSU, 50 households were selected.

The third stage of sample selection was to select one adult per household within the desired age range. When the interviewer made contact at the household, all individuals aged 16 to 64 living permanently at that address were listed. The selection of one individual was made using the birthday method. That is, whose date of birth was closest to the date of the interview.

Netherlands

The initial sampling frame was a postal code file consisting of all postal codes in the country.

A sample of 3,000 successful interviews (2,750 persons aged 16 to 64 years, and 250 aged 65 to 74 years) was desired. An initial sample of 7,000 postal codes was selected to accommodate for estimated losses of 5 percent for nonexistent addresses, 10 percent for addresses outside of the target group, 15 percent for households in which the selected inhabitant was either outside of the target population or away for a long period of time and 40 percent for non-response.

A two-stage sampling approach was used to select the sample. In the first stage, a systematic sample of 7,000 postal codes was selected from a file of 540,817 codes. In the second stage, systematic sampling was again used to select one address per sampled postal code from the available list of addresses in each postal code. On average, there were 11.4 addresses per postal code. Large apartment buildings posed a

problem, however, since they contained many addresses. A weight was therefore assigned to each address in the selected postal codes so that only one address per postal code was selected.

All selected addresses were mailed a letter informing the household that an interviewer would be visiting to conduct a literacy survey. A larger than expected number of letters were returned because they could not be delivered or because they had been sent to businesses. There had been no way to determine beforehand which addresses belonged to private households. Therefore, an additional sample of 2,000 addresses was drawn using the same techniques described above.

Within the selected households, the person in the target age range with the first-occurring birthday in the year was selected to participate in the survey. A counter was set up to count the number of elderly persons (65 to 74) selected. In theory, after conducting the predetermined number (250) of interviews for this age group, the remaining persons aged 65 to 74 years were to be excluded from the sample. In practice, this rule did not have to be implemented.

New Zealand

The initial sampling frame was the list of meshblocks, which fell within the geographical coverage of the survey. The country was stratified by region - with 13 Regional Authority areas, which cover New Zealand. Further stratification was then applied according to the type of area. The four area types were:

- i) main urban areas which have populations of 30,000 or more
- ii) secondary urban areas which have populations between 10,000 and 30,000
- iii) minor urban areas, which have populations between 1,000 and 10,000
- iv) rural areas which sometimes include rural centres where there are populations between 300 and 1,000 in a reasonable compact area.

The appropriate numbers of meshblocks were randomly sampled from each of the area strata from within each of the Regional strata with probability proportional to size. A total of 475 meshblocks were sampled.

Each meshblock was exactly described according to the streets, side of street and the portion of street, which belonged to the meshblock. Every second permanent, privately-occupied dwelling from a starting point within the meshblock was eligible for selection to yield 20 contact-attempted dwellings.

Within each dwelling all eligible respondents were identified. The names of all eligible respondents were listed in descending order of age onto a Kish sampling grid. The respondent who was to be asked for an interview was that whose name fell alongside predetermined indicators. Only one respondent per dwelling was selected.

Northern Ireland

In Northern Ireland, a list of all private addresses was used to select an initial systematic sample of 7000. At each of these addresses, one person was selected using the Kish method.

Poland

The Polish sample was based upon a stratified, two-stage design employing probability sampling at each stage of the design.

The population was first divided into 16 strata (eight urban and eight rural). The urban strata were constructed by grouping cities according to the number of inhabitants. The rural strata were constructed by collapsing counties, which are administrative units covering a number of villages or a city. Poland is divided into 3,009 counties, of which 856 are city counties and 2,153 are rural counties. The mean number of inhabitants in a rural county is about 6,800 persons.

The sample was distributed to each stratum with probability proportional to the number of inhabitants within the stratum. In the first stage of sampling, the sampling process was different for urban and rural strata.

There were two strata for urban areas with populations of 200,000 or more. One stratum contained five cities with populations of more than 500,000 (Warsaw, Lodz, Cracow, Poznan, and Wroclaw), and the second stratum contained 15 smaller cities with populations of 200,000 to 500,000. Each city was included in the sample for each strata.

For the remaining six urban strata, a cluster of 10 individuals per city was established. The number of cities was then selected from each stratum (randomly with replacement) so that the number of individuals selected (10 per city) would be equal to the sample size already allocated to that stratum. The ten individuals were selected systematically within each selected city.

A first-stage sampling strategy similar to the one used for the smaller urban strata was used for the rural strata. The primary sampling units for the rural strata were counties (administrative units covering a number of villages or a city). The cluster size used in rural strata was the same as that used in urban strata (10 individuals). The number of counties was then selected from each stratum (with probability proportional to size) so that the number of individuals selected (10 per county) would be equal to the sample size already allocated to that stratum. A systematic sample of individuals was then drawn independently in each selected county.

In urban and rural strata alike, individuals were sampled from the Polish National Register of Citizens (PESEL), a listing which covers all Polish residents living permanently (i.e., longer than three months) in Poland. Each individual listed in the PESEL has an assigned ID number, which consists of the person's birthday (year/month/day) followed by five random digits. The PESEL is sorted by this ID number. A systematic sample was selected from this list. Because the file was already sorted by date of birth, the sample was automatically stratified by age.

In all, a total of 3,000 individuals (1,910 from urban strata and 1,090 from rural strata) were selected for the basic sample, and an additional 3,170 individuals (1,948 from urban strata and 1,123 from rural strata) were selected for a supplementary sample. The supplementary sample was selected to accommodate for non-response and was used for making substitutions in cases where non-response occurred. Both samples were stratified in exactly the same manner.

Sweden

Sweden's IALS sample was selected using a two-stage design. The 286 municipalities ("kommun") of the country were classified into two different categories: one defined as urban, consisting of all large urban municipalities, and the other defined as rural, comprising groupings of the remaining municipalities.

The urban municipalities were stratified into 30 strata depending on their population size. All 61 municipalities in the urban strata were selected for the sample. A random sample of persons from these municipalities was selected directly from the persons register using a systematic sample. The probability of selection, P , was given as:

$$P = \text{total size of the sample} / \text{total size of the population}$$

For the rural strata, one municipality was selected from each municipality grouping within a stratum. The probability of selection was proportional to the number of inhabitants who were age 16 years and older. The probability of selection of persons within the chosen municipalities was set so that the overall sampling probability, P , was exactly equal to the probability of selection of persons from the urban category. That is,

$$P_{\text{person}} = P / P_{\text{municipality}}$$

For each of the sampled municipalities, a random sample of persons was drawn from the Census register.

Switzerland

The target population was divided into two strata based on the official language (German speaking and French speaking) of each region. From the telephone frame, two systematic samples of addresses were drawn for each region: a main sample of 1,350 persons and a reserve sample of 500 persons. Each of these samples was divided into 2 sub-samples.

For the main sample, the first sub-sample was selected systematically within Cantons and District Councils. The second sub-sample was selected by taking the records that were 15 records down from the record selected in the first sub-sample. This method increased the probability of selecting at least two households in the same District Council.

The same method was used for the reserve sample.

Because separate estimates were required for the Canton of Geneva, a systematic sample of 600 telephone numbers in this area was drawn using the same method described above.

The final sample size, including the oversample for the Canton of Geneva, consisted of 3,000 persons.

The selected addresses were contacted by telephone. The person answering the call was asked to provide the number of household members who belonged to the 16-65 age group. The contact person was then asked for the given name of the age-eligible household member whose name came first in the alphabet, and this individual was selected for inclusion in the sample.

United States

The sample for the United States IALS was selected from a sample of individuals in housing units who were completing their final round of interviews in the Current Population Survey (CPS). The CPS is a large-scale continuous household survey of the civilian non-institutionalized population aged 15 and over. For the CPS, a sample of housing units is selected each month and is retained in the sample for four consecutive months. These units are then dropped from the sample for eight months, and then return to the sample for four additional months.

The United States IALS sample was selected from housing units undergoing their final interviews in March, April, May, and June 1994. These housing units were included in the CPS for their initial interviews in December 1992 and January, February, and March 1993. The IALS interviews were conducted in October and November 1994.

The CPS sample is selected using a stratified multi-stage design. Housing units that existed at the time of the 1980 Population Census were sampled from the Census list of addresses. Housing units that did not exist at that time were sampled from lists of new construction when available and otherwise by area sampling methods. Occupants of housing units that came into existence between the time of the CPS sample selection and the time of the IALS fieldwork had no chance of being selected for the IALS.

The IALS sample was confined to 60 of the 729 CPS primary sampling units (PSUs). Within these 60 PSUs, all persons aged 16 to 65 years of age in the sampled housing units were classified into 20 cells defined by race/ethnicity and education. Within each cell, persons were selected for the IALS with probability proportional to their CPS weights, with the aim of producing an equal probability sample of persons within cells. A total of 4,901 persons was selected for the IALS.

5.3

Weighting and Benchmarking

IALS countries used different methods for weighting their samples to their population totals. For countries with known probabilities of selection, a base weight calculated using the probability of selection could have been computed. Another method commonly used to weight data, was to adjust the rough estimates produced by the sample to match known population counts from non-IALS sources. This “benchmarking” procedure, assumes that the characteristics of non-respondents are similar to those of the respondents.

The weighting procedures used by each individual country are discussed below. All the IALS countries used benchmarking as the final step in their weighting process. A table showing the variables to which each country benchmarked, is given at the end of this section.

Belgium

Belgium used counts from its 1991 Census as the benchmarking variables. The variables region, age, sex and education were used.

Canada

Since the main Canadian sample used a sub sample of the Labour Force Survey (LFS) sample, the LFS weight was taken as the initial weight. Three adjustments then were made to the LFS weights in order to derive final weights for the individual records on the file:

- (1) An adjustment to reflect the selection probabilities associated with the IALS sub-sample,
- (2) An adjustment to account for the additional non-response to the main Canadian IALS, and
- (3) Re-adjustments to account for independent province/age/sex projections and for independent Economic Region/Census Metropolitan Area projections, made after the above adjustments.

In the Franco-Ontario sample, the final weight of every record was the product of five numbers: the weight for the first stage of selection, an adjustment factor for this stage, the weight for the second stage of selection, an adjustment factor for this stage, and the weight for the third stage of selection. These are defined below.

The weight for the first stage of selection is the inverse of the probability of selection of the primary sampling unit (PSU). It varies according to the size of the PSU.

The first adjustment factor corrects for complete non-response at the PSU level. The adjustment factor is the ratio of total PSUs selected to responding PSUs and is done independently in strata 1 and 2. In practice, there was no complete non-response, and all the factors ended up being equal to unity.

The weight for the second stage of selection is the inverse of the probability of selection of the household. All households in a given PSU have the same weight (provided they belong to the target population of households).

The second adjustment factor has two purposes: to correct for non-response for households that belong to the target population, and to correct for out-of-scope households that do not. The adjustment factor is simply the ratio of total households selected to responding households, and is calculated at the PSU level. Correcting for out-of-scope households means accounting for households that did not include Francophones at the last census but into which Francophones have moved since. The adjustment ensures that the number of households with Francophones is comparable to what it was at the last Census.

The weight for the third stage of selection is the inverse of the probability of selection of the individual. In other words, the weight is equal to the number of Francophones aged 16 or over in the household.

The next step in the weighting procedure was to merge the data from the LFS-based and census-based samples and to adjust the weights accordingly.

First, Franco-Ontarians in the LFS-based sample were identified and eliminated from the sample. These already-weighted records were then replaced by the 1,440 respondents from the census-based sample. The resulting file size was 5,660 records. Next, the

weights were adjusted to comply with the French/English speaking counts for Ontario. Finally, these weights were adjusted based on the province/sex/age categories used previously. The resulting final weight appears on the IALS microdata file.

Germany

The German data were weighted by comparing the estimates taken from the sample with external sources. The sample was split into 277 different sub-groups defined by the intersection of different characteristics, including the number of household members aged 16 to 65, age and sex, and citizenship.

Great Britain

Education and employment questions taken from the Labour Force Survey were used as the benchmark variables as well as region, age and sex.

Ireland

Two stages were used in the weighting of the Irish sample. The first stage weight was to adjust for the probability of selection of the individual respondent. This weight was calculated for each individual record. Each involved dividing the number of eligible people (16 - 65 year olds) at a particular address by the number of names (electors) leading to the address.

Age data was recorded on the household roster. From these data, the number of individuals aged 18+ were identified and divided into the number of eligible individuals. The resultant factor was the initial weight factor for each record.

The second stage of weighting consisted of a matrix of target weights, correlating region, sex and age to adjust the effective sample in line with known population parameters. The combination of two gender groups by five age groups by eight regional groups yielded a matrix of eighty target cells.

Netherlands

Each respondent in the Netherlands sample was assigned a "base weight." This weight was calculated by dividing the in-scope target population size by the number of respondents. The Netherlands then adjusted its sample counts to correspond to 1994 counts from the Central Bureau of Statistics (CBS) for Dutch inhabitants aged 16 to 74. These adjustments were based on four demographic characteristics: region, age, sex, and education.

New Zealand

New Zealand's benchmarking included the variables gender, age, household size and the urban/rural coding.



Northern Ireland

Northern Ireland's sample counts were adjusted based on the demographic characteristics: age, sex, and education.

Poland

The Polish team used age groups, rural-urban codes, and regions (voivodeships) as post-stratification variables. This information was derived from Poland's Statistical Yearbook of Demography (Central Statistical Office, Warsaw, 1993). Although this benchmarking information was slightly out-of-date, Poland's demographic counts are known to be stable over a two- to three-year period.

Sweden

Sweden employed a self-weighting sample design. Estimates were benchmarked to geographic region, educational attainment, age, and sex counts.

Switzerland

Switzerland used a number of benchmark characteristics to adjust the sample data, with one reweighting characteristic after another used to adjust the sample. After each reweighting, certain characteristics were checked to ensure that the results were not biased by the procedures. The six characteristics used by the Swiss were: number of household members aged 16 to 65, total number of persons in the household, level of education, size of community, age, and sex.

United States

Weights for the United States IALS included two components. The first assigned weights to Current Population Survey (CPS) respondents, and the second assigned weights to the IALS respondents.

