

Towards a better understanding of the link between oral fluency, literacy and Essential Skills

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Introduction

This report presents the results of an analysis of the link between official language oral proficiency, literacy and Essential Skills proficiency in adult Canadians. The study summarizes a range of existing Canadian and international literature to give a sense of the expected interactions between oral communication skills and literacy skills and then presents an analysis of two Canadian datasets – the International Survey of Reading Skills (ISRS) and the IALSS/CLB linking study (IALSS/CLB) - that support an examination of the correlation between oral communication skills and other text-based skills.

All errors and omissions are those of the authors. Readers are invited to direct questions of clarification to:

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Individual education plan (IEP)	A plan that identifies a student's learning goals, and maps how the school or program will meet these specific goals.
Information communication technologies (ICT)	Education tools including computers, software and the internet.

Acronyms and Glossary

ALL	Adult literacy and life-skills
CBT	Computer-based training
ESL	English as a second language
FSL	French as a second language
GDP	Gross domestic product per capita
IALS	International Adult Literacy Survey
IALSS	International Adult Literacy and Skills Survey
ICT	Information communication technologies
IEP	Individual education plan
ISRS	International Study of Reading Skills
LCA	Latent class analysis
OECD	Organisation for Economic Co-operation and Development
PSE	Post-secondary education
TOWRE-A	Test of Word Reading Efficiency—Real Words
TOWRE-B	Test of Word Reading Efficiency—Pseudo-words
Computer-based training (CBT)	An interactive instructional method that primarily uses computers to deliver course instruction.
Decoding skills	Skills required to identify spoken or written letters and words, and to understand their meaning in the context in which they are used.
Document literacy	The ability to find and use information in forms, figures, graphs and other tables.

International Adult Literacy

Survey (IALS), 1994, 1996 and 1998

The world's first internationally comparative survey of adult literacy, which created comparable literacy profiles across national, linguistic and cultural boundaries.

International Literacy and Life Skills Survey (ALL), 2003, 2005

ALL built on its predecessor, the 1994

International Adult Literacy Survey (IALS). It measured adults' knowledge and skills in four domains: prose literacy, document literacy, numeracy, and problem solving. Proficiencies were rated and reported as scores on a 500 point scale or on the basis of five levels: Levels 1 through 5. Data is available for Canada, the US, Norway, Australia, Bermuda, Hungary, Korea and the Netherlands.

International Adult Literacy and Skills Survey (IALSS), 2003

The Canadian version of the ALL survey.

International Survey of Reading Skills (ISRS), 2005

Additional clinical reading tests administered to a sample of adults who had participated in the 2003 IALSS.

Latent class analysis (LCA)

A process by which individuals are organized into groups based on their patterns of response to a set of background questions and/or skills

Prose literacy

The knowledge and skills required to understand and appropriately use information from print materials.

The IALS, ALL/IALSS and ISRS studies defines the following five levels of literacy:

Level 1 Very poor literacy skills.

An individual at this level may, for example, be unable to determine from a package label the correct amount of medicine to give a child. Primarily involves recall of isolated facts from back of brain. For beginning readers this will involve remembering letters and simple vocabulary.

Level 2 A capacity to deal only with simple, clear material involving uncomplicated tasks.

People at this level may develop everyday coping skills, but their poor literacy skills make it hard to conquer challenges such as learning new job skills. Primarily involves recall of isolated facts from back of brain.

Level 3 Adequate for coping with the demands of everyday life and work in an advanced society.

This roughly denotes the skill level required for successful high school completion and college entry. Involves integration of information in the pre-frontal cortex.

Levels 4 and 5 Strong skills.

Individuals at these levels can process information of a complex and demanding nature.

Literacy levels are assessed on a scale of 500 and based on the completion of specific tasks. Some of these tasks are described in the table below. Involves the generation of new information in the pre-frontal cortex.

IALLS proficiency levels, score ranges task descriptors

Level Score Range Required Literacy Tasks

Level 1 176 to 225

Tasks at Level 1 require the ability to read relatively short text; to locate or enter a piece of information into that text; and to complete simple, one-step tasks such as counting, sorting dates or performing simple arithmetic.

Level 2 226 to 275

Tasks at this level require the ability to sort through “distractors” (plausible but incorrect pieces of information), to integrate two or more pieces of information, to compare and contrast information, and to interpret simple graphs.

Level 3 276 to 325

These tasks require the ability to integrate information from dense or lengthy text, to integrate multiple pieces of information, and to demonstrate an understanding of mathematical information represented in a range of different forms. Level 3 tasks typically involve a number of steps or processes in order to solve problems.

Level 4 326 to 375

Tasks at this level involve multiple steps to find solutions to abstract problems. Tasks require the ability to integrate and synthesize multiple pieces of information from lengthy or complex passages, and to make inferences from the information.

Level 5 376 to 500

Tasks at Level 5 require the ability to search for information in dense text that has a number of distractors, to make high-level inferences or use specialized background knowledge, and to understand complex representations of abstract formal and informal mathematical ideas.

Background to the present research

Little work has been done in Canada on the relationship between oral fluency and other essential skills, in large part because little reliable data has been collected on the subject at the population level.

Existing data on immigrants' reading, writing and numeracy skills indicate that a high proportion of immigrants, as compared to the native born population, do not have the literacy and essential skills (Level 3 and above on the IALSS scale) needed for success in the knowledge-based economy (Statistics Canada and OECD, 2005; Statistics Canada and HRSDC, 2006). Additionally, further analyses of the groups of adult Canadians who face significant reading challenges indicate that a sizeable proportion of those in need of skill upgrading are non-native speakers of English, with varying levels of educational attainment in their mother tongue, mainly females, who are currently in the workforce (International Survey of Reading Skills 2008).^{1,2}

Data also indicate that majority of immigrants with low LES are in the labour market. More importantly, many of them do not have the LES adequate to the requirements of the jobs they hold. A study comparing prose skills from IALSS to both the typical and complex skill requirements from the ESRP found that approximately 60% of immigrants in Canada work under-skilled compared to 35% for non-immigrants (Brink 2009).³

A series of market segmentation analyses by DataAngel (DataAngel 2010) show that immigrants face high risks of having prose literacy skills below the level demanded by their occupations.

Several critical policy questions remain unanswered, including:

What proportion of immigrant adults with low literacy and numeracy skills also have weak oral language skills? What impact is this likely to have on the efficiency and effectiveness of remedial literacy and numeracy instruction?

Does the available empirical data support the predicted alignment of the Canadian Language Benchmarks (CLB) and ES/IALSS proficiency levels? How does this inform future directions for developing and promoting assessment instruments and strategies for oral communication skills, to meet Canadian labour market requirements?

And more generally:

What is the relationship between oral communication skills and text-based literacy skills?

The analysis presented in this report attempts to address these research questions using data from two data sets:

The International Survey of Reading Skills (ISRS), and, The CLB/IALSS linkage study that saw IALSS document and numeracy measures administered to a sample of adults participating in the Language Instruction for Newcomers to Canada (LINC) program.