The CPS weighting scheme is a complex one involving three components: basic weighting, non-interview adjustment, and ratio adjustment. The basic weighting compensates for unequal selection probabilities. The non-interview adjustment compensates for non-response within weighting cells created by clusters of PSUs of similar size; Metropolitan Statistical Area (MSA) clusters are subdivided into central city areas, and the balance of the MSA and non-MSA clusters are divided into urban and rural areas. The ratio adjustment makes the weighted sample distributions conform to known distributions on such characteristics as age, race, Spanish origin, sex, and residence.

The IALS sample design began with persons aged 16 to 65 in the 60 sampled PSUs and the persons' final CPS weights. Individuals were sampled for IALS with probabilities proportional to their final CPS weights. The weights of persons sampled for IALS were adjusted to compensate for the use of the four rotation groups, the sampling of the 60 PSUs, and the sampling of persons within the 60 PSUs.

The IALS non-interview adjustment compensated for sampled persons for whom no information was obtained because they were absent, refused to participate, had a short-

term illness, had moved or had experienced an unusual circumstance that prevented them from being interviewed.

Finally, the IALS ratio adjustment ensured that the weighted sample distributions across a number of education groups conformed to March 1994 CPS estimates of these numbers.

Summary

Below is a summary table of the benchmark variables, by country, used in the IALS survey.

Table 5.4: Benchmark variables by country

Country	Benchmark variables
Belgium (Flanders)	Age, sex, education
Canada	Province, economic region, census metropolitan area, age, sex, in-school youth, out-of school youth, unemployment insurance recipients, social assistants recipients
Germany	Number of household members aged 16-65, age, sex, citizenship
Great Britain	Education, age, sex
Ireland	Area, sex, age
Netherlands	Region, age, sex, education
New Zealand	Sex, age, household size, urban/rural
Northern Ireland	Sex, age, education
Poland	Region, urban/rural, age
Sweden	Region, education, age, sex
Switzerland	Number of household members aged 16-65, total number of persons in the household, level of education, size of community, age, sex
United States	Education

Source: Statistics Canada and Educational Testing Service, International Adult Literacy Survey, 1994.

6.0

Data Collection and Processing

6.1

Introduction

The IALS gathered descriptive and proficiency information from sampled respondents through a background questionnaire and a series of assessment booklets containing prose, document, and quantitative literacy tasks. Survey respondents spent approximately 20 minutes answering a common set of background questions concerning their demographic characteristics, educational experiences, labor market experiences, and literacy related activities. Responses to these background questions make it possible to summarize the survey results using an array of descriptive variables, and also increase the accuracy of the proficiency estimates for various subpopulations. Background information was collected by trained interviewers.

After answering the background questions, the remainder of respondents' time was spent completing a booklet of literacy tasks designed to measure their prose, document, and quantitative skills. Most of these tasks were open-ended; that is, they required respondents to provide a written answer.

To achieve good content coverage of each of three literacy domains, the number of tasks in the assessment had to be quite large. Yet, the time burden for each respondent also needed to be kept within an acceptable range. To accommodate these two conflicting requirements—in other words, to reduce respondents' time burden without sacrificing good representation of the content domain—each respondent was administered only a fraction of the pool of tasks, using a variant of matrix sampling.

6.2

Model Procedures Manuals and Instruments

Each IALS country was given a set of administration manuals and survey instruments to use as a model. Countries were permitted to adapt these models to their own national data collection systems, but they were required to retain a number of key features. First, respondents were to complete the core and main test booklets alone, in their homes, without help from another person or from a calculator. Second, respondents were not to be given monetary incentives for participating. Third, despite the prohibition on monetary incentives, interviewers were provided with procedures to maximize the number of completed background questionnaires, and were to use a common set of coding specifications to deal with non-response. This last requirement is critical. Because non-completion of the core and main task booklets is correlated with ability, background information about non-respondents is needed in order to impute cognitive data for these persons.

6.2.1

Background questions

The model background questionnaires given to all IALS countries contained two sets of questions: mandatory questions, which all countries were required to include; and optional questions, which were recommended but not required. Countries were not required to field literal translations of the mandatory questions, but were asked to respect the conceptual intent of each question in adapting it for use. Countries were permitted to add questions to their background questionnaires if the additional burden on respondents would not reduce response rates. However, these questions will not be found in the international file, only in the country's national file.

6.2.2

Literacy tasks

The IALS is based on the premise that the difficulty of various literacy tasks is determined by certain factors, which are stable across language and culture. Accordingly, all of the IALS countries were given graphic files containing the pool of IALS literacy items and were instructed to modify each item by translating the English text to their own language without altering the graphic representation.

Certain rules governed the item modification process. For instance, some items required respondents to perform a task that was facilitated by the use of keywords. In some cases, the keywords were identical in the question and the body of the item; in others, the keyword was similar but not exactly the same; and in still other cases, the keyword was a synonym of the word used in the body of the item. In another case, respondents were asked to choose among multiple keywords in the body of the item, only one of which was correct. Countries were required to preserve these conceptual associations during the translation process.

Particular conventions used in the items—for example, currency units, date formats, and decimal delimiters—were adapted as appropriate for each country.

To ensure that the adaptation process did not compromise the psychometric integrity of the items, each country's test booklets were carefully reviewed for errors of adaptation.

6.2.3

Standardized non-response coding

It was crucial that the IALS countries managed non-respondent cases in a uniform manner so as to limit the level of non-response bias in the resulting survey estimates.

In IALS, a respondent had to complete the background questionnaire, pass the core block of literacy tasks, and attempt at least five tasks per literacy scale in order for researchers to be able to estimate his or her literacy skills directly. Literacy proficiency data were imputed for individuals who failed or refused to perform the core literacy tasks and for those who passed the core block but did not attempt at least five tasks per literacy scale.

Because the model used to impute literacy estimates for non-respondents relies on a full set of responses to the background questions, IALS countries were instructed to obtain at least a background questionnaire from sampled individuals. They were also given a detailed non-response classification to use in the survey.

Each country was responsible for hiring its own interviewing staff. Thus, the number of interviewers, their pay rates, and the length of the survey period varied among the countries according to their norms and budgets. Each country was provided with a booklet to be used in training interviewers.

6.3

Survey Response

The IALS instruments consisted of three parts:

- i) a background questionnaire, which collected demographic information about respondents;
- ii) a set of core literacy tasks, which screened out respondents with very limited literacy skills; and
- iii) a main booklet of literacy tasks, which was used to calibrate literacy levels.

The definition of a respondent for the IALS is a person who partially or fully completed the background questionnaire. In some cases, incomplete assessment data were obtained, but if the individual provided background information and indicated why he or she did not complete the core and main literacy task booklets, it was possible to impute a literacy profile for the person.

Each IALS country was required to provide a sample of at least 1,000 survey respondents per language of test. This sample size ensured sufficient information for the calculation of reliable literacy profiles. To permit international comparisons, each country was required to cover ages 16 to 65 inclusive. The numbers of respondents for the various countries are presented in Table 6.1.

All countries participating in the IALS instructed interviewers to make call-backs at households that were difficult to contact.

The first table below shows the number of responses for the population 16 to 65. The second table shows the number of responses and overall responses rate for the target population in each country.

Table 6.1: Survey coverage, language of test, and number of respondents, by country for the population aged 16 to 65

Country	Language of test	Population Covered*	Number of respondents*
Belgium (Flanders)	Dutch	4,500,000	2,261
Canada	English	13,700,000	3,130
	French	4,800,000	1,370
Germany	German	53,800,000	2,062
Great Britain	English	36,324,303	3,811
Ireland	English	2,200,000	2,423
Netherlands	Dutch	10,500,000	2,837
New Zealand	English	2,100,000	4,223
Northern Ireland	English	1,012,875	2,907
Poland	Polish	24,500,000	3,000
Sweden	Swedish	5,400,000	2,645
Switzerland	French	1,000,000	1,433
	German	3,000,000	1,393
United States	English	161,100,000	3045

* Aged 16 to 65.

Source: Statistics Canada and Educational Testing Service, International Adult Literacy Survey, 1994.

Table 6.2: Ages sampled, number of respondents, and response rate by country

Country	Ages Sampled	Total Number of respondents	Response rate (%)
Belgium (Flanders)	16 to 65	2,261	36*
Canada	16 and older	5,660	69
Germany	16 to 65	2,062	69
Great Britain	16 to 65	3,811	66
Ireland	16 to 65	2,423	60
Netherlands	16 to 74	3,090	45
New Zealand	16 to 65	4,223	74
Northern Ireland	16 to 65	2,907	58
Poland	16 to 65	3,000	75**
Sweden	16 and older	3,038	60
Switzerland	16 and older	2,838	55
United States	16 to 65	3,045	60

* In Flanders, the sample design did not allow for replacement. See sampling information (Section 5.2).

** Poland's response rate included only the first wave of sampled persons, before interviewer follow-up.

Source: Statistics Canada and Educational Testing Service, International Adult Literacy Survey, 1994.

Response information for the various IALS countries is provided below.

Belgium

The response rate for Belgium is 36.4% for those aged 16 - 64. The following table summarizes the Belgium responses:

Total Sample	Out-of-Scope	Responses			Non-Responses		
		Total	Complete	Partial	Total	Refusal	Other
8,880	2,667 (30.0%)	2,261	1,911 (84.5%)	350 (15.5%)	3,952	1,630 (41.2%)	2,322 (58.8%)

For the non-response category, the second largest reason was given as "not at home" with 1,118 records (28.3% of the 3,952 non-responses) coded as such.

Out of the total of 6,167 records that were in-scope for Belgium's IALS survey, 2,261 were response records (36.4%) and 3,952 were non-response.

Canada

When sampled persons were hard to reach, Canada's interviewers were instructed to call back at least three times, always at different times of the day or evening.

Because the main Canadian sample was selected from respondents to the Labour Force Survey, the total non-response rate for IALS includes non-response to the LFS as well as non-response to IALS. The response rate for the LFS in May 1994 was 92.1 percent. The largest group of non-respondents to the LFS is males between the ages of 20 and 24 inclusive (1.4 percent of the non-response). However, LFS estimates are weighted up to population projections from the 1991 Census by province, sex, and age group cells to adjust for undercoverage.

Of the 6,427 persons selected in the main IALS sample, 4,703 (73.2 percent) responded to the IALS survey. Thus, the overall response rate was 67.4 percent when the LFS response rate was included.

For the Franco-Ontarian portion of the survey, the initial sample consisted of 2,285 people in the same number of households. The first stage of data collection involved contacting any member of the selected household to determine whether the household was in scope. There was a successful contact in 85.6 percent (1,956) of the cases. Non-response at this stage was divided equally between individuals who refused outright to participate in the survey and those whom interviewers were unable to contact during the entire data collection period. The second stage of data collection involved determining household eligibility. Nearly 40 of the households sampled proved to be ineligible because there were no Francophones living there. The response rate among persons selected from eligible households was 88.2 percent. Together, the household (85.6 percent) and individual rates (88.2 percent) yield an overall response rate of 75.5 percent for the Franco-Ontario portion of the Canadian IALS. Combining the two samples meant that records that belonged to Franco-Ontarians from the LFS frame needed to be dropped. Thus, the final sample was 5,660 respondents aged 16 years and older (4,616 from the LFS frame and 1,044 from the Census frame) with a final combined response rate of 69 percent.

Germany

Germany's interviewers were instructed to attempt to contact a selected household at least three times at different times on different days before they coded a household as a non-response.

Germany obtained a response rate of 69 percent. There was, however, a very small percentage of households in which language difficulties were cited. This percentage seems to agree with the results of another recent survey, "ZUM - ALLBUS."

Great Britain

The response rate for Great Britain was 65.9%. The following table summarizes the Great Britain responses:

Total Sample	Out-of-Scope	Responses			Non-Responses		
		Total	Complete	Partial	Total	Refusal	Other
8,290	2,508 (30.3%)	3,813	3,801 (99.7%)	12 (0.3%)	1,969	1,275 (64.8%)	694 (35.2%)

For the non-response category, the second largest reason was given as "not at home" with 345 records (17.5% of the 1,969 non-responses) coded as such.

Out of the total of 5,782 records that were in-scope for Britain's IALS survey, 3,813 were response records (65.9%) and 1,969 were non-response. Britain tried to collect three variables for non-respondents: age, sex and employment status. However, demographic data was provided by only about half the non-response records, so a comparison of the distribution between response and non-response records was not possible.

Ireland

The 4,099 contacts in Ireland that were made with households, which had an eligible respondent, resulted in 2,423 people participating in the study. In 818 instances, there was a household refusal, in 345 cases, the selected respondent refused to participate, while 513 other contacts did not result in a respondent participating for a variety of reasons. The overall response rate for Ireland was 60%.

Netherlands

In the Netherlands, interviewers were instructed to call back at least four times before coding a household as a non-response.

The Netherlands¹ total initial sample size was 9,000 households. Interviews were actually completed for 3,090 households, while 3,811 were non-respondents and 2,099 were out of scope. Of the 2,099 out-of-scope records, 809 were so identified after the first wave of introductory letters was mailed, 460 were identified as businesses or institutions by the interviewers, and 830 contained respondents who were outside the target age group. The 830 out-of-scope respondents represent 9.2 percent of the initial sample.

With an in-scope sample of 6,901 households (9,000 minus 2,099), one interview per household, and 3,090 completed interviews, the Netherlands had a response rate of 44.8 percent. It should be noted that Dutch surveys generally have high rates of non-response, perhaps because a large number of interviews are conducted in the country on an annual basis. Experience shows that most Dutch social surveys encounter serious response problems.

New Zealand

The response rate for New Zealand was 74.1%. The following table summarizes the New Zealand responses:

Total Sample	Out-of-Scope	Responses			Non-Responses		
		Total	Complete	Partial	Total	Refusal	Other
7,184	1,484 (20.7%)	4,223	3,293 (78.0%)	930 (22.0%)	1,477	835 (56.5%)	642 (43.5%)

For the non-response category, the second largest reason was given as "not at home" with 450 records (30.5% of the 1,477 non-responses) coded as such.

New Zealand was not able to provide frame information for the non-response records due to the fact that the sample was selected using an area frame. However, there were 930 partial respondents from whom the survey was able to pick up 7 variables via a small questionnaire: age, gender, area, ethnicity, personal income, language first spoken as a child, and highest level of schooling achieved.