The report will also reflect on how the new findings fit with what the research literature says about the relationship between oral fluency and other Essential Skills and will set out a strategy to fill implied research gaps.

Both of these data sets provide interesting insights into how the various oral fluency skill measures relate to one another and to skill in other domains. Readers should, however, treat the findings presented in this report as indicative. The sample sizes in both studies are simply too small to support definitive conclusions. Additional focused research is needed to confirm key findings.

1. *Learning Literacy in Canada: Evidence from the International Survey of Reading Skills*. Statistics Canada and HRSDC.
2. *Reading the Future: Planning to meet Canada's future literacy needs*. 2008. Canadian Council on Learning.
3. *Distribution of Essential Skills in the Labor Force and the Labor Market*, S. Brink National Learning Policy Research, Learning Policy Directorate, HRSDC.

Organization of the report

This report is organized in five chapters supported by 4 annexes.

Chapter 1 introduces the issues that motivated the study, identifies the research questions that the report attempts to address and provides an overview of the data sources that are used to inform the analysis.

Chapter 2 provides an overview of what the research literature says about the relationship between oral fluency and the acquisition of skill in other domains, most particularly prose literacy, document literacy and numeracy.

Chapter 3 presents the results of an analysis of the relationship between oral fluency skill and a subset of Essential Skills skill domains: prose literacy, document literacy and numeracy.

Chapter 4 presents the results of an analysis of the how Canadian Language Benchmarks and IALSS/ISRS skill levels line up for those domains that appear in both assessment frameworks. The chapter also compares the CLB levels to the skill demands of the jobs held by workers with low oral fluency and provides estimates of the positive impact that improved oral fluency levels would have on employment and wage rates.

Chapter 5 summarizes the results presented in the report and reflects on what they imply for policy, practice and future research.

The empirical analyses in this report use data from five key sources, including the Essential Skills Profiles, the Canadian Language Benchmarks (CLB), the International Adult Literacy and Skills Survey (IALSS), the International Survey of Reading Skills (ISRS) and the CLB/IALSS linking study. Summary descriptions of each of these data sources have been included as they are introduced.

Chapter 2

The Learning Nexus of Oral Proficiency and Literacy for Adults: What the Research Literature Reveals

This chapter explores the relationship between oral language proficiency and literacy skill development for adults. This is an important but little understood transition point in adult literacy development. It marks the nexus at which daily language skills of orality begin to shape the reading and writing skills of literacy. This transitional nexus is an area that has received extensive attention within different child populations, but has been generally overlooked for the adult population. This review draws from numerous peer reviewed sources containing research from around the world related to adult oral language ability and its relationship to adult literacy skill development. The review provides six integrated summary sections on each of the defined areas of investigation; typical oral language development and literacy acquisition, atypical oral language development and literacy acquisition, and second language development and literacy acquisition. These summaries are followed by a review that provides a synthesis of the core common factors noted across each of the prior six sections. The final section puts forward a series of potential questions that could be addressed to further our collective understanding of this important connection between adult oral proficiency skills and their literacy skills acquisition.

Oral language and literacy are both developmental in nature (Piaget, 1955 Vygotsky, 1962). They both undergo qualitative and quantitative changes across an individual's life span (Gambrell, 2004). These changes have been categorized according to numerous theoretical continuums to define important chronological and

cognitive benchmarks. We now know that deficiencies within either of these developmental continuums can cause potentially compounding life-long negative effects. Failure to achieve an oral or literacy benchmark may initiate the exacerbating spiral of the “Matthew effect.” Stanovich (1986) made his “Matthew effect” argument to show that relatively small cognitive differences that cause us to miss defined benchmarks as young children can lead to wide and socially significant differences in adult outcomes.

It is Stanovich's notion of “small cognitive differences” that are at the core of numerous investigations in the areas of oral proficiency and literacy acquisition. The resulting research from these investigations has provided tremendous understanding in the areas of linguistics, cognitive psychology, and literacy. However, the majority of this research has focused specifically on child populations with very little attention given to its relationship within adult populations. Furthermore, this same body of research has clustered in a literacy-centric manner around the effects that reading and writing have had on cognitive development and language development. Ong (1982) clearly frames this relationship by stating that “writing restructures consciousness” (p. 78). Ong (1982) provides a broad view of the oral proficiency and literacy connection by noting that the cognitive processes for creating, transmitting, storing, and retrieving human knowledge are fundamentally different in oral and literate cultures. He views the development of literacy itself as means to those cognitive changes. This concept is further developed in the literature by Ravid and Tolchinsky (2002). As summarized by Tarone and Bigelow (2005, p.8) “Ravid and Tolchinsky suggest that before speakers of a language become literate, they focus out of necessity on the meaning of their utterances, and not upon the linguistic form of language. But with literacy, those individuals begin to develop an explicit and analytical awareness of language itself. With that awareness, comes increasing cognitive control. Links are established between the internal representation of phonemes, syllables and morphemes and their written representations, and these newly articulated representations become the locus of increasing control.” This widely accepted line of thought in the literature generally ignores the inverse effects of oral language development and proficiency on the development of literacy skills, especially within adult populations. This under investigated area is the general focus of this literature review.

Evidence has found that literacy development is built upon the foundations of oral language acquisition (Bigelow & Schwarz, 2010; Olsen, 1988; Droop & Verhoeven, 2003; Glazer, 1989, Perfetti, 2000, Mangler, 2005, Nathan, 2004 & Kouir, 2006). However, the majority of this evidence has focused on either language acquisition or literacy and not on the connection between the two. Therefore, the more specific focus of this literature review is on the nexus of oral language acquisition and proficiency, literacy, and its implications for adults.

To gain a greater understanding of this nexus, focused searches were performed on the oral proficiency effects on reading development and oral proficiency effects on writing development. This initial effort garnered limited information. However, it revealed a clustering of three distinct areas in the research literature. These three noted areas of investigation were typical language development, atypical language development, and second language development. These areas became the structure for this review. Each area, typical, atypical, and second language development, is addressed in two separate sections. The first section for each area reviews the literature addressing salient aspects of the specified type of language development. The second related section for each area reviews the literature addressing literacy acquisition as it relates to the specified type of language development. The final sections of the review provide a general overview and considerations of all three areas, typical, atypical, and second language development, as they relate specifically to adult literacy acquisition.

Based on the limited space, the review does not cover the expanse of research literature that specifically defines the numerous theories and practices related to normal and abnormal language development, first and second language acquisition, and adult literacy. This volume of literature is beyond the scope of this focused review.

2.1 Typical Oral Language Development

Oral language proficiency is the ability to communicate verbally in a functional and accurate way in a target language (Omaggio, 1999). The development of oral language is believed to play a critical role in the development of all subsequent language literacy. This agreed upon statement was found across the research examined for this literature review as well as being noted as an accepted assumption from the general population. It is thought that oral language acquisition lays a foundation for learning reading and writing skills. This

“foundational development” concept is widely investigated within children populations as it relates to their emergent literacy skills, but not adult populations. Oral language development literature, as reviewed, centered around the question of how and why children learn language.

In an explanation of why children learn language Vygotsky states: “Children learn to talk primarily because they need to communicate. Their emotional and social drives greatly affect the process of language development. They also learn to talk because language is a part of the culture. Through language, children learn the social norms and expectations that enable them to participate in society.” The substance of what Vygotsky conveys in this explanation is believed to carry over into oral language use with adults. The general differences being the level of complexity with which the message is conveyed and the breadth and depth of concepts communicated.

In a review of articles from across different cultures Oberg & Ramirez’s (2006) study language use to analyze how education, culture, and primary language (L1) effect phonological verbal fluency in individuals from across the globe with no known language issues. Their findings demonstrated that education level had the greatest effect on the verbal fluency. In addition the researchers found that when they controlled for years of education, verbal fluency was consistent across cultures and L1 differences. These two perspectives demonstrate that the need for oral language, the development of oral language, and the functionality of oral language stays consistent across age, education, and culture. What is not clearly provided across the literature is how oral language development directly effects literacy for typical adults.

Adults with typical oral language proficiency were found through out the literature as control groups from which dysfunction or atypical oral language development was defined (see Section 3).

2.2 Resulting Typical Literacy Acquisition

The oral language skills of listening and speaking, which are primary forms of language, are believed to have a significantly dependant relationship with reading and writing (literacy)skills, which are secondary language forms (Berninger, 2000). This dependant relationship between orality and literacy demonstrates correlations in development in the areas of phonemics, semantics, vocabulary, and pragmatics (Roth, Speece, & Cooper, 2002; Shanahan, 2006).

Specifically, Lee (1992) described three different approaches to improving the reading comprehension skills of young adolescent learners through use of oral traditions in three culturally different populations. Her insight into how oral skills relate to literacy is helpful in thinking about moving the non-literate into literacy. Useful information about oral skills might include learners' knowledge of rhetorical structures evident in their ability to recite poetry; tell stories with a moral, riddle or joke; or engage in wordplay (such as puns) in their dominant language. Sarroub (2005) posited that oral practices such as the recitation of religious texts are useful bridges to print literacy practices in English.

Adult Literacy and Cognition:

Huntley (1992), in her discussion of different perspectives on teaching literacy to non-literate adults, cited several other researchers who support the view that "literacy promotes higher orders of cognitive development that are significantly different than the oral modes" (p. 24). She noted that so strong was the belief that literacy transforms minds and thought, that in 1965, UNESCO "urged the acceleration of world-wide literacy programs to overcome the deep psychological differences between oral and literate thought" (Huntley, 1992, p. 24).

The other point of view on cognitive development and literacy, which Scribner and Cole supported with their studies of the Vai people of Liberia, is that higher-level cognitive thinking skills are not, in themselves, dependent solely on literacy. Scribner and Cole found that literate and non-literate Vai performed similarly on the cognitive tasks presented, but they did acknowledge that more years of formal schooling provided a definite advantage over no formal schooling in speed and overall understanding in performing these tasks (as cited in Shank, 1986, p. 9).

More precise information about how literacy changes the way the brain functions has emerged thanks to technology that permits observation of the brain during processing of phonological tasks. The effects of literacy on the brain are profound. Castro-Caldas and Reis (2003) believe that learning to read causes fundamental changes in the organization and functioning of the brain. In non-print-literate adults, fewer and different areas of the brain are activated during oral language tasks involving phonological information (e.g., manipulating syllables or sounds) or unreal words (e.g., *frip*) than in the brains of literate subjects. However, the

brains of both groups functioned in the same way during the oral repetition of real words. These findings were understood as showing that knowledge of orthography, or written language, interacts with oral language, modulating oral language in significant ways (Petersson, Reis, Askelöf, Castro-Caldas, & Ingvar, 2000). Learning to read causes the brain to acquire different strategies for information processing; literate subjects use both hemispheres of the brain for processing language related tasks, while non-literate subjects use largely the left hemisphere (Castro-Caldas & Reis, 2003; Ostrosky-Solís, García, & Pérez, 2004; Petersson, Silva, Castro-Caldas, Ingvar, & Reis, 2007). Thus, Petersson et al. (2007) argued that literacy influences how the two hemispheres of the brain interact, specifically with respect to the balance between the reading and verbal working-memory-related regions.

2.3 Atypical Oral Language Developmental

Since the 1970s, much of the research regarding typical and atypical oral language development has focused on phonological awareness and phoneme skills acquisition. Researchers have worked under the assumption that phonological skills play a key role in both oral language and literacy acquisition for youth and "potentially" for adults. The research has focused on three main themes when studying atypical oral language development; phonological awareness, receptive language skills, and to a lesser extent the ability to hear frequencies.

To better understand oral language development and the role of phonological awareness in the development of oral language, Nathan (2004) studied a cohort of young learners who had either speech difficulties or language difficulties and compared them to a normally developing language cohort. The authors were interested in early literacy development and understanding which cohort was at greatest risk for literacy difficulties. They also hypothesized that phonological awareness would play a key role in predicting language deficits. Results of the study did not support the hypothesis that phonological difficulties are a good predictor of deficits in literacy. In contrast, this study demonstrated that difficulties with speech production are good indicators of literacy ability.

Analysis of the ISRS and PhonePass data has shown that phonological fluency and accuracy both play a significant role in determining overall literacy and oral fluency skill. In a study of learners with Specific Language Impairments (SLI) or dyslexia, Marshall and van der Lehy (2009) were interested in word positioning and

created a non-word repetition task to see if word positioning or repetition had any effect on how children learn language. None of the typically functioning children experienced difficulty with either word positioning or word clustering, however all three of the disability groups experienced difficulty with word clustering. The authors believe this is related to differences in phonological grammar in children with SLI and dyslexia, differences that apparently persist into adulthood.

Receptive language skills are another possible cause of oral language difficulties. Law and Rush (2009) conducted a study looking at the long term outcomes for individuals with developmental language difficulties. This study followed over 17,000 participants from ages 5-35 in a national survey in the UK. Specifically, the authors wanted to answer two questions:

- What is the relationship between proximal, distal, and biological factors for both Specific Language Impairments (SLI), Non-Specific Language Impairments (N-SLI) and Typical Language group (TL) at school?
- What is the risk associated with early developmental language difficulties in terms of literacy, mental health, and employment at age 34?

The researchers found that difficulties in adult literacy in the SLI and N-SLI populations significantly correlated with early receptive language issues. In particular, the N-SLI were six times more likely to have poor literacy than the TL group. These language issues had a direct effect on employment, with the SLI population being more likely than the TL group to spend at least 12 or more months on unemployment.