Northern Ireland

The response rate for Northern Ireland was 58.4%. The following table summarizes the Northern Ireland responses:

Total Sample	Out-of-Scope	Responses			Non-Responses		
		Total	Complete	Partial	Total	Refusal	Other
6,723	1,749 (26.0%)	2,907	2,892 (99.5%)	15 (0.5%)	2,067	1,451 (70.2%)	616 (29.8%)

For the non-response category, the second largest reason was given as "not at home" with 459 records (22.2% of the 2,067 non-responses) coded as such.

Out of the total of 4,974 records that were in-scope for Northern Ireland's IALS survey, 2,907 were response records (58.4%) and 2,067 were non-response.

Poland

In attempting to contact hard-to-reach households, Poland's interviewers were instructed to call back at least three times and attempt to schedule an interview time that was convenient for the respondent.

Poland's initial sample size was 6,071 persons. This number included an initial sample of 3,000 and a second sample of 3,071 replacements to be used if the originally selected person did not respond. The actual number of survey respondents was 3,000.

Poland reports that 24.1 percent of the originally sampled households were non-responsive, so replacement households needed to be contacted. No report of the number of replacement households that subsequently refused was given, however. Thus, the response rate of 75.9 percent represents only the rate after the first wave of interviewing.

Sweden

The Swedish interviewers were instructed to make a minimum of 10 calls and site visits if they experienced a problem contacting a selected respondent. Respondents who were immigrants with a limited command of Swedish were informed that the background questionnaire could be answered with the assistance of a family interpreter.

Sweden's initial sample size was 5,275 persons, 211 of whom were out of scope. Thus, the net sample deemed to be in scope was 5,064. While 3,038 (60.0 percent) answered the background questionnaire, there were 2,026 non-respondents.

Switzerland

Switzerland selected an initial sample of 3,000 persons as well as a second sample to replace non-responding cases.

In the German part of the sample, a total of 3,043 interviews were attempted. Because 694 addresses were out of scope (e.g., business address, fax number, summer home), the total in-scope sample was 2,349 addresses. In all, 1,399 successful interviews were conducted, resulting in a response rate of 59.6 percent.

Similarly, in the French portion of the sample, a total of 3,728 interviews were attempted. Because 856 of these addresses were out of scope, the total in-scope sample was 2872 addresses. Successful interviews were completed with 1,444 individuals, for a response rate of 50.3 percent.

Averaging the two response rates of 59.6 percent and 50.3 percent, Switzerland reported an overall response rate of 55.0 percent.

United States

In the United States, non-response to the IALS occurred for two reasons. First, some individuals did not respond to the Current Population Survey (CPS). Second, some of the CPS respondents selected for IALS did not respond to the IALS instruments. In any given month, non-response to the CPS is typically quite low, around 4 to 5 percent. Its magnitude in the expiring rotation groups employed for IALS selection is not known. About half of the CPS non-response is caused by refusals to participate, while the remainder is caused by temporary absences, other failures to contact, inability of persons contacted to respond, and unavailability for other reasons.

A sizeable proportion of the non-response to the IALS background questionnaire was attributable to persons who had moved. For budgetary reasons, it was decided that persons who were not living at the CPS addresses at the time of the IALS interviews

would not be contacted. This decision had a notable effect on the sample of students, who are sampled in dormitories and other housing units in the CPS only if they do not officially reside at their parents' homes. Those who reside at their parents' home are included in the CPS at that address, but because most of these students were away at college during the IALS interview period (October to November 1994), they could not respond to the IALS.

The high level of non-response for college students could cause a downward bias in the literacy skill-level estimates. This group represents only a small proportion of the United States population, however, so the potential bias is likely to be quite small. Further, comparison of the IALS results to the U.S. National Adult Literacy Survey data discounts this as a major source of bias.

Out of the 4,901 CPS respondents sampled for IALS, 3,060 responded. Including a non-response rate of approximately 5 percent from the CPS, a total response rate of 59.4 percent (62.4 x 95.0) was obtained for the United States IALS.

6.4

Scoring

Respondents' literacy proficiencies were estimated based on their performance on the cognitive tasks administered in the assessment. Unlike multiple-choice questions, which are commonly used in large-scale surveys and which offer a fixed number of answer choices, open-ended items such as those used in the IALS elicit a large variety of responses. Because raw data is seldom useful by itself, responses must be grouped in some way in order to summarize the performance results. As they were scored, responses to the IALS open-ended items were classified as correct, incorrect, or omitted.

The models employed to estimate ability and difficulty are predicated on the assumption that the scoring rubrics developed for the assessment were applied in a consistent fashion within and between countries. Several steps were taken to ensure that this assumption was met. Two of these main steps were the intra-country and inter-country rescoring described in the following sections.

6.4.1

Intra-country rescoring

A variable sampling ratio procedure was set up to monitor scoring accuracy. At the beginning of scoring, almost all responses were rescored to identify inaccurate scorers and to detect unique or difficult responses that were not covered in the scoring manual. After a satisfactory level of accuracy was achieved, the rescoring ratio was dropped to a maintenance level to monitor the accuracy of all scorers. Average agreements were calculated across all items. To ensure that the first and second scores were truly independent, certain precautions had to be taken. For example, scorers had to be different persons, and the second scorer could not be able to see the scores given by the first scorer.

Scorers who received identical training within a country are expected to be more consistent with one other than with scorers in other countries. This expectation was

confirmed, as shown in Table 6.3. Most of the rescoring reliabilities were above 97 percent. It is important to note that the results were well within the statistical tolerances set for the IALS study and considerably better than those realized in other large-scale studies using open-ended items.

Table 6.3: Intra-country rescore reliabilities, by country/language group

Country	No. of booklets rescored	Average percent agreement
Belgium (Flanders)	300	96
Canada/English	688	97
Canada/French	313	97
Germany	268	94
Great Britain	300	97
Ireland	300	97
Netherlands	599	97
New Zealand	300	98
Northern Ireland	300	98
Poland	589	99
Sweden	301	98
Switzerland/French	1,187	98
Switzerland/German	1,143	97
United States	not applicable	not applicable

Source: Statistics Canada and Educational Testing Service, International Adult Literacy Survey, 1994.

Since intra-country rescoring was used as a tool to improve data quality, score updates were not made to the database. In other words, the agreement data presented here indicate the minimum agreement achieved in scoring. After intra-country reliabilities were calculated, a few scorers were found to be unreliable. These scorers either received additional training or were released. Where scores and rescores differed, the first scores were replaced with correct scores if the inaccuracy was due to a systematic error on the part of the first scorer. In some cases, the scoring guide was found to be ambiguous. In such cases, the scoring guide was revised and the first scores were changed to reflect the revisions, but the second scores were not altered. The second scores were never replaced, even if they were subsequently found to be erroneous.

In sum, the first scores reflect changes and corrections resulting from lessons learned in the intra-country rescoring analysis. The first scores are therefore more accurate and consistent than the second scores, which retain errors and thereby underestimate the rescore reliabilities somewhat. The extent to which the reliabilities are underestimated must be very small, however, given that most of the reliabilities are above 97 percent. These values indicate that very consistent scoring was achieved by all the participating countries.

6.4.2

Inter-country rescoring

Even after ensuring that all scorers were scoring consistently, fixing ambiguities in the scoring guides, and correcting any systematic scoring errors, it was still necessary to examine the comparability of scores across countries. Accurate and consistent scoring within a country does not necessarily imply that all countries are applying the scoring guides in the same manner. Scoring bias may be introduced if one country scores a

certain response differently from the other countries. The inter-country rescorings described in this section were undertaken to ensure scoring comparability across countries.

As noted earlier, responses to the IALS assessment items were scored by each country separately. To determine inter-country scoring reliabilities for each item, the responses of a subset of examinees were scored by two separate groups. Usually, these scoring groups were from different countries. For example, a sample of test booklets was scored by two groups who scored Canada/English booklets and United States booklets. Inter-country score reliabilities were calculated by Statistics Canada, then evaluated by ETS. Based on the evaluation, every country was required to introduce a few minor changes in scoring procedures. In some cases, ambiguous instructions in the scoring manual were found to be causing erroneous interpretations and therefore lower reliabilities.

Using the inter-country score reliabilities, researchers can identify poorly constructed items, ambiguous scoring criteria, erroneous translations of items or scoring criteria, erroneous printing of items or scoring criteria, scorer inaccuracies, and, most important, situations in which one country consistently scored differently from another. In the latter circumstance, scorers in one country may consistently rate a certain response as being correct while those in another country score the same response as incorrect. This type of score asymmetry must be eliminated before the IRT scaling is performed. ETS and Statistics Canada identified such items, while the country in which the scoring problem occurred investigated the plausible causes for such systematic bias in scores. Where a systematic error was identified in a particular country, the original scores for that item were corrected for the entire sample.

Table 6.4 summarizes the inter-country rescore reliabilities, before corrections.

Table 6.4: Inter-country rescore reliabilities, by country/language group

Original Country	No. of booklets rescored	Average percent agreement	Asymmetric items	Rescored by
Belgium (Flanders)	300	94		Netherlands
Canada/English	158	97	1	United States
Canada/French	142	97	7	France
Germany	270	94	6	Switzerland/German
Great Britain	300	97		Northern Ireland
Ireland	300	97		United States
Netherlands	300	97	2	Netherlands*
New Zealand	300	98		Australia
Northern Ireland	300	98		Great Britain
Poland	300	99	2	Canada
Sweden	300	98	1	Sweden*
Switzerland/French	154	98	11	France
Switzerland/German	153	98	4	Germany
United States	315	97	0	Canada/English

* The Netherlands and Sweden carried out both inter- and intra-country rescoring internally due to a lack of available language experts in Dutch and Swedish. Separate groups were established to perform the rescoring.

Source: Statistics Canada and Educational Testing Service, International Adult Literacy Survey, 1994.

6.5

Data Capture, Data Processing, and Coding

As a condition of their participation in the IALS, countries were required to capture and process their files using procedures that ensured logical consistency and acceptable levels of data capture error.

Specifically, countries were advised to conduct complete verification of the captured scores (i.e., enter each record twice) in order to minimize error rates. Because the process of accurately capturing the test scores is essential to high data quality, 100 percent keystroke validation was needed.

Each country was also responsible for coding industry, occupation, and education using standard international coding schemes (International Standard Industrial Classification, or ISIC; International Standard Occupational Classification, or ISOC; and International Standard Classification of Education, or ISCED). Further, coding schemes were provided for open-ended items, and countries were given specific instructions about the coding of such items so that coding error could be contained to acceptable levels.

To create a workable comparative analysis, each IALS country was required to map its national dataset into a highly structured, standardized record layout. In addition to specifying the position, format, and length of each field, this International Record Layout included a description of each variable and indicated the categories and codes to be provided for that variable. Upon receiving a country's file, Statistics Canada performed a series of range checks to ensure compliance to the prescribed format. When anomalies were detected, countries corrected the problems and submitted new files. Statistics Canada did not, however, perform any logic or flow edits, as it was assumed that participating countries performed this step themselves.

7.0

Guidelines for Tabulation and Analysis

This section of the documentation outlines the guidelines to be adhered to by users tabulating, analysing, publishing or otherwise releasing any data derived from the survey microdata tapes. With the aid of these guidelines, users of microdata should be able to produce the same figures as those produced by Statistics Canada and, at the same time, will be able to develop currently unpublished figures in a manner consistent with these established guidelines.

7.1

Sample Weighting Guidelines for Tabulation

The IALS surveys are based upon complex sample designs, with stratification, multiple stages of selection, and unequal probabilities of selection of respondents. Using data from such complex surveys presents problems to analysts because the survey design and the selection probabilities affect the estimation and variance calculation procedures that should be used. In order for survey estimates and analyses to be free from bias, the survey weights must be used.

While many analysis procedures found in statistical packages allow weights to be used, the meaning or definition of the weight in these procedures differ from that which is appropriate in a sample survey framework, with the result that while in many cases the estimates produced by the packages are correct, the variances that are calculated are poor. Programs for calculating standard errors for simple estimates such as totals, proportions and ratios (for qualitative variables) are provided in the following section.

7.2

Definitions of Types of Estimates: Categorical vs. Quantitative

Before discussing how the IALS data can be tabulated and analyzed, it is useful to describe the two main types of point estimates of population characteristics, which can be generated from the microdata file for the IALS.

Categorical Estimates:

Categorical estimates are estimates of the number, or percentage of the surveyed population possessing certain characteristics or falling into some defined category. The number of Germans at literacy Level 1 on the prose scale or the proportion of Canadians at literacy Level 4 in numeracy are examples of such estimates. An estimate of the

number of persons possessing a certain characteristic may also be referred to as an estimate of an aggregate.

Examples of Categorical Questions:

Q: Do you ever watch television or videos in a language other than French or English?

R: Yes / No

Q: How would you rate your reading skills in English needed in daily life?

R: Excellent / Good / Moderate / Poor

Quantitative Estimates:

Quantitative estimates are estimates of totals or of means, medians and other measures of central tendency of quantities based upon some or all of the members of the surveyed population. They also specifically involve estimates of the form X/Y where X is an estimate of surveyed population quantity total and Y is an estimate of the number of persons in the surveyed population contributing to that total quantity.

An example of a quantitative estimate is the average number of employers that working Canadians had in the past 12 months. The numerator is an estimate of the total number of employers that working Canadians had in the past 12 months, and its denominator is the number of Canadians reporting that they worked in the past 12 months.

Examples of Quantitative Questions :

Q: How many different employers have you had in the past 12 months?

R: employer(s)

Q: How many hours per week did you usually work at this job?

R: hours

7.2.1

Tabulation of Categorical Estimates

Estimates of the number of people within a given country with a certain characteristic can be obtained from the microdata file by summing the final weights of all records possessing the characteristic(s) of interest.

Proportions and ratios of the form X/Y for a country are obtained by:

- a) summing the final weights of records having the characteristic of interest for the numerator (X),
- b) summing the final weights of records having the characteristic of interest for the denominator (Y), then
- c) dividing the numerator estimate by the denominator estimate.

7.2.2

Tabulation of Quantitative Estimates

Estimates of quantities can be obtained from the microdata file by multiplying the value of the variable of interest by the final weight for each record, then summing this quantity over all records of interest. For example, to obtain an estimate for a particular country of the total number of different employers that people working part time have had in the past 12 months, multiply the value reported in the question D4 (number of employers) by the final weight for the record, then sum this value over all records with D5=2 (part time).