The research of oral language acquisition has focused almost exclusively on phonemes, and receptive language skills. However, the role of audiological ability has been overlooked. The skill of frequency discrimination remains an important yet little understood aspect of oral language. Mengler and colleagues (2005) focused their research on the area of frequency discrimination. The goal of their study of children with and without Specific Language Impairments (SLI) was to determine whether children with SLI have difficulty discriminating auditory frequencies. If auditory frequency discrimination was a factor, they were also interested in understanding whether these deficits were linked to reading, oral language ability, or both. The findings of the study demonstrated that the SLI group needed a much larger discrimination between frequencies to notice a difference, and oral language ability accounted for a significant proportion of the variance.

2.4 Resulting Atypical Literacy Acquisition

The research regarding atypical literacy acquisition has focused almost exclusively on developmental phonological awareness issues in children. It has often been taken as fact that phonological awareness is the major factor in difficulties with language acquisition. Yet little research has proven this to be the case, and few researchers have stepped outside the confines of phonological awareness and looked at other factors that may account for some of the variability of language difficulties or the relation to oral language skills.

In a study focused on the connection between phonemic awareness and oral fluency, Kouri (2006) investigated poor reading decoding (phonemic awareness), and its effect on oral fluency in reading and comprehension. This study used typically developing children (TD) and children with specific language impairments (SLI) and had them participate in a corrective feedback program where the graphic-phonemic aspects of text were taught to the participants. Ultimately this study found that children with SLI did much better (four times better) when they received graphic-phonemic cues than when they received meaning cues. This study suggests that phonemic awareness training was particularly beneficial in helping learners improve oral language that was directly related to phonemic based language words, however the impact of phonemic awareness was not a significant factor when considering reading comprehension.

Two other studies (one of children and one of adults) also illustrate the limitations of focusing on phonemic awareness as the major factor that effects oral and written language acquisition. Nathan et. al., (2004) conducted a study of early literacy skills focused on further investigating what is referred to as the “critical age hypothesis.” This study followed young children in three groups; specific speech difficulties, speech and language difficulties, and normally developing. The authors were interested in understanding which groups were at greatest risk for literacy difficulties and the role of phoneme awareness. The authors also investigated if there was a significant difference between children classified with speech only difficulties versus children with speech and language difficulties with poor phonological awareness.

The researchers found that:

“The hypothesis that children with more pervasive phonological problems that affect both input and output phonology are at higher risk of literacy problems received no direct support. In fact, input phonological processing was a poor predictor of oral language and literacy skills.”

Cheung (2006), was interested in investigating the role of phonological awareness in mediating between reading and listening to speech. This two part adult study focused on developmental acquisition of phonological skills in native and non-native speakers of English. The study involved undergraduate psychology students from New Zealand and Cantonese - English bilingual undergraduate students. The hypothesis was that beginning readers need phonological awareness to process sound symbol relationships which in turn impacts comprehension. The study reviewed five variables; phonological priming, listening comprehension, phonological awareness, reading comprehension and reading aloud to see how spoken and written language processing were linked via phonemic awareness. The investigators were surprised to find a disconnect between reading aloud, reading comprehension and the limited correlation with spoken language. Most importantly, the findings suggest that to predict reading performance, spoken/oral language should be considered as a primary construct. The researchers also found that, contrary to their hypothesis, phonological awareness was not a key factor in mediating between reading and listening to speech. The importance of these studies can not be understated. If phonological awareness is not a major connection point between orality and literacy, than what is?

2.5 Second Language Oral Development

Much has been written about second language development regarding oral language skills. In particular, research has focused on adult second language programs as they relate to job readiness and skill training programs (Bryne et. al., 1996; Taylor et. al., 2009; Center of Literacy Quebec, 2009). These studies start from the point of a non-native speaker who has recently entered a country. Yet few studies have focused on the role of the non-native speakers language skills from their “home” country and the language skills they bring with them.

August and Shanahan’s (2006b) report discussed the role of native language in relation to the debates about what does and does not transfer from the first language (L1) to English language speech and literacy. Research

on foreign-language learning difficulties and factors predicting these difficulties demonstrated a strong relationship between L1 oral skills and later levels of oral and literacy proficiency in a second language (L2) among children. This finding held true for adult L2 learners as well (Sparks, Patton, Ganschow, Humbach, & Javorsky, 2006). A study of young Spanish-speaking English Language Learners (ELL) that investigated the notion that phonological skills transfer from L1 to L2 found that although statistical trends in groups indicate that transfer happens readily, actual transfer is highly subject to individual L1 oral proficiency (Atwill, Blanchard, Gorin, & Burstein, 2007), with less-proficient Spanish speakers transferring little phonological awareness to English.

Marian, (2007) also studied adult native Spanish speakers that are bilingual in English. This investigation created and validated The Language Experience and Proficiency Questionnaire (LEAP-Q) which focuses on language competence, language acquisition, as well as prior and current language exposure. Factor analysis showed sixteen key factors that have either a positive or negative effect on oral language development. The top three factors were: self-report of speaking, understanding, reading and writing in L1; age at initial L2 acquisition; and total amount of time exposed to L2. These three factors accounted for the greatest variance in language acquisition and suggested that a person’s reading ability in L1 was the best indicator of language acquisition in L1, while speaking in L2 was the best indicator of language acquisition in L2.

2.6 Resulting Second Language Literacy Acquisition

One of the limitations of previous research and summary articles regarding adult second language literacy acquisition is that often the participants are considered as one homogeneous group. Bigelow, (2010) conducted an analysis of the research regarding second language literacy acquisition and found that adult second language learners comprise a remarkably heterogeneous group and that a number of key factors should be considered when reviewing their ability to acquire second language skills. Bigelow pulls from many of the previously mentioned sections including phonemic awareness research and cognitive based studies. In this extensive review, Bigelow found that the research reviewed supported the idea that a number of brain structure factors effect literacy acquisition. Specifically, these studies documented differences in brain activity between high literacy and

low literacy people and supported the fact that high literacy people use more of both hemispheres, while low literacy people use predominately just their left hemisphere. In addition to cognitive considerations, Bigelow concludes that key factors such as: access to education in home country, age, gender, cultural emphasis on education, access and ability to attend language classes in host country, and political stability of the home country can all influence the ability to acquire language and literacy skills in the new country.

2.7 Common Factors

The evidence in the studies presented in this review suggest a number of important points. Foremost phonological awareness, although important, does not play as key of a role in oral language acquisition as originally thought. Phonemic awareness is a good indicator of decoding, symbol, and sound relationships, however it is not a good predictor of reading comprehension. In fact Scholes (1998), argues that the field of literacy has put much too much emphasis on phonemic awareness and the impact it has on literacy and oral language acquisition. In the adult second language literature there is compelling evidence that strong phonemic awareness skills are helpful to adult learners in improving decoding skills, but fail to help these adult learners with oral language acquisition,

reading comprehension, or written literacy skills, all of which are essential to become gainfully employed in their new homeland. This limited role of phonological awareness remains constant across the research of children and adult language learners. In addition, other factors appear to be emerging as better predictors of oral language development including; speech production, receptive language ability, and audiological frequency discrimination.

It also became clear during this review of the literature that literacy fluency is well defined, and utilizes a universal framework based around phonemic awareness. Despite the limitations of phonemic awareness, this universal framework has allowed researchers to speak a common language when conducting literacy research and to create solutions for literacy problems. However, the same can not be said about oral language fluency. Based on this literature review, there is no universal framework that spoken oral fluency is centered around (other than Piaget & Vygotsky's developmental frameworks) and thus the research in this area, particularly in adult oral and literacy acquisition is limited. Research that continues to show promise has been conducted regarding oral language acquisition is the area of technology-based oral language assessments for L2 learners. An example of this research is the Phone Pass System that focuses on the productive aspect of language rather than its rhetorical or cognitive aspects (Ordinate, 2000).

Chapter 3

The Relationship of Oral Fluency, Prose Literacy, Document Literacy and Numeracy: What the Canadian Evidence Reveals

This chapter uses data from the IALSS and ISRS studies to document the distribution of oral fluency in the adult population and to explore how oral fluency is related to proficiency in the other skill domains: prose literacy, document literacy and numeracy. The goal of this latter analysis will be to show the degree to which adults with literacy and numeracy problems also have oral fluency problems that would interfere with their labour market success and, somewhat ironically, the efficiency of remedial literacy and numeracy instruction.

About the IALSS

Canada has played a lead role in the development, implementation and analysis of population data on adult skills. The initial comparative assessment, known as the International Adult Literacy Survey (IALS), collected comparative data on prose literacy, document literacy, quantitative literacy and adult learning in three separate rounds involving some 25 countries: 1994, 1996 and 1998. Subsequent rounds of data collection, known internationally as the Adult Literacy and Life Skills Survey (ALL), were conducted in 2003 and 2005 in 9 countries, including Canada. The ALL survey provided measures of proficiency for:

Prose literacy – the knowledge and skills needed to understand and use information from texts including editorials, news stories, brochures and instruction manuals.

Document literacy – the knowledge and skills required to locate and use information contained in various document formats, including job applications, payroll forms, transportation schedules, maps, tables and Figures.

Numeracy - The knowledge and skills required to effectively manage and respond to the mathematical demands of diverse situations.

Analytic problem solving - is the core of problem solving as a goal-directed cognitive process. It encompasses the use of content-specific and general knowledge, rules and strategies, and meta-cognition. A person's analytical problem-solving competency may be indicated by his or her performance in identifying a problem, searching for relevant information and integrating it into a coherent problem representation, evaluating the problem situation with respect to given goals and criteria, devising a plan – i.e. an ordered sequence of appropriate actions – and monitoring its execution

The ALL study also collected the world's first comparative data on the use Information and Communication Technologies (ICT's) by adult populations.

The Canadian component of the ALL study, known as the International Adult Literacy and Skills Survey (IALSS), also provided a unique opportunity to explore processes of skill gain and loss in prose literacy and document literacy.

The IALSS scores have been grouped into levels based on score ranges within the 0 to 500 scale, which correspond to proficiency levels.

About the ISRS

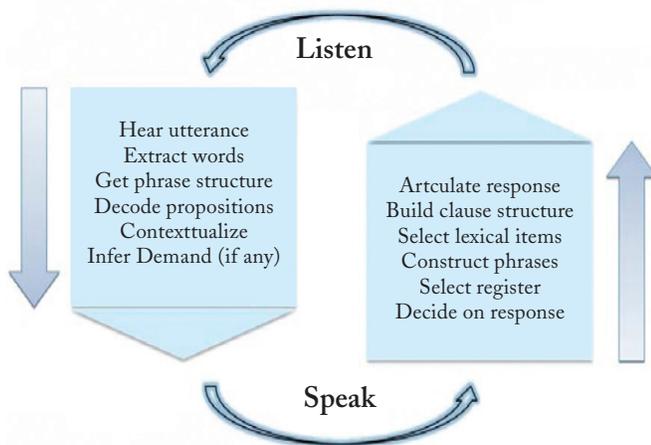
In 2005, the *International Survey of Reading Skills* (ISRS) provides measures of the component reading skills of Canadian adults at literacy Levels 1 and 2 – skills that are thought to underpin the emergence of fluid and automatic reading that emerges towards the middle of IALSS prose literacy Level 2. The ISRS was designed to identify more fully the reading abilities, demographic characteristics and learning needs of those with low literacy skills (Statistics Canada and HRSDC, 2008; CCL, 2009).

A range of recent research has used data from the ISRS to identify the learning needs and characteristics of different groups of learners in the Canadian literacy market, analysis that allows one to explore the fit between

learner needs and the programs that are currently on offer. In addition to the component reading measures the ISRS provides measures of oral fluency using Versant's PhonePass test. The Versant English Test measures facility in spoken English – that is, the ability to understand spoken English on everyday topics and to respond appropriately at a native-like conversational pace in intelligible English. Another way to express the construct facility in spoken English is “ease and immediacy in understanding and producing appropriate conversational English.” This definition relates to what occurs during the course of a spoken conversation. While keeping up with the conversational pace, a person has to track what is being said, extract meaning as speech continues, and then, on occasion, formulate and produce a relevant and intelligible response. These component processes of listening and speaking are schematized in Figure A, adapted from Levelt (1989).

Figure A

Conversational processing components in listening and speaking



Source: Adapted from Levelt, 1989.

In the Versant English Test, the testing system presents a series of discrete prompts to the test taker at a native conversational pace as recorded by several different native speakers, producing a range of native accents and speaking styles. These integrated “listen-then-speak” items require real-time receptive and productive processing of spoken language forms, and the items are designed to be relatively independent of social nuance and high-cognitive functions. The same facility in spoken English that enables a person to participate in everyday native-paced English conversation also enables that person to satisfactorily understand and respond to the

listening/speaking tasks in the Versant English Test. The Versant English Test measures the test taker's control of core language processing components, such as lexical access and syntactic encoding. For example, in normal everyday conversation, native speakers go from building a clause structure to phonetic encoding (the last two stages in the right-hand column of Figure A) in about 40 milliseconds (Van Turenout, Hagoort, and Brown, 1998). Similarly, the other stages shown in Figure A have to be performed within the small period of time available to a speaker involved in everyday communication. The typical time window in turn taking is about 500-1000 milliseconds (Bull and Aylett, 1998). If language users involved in communication cannot perform the whole series of mental activities presented in Figure A in real-time, both as listeners and as speakers, they will not be able to participate actively in such communication.