To obtain a weighted average of the form X/Y , the numerator (X) is calculated as for a quantitative estimate and the denominator (Y) is calculated as for a categorical estimate. For example, to estimate the average number of employers in the past 12 months of people working part time, in a given country

- a) estimate the total number of employers as described above,
- b) estimate the number of people in this category by summing the final weights of all records with QD5=2, then
- c) divide estimate a) by estimate b).

7.3

Literacy Level Estimates

The 1994/1996 International Adult Literacy Survey design is an adaptation of a three parameter logistic (PL) Item Response Theory model. The first parameter (A) is the ability of the item to discriminate (sensitivity to proficiency) and the second (B) is its difficulty. A third parameter (C) is the lower asymptote parameter which reflects the possibly non-zero chance of a correct response independent of ability. However, since the IALS test did not use any multiple choice type questions, this (C) parameter was fixed at zero throughout, thus transforming the equation into what can now be called a 2PL model. Once the parameters have been calculated, each item can be assigned a Response Probability value of 80 (RP80) which measures the proficiency level needed for a respondent to answer the task with an 80% probability of success. If four or more subpopulations displayed differential parameters, the item was dropped from the assessment and did not go into the calculation of the assessment of an individual's proficiency.

As noted previously, a respondent's proficiency in the three scales was summarized through the use of the item parameters and the respondent's ability in accordance with the IRT scaling models. The application differed from the norm in that the IALS called for administering relatively few items to each respondent in order to track population levels of proficiency more efficiently. Because the data are not intended to estimate individual levels of proficiency, however, more complicated analyses are required. Plausible values methodology was used to estimate key population features consistently and to approximate others no less accurately than standard IRT procedures would. In essence, this added dimension requires that the estimation of proficiency be based on a series of five plausible values for each of the three literacy domains. These five plausible values—

prose1 through prose5 for the prose scale, doc1 through doc5 for the document scale and quant1 through quant5 for the quantitative scale—have been recoded into plausible levels with values from 1 through 5 reflecting the empirically determined progression of information-processing skills and strategies required to perform increasingly complex tasks. Level 1 is equivalent to scores in the range 0 to 226 (inclusive); Level 2 is equal to scores of 226.0001 through 276; Level 3 goes from 276.0001 to 326; Level 4 includes scores ranging from 326.0001 to 376 and, Level 5 is equivalent to scores greater or equal to 376.0001. For the prose scale, the variables are called plev1 through plev5, for the document scale, these are dlev1 through dlev5 and for the quantitative scale, qlev1 through qlev5. Finally, in order to reproduce estimates published in the international and national Canadian (1996) reports, plev1 has been recoded into variable xprose whereby Levels 4 and 5 have been collapsed. Similarly, dlev1 has been recoded into xdoc and qlev1 into xquant. The reason for this recoding is to provide enough sample in each level to produce statistically meaningful estimates. The use of the first plausible value as the root for these estimates is entirely arbitrary and it would be equally legitimate to use any of the five values to produce point estimates. The table below demonstrates the inheritance tree for the plausible values, levels and reporting level for all three domains.

	PROSE1 →	PLEV1 →	1-4	XPROSE
	PROSE2 →	PLEV2		
0-500	PROSE3 →	1-5	PLEV3	
	PROSE4 →	PLEV4		
	PROSE5 →	PLEV5		
	DOC1 →	DLEV1 →	1-4	XDOC
	DOC2 →	DLEV2		
0-500	DOC3 →	1-5	DLEV3	
	DOC4 →	DLEV4		
	DOC5 →	DLEV5		
	QUANT1 →	QLEV1 →	1-4	XQUANT
	QUANT2 →	QLEV2		
0-500	QUANT3 →	1-5	QLEV3	
	QUANT4 →	QLEV4		
	QUANT5 →	QLEV5		

For simple point estimates in either of the three literacy domains, it is sufficient to use the population weight along with one of the corresponding five plausible values (chosen at random). To simplify this type of univariate or bivariate analysis, the variables xprose, xdoc and xquant are included on the international microdata file.

However, a more precise point estimate can be obtained by taking the average of the five estimates produced from each of the five plausible values, which can be computed as follows:

$$T = (\sum_i T_i) / 5, \text{ where } T_i \text{ is a vector of five weighted estimates derived from each of the five plausible values.}$$

Note that taking an average of the five plausible values, will only produce a valid point estimate, not a valid variance estimate. **All five** plausible values as well as the 30 replicate weights must be used in order to correctly compute design-based variance

estimates. Design-based variance estimates are discussed further in section 8.1.2. (Using Plausible Values and Replicate Weights in Calculating Sampling Errors).

7.4

Rounding Guidelines

In order that estimates for publication or other release derived from the microdata file correspond to those produced by Statistics Canada, users are urged to adhere to the following guidelines regarding the rounding of such estimates:

- a) Estimates in the main body of a statistical table are to be rounded to the nearest hundred units using the normal rounding technique. In normal rounding, if the first or only digit to be dropped is 0 to 4, the last digit to be retained is not changed. If the first or only digit to be dropped is 5 to 9, the last digit to be retained is raised by one. For example, in normal rounding to the nearest 100, if the last two digits are between 00 and 49, they are changed to 00 and the preceding digit (the hundreds digit) is left unchanged. If the last digits are between 50 and 99 they are changed to 00 and the preceding digit is incremented by 1.
- b) Marginal sub-totals and totals in statistical tables are to be derived from their corresponding unrounded components and then are to be rounded themselves to the nearest 100 units using normal rounding.
- c) Averages, proportions, rates and percentages are to be computed from unrounded components (i.e. numerators and/or denominators) and then are to be rounded themselves to one decimal using normal rounding. In normal rounding to a single digit, if the final or only digit to be dropped is 0 to 4, the last digit to be retained is not changed. If the first or only digit to be dropped is 5 to 9, the last digit to be retained is increased by 1.
- d) Sums and differences of aggregates (or ratios) are to be derived from their corresponding unrounded components and then are to be rounded themselves to the nearest 100 units (or the nearest one decimal) using normal rounding.
- e) In instances where, due to technical or other limitations, a rounding technique other than normal rounding is used resulting in estimates to be published or otherwise released which differ from corresponding estimates published by Statistics Canada, users are urged to note the reason for such differences in the publication or release document(s).
- f) Under no circumstances are unrounded estimates to be published or otherwise released by users. Unrounded estimates imply greater precision than actually exists.

8.0 Data Quality

The data quality from any survey can be evaluated by looking at two types of survey errors: sampling error and non-sampling error.

The estimates derived from this survey are based on a sample of individuals. Somewhat different figures might have been obtained if a complete census had been taken using the same questionnaire, interviewers, supervisors, processing methods, etc. as those actually used. The difference between the estimates obtained from the sample and the results from a complete count taken under similar conditions is called the sampling error of the estimate.

Errors, which are not related to sampling, may occur at almost every phase of a survey operation. Interviewers may misunderstand instructions, respondents may make errors in answering questions, the answers may be incorrectly entered on the questionnaire and errors may be introduced in the processing and tabulation of the data. These are all examples of non-sampling errors.

8.1

Sampling Errors

Since it is an unavoidable fact that estimates from a sample survey are subject to sampling error, sound statistical practice calls for researchers to provide users with some indication of the magnitude of this sampling error. This section of the documentation outlines the measures of sampling error which Statistics Canada commonly uses and which it urges users producing estimates from this microdata file to use also.

The basis for measuring the potential size of sampling errors is the standard error of the estimates derived from survey results.

However, because of the large variety of estimates that can be produced from a survey, the standard error of an estimate is usually expressed relative to the estimate to which it pertains. This resulting measure, known as the coefficient of variation (C.V.) of an estimate, is obtained by dividing the standard error of the estimate by the estimate itself and is expressed as a percentage of the estimate.

For example, suppose that, based upon the survey results, one estimates that 16.6% of Canadians are at literacy Level 1 with regard to prose, and this estimate is found to have standard error of 0.013. Then the coefficient of variation of the estimate is calculated as:

$$\left(\frac{.013}{.166}\right) \times 100\% = 7.8\%$$

8.1.1

CV Release Guidelines

One criterion that can be used to determine whether survey estimates are publishable is the coefficient of variation (CV). The CV is the standard error of an estimate expressed as a percentage of that estimate.

Before releasing and/or publishing any estimate from the IALS, users should first determine the quality level of the estimate. The quality levels are acceptable, marginal and unacceptable. Data quality is affected by both sampling and non-sampling errors. However for release purposes, the quality level of an estimate will be determined only on the basis of sampling error as reflected by the coefficient of variation as shown in table 8.1. Nonetheless users should be sure to read section 8 to be more fully aware of the quality characteristics of these data.

First, the number of respondents who contribute to the calculation of the estimate should be determined. If this number is less than 30, the weighted estimate should be considered to be of unacceptable quality.

For weighted estimates based on sample sizes of 30 or more, users should determine the coefficient of variation of the estimate and follow the guidelines below. These quality level guidelines should be applied to weighted rounded estimates.

All estimates can be considered releasable. However, those of marginal or unacceptable quality level must be accompanied by a warning to caution subsequent users.

Table 8.1: Quality Level Guidelines

Quality level of estimate	Guidelines
1. Acceptable	<p>Estimates have: a sample size of 30 or more, and low coefficients of variation in the range 0.0% to 16.5%.</p> <p>No warning is required.</p>
2. Marginal	<p>Estimates have: a sample size of 30 or more, and high coefficients of variation in the range 16.6% to 33.3%.</p> <p>Estimates should be flagged with the letter M (or some similar identifier). They should be accompanied by a warning to caution subsequent users about the high levels of error associated with the estimates.</p>
3. Unacceptable	<p>Estimates have: a sample size of less than 30, or very high coefficients of variation in excess of 33.3%.</p> <p>Statistics Canada recommends not to release estimates of unacceptable quality. However, if the user chooses to do so then estimates should be flagged with the letter U (or some similar identifier) and the following warning should accompany the estimates:</p> <p>“The user is advised that . . . (specify the data) . . . do not meet Statistics Canada’s quality standards for this statistical program. Conclusions based on these data will be unreliable, and most likely invalid. These data and any consequent findings should not be published. If the user chooses to publish these data or findings, then this disclaimer must be published with the data.”</p>

8.1.2

Using Plausible Values and Replicate Weights in Calculating Sampling Error

IALS countries used a variety of sampling schemes depending upon what was most efficient in each country. Thus, the jack-knife technique has been chosen as an appropriate variance estimation technique due to its ability to handle various complex sampling designs. Using a jack-knife variance estimator allows for fairly precise estimates of the total sampling error for population estimates and for conducting multivariate analyses. The jack-knife procedure has a number of properties that make it particularly suited to the analysis of these data:

- a) It provides unbiased estimates of the sampling error arising from the complex sample selection procedure for linear estimates such as simple totals and means, and does so approximately for more complex estimates.
- b) It reflects the component of sampling error introduced by the use of weighting factors, such as non-response adjustments, that are dependent on the sample data actually obtained.
- c) It can be adapted readily to the estimation of sampling errors for parameters estimated using statistical modelling procedures, as well as for tabulation estimates such as totals and means.
- d) Once appropriate weights are derived and attached to each record, jack-knifing can be used to estimate sampling errors. A single set of replicate weights is required for all tabulations and model parameter estimates that may be needed.

When computing jack-knife variance estimates for literacy score estimates, it is important to use all five plausible values in the equation as well as the 30 replicate weights. This is a cumbersome procedure requiring the replication of tabulations using each of the replicate weights and each of the plausible values. In effect, for each variance estimate required, five sets of thirty estimates (5 plausible values X 30 replicate weights) must be produced. The first component of the variance formula is the mean of the five variances computed from each of the five sets of thirty estimates. The second component of the variance formula, which is multiplied by a shrinkage factor of 6/5 and added to the first component, is the variance of the five estimates produced from each of the five plausible values. The formula is as follows:

$$\text{Var} (T.) = [\sum_i ((\sum_j (t_{ij} - T_i))^2/29)]/5 + (6/5 \sum_i (T_i - T.)^2)/4 ,$$

where $i = 1, \dots, 5$ represents the five plausible values,

$j = 1, \dots, 30$ represents the thirty replicate weights,

$T. = (\sum_i T_i) / 5$, where T_i is a vector of five weighted estimates derived from each of the five plausible values.

$T_i = \sum_j t_{ij} / 30$, where t_{ij} is a matrix of 150 estimates derived from each of the five plausible values X 30 replicate weights.

The correct standard error is simply the square root of $\text{Var} (T.)$. Such standard errors would include errors from both sampling and imputation. It is possible to do this jack-knifing procedure using SPSS or SAS in a single pass. The following routines detail this procedure.

For the following programs note:

The bold characters are the only variables and strings that need to be modified.

It is crucial that the case weights not be applied to the datasets before executing any of the following procedures, since the procedures themselves weight the data. If this is done, the estimates produced will be incorrect because the weight will have been applied twice. In addition, these procedures do not handle missing values as do other predefined procedures within SPSS or SAS. Thus, whenever it is necessary, make sure to exclude cases with missing values that may affect the final results.