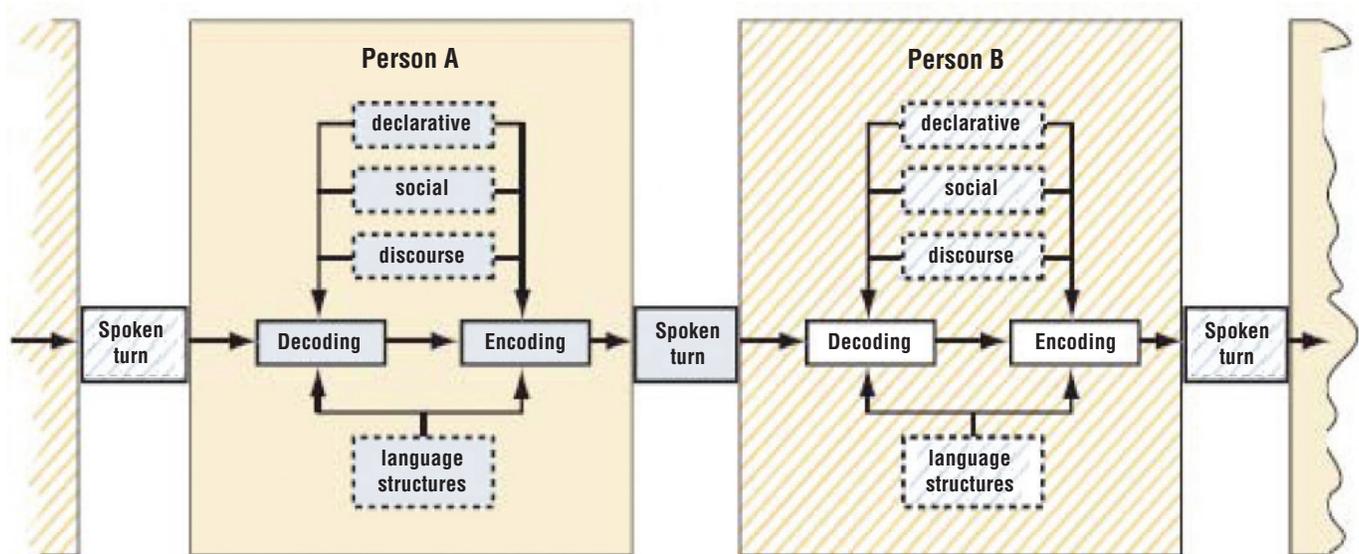
In this process, automaticity in language processing is required in order for the speaker/listener to be able to pay attention to what needs to be said/understood rather than to how the encoded message is to be structured/analyzed. Automaticity in language processing is the ability to access and retrieve lexical items, to build phrases and clause structures, and to articulate responses without conscious attention to the linguistic code (Cutler, 2003; Jescheniak, Hahne, and Schriefers, 2003; Levelt, 2001).

The Versant English Test probes the psycholinguistic elements of spoken language performance rather than the social, rhetorical and cognitive elements of communication. The reason for this focus is to ensure that test performance relates most closely to the test taker's facility with the language itself and is not confounded with other factors. The goal is to tease apart familiarity with spoken language from cultural knowledge, understanding of social relations and behavior, and the test taker's own cognitive style. Also, by focusing on context-independent material, less time is spent developing a background cognitive schema for the tasks, and more time is spent collecting data for language assessment.

The Versant English Test is a measurement of the real-time encoding and decoding of spoken English. Performance on Versant English Test items predicts a more general spoken language facility, which is essential in successful oral communication. The reason for the predictive relation between spoken language facility and oral communication skills is schematized in Figure B. This figure puts Figure A into a larger context, as one might find in a social situated dialog.

Figure B

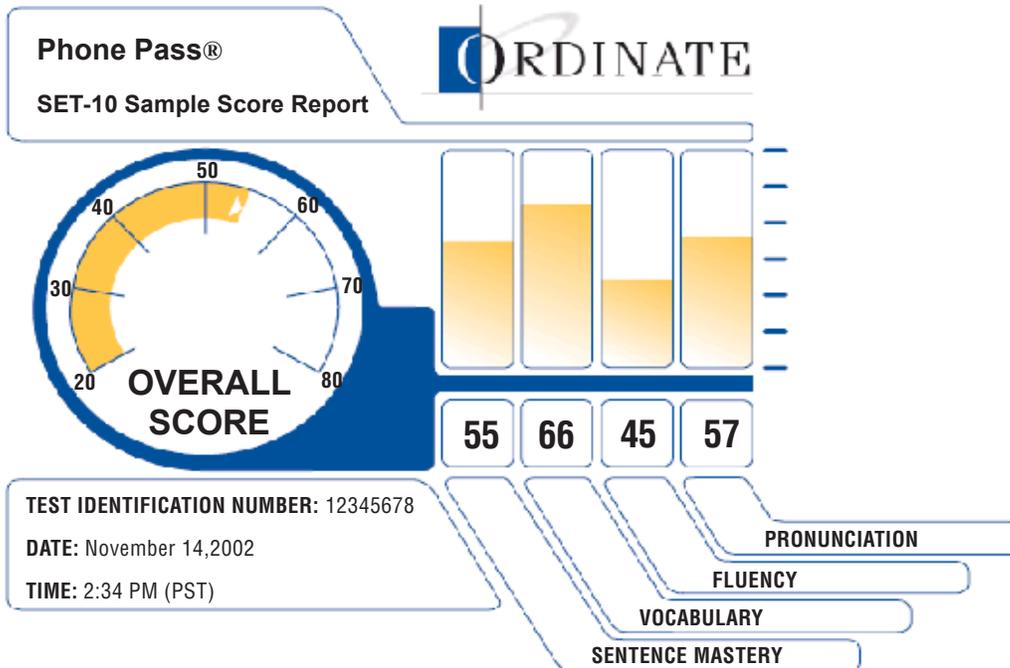
Message decoding and message encoding as a real-time chain-process in oral interaction



The language structures that are largely shared among the members of a speech community are used to encode and decode various threads of meaning that are communicated in spoken turns. These threads of meaning that are encoded and decoded include declarative information, as well as social information and discourse markers. World knowledge and knowledge of social relations and behaviour are also used in understanding the spoken turns and in formulating the content of spoken turns. However, these social-cognitive elements

of communication are not represented in this model and are not directly measured in the Versant English Test. Thus, the Versant test focus on peoples' ability to meet the pragmatic communication demands of work rather than the elegance of communication – a focus that fits well with the Essential Skills notion of oral communication.

The PhonePass provides an overall oral fluency score and scores for four sub-scales (see text box).



Overall Score

The Overall Score of the test represents the ability to understand spoken English and speak it intelligibly at a native conversational pace on everyday topics. Scores are based on a weighted combination of four diagnostic sub-scores. Scores are reported in 6 levels on a scale that ranges from 20 to 80.

Level 1 — 72-80 Test-taker speaks and understands effortlessly at native speaker speeds, and can contribute readily to a native-paced discussion at length, maintaining the colloquial flow. Speech is completely fluent and intelligible; test-taker has consistent mastery of complex language structures.