I. Standard error and mean computation for literacy scores: Multiweight method using SPSS with correction for imputation

This program provides mean literacy scores and the associated standard errors for any of the three literacy scales. The estimates can be produced for any categorical break variable or a combination of categorical break variables. The following example produces mean scores and standard errors on the prose scale for each gender within each country.

```
Get File= 'path and filename of dataset'  
      /Keep= cntrid (or other break variable), gender (or other break variable),  
weight, replic01 To replic30, prose1 To prose5 (or doc1 To doc5 or quant1 To  
quant5).
```

```
Select if (not sysmis(Gender)).  
Execute.
```

```
Vector WT= replic01 To replic30.  
Vector AWX(30).  
Vector BWX(30).  
Vector CWX(30).  
Vector DWX(30).  
Vector EWX(30).
```

**{The bold characters are
the only variables and strings that
need modification}**

```
Loop #i= 1 To 30.  
  Compute AWX(#i)= WT(#i)*prose1.  
  Compute BWX(#i)= WT(#i)*prose2.  
  Compute CWX(#i)= WT(#i)*prose3.  
  Compute DWX(#i)= WT(#i)*prose4.  
  Compute EWX(#i)= WT(#i)*prose5.  
End Loop.  
Execute.
```

```
Vector VALUE= prose1 To prose5.  
Vector WS(5).  
Loop #i= 1 To 5.  
  Compute WS(#i)= VALUE(#i)*weight.  
End Loop.  
Execute.
```

```
Aggregate Outfile= 'path and filename of aggregate file to create'/Break=cntrid  
gender/UNW=N(weight)/  
      SWT, SW1 To SW30= Sum(weight, replic01 To replic30)/  
      ASX1 To ASX30, BSX1 To BSX30, CSX1 To CSX30, DSX1 To DSX30, ESX1 To ESX30  
      =Sum(AWX1 To AWX30, BWX1 To BWX30, CWX1 To CWX30, DWX1 To DWX30,  
      EWX1 To EWX30)/  
      SS1 TO SS5= Sum(WS1 To WS5)/.
```

```
Get File= 'path and filename of aggregate file created'.  
Execute.
```

```
Vector SA= SW1 To SW30.  
Vector SB= SW1 To SW30.  
Vector SC= SW1 To SW30.  
Vector SD= SW1 To SW30.  
Vector SE= SW1 To SW30.  
Vector VSX= ASX1 To ASX30.  
Vector WSX= BSX1 To BSX30.
```

Vector XSX= CSX1 To CSX30.
Vector YSX= DSX1 To DSX30.
Vector ZSX= ESX1 To ESX30.

Vector AXBAR(30).
Loop #i= 1 To 30.
 Compute AXBAR(#i)= VSX(#i)/SA(#i).
End Loop.
Vector BXBAR(30).
Loop #i= 1 To 30.
 Compute BXBAR(#i) = WSX(#i)/SB(#i).
End Loop.
Vector CXBAR(30).
Loop #i= 1 To 30.
 Compute CXBAR(#i) = XSX(#i)/SC(#i).
End Loop.
Vector DXBAR(30).
Loop #i= 1 To 30.
 Compute DXBAR(#i) = YSX(#i)/SD(#i).
End Loop.
Vector EXBAR(30).
Loop #i= 1 To 30.
 Compute EXBAR(#i) = ZSX(#i)/SE(#i).
End Loop.
Execute.

Compute XVAR1= Variance(AXBAR1 To AXBAR30).
Compute XVAR2= Variance(BXBAR1 To BXBAR30).
Compute XVAR3= Variance(CXBAR1 To CXBAR30).
Compute XVAR4= Variance(DXBAR1 To DXBAR30).
Compute XVAR5= Variance(EXBAR1 To EXBAR30).

Vector SI= SS1 To SS5.
Vector STI(5).
Loop #i= 1 To 5.
 Compute STI(#i)= SI(#i)/SWT.
End Loop.

Compute SBAR= Mean(STI1 To STI5).
Compute XVAR= Mean(XVAR1 To XVAR5).
Compute SVAR= Variance(STI1 To STI5).
Compute XSE= SQRT(XVAR+(6/5)*SVAR).

Print Formats SBAR, SVAR, XSE (F8.4).

Tables

```
/Observation = SWT UNW SBAR XSE  
/Table = cntrid > gender BY ( SWT + UNW + SBAR + XSE )  
/Title 'Gender and Country by Mean Prose Score'.
```

The final output will have two lines for each country, one for males and the other for females. The variable SBAR provides the mean score and the variable XSE provides the standard error for the mean estimate. The variable SWT gives a weighted cell count and UNW provides an unweighted cell count. An error message indicating that a division by zero has been attempted may result since some of the replicate weights are zero. SPSS swiftly deals with the problem of dividing by zero, by setting the result to a system missing value and proceeding with the computations without any affect on the final results.

The following is an example of the output produced from program I:

		Gender and Country by Mean Prose Scores			
		SWT	UNW	SBAR	XSE
Canada	Male	10383120	2423	265.01	1.24
	Female	10924774	3237	275.68	1.16
Switzerland (German)	Male	1577355	663	265.23	0.64
	Female	1576824	735	261.15	0.69
Switzerland (French)	Male	505906.7	688	265.04	0.85
	Female	505712.6	752	264.05	0.44
Germany	Male	26874222	938	276.84	0.67
	Female	26952066	1124	274.87	0.57
United States	Male	75485785	1437	269.34	0.96
	Female	85271760	1608	277.42	1.32
Ireland	Male	1092200	1077	262.94	1.55
	Female	1082180	1346	268.39	0.78
Netherlands	Male	5794417	1482	278.39	0.33
	Female	5701302	1608	278.33	0.46
Poland	Male	12130543	1431	227.90	0.50
	Female	12345106	1569	230.99	0.56
Sweden	Male	3264171	1494	290.59	0.56
	Female	3435209	1544	288.14	0.78
New Zealand	Male	1113047	1821	270.60	0.67
	Female	1151802	2402	279.66	0.40
Great Britain	Male	18254224	1730	267.02	0.75
	Female	18070079	2081	266.58	0.57
Northern Ireland	Male	502100.1	1322	262.25	1.41
	Female	510774.8	1585	264.92	0.61
Belgium (Flanders)	Male	1793505	1066	274.88	0.54
	Female	1874117	1180	268.88	0.47

II. Standard error computation for background (categorical) variables: Multiweight method using SPSS:

This program computes row proportions and the associated standard errors using the thirty replicate weights for any two (or more if additional break variables are added) categorical background variables. The following example produces the proportions of males and females along with their associated standard errors within each country.

Get File= '**path and filename of IALS dataset**'

/Keep= **cntrid (or other break variable), gender (or other break variable)**, weight,
replic01 To replic30.

Select if (not **sysmis(gender)**).

Execute.

**{The bold characters are
the only variables and strings that
need modification}**

Vector WT= replic01 To replic30.

Aggregate outfile= '**path and filename for first aggregate file to create**' /Break=**cntrid
gender/UNW=N(weight)/**

SWT, SW1 To SW30= Sum(weight, replic01 To replic30)/.

Aggregate outfile= '**path and filename for second aggregate file to create**'
/Break=**cntrid**/UNWT=N(weight)/
ZSWT, ZSW1 To ZSW30= Sum(weight, replic01 To replic30)/.

Match Files /File= '**path and filename for first aggregate file created**'
/Table= '**path and filename for second aggregate file created**'
/By **cntrid**.
Execute.
Save Outfile= '**path and filename for merged aggregate file created**'.

Vector SW= SW1 To SW30.
Vector ZSW= ZSW1 To ZSW30.
Compute XBAR= (SWT/ZSWT)*100.
Compute XVAR= 0.
Loop #i= 1 To 30.
 Compute #DIFF= ((SW(#i)/ZSW(#i))*100) - XBAR.
 Compute XVAR= XVAR + (#DIFF*#DIFF).
End loop.
Compute XSE= (Sqrt(XVAR)).
Execute.
Print formats XVAR, XSE (F8.4).
Tables
 /Observation = SWT UNW XBAR XSE
 /Table = **cntrid** > **gender** by (SWT + UNW + XBAR + XSE)
 /Title '**Country by Gender**'.

The following is an example of the output produced from program II:

		Country by Gender			
		SWT	UNW	XBAR	XSE
Canada	Male	10383120	2423	48.73	0.43
	Female	10924774	3237	51.27	0.43
Switzerland (German)	Male	1577355	663	50.01	0.01
	Female	1576824	735	49.99	0.01
Switzerland (French)	Male	505906.7	688	50.01	0.01
	Female	505712.6	752	49.99	0.01
Germany	Male	26874222	938	49.93	1.21
	Female	26952066	1124	50.07	1.21
United States	Male	75485785	1437	46.96	1.06
	Female	85271760	1608	53.04	1.06
Ireland	Male	1092200	1077	50.23	1.01
	Female	1082180	1346	49.77	1.01
Netherlands	Male	5794417	1482	50.40	0.00
	Female	5701302	1608	49.60	0.00
Poland	Male	12130543	1431	49.56	0.00
	Female	12345106	1569	50.44	0.00
Sweden	Male	3264171	1494	48.72	0.90
	Female	3435209	1544	51.28	0.90
New Zealand	Male	1113047	1821	49.14	0.00
	Female	1151802	2402	50.86	0.00
Great Britain	Male	18254224	1730	50.25	1.40
	Female	18070079	2081	49.75	1.40
Northern Ireland	Male	502100.1	1322	49.57	0.11
	Female	510774.8	1585	50.43	0.11
Belgium (Flanders)	Male	1793505	1066	48.58	1.78
	Female	1874117	1180	50.76	1.85

III. Standard error computation for quantitative variables excluding literacy scores: Multiweight method using SPSS.

This program computes standard errors for quantitative variables other than the plausible values (i.e. other than the literacy scores). The mean for variables such as duration of training (Derived by multiplying variables F8M1*F9M1*F10M1, gives duration of first mentioned course/program) or other continuous variables that may be derived can have their means calculated along with the standard error in the following program. The following example produces mean estimates of duration of training and their associated standard errors for each gender within each country.

Get File= '**path and filename of IALS dataset**'
 /Keep= **cntrid, gender (or other break variable)**, weight, replic01 To replic30,
a quantitative variable (e.g. duration of training - durtot).

Select if (not sysmis(**gender**)).
 Select if (not sysmis(**durtot**)).
 Execute.

Vector WT= replic01 To replic30.

Vector WX(30).

Compute WTX= Weight*durtot.

Loop #i= 1 To 30.

 Compute WX(#i)= WT(#i)*durtot.

End loop.

Execute.

**{The bold characters are
the only variables and strings that
need modification}**

Aggregate outfile= '**path and filename of aggregate file to create**' /Break=cntrid
gender/UNW=N(weight)/

 SWT, SW1 To SW30= Sum(weight, replic01 To replic30)/

 SWX, SX1 To SX30= Sum(WTX, WX1 To WX30)/.

Get File= '**path and filename of aggregate file created**'.

Vector SW= SW1 to SW30.

Vector SX= SX1 to SX30.

Compute XBAR= SWX/SWT.

Compute XVAR= 0.

Loop #i= 1 To 30.

 Compute #DIFF= (SX(#i)/SW(#i)) - XBAR.

 Compute XVAR= XVAR + (#DIFF*#DIFF).

End loop.

Compute XSE= Sqrt(XVAR).

Execute.

Print formats XVAR, XSE (F8.4).

Tables

 /Observation = SWT UNW XBAR XSE

 /Table = **cntrid** > **gender** By (SWT + UNW + XBAR + XSE)

 /Title '**Country and Gender by Mean Duration of Training**'.

The following is an example of the output produced from program III:

		Country and Gender by Mean Duration of Training			
		SWT	UNW	XBAR	XSE
Canada	Male	4113511	899	423.23	39.04
	Female	3965155	1170	380.75	53.73
Switzerland (German)	Male	680361.8	299	216.52	32.00
	Female	677703.4	311	182.12	28.05
Switzerland (French)	Male	178293.7	246	264.60	35.85
	Female	149798.9	223	177.64	33.16
Germany	Male	4702590	155	341.21	44.63
	Female	4758647	197	359.08	51.93
United States	Male	32251809	576	279.74	46.52
	Female	35664751	640	212.20	30.57
Ireland	Male	256038.1	239	537.79	54.58
	Female	286798.4	339	493.76	46.76
Netherlands	Male	2312375	562	385.50	31.22
	Female	2086068	618	376.40	23.52
Poland	Male	1679860	190	203.48	26.67
	Female	1291481	165	184.36	18.58
New Zealand	Male	456164.4	717	345.11	27.58
	Female	493908.2	1018	353.37	17.08
Great Britain	Male	8855527	827	241.34	17.85
	Female	8353211	931	241.65	20.30
Northern Ireland	Male	198627	539	383.58	45.50
	Female	176520.6	540	325.45	27.94
Belgium (Flanders)	Male	316948	199	169.25	34.18
	Female	312579.3	227	170.65	48.97

The next three programs are identical to the preceding three, but are written in SAS language.

IV. Standard error and mean computation for literacy scores: Multiweight method using SAS with correction for imputation:

This program provides mean literacy scores and the associated standard errors for any of the three literacy scales. The estimates can be produced for any categorical break variable or a combination of categorical break variables. The following example produces mean scores and standard errors on the prose scale for each gender within each country.

```
Data A;
  Set Libname.FileName;
  Array WT replic01-replic30;
  Array AWX AWX1-AWX30;
  Array BWX BWX1-BWX30;
  Array CWX CWX1-CWX30;
  Array DWX DWX1-DWX30;
  Array EWX EWX1-EWX30;
  Array VALUE prose1-prose5;
  Array WS WS1-WS5;
```

{The bold characters are
the only variables and strings that
need modification}

```
Do Over WT;
  AWX = WT*prose1;
  BWX = WT*prose2;
  CWX = WT*prose3;
  DWX = WT*prose4;
  EWX = WT*prose5;
end;

Do Over WS;
  WS = VALUE*weight;
end;

Proc Summary Data=A;
  Class cntrid gender;
  Var weight replic01-replic30 AWX1-AWX30 BWX1-BWX30
  CWX1-CWX30 DWX1-DWX30 EWX1-EWX30 WS1-WS5;
  Output Out=B N(weight)=UNW
  Sum(weight replic01-replic30 AWX1-AWX30 BWX1-BWX30
  CWX1-CWX30 DWX1-DWX30 EWX1-EWX30 WS1-WS5)=
  SWT SW1-SW30 ASX1-ASX30 BSX1-BSX30
  CSX1-CSX30 DSX1-DSX30 ESX1-ESX30 SS1-SS5;

Data C;
  Set B;
  Array SW SW1-SW30;
  Array VSX ASX1-ASX30;
  Array WSX BSX1-BSX30;
  Array XSX CSX1-CSX30;
  Array YSX DSX1-DSX30;
  Array ZSX ESX1-ESX30;
  Array SS SS1-SS5;
  Array AXBAR AXBAR1-AXBAR30;
  Array BXBAR BXBAR1-BXBAR30;
  Array CXBAR CXBAR1-CXBAR30;
  Array DXBAR DXBAR1-DXBAR30;
  Array EXBAR EXBAR1-EXBAR30;

  Do over SW;
    AXBAR = VSX/SW;
    BXBAR = WSX/SW;
    CXBAR = XSX/SW;
    DXBAR = YSX/SW;
    EXBAR = ZSX/SW;
  end;

  XVAR1 = Var(Of AXBAR1—AXBAR30);
  XVAR2 = Var(Of BXBAR1—BXBAR30);
  XVAR3 = Var(Of CXBAR1—CXBAR30);
  XVAR4 = Var(Of DXBAR1—DXBAR30);
  XVAR5 = Var(Of EXBAR1—EXBAR30);
```

```

Do Over SS;
    SS = SS/SWT;
end;

XVAR = Mean(Of XVAR1-XVAR5)
SBAR = Mean(Of SS1-SS5);
SVAR = Var(Of SS1-SS5);
XSE = Sqrt(XVAR+((6/5)*SVAR));

if (cntrid ne.);
if (gender ne.);

Proc Print;
    Title 'Gender and Country by Mean Prose Scores';
    Var cntrid gender UNW SWT SBAR XSE;
run;

```

The final output will have two lines for each country, one for males and the other for females. The variable SBAR provides the mean score and the variable XSE provides the standard error for the mean estimate. The variable SWT gives a weighted cell count and UNW provides an unweighted cell count. An error message indicating that a division by zero has been attempted may result since some of the replicate weights are zero. SAS swiftly deals with the problem of dividing by zero by setting the result to a system missing value and proceeding with the computations without any affect on the final results.

The following is an example of the output produced from program IV:

		Gender and Country by Mean Prose Scores			
		SWT	UNW	SBAR	XSE
Canada	Male	10383120	2423	265.01	1.24
	Female	10924774	3237	275.68	1.16
Switzerland (German)	Male	1577355	663	265.23	0.64
	Female	1576824	735	261.15	0.69
Switzerland (French)	Male	505906.7	688	265.04	0.85
	Female	505712.6	752	264.05	0.44
Germany	Male	26874222	938	276.84	0.67
	Female	26952066	1124	274.87	0.57
United States	Male	75485785	1437	269.34	0.96
	Female	85271760	1608	277.42	1.32
Ireland	Male	1092200	1077	262.94	1.55
	Female	1082180	1346	268.39	0.78
Netherlands	Male	5794417	1482	278.39	0.33
	Female	5701302	1608	278.33	0.46
Poland	Male	12130543	1431	227.90	0.50
	Female	12345106	1569	230.99	0.56
Sweden	Male	3264171	1494	290.59	0.56
	Female	3435209	1544	288.14	0.78
New Zealand	Male	1113047	1821	270.60	0.67
	Female	1151802	2402	279.66	0.40
Great Britain	Male	18254224	1730	267.02	0.75
	Female	18070079	2081	266.58	0.57
Northern Ireland	Male	502100.1	1322	262.25	1.41
	Female	510774.8	1585	264.92	0.61
Belgium (Flanders)	Male	1793505	1066	274.88	0.54
	Female	1874117	1180	268.88	0.47

**V. Standard error computation for background (categorical) variables:
Multiweight method using SAS:**

This program computes row proportions and the associated standard errors using the thirty replicate weights for any two (or more if additional break variables are added) categorical background variables. The following example produces the proportions of males and females along with their associated standard errors within each country.

```
Data A;
  Set Libname.FileName;
  Array WT replic01-replic30;
  {The bold characters are
the only variables and strings that
need modification}

Proc Summary Data=A;
  Class cntrid gender;
  Var weight replic01-replic30;
  Output Out=B N(weight)=UNW
  Sum(weight replic01-replic30)=
  SWT SW1-SW30;
```

```

Proc Summary Data=A;
  Class cntrid;
  Var weight replic01-replic30;
  Output Out=C N(weight)=UNW
  Sum(weight replic01-replic30)=
  ZSWT ZSW1-ZSW30;

Proc Sort Data = B;
  By cntrid;

Proc Sort Data = C;
  By cntrid;

Data D nonD Problem;
  Merge B(in=b) C(in=c);
  By cntrid;
  if b and c then output D;
  else if b and not(c) then output nonD;
  else if not(b) and c then output problem;
run;

Data E;
  Set D;
  Array SW SW1-SW30;
  Array ZSW ZSW1-ZSW30;
  XBAR = SWT/ZSWT*100;
  XVAR = 0;
  Do Over SW;
    Diff = ((SW/ZSW)*100) - XBAR;
    XVAR = XVAR+(Diff*Diff);
  end;
  XSE = Sqrt(XVAR);
  if (cntrid ne .);
  if (gender ne .);

Proc Print Data=E;
  Title 'Country by Gender';
  Var cntrid gender UNW SWT XBAR XSE;
run;

```

The following is an example of the output produced from program V:

		Country by Gender			
		SWT	UNW	XBAR	XSE
Canada	Male	10383120	2423	48.73	0.43
	Female	10924774	3237	51.27	0.43
Switzerland (German)	Male	1577355	663	50.01	0.01
	Female	1576824	735	49.99	0.01
Switzerland (French)	Male	505906.7	688	50.01	0.01
	Female	505712.6	752	49.99	0.01
Germany	Male	26874222	938	49.93	1.21
	Female	26952066	1124	50.07	1.21
United States	Male	75485785	1437	46.96	1.06
	Female	85271760	1608	53.04	1.06
Ireland	Male	1092200	1077	50.23	1.01
	Female	1082180	1346	49.77	1.01
Netherlands	Male	5794417	1482	50.40	0.00
	Female	5701302	1608	49.60	0.00
Poland	Male	12130543	1431	49.56	0.00
	Female	12345106	1569	50.44	0.00
Sweden	Male	3264171	1494	48.72	0.90
	Female	3435209	1544	51.28	0.90
New Zealand	Male	1113047	1821	49.14	0.00
	Female	1151802	2402	50.86	0.00
Great Britain	Male	18254224	1730	50.25	1.40
	Female	18070079	2081	49.75	1.40
Northern Ireland	Male	502100.1	1322	49.57	0.11
	Female	510774.8	1585	50.43	0.11
Belgium (Flanders)	Male	1793505	1066	48.58	1.78
	Female	1874117	1180	50.76	1.85

VI. Standard error computation for quantitative variables excluding literacy scores: Multiweight method using SAS:

This program computes standard errors for quantitative variables other than the plausible values (i.e. other than the literacy scores). The mean for variables such as duration of training (Derived by multiplying variables F8M1*F9M1*F10M1, gives duration of first mentioned course/program) or other continuous variables that may be derived can have their means calculated along with their standard errors. The following example produces mean estimates of duration of training and their associated standard errors for each gender within each country.

```
Data A;
  Set Libname.FileName;
if durtot ne .;
if gender ne .;
  Array WT replic01-replic30;
  Array WX WX1-WX30;
  WTX = weight*durtot;
```

```
Do Over WT;
  WX = WT*durtot;
end;
```

{The bold characters are
the only variables and strings that
need modification}

```
Proc Summary;
  Class cntrid gender;
  Var weight replic01-replic30 WTX WX1-WX30;
  Output Out=B N(weight)=UNW
  Sum(weight WTX replic01-replic30 WX1-WX30)=
  SWT SWX SW1-SW30 SX1-SX30;
```

```
Data C;
  Set B;
  Array SW SW1-SW30;
  Array SX SX1-SX30;
  XBAR = SWX/SWT;
  XVAR = 0;
  Do Over SW;
    Diff = (SX/SW) - XBAR;
    XVAR = XVAR+(Diff*Diff);
  end;
  XSE = Sqrt(XVAR);
  if (cntrid ne.);
  if (gender ne.);
```

```
Proc Print Data=C;
  Title 'Country and Gender by Mean Duration of Training';
  Var cntrid gender UNW SWT XBAR XSE;
run;
```

The following is an example of the output produced from program VI:

Country and Gender by Mean Duration of Training		SWT	UNW	XBAR	XSE
Canada	Male	4113511	899	423.23	39.04
	Female	3965155	1170	380.75	53.73
Switzerland (German)	Male	680361.8	299	216.52	32.00
	Female	677703.4	311	182.12	28.05
Switzerland (French)	Male	178293.7	246	264.60	35.85
	Female	149798.9	223	177.64	33.16
Germany	Male	4702590	155	341.21	44.63
	Female	4758647	197	359.08	51.93
United States	Male	32251809	576	279.74	46.52
	Female	35664751	640	212.20	30.57
Ireland	Male	256038.1	239	537.79	54.58
	Female	286798.4	339	493.76	46.76
Netherlands	Male	2312375	562	385.50	31.22
	Female	2086068	618	376.40	23.52
Poland	Male	1679860	190	203.48	26.67
	Female	1291481	165	184.36	18.58
New Zealand	Male	456164.4	717	345.11	27.58
	Female	493908.2	1018	353.37	17.08
Great Britain	Male	8855527	827	241.34	17.85
	Female	8353211	931	241.65	20.30
Northern Ireland	Male	198627	539	383.58	45.50
	Female	176520.6	540	325.45	27.94
Belgium (Flanders)	Male	316948	199	169.25	34.18
	Female	312579.3	227	170.65	48.97

8.2

Non-Sampling errors

Over a large number of observations, randomly occurring non-sampling errors will have little effect on estimates derived from the survey. However, errors occurring systematically will contribute to biases in the survey estimates. Considerable time and effort was made to reduce non-sampling errors in the survey. Quality assurance measures were implemented at each step of the data collection and processing cycle to monitor the quality of the data. These measures included the use of highly skilled interviewers, extensive training of interviewers with respect to the survey procedures and questionnaire, observation of interviewers to detect problems of questionnaire design or misunderstanding of instructions, procedures to ensure that data capture errors were minimized and coding and edit quality checks to verify the processing logic.

Despite these efforts, non-sampling error is bound to exist in every survey. The following text outlines the most likely sources of this error and its impact on the IALS survey.

Sampling Frame:

Once the population for a survey has been defined, the next step is to establish a means to access this population. The sampling frame provides the means. However, there are a number of issues that may arise with respect to the suitability of a frame. One of the main

issues in evaluating a frame is the issue of under coverage, where not all elements that should be in the population are on that frame.

Table 8.2 presented below (repeated from section 5.1) reports the percentage of the population 16 to 65 covered in each country and lists the excluded populations. As this table shows, all the IALS countries attained high levels of coverage.

Table 8.2: Survey coverage, by country

Country	Coverage (%)	Exclusions
Belgium (Flanders)	99	Residents of institutions and the Brussels region
Canada	98	Residents of institutions, persons living on Indian reserves, members of the armed forces, residents of the Yukon and Northwest Territories Francophone residents in the province of Ontario who lived in geographic regions where less than 20 persons were Francophone
Germany	98	Residents of institutions
Great Britain	97	Residents of institutions; the Scottish Highlands and islands north of the Caledonian Canal
Ireland	100	None
Netherlands	99	Residents of institutions
New Zealand	99	Residents of institutions; offshore islands, onshore islands, waterways and inlets
Northern Ireland	97	None
Poland	99	Persons residing in Poland for less than three months
Sweden	98	Persons living in institutions (including those doing their military service), persons living abroad during the survey period
Switzerland	89	Persons in Italian and Rhaeto-Romantic regions, persons in institutions, persons without telephones
United States	97	Members of the armed forces on active duty, those who reside outside the United States, those with no fixed household address

Source: Statistics Canada and Educational Testing Service, International Adult Literacy Survey, 1994.

Non-response:

A major source of non-sampling errors in surveys is the effect of non-response on the survey results. The extent of non-response varies from partial non-response (failure to answer just one or some questions) to total non-response.

Total non-response occurred when the interviewer was either unable to contact the respondent, no member of the household was able to provide the information, or the respondent refused to participate in the survey. The non-response rate for the IALS varied by country (See section 6.3). However, analysis of the characteristics of the IALS non-respondents suggests that they are not concentrated in any specific group. Total non-response was handled by adjusting the weight of households who responded to the survey to compensate for those who did not respond.

Partial non-response to the survey occurred, in most cases, when the respondent did not understand or misinterpreted a question, refused to answer a question, or could not recall the requested information. Generally, the extent of partial non-response was small in the IALS. However, one of the variables, which was particularly difficult to collect, as in all surveys, was income.

The IALS had three income questions:

J2: What is the best estimate of your personal income in 1993/94 from all sources, including those just mentioned?

J3: What is the best estimate of your personal income from only wages, salary or self-employment in 1993/94?

J5: What is the best estimate of the total income of all household members (including yourself) from all sources in 1993/94?

The response rates for the income questions are examined in detail in the next section.

Other key variables in the IALS are the education questions A5 and A8:

A5: Before you first immigrated to country of interview, what was the highest level of schooling you had completed?

A8: What is the highest level of schooling you have completed?

The response rates to these questions are also presented in the following section.

Response Error:

A number of other potential sources of non-sampling error that are unique to the IALS deserve comment. Firstly, some of the respondents may have found the test portion of the study intimidating and this may have had a negative affect on their performance. Unlike “usual” surveys, the IALS test items have “right” and “wrong” answers. Also, for many respondents this would have been their first exposure to a “test” environment in a considerable number of years. Further, although interviewers did not enforce a time limit for answering questions, the reality of having someone watching and waiting may have, in fact, imposed an unintentional time pressure. It is recognized, therefore that even though items were chosen to closely reflect everyday tasks, the test responses might not fully reveal the literacy capabilities of respondents due to the testing environment. Further, although the test nature of the study called for respondents to perform the activities completely independently of others, situations in the real world often enable persons to sort through printed materials with family, friends and associates. It could be therefore, that the skills measured by the survey do not reflect the full range of some respondents’ abilities in a more natural setting.

Scoring:

Another potential source of non-sampling error for the IALS relates to the scoring of the test items, particularly those that were scored on a scale (e.g. items that required respondents to write). Special efforts such as centralizing the scoring and sample verification were made to minimize the extent of scoring errors.

8.2.1

Quality Notes

General Notes

There have been thirteen countries that have participated in the IALS survey to date. Each country was responsible for editing their own data file. A generic international record layout (IRL) was provided to each country with instructions on how to create their own national data file. The national files were reviewed by Statistics Canada to search for any deviations from the IRL. This process attempted to identify flow errors, missing categories, and anything out of the ordinary. Despite these efforts, the international data files remain less than perfect. The following provides brief notes on deviations from the IRL that have remained on the data file, by country.

Note that flow errors that involve less than ten to twelve cases have been omitted from the following quality report. These are thought to have a negligible impact on statistical results.