Level 2 — 63-71 Test-taker easily handles a wide variety of discourse and speaking styles, and can contribute to a native-paced discussion. Speech is fluent, smooth and intelligible; test-taker controls appropriate language structure for speaking about complex material.

Level 3 — 46-62 Test-taker can handle many utterances using a variety of words and structures, and can follow and sometimes participate in a native-paced conversation. Pronunciation is generally intelligible; test-taker can express some composite information on familiar topics to a cooperative listener.

Level 4 — 37-45 Test-taker can handle short utterances using common words and simple structures, but has difficulty following a native-paced conversation. Pronunciation may sometimes not be intelligible; test-taker speaks slowly and pauses, but can convey basic information to a cooperative listener.

Level 5 — 28-36 Test-taker can manage some slow, short, isolated utterances, or spoken formulas, but has difficulty following any native conversation; test-taker may often pause to search for words and may be difficult to understand.

Level 6 — 20-27 Test-taker has very limited speaking and listening skills in English.

The following series of figures plot the distribution of oral fluency proficiency by literacy market segment. Latent class analysis was used to identify literacy market

segments using the battery of clinical literacy tests administered in the ISRS study.

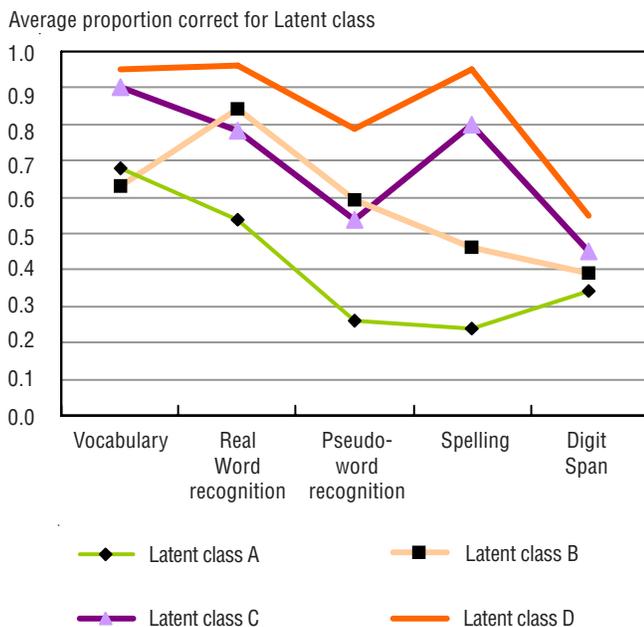
What does latent class analysis do?

Individuals are organized into groups or classes based on their patterns of performance on the five component skills. More specifically, the scores of the five components skill tests are analyzed using Latent Class Analysis (LCA) methods (Lazarsfeld and Henry, 1968; Patterson, Dayton and Graubard, 2002). LCA is a statistical tool for clustering subjects based on categorical variables. This analysis yields a probabilistic classification for each survey participant, where the classes are represented by different tendencies to perform in a certain way (more formally, each class is characterized by its conditional response probabilities) in each of the five components. Latent class analysis identifies relatively homogeneous groups of learners that share common sets of learning needs. Latent classes can then be situated on the overall prose literacy scale and profiled demographically.

The following chart reveals that each of the four market segments have a distinct patterns of strength and weakness in decoding and comprehension.

Figure 3.0

Average proportion correct scores on each component displayed separately for each latent class, Canada excluding territories, population aged 16 to 65, 2005

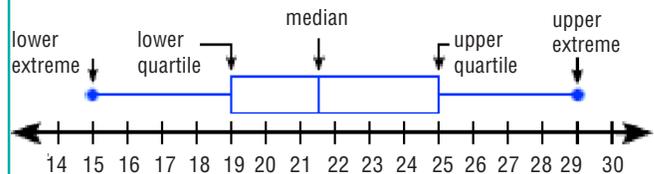


Subsequent analysis have sub-divided segments A and B into immigrant and non-immigrant groups. The following analysis extends the market segmentation analysis to include oral fluency.

The oral fluency data are presented in the form of box whisker plots in order to provide a rich sense of the underlying distributions of skill within each of the six market segments identified in DataAngel’s cost-benefit analysis (DataAngel, 2009) (see box below).

Box Whisker plots

A box and whisker plot (sometimes called a boxplot) is a graph that presents information from a five-number summary. It does not show a distribution in as much detail as a stem and leaf plot or histogram does, but is especially useful for indicating whether a distribution is skewed and whether there are potential unusual observations (outliers) in the data set. Box and whisker plots are also very useful when large numbers of observations are involved and when two or more data sets are being compared. Box and whisker plots are ideal for comparing distributions because the centre, spread and overall range are immediately apparent.



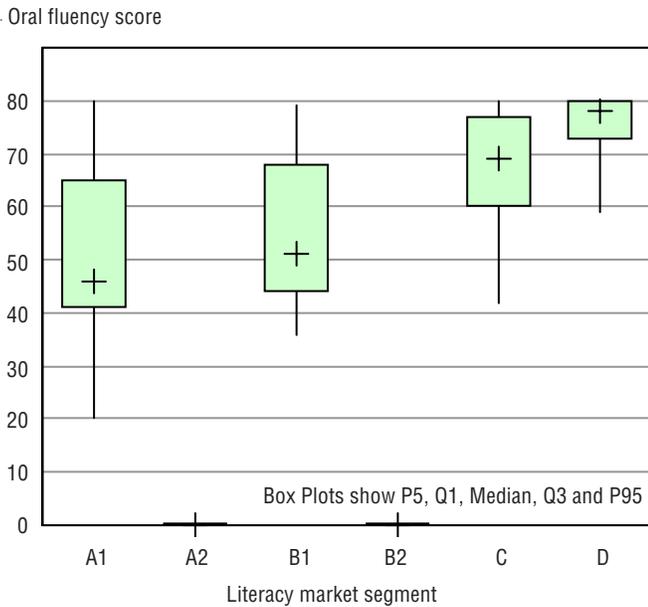
A box and whisker plot is a way of summarizing a set of data measured on an interval scale. It is often used in explanatory data analysis. This type of graph is used to show the shape of the distribution, its central value, and its variability.

In a box and whisker plot:

the ends of the box are the upper and lower quartiles, so the box spans the interquartile range the median is marked by a vertical line inside the box the whiskers are the two lines outside the box that extend to the scores at the 5th and 95th percentiles.

Figure 3.1

Oral fluency score distributions by literacy market segments, adults aged 16 and over, Canada, 2005



Source: ISRS, 2005

The figure reveals several important facts, including:

In general, median oral fluency rises with ascending literacy market segment, a pattern that mirrors the relationship observed between prose literacy and segment membership,

Notwithstanding this general observation, each literacy market segment contains adults with a range of oral fluency skill,

Market segment A2, one of two segments that is dominated by immigrant women, exhibits the lowest median oral fluency score.

Market segment A1, a segment dominated by Canadian born men without high school graduation, displays the largest range of skill.