There also exist outlier values in some of the questions involving ranges of acceptable data. Efforts were made to identify and rectify the outliers. Therefore, the extent to which there are outliers is minimal.

In general, countries who did not use the filter questions Q.C1 and/or Q.C7 will have higher non-response rates for Q.C5 and Q.C11 respectively.

Belgium Flanders

Section A

- The 26 responses coded 'DK/Refused' (Code 98) in Q.A8 were not flowed into Q.A11 and Q.A12.

Section B

- There were 570 cases in Q.B14, Q.B15, & Q.B17 that were not imputed to the language mentioned in Q.B13L1. The IRL states that if only one language was reported in Q.B13, then Q.B14 to QB17 should be imputed with the same language code.

Section F

- Q.F3M1 to Q.F3M3 should have the same number of responses as Q.F4 to Q.F11.
- Note that there is a high proportion of responses that answered 'Yes' (Code 1) in Q.F6G (i.e. 'Other').
- Q.F12M3 has a total of 89 responses, but according to the flow from Q.F11M3 there should be 119 responses. There are 30 missing responses.

Section J

- In Q.J1A, there are 644 responses coded 'No' (Code 2), but in Q.J3 there are 804 responses coded 'No income' (Code 0).

Non-Response Rates

A5 = 20.7%

A8 = 1.2%

J2 = 11.9%

J3 = 14.9%

J5 = 30.5%

Canada

General

- Canada's French and English samples **can** be combined and analyzed together without affecting the representation of the populations.
- For users who wish to merge Canada's National file with the international file, please note that the numbering of the questions in Section G (only), beyond Q.G6 is different between the two files. This is due to an additional question that was on the Canadian version of the survey.

Section B

- Q.B2L2 to Q.B5L2 have 174 cases that appear to be missing according to the flow from Q.B1L2. However, when we consider the rule used to determine whether or not the respondent's mother tongue matched the language of interview, the flow is correct. If there were two mother tongues reported and neither Q.B1L1 nor Q.B1L2 had a mother tongue equal to the language of interview, then the responses were flowed into Q.B2L2 to Q.B5L2. There were only 18 responses that satisfied these criteria.
- For Q.B6, and Q.B9 to Q.B12, please read the National Official Language as English if **interview** was in English and French if **interview** was in French. Note that individuals who were interviewed in one language can have performed the literacy tasks in the other language. See notes for BQLANG and TBLANG on the record layout.

Section E

- For Q.E4 to Q.E7, please read the National Official Language as English if **interview** was in English and French if **interview** was in French. Note that individuals who were interviewed in one language can have performed the literacy tasks in the other language. See notes for BQLANG and TBLANG on the record layout.

Section G:

- For Q.G2, Q.G3, Q.G5, Q.G11 to Q.G13, and Q.G15, please read the National Official Language as English if **interview** was in English and French if **interview** was in French. This can cause confusion when we consider the individuals that were interviewed in one language and performed the literacy tasks in the other language. See notes for BQLANG and TBLANG on the record layout.

Non-Response Rates

A5 = 0.01%

A8 = 0.01%

J2 = 18.7%

J3 = 12.7%

J5 = 33.8%

Germany

Section A

- Q.A2 has 1,900 responses that were imputed to 'Germany' (Code 28).
- Q.A3 has 2 responses that indicate the respondents immigrated before they were born.
- In Q.A12, there should be 1,302 responses but there are only 131 responses. There are 1,171 responses missing.

Section B

- There is one illegal value in Q.B1L2. The value '0' is not a valid category.

Section E

- Responses should be constant throughout the whole section at 1,237. But Q.E5, Q.E7, & Q.E9 only have 114, 155 & 212 responses respectively.
- For Q.E4 to Q.E9 there should be the same number of responses as in Q.E1 to Q.E3, but the number of responses are not consistent.

Section F

- Germany's survey did not treat this section in a comparable manner to the international survey. They excluded a major component of their adult education process (i.e. apprenticeship training). Therefore, Germany's adult and education training is understated as a result.
- Q.F4AM1 to Q.F4EM1 are missing 130 responses.
- Q.F4AM2 to Q.F4EM2 are missing 64 responses.
- Q.F4AM3 to Q.F4EM3 are missing 31 responses.
- Q.F12M1 has 26 extra responses.

Section G

- Q.G16D has 16 responses missing. The non-responses from Q.G15D were not flowed into this question.

Section J

- In Q.J3, there are 612 responses coded 'No income' (Code 0), but in Q.J1A only 468 responses were coded 'No' (Code2).

Non-Response Rates

A5 = 22.8%

A8 = 10.4%

J2 = omitted

J3 = 14.8%

J5 = 22.5%

Great Britain

Section B

- Q.B5L1 has 88 responses, but according to the flow from Q.B1L1 there should be 254 responses. There are 166 missing responses.
- Q.B14 to Q.B17 have 2,992 responses, but according to the flow of the section there should be 3,811 responses. There are 819 missing responses.

Section D

- Q.D4 has 2,638 responses, but according to the flow from Q.D2 there should be 2,761 responses. There are 123 missing responses.
- The 123 non-responses in Q.D5 are not flowed in to Q.D6.
- Q.D10 has 2,429 responses, but according to the flow from Q.D9 (ISCOR) there should be 2,761 responses. There are 332 missing responses.
- Q.D11 has 2,815 responses, but according to the flow from Q.D9 (ISCOR) there should only be 2,761 responses. There are 54 extra responses.
- Q.D12 and Q.D13 have 2,740 responses, but according to the flow of the section there should be 2,761 responses. There are 21 missing responses.
- Q.D15 has 585 responses, but according to the flow from Q.D14 there should be 608 responses. There are 23 missing responses.
- Q.D16 has 26 missing responses.
- Q.D17 has 671 total responses. The flow from Q.D15 indicates that the total responses should be 333. All responses that flowed in to Q.D16 should of been directly flowed to section E.

Non-Response Rates

A5 = 0.8%

A8 = 0.0%

J2 = 4.0%

J3 = 2.8%

J5 = 15.2%

Ireland

Section A

- Q.A8 has a total of 2,361 responses, but according to the flow from Q.A7 there should be a total of 2,423 responses. Six responses coded 'No schooling' (Code 0) in Q.A7 were not imputed to 'No schooling' (Code 10) in Q.A8. There are an additional 56 missing responses.
- Q.A12 has a total of 1,301 responses, but according to the flow from Q.A8 the total should be 1,318 responses. There are 17 missing responses.

Section D

- Q.D3 has a total of 1,178 responses, but there should only be 978 responses.
- Q.D4 has a total of 1,317 responses, but according to the flow from Q.D1 and Q.D2 there should be 1,466 responses. There are 149 missing cases.
- Q.D5, Q.D7/Q.D8 (ISCOF), Q.D9 (ISICF) up to Q.D14 should have the same number of responses as Q.D4. However, they vary from 1387 to 1431.
- Q.D15 has a total of 380 responses, but according to the flow of the section there should be 417 responses. There are 27 missing responses.
- Q.D16 has a total of 376 responses, but according to the flow from Q.D15 (as it is) there should only be 226. There are 150 extra cases.
- Q.D17 has a total of 162 responses, but according to the flow from Q.D15 (as it is) there should be 203 responses. There are 41 missing responses.
- Q.D19 has a total of 931 responses, but according to the flow from Q.D3 (as it is) there should be 1178 responses. There are 247 missing responses.
- Q.D21 has a total of 87 responses, but according to the flow from Q.D19 (as it is) there should be 252 responses. There are 165 missing responses.

- Q.D22 has a total of 71 responses, but there should be the same amount of responses as Q.D21.

Section E

- This section should have the same number of responses throughout but it varies from 1,417 to 1,477 responses.

Section F

- The number of responses for Q.F4M1, Q.F4M2, & Q.F4M3 to Q.F14M1, Q.F14M2, & Q.F14M3 should all be constant and equal to the number of responses in Q.F3M1, Q.F3M2, & Q.F3M3 respectively, but the number of responses vary from question to question.

Non-Response Rates

A5 = 0.0%

A8 = 0.0%

J2 = 10.4%

J3 = 11.6%

J5 = 27.1%

Netherlands

Section A

- Q.A12 should have a total of 1,336 responses, but there are only 882 responses. There are 454 responses missing.

Section F

- In Q.F5, there are a high proportion (i.e. 66.29%) of responses coded 'Other' (Code 7).
- In Q.F7, only three of the ten international categories were used. Hence there is a high proportion (i.e. 76.12%) of responses coded 'Elsewhere' (Code 10).

Non-Response Rates

A5 = 0.0%

A8 = 0.0%

J2 = 8.6%

J3 = 5.2%

J5 = 13.3%

New Zealand

General

- There is a very high proportion of not stated responses in some questions due to the fact that New Zealand gathered limited information via a small questionnaire administered to 922 persons who refused the background questionnaire.

Section A

- The 922 non-response cases from Q.A1 were not flowed into Q.A5.
- The responses coded 'No schooling' (Code 0) in Q.A7 were not imputed to 'No schooling' (Code 10) in Q.A8, rather they were left uncoded in Q.A8.

- Q.A9 has a total of 1,875 responses, but according to flow from Q.A8 there should be 2,392 responses.
- Q.A11 has a total of 1,364 responses, but according to the flow from Q.A8 there should be 1,753 responses. There are 389 missing responses.
- Q.A12 has a total of 1,423 responses but according to the flow from Q.A8 and Q.A11 there should be 1,843 responses. There are 420 missing responses.

Section B

- Q.B13, Q.B14, & Q.B17 are examples of how New Zealand conducted their survey. According to the flow from Q.B1L1 there should be a total of 4,223 responses in these question. However, only 3,301 responses were flowed in to Q.B13. For some questions New Zealand coded the difference with not stated responses (i.e. 922 responses), but for these questions they did not.

Section C

- Q.C1, Q.C5, Q.C7, Q.C8, & Q.C11 are examples of how New Zealand conducted their survey. There are 922 missing responses; For some questions New Zealand coded the difference with not stated responses (i.e. 922 responses), but for these questions they did not.

Section D

- The 922 responses coded 'Not stated' (Code 9) in Q.D2 were not carried into Q.D3 and Q.D4 through the rest of the section.

Section F

- There was 922 cases not carried through this section.

Section J

- There was 922 cases not carried through Q.J4 and Q.J5.
- Q.J3 has 689 responses coded to 'No income' (Code 0), however, Q.J1A has 706 responses coded as 'No' (Code 2).

Non-Response Rates

A5 = 0.2%

A8 = 0.4%

J2 = 8.6%

J3 = 24.9% (including 922 not stated responses)

J5 = 0.2%

Northern Ireland

Section B

- Q.B12 has 40 missing responses.

Section D

- The 21 non-responses from Q.D5 were not carried into Q.D6.
- The 20 non-responses from Q.D16 were not carried into Q.D17 and Q.D18.

Non-Response Rates

A5 = 0.0%

A8 = 0.0%

J2 = 4.1%

J3 = 2.1%

J5 = 14.0%

Poland

Section A

- The responses coded 'No schooling' (Code 0) in Q.A7 were coded 'ISCED 0' (Code 0) in Q.A8 rather being imputed to 'No schooling' (Code 10).
- Q.A10 has a total of 1,319 responses, but according to the flow from Q.A9 there should only be 1,103 responses. There are 219 extra cases.
- Q.A12 has a total of 2,782 responses, but according to the flow from Q.A8 there should only be 1,889 responses. There are 893 extra responses.

Section D

- Q.D15 has a total of 374 responses, but according to the flow from Q.D14 there should only be 350 responses. There are 24 extra cases.

Section J

- Q.J5 has 179 responses not imputed from Q.J2.

Non-Response Rates

A5 = 1.7%

A8 = 0.0%

J2 = 8.4%

J3 = 48.5%

J5 = 22.1%

Sweden

Section A

- The responses coded 'No schooling' (Code 0) in Q.A7 were not imputed to 'No schooling' (Code 10) in Q.A8.
- For Q.A5 and Q.A.8, category 'ISCED 7' (Code 7) was omitted from the BQ.

Section B

- In Q.B1L1, there are 29 responses coded 'Refused' (Code 98). These responses are not carried throughout the rest of the section.

Section C

- For Q.C5 and Q.C.11, category 'ISCED 7' (Code 7) was omitted from the BQ.

Section D

- In Q.D3, there are a high proportion (i.e. 24.7%) of responses coded 'Don't know/refused' (Code 98), but no responses are coded 'Never worked' (Code 0).
- In Q.D5, there are 37 responses coded 'Don't know/refused' (Code 8) that were not carried to Q.D6.

Section E

- For Q.E1, Q.E2, Q.E3A & Q.E3B, category 'Once a week' (Code 3) was omitted from the BQ. They asked either greater or less than once a week.

Section F

- Q.F5 has 1,011 responses but it should have 1,407 responses.
- In Q.F5, categories 'An apprenticeship certificate' (Code 4) and 'Professional or career upgrading' (Code 6) were omitted from the BQ.
- Q.F8 has 1,006 responses but should have 1407 responses.
- In Q.F11, the first mention has 0 responses, but the second mention has 556 responses? There should be 1,407 responses in the first mention.

Section G

- For Q.G11, Q.G12, and Q.G13 the category 'Moderate' (Code 3) was omitted from the BQ.

Non-Response Rates

A5 = 2.94%

A8 = 0.66%

J2 = omitted

J3 = 36.34%

J5 = omitted

Switzerland French

General

- Switzerland's German and French samples **cannot** be combined and analyzed together due to the manner in which their samples were designed.

Section A

- Q.A4 and Q.A5 have a total of 428 responses, but according to the flow from Q.A3 there should only be 340 responses. There are 88 extra responses.
- For Q.A5 and Q.A8, categories 'ISCED 0' (Code 0) and 'ISCED 6' (Code 6) were omitted from the BQ.

Section B

- Q.B4L2 and Q.B5L2 have 95 extra responses according to the flow from Q.B1L2.

Section C

- In Q.C5 and Q.C11, categories 'ISCED 0' (Code 0) and 'ISCED 6' (Code 6) were omitted from the BQ.

Section D

- Q.D12 has a total of 1,041 responses, but according to the flow from Q.D11 there should be 1,171 responses. There are 130 missing responses.

Section F

- Q.F3 has a 100% non-response rate.

Non-Response Rates

A5 = 15.4%

A8 = 7.1%

J2 = 25.3%

J3 = 25.9%

J5 = 28.3%

Switzerland German

General

- Switzerland's German and French samples **cannot** be combined and analyzed together due to the manner in which their samples were designed.

Section A

- Q.A4 and Q.A5 have a total of 278 responses, but according to the flow from Q.A3 there should be 228 responses. There are 50 extra responses.
- For Q.A5 and Q.A8, categories 'ISCED 0' (Code 0) and 'ISCED 6' (Code 6) were omitted from the BQ.

Section B

- Q.B4L2 and Q.B5L2 have 96 extra responses according to the flow from Q.B1L2.

Section C

- For Q.C5 and Q.C11, categories 'ISCED 0' (Code 0) and 'ISCED 6' (Code 6) were omitted from the BQ.

Section D

- Q.D12 has a total of 1,023 responses, but according to the flow from Q.D11 there should be 1,165 responses. There are 142 missing responses.

Section F

- Q.F3 has a 100% non-response rate.

Non-Responses Rates

A5 = 27.3%

A8 = 10.8%

J2 = 25.3%

J3 = 28.9%

J5 = 32.3%

United States

Section A

- In Q.A5 and Q.A8, category 'ISCED 0' (Code 0) was omitted from the BQ.
- Q.A9 has a total of 2,123 responses, but according to the flow from Q.A8 there should be 2,170 responses. There are 47 missing responses.
- Q.A12 has a total of 732 responses, but according to the flow from Q.A8 there should be 887 responses. There are 155 missing responses.

Section B

- For Q.B2L2 to Q.B5L2 there are 16 missing responses according to the flow from Q.B1L2.
- For Q.B18 only one mention was used. This implies that individuals surveyed are classified as belonging to only one ethnic or cultural group, and does not allow for the possibility of mixed ethnic origin.

Section C

- In Q.C5 and Q.C11, categories 'No schooling' (Code10) and 'ISCED 0' (Code 0) were omitted from the BQ.
- Q.D7/Q.D8 (ISCOF), Q.D9 (ISICF) have a total of 2,845 responses, but according to the flow from Q.C11 there should be 2,901 responses. There are 56 missing responses.

Section D

- Q.D6 has a total of 501 responses, but according to the flow from Q.D5 there should be 570 responses. There are 69 missing responses.
- In Q.D6, category 'Other personal or family responsibilities' (Code 3) was omitted from the BQ.
- Q.D21 and Q.D22 have 74 missing responses according to the flow from Q.D19. The non-responses from Q.D19 were not flowed into these questions.

Non-Response Rates

A5 = 12.4%

A8 = 0.4%

J2 = 20.9%

J3 = 18.0%

J5 = 27.9%

9.0 Questionnaires

To view any of the following questionnaires, activate the hand tool and click on the corresponding country name. Once the questionnaire is opened, you can link back to the user's guide by clicking inside the blue box on the first or last page of the selected questionnaire.

- [9.0.1 Belgium \(Flanders\)](#)
- [9.0.2 Canada English](#)
- [9.0.3 Canada French](#)
- [9.0.4 Germany](#)
- [9.0.5 Great Britain](#)
- [9.0.6 Ireland](#)
- [9.0.7 Netherlands](#)
- [9.0.8 New Zealand](#)
- [9.0.9 Northern Ireland](#)
- [9.0.10 Poland.....](#)
- [9.0.11 Sweden](#)
- [9.0.12 Switzerland German](#)
- [9.0.13 Switzerland French.....](#)
- [9.0.14 United States](#)

10.0 Record Layouts and Univariates

The following section contains the record layouts for each of the twelve IALS countries and for the entire set of countries combined. On the right-hand margin of the layout are found the unweighted and weighted counts for each variable on the file.

These record layouts should always be consulted when using the microdata files. They contain notes, which will aid in the understanding of the data. Users are cautioned that in many cases the code numbers for variables on the record layout will not correspond with those on the questionnaire for that variable.

As can be observed from the following record layouts, the logical record length of the microdata file is 1,278; the data file contains 433 variables and 38,358 records. The approximate storage space required for the flat file, SPSS file, and SAS file are 48MB, 30MB, and 60MB respectively.

To view any of the following record layouts, activate the hand tool and click on the corresponding country name. Once the record layout is opened, you can link back to the user's guide by clicking inside the blue box on the first or last page of the selected record layout.


- [10.0.1 Belgium \(Flanders\)](#)
- [10.0.2 Canada](#)
- [10.0.3 Germany](#)
- [10.0.4 Great Britain](#)
- [10.0.5 Ireland](#)
- [10.0.6 Netherlands](#)
- [10.0.7 New Zealand](#)
- [10.0.8 Northern Ireland](#)
- [10.0.9 Poland.....](#)
- [10.0.10 Sweden](#)
- [10.0.11 Switzerland German](#)
- [10.0.12 Switzerland French.....](#)
- [10.0.13 United States](#)
- [10.0.14 International](#)

Appendix 1

International Standard Industrial Classification (ISIC 1968)

Major (10) and sub-major (34) groups

1. **Agriculture, hunting, forestry and fishing**
Agriculture and hunting
Forestry and logging
Fishing
2. **Mining and quarrying**
Coal mining
Crude petroleum and natural gas production
Metal ore mining
Other mining
3. **Manufacturing**
Manufacture of food, beverages and tobacco
Textile, wearing apparel and leather industries
Manufacture of wood and wood products, including furniture
Manufacture of paper and paper products, printing and publishing
Manufacture of chemicals and chemical, petroleum, coal, rubber and plastic products
Manufacture of non-metallic mineral products, except products of petroleum and coal
Basic metal industries
Manufacture of fabricated metal products, machinery and equipment
Other manufacturing industries
4. **Electricity, gas and water**
Electricity, gas and steam
Water works and supply
5. **Construction**
6. **Wholesale and retail trade, and restaurants and hotels**
Wholesale trade
Retail trade
Restaurants and hotels
7. **Transport, storage and communication**
Transport and storage
Communication
8. **Finance, insurance, real estate and business services**
Financial institutions
Insurance
Real estate and business services
9. **Community, social and personal services**
Public administration and defence



Sanitary and similar services
Social and related community services
Recreational and cultural services
Personal and household services
International and other extra-territorial bodies

0. **Activities not adequately defined**

International Standard Classification of Occupations (ISCO 1988)

Major (10) and sub-major (28) groups

- 1. Legislators, senior officials and managers**
Legislators and senior officials
Corporate managers
General managers
- 2. Professionals**
Physical, mathematical and engineering science professionals
Life science and health professionals
Teaching professionals
Other professionals
- 3. Technicians and associate professionals**
Physical and engineering science associate professionals
Life science and health associate professionals
Teaching associate professionals
Other associate professionals
- 4. Clerks**
Office clerks
Customer services clerks
- 5. Service workers and shop and market sales workers**
Personal and protective services workers
Models, salespersons and demonstrators
- 6. Skilled agricultural and fishery workers**
Market-oriented skilled agricultural and fishery workers
Subsistence agricultural and fishery workers
- 7. Craft and related trades workers**
Extraction and building trades workers
Metal, machinery and related trades workers
Precision, handicraft, printing and related trades workers
Other craft and related trades workers
- 8. Plant and machine operators and assemblers**
Stationary-plant and related operators
Machine operators and assemblers
Drivers and mobile-plant operators
- 9. Elementary occupations**
Sales and services elementary occupations
Agricultural, fishery and related labourers
Labourers in mining, construction, manufacturing and transport
- 0. Armed forces**

Major Field of Study—Final Classification Structure

01 EDUCATIONAL, RECREATIONAL AND COUNSELLING SERVICES (001-009)

- 001 Education - General
- 002 Elementary - Primary Education
- 003 Secondary Education (Basic)
- 004 Secondary Education (Specialized)
- 005 Special Education
- 006 Non-teaching Educational Fields
- 007 Physical Education, Health and Recreation
- 008 Counselling Services and Personal Development
- 009 Other Education

02 FINE AND APPLIED ARTS (010-016)

- 010 Fine Arts
- 011 Music
- 012 Other Performing Arts
- 013 Commercial and Promotional Arts
- 014 Graphic and Audio-visual Arts
- 015 Creative and Design Arts
- 016 Other Applied Arts

03 HUMANITIES AND RELATED FIELDS (017-026)

- 017 Classics, Classical and Dead Languages
- 018 History
- 019 Library and Records Science
- 020 Mass Media Studies
- 021 English Language and Literature
- 022 French Language and Literature
- 023 Other Languages and Literature
- 024 Philosophy
- 025 Religious Studies
- 026 Other Humanities and Related Fields

04 SOCIAL SCIENCES AND RELATED FIELDS (027-039)

- 027 Anthropology
- 028 Archeology
- 029 Area Studies (Non Languages or Literature)
- 030 Economics
- 031 Geography
- 032 Law and Jurisprudence
- 033 Man/Environment Studies
- 034 Political Science
- 035 Psychology
- 036 Sociology
- 037 Social Work and Social Services
- 038 War and Military Studies
- 039 Other Social Sciences and Related Fields

05 COMMERCE, MANAGEMENT AND BUSINESS ADMINISTRATION (040-045)

- 040 Business and Commerce
- 041 Financial Management
- 042 Industrial Management and Administration
- 043 Institutional Management and Administration
- 044 Marketing, Merchandising, Retailing and Sales
- 045 Secretarial Science - General Fields

**06 AGRICULTURAL AND BIOLOGICAL SCIENCES/TECHNOLOGIES
(046-056)**

- 046 Agricultural Science
- 047 Agricultural Technology
- 048 Animal Science Technologies
- 049 Biochemistry
- 050 Biology
- 051 Biophysics
- 052 Botany
- 053 Household Science and Related Fields
- 054 Veterinary Medicine/Science
- 055 Zoology
- 056 Other Agricultural and Biological Sciences/Technologies

07 ENGINEERING AND APPLIED SCIENCES (057-070)

- 057 Architecture and Architectural Engineering
- 058 Aeronautical and Aerospace Engineering
- 059 Biological and Chemical Engineering
- 060 Civil Engineering
- 061 Design/Systems Engineering
- 062 Electrical/Electronic Engineering
- 063 Industrial Engineering
- 064 Mechanical Engineering
- 065 Mining, Metallurgical and Petroleum Engineering
- 066 Resources and Environmental Engineering
- 067 Engineering Science
- 068 Engineering, n.e.c.
- 069 Forestry
- 070 Landscape Architecture

**08 ENGINEERING AND APPLIED SCIENCE TECHNOLOGIES AND
TRADES (071-082)**

- 071 Architectural Technology
- 072 Chemical Technology
- 073 Building Technologies
- 074 Data Processing and Computer Science Technologies
- 075 Electronic and Electrical Technologies
- 076 Environmental and Conservation Technologies
- 077 General and Civil Engineering Technologies
- 078 Industrial Engineering Technologies
- 079 Mechanical Engineering Technologies
- 080 Primary Industries/Resource Processing Technology
- 081 Transportation Technologies
- 082 Other Engineering/Applied Science Technologies, n.e.c.

**09 HEALTH PROFESSIONS, SCIENCES AND TECHNOLOGIES
(083-098)**

- 083 Dentistry
- 084 Medicine - General
- 085 Medicine - Basic Medical Science
- 086 Medical Specializations (Non-surgical)
- 087 Paraclinical Sciences
- 088 Surgery and Surgical Specializations
- 089 Nursing
- 090 Nursing Assistance
- 091 Optometry
- 092 Pharmacy and Pharmaceutical Sciences
- 093 Public Health
- 094 Rehabilitation Medicine
- 095 Medical Laboratory and Diagnostic Technology
- 096 Medical Treatment Technologies
- 097 Medical Equipment and Prosthetics
- 098 Other Health Professions, Sciences and Technologies, n.e.c.

10 MATHEMATICS AND PHYSICAL SCIENCES (099-109)

- 099 Actuarial Science
- 100 Applied Mathematics
- 101 Chemistry
- 102 Geology and Related Fields
- 103 Mathematical Statistics
- 104 Mathematics
- 105 Metallurgy and Materials Science
- 106 Meteorology
- 107 Oceanography and Marine Sciences
- 108 Physics
- 109 General Science

11 ALL OTHER N.E.C. (110)

- 110 All Other - (Not Elsewhere Classified)

12 NO SPECIALIZATION (111)

- 111 No Specialization

13 NO POSTSECONDARY QUALIFICATION (112)

- 112 No Postsecondary Qualification

14 UPGRADING (120-130)

- 120 Upgrading - General
- 121 Basic Education (Grades 1-8)
- 122 General Education (G.E.D. - High School equivalency)
- 123 High School Subjects (Secondary Credit, Grades 9-13)
- 124 Post Secondary Upgrading
- 125 Pre-Vocational Upgrading
- 126 Basic Training for Skill Development (B.T.S.D.)
- 127 Basic Job Readiness Training (B.J.R.T. - job entry program)
- 128 Orientation
- 129 Career Alternatives (Job Hunting)
- 130 University Transfer

15 PERSONAL DEVELOPMENT (131-138)

- 131 Personal Development - General
- 132 Home and Family
- 133 Consumer/Financial
- 134 Coping Skills
- 135 Communications Skills
- 136 Religion and Morals
- 137 Public Affairs, Community/Current Events
- 138 Driver Instruction

16 RECREATIONAL ACTIVITY (139-141)

- 139 Sports and Outdoor Recreation
- 140 Physical Fitness
- 141 Games

The following are special codes that apply only to Great Britain and Northern Ireland.

Major Field of Study (Major Headings)—Final Classification Structure

- 150 Educational, Recreational and Counselling Services
- 151 Fine and Applied Arts
- 152 Humanities and Related Fields
- 153 Social Sciences and Related Fields
- 154 Commerce, Management and Business Administration
- 155 Agricultural and Biological Sciences/Technologies
- 156 Engineering and Applied Sciences
- 157 Engineering and Applied Science Technologies and Trades
- 158 Health Professions, Sciences and Technologies
- 159 Mathematics and Physical Sciences
- 160 All Other N.E.C. (Not Elsewhere Classified)
- 161 No Specialization
- 162 No Postsecondary Qualification
- 163 Upgrading
- 164 Personal Development
- 165 Recreational Activity