Only adults in the last two literacy market segments, C and D, have median oral fluency scores in the top two oral proficiency levels. Thus, segments A1, A2, B1 and B2 all have discernable weakness in their oral fluency levels.

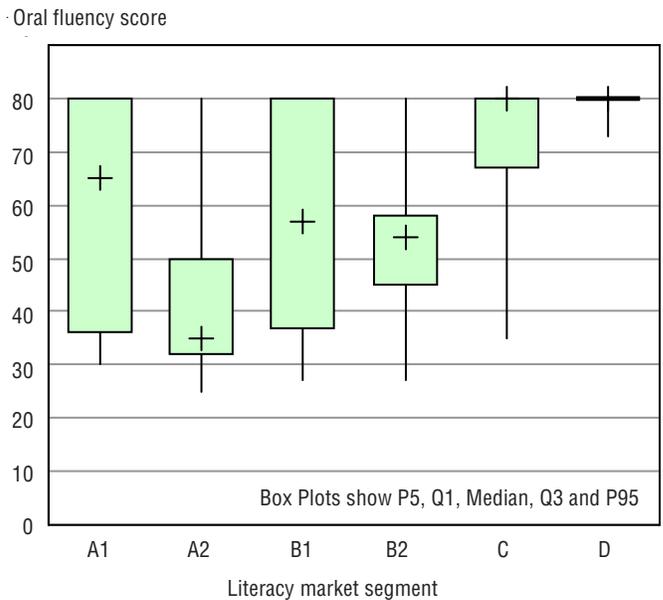
The upper extreme of the distribution of oral fluency skill in segments C and D seems to be truncated, a finding that suggests the presence of a ceiling effect in the Versant test.

The same distributions were plotted for each of the PhonePass sub-scales: repeat fluency, pronunciation and repeat accuracy. These distributions, included as Annex C, reveal much the same pattern of results.

The Versant vocabulary and fluency oral fluency sub-domains should tap the same skills as the ISRS vocabulary and phonetic decoding sub-tests, a relationship that should increase the degree to which the two measures are correlated.

Figure 3.2

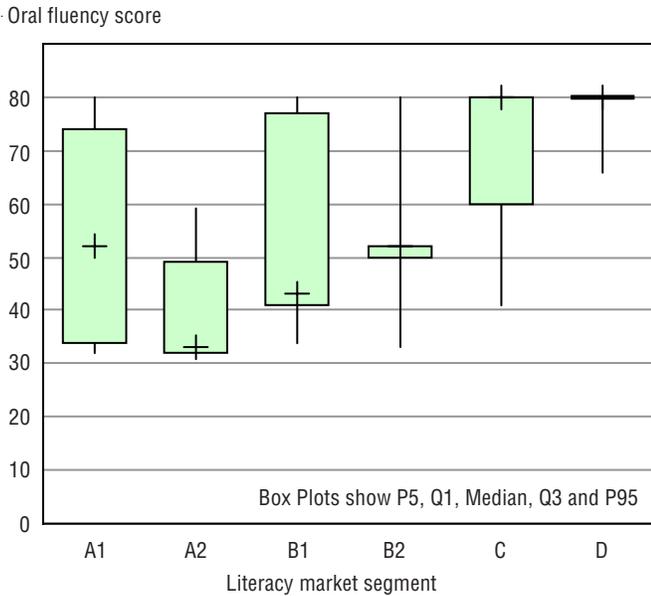
Repeat fluency score distributions by literacy market segments, adults aged 16 and over, Canada, 2005



Source: ISRS, 2005.

Figure 3.3

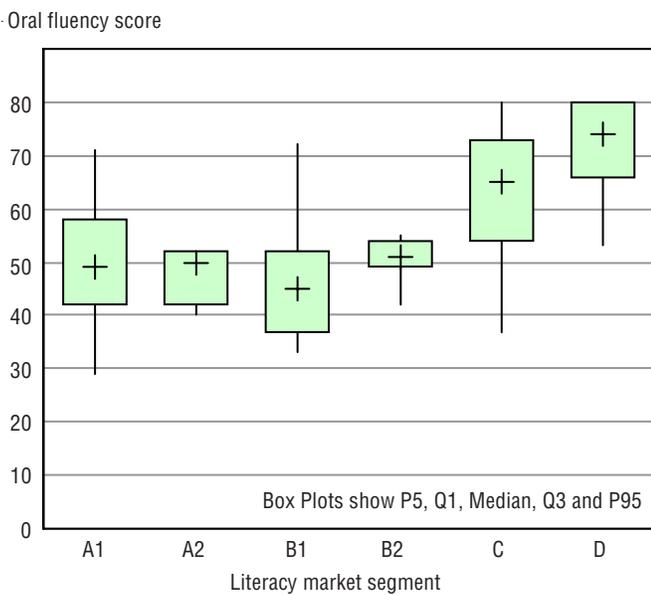
Pronunciation score distributions by literacy market segments, adults aged 16 and over, Canada, 2005



Source: ISRS, 2005.

Figure 3.4

Repeat accuracy score distributions by literacy market segments, adults aged 16 and over, Canada, 2005



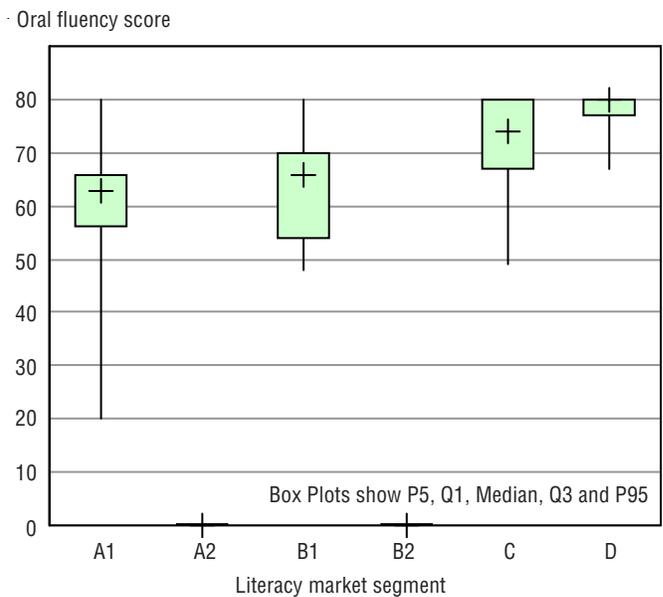
Source: ISRS, 2005.

The Figures reveal essentially the same pattern of results albeit it with somewhat more variability than observed in the overall fluency score.

The following series of Figures display the fluency score distributions by market segment for key subgroups in the population. The first Figure displays the oral fluency distributions for adult non-immigrants with mother tongues of English or French.

Figure 3.5

Oral fluency score distributions by literacy market segments, Official language non-immigrant adults aged 16 and over, Canada, 2005



Source: ISRS, 2005.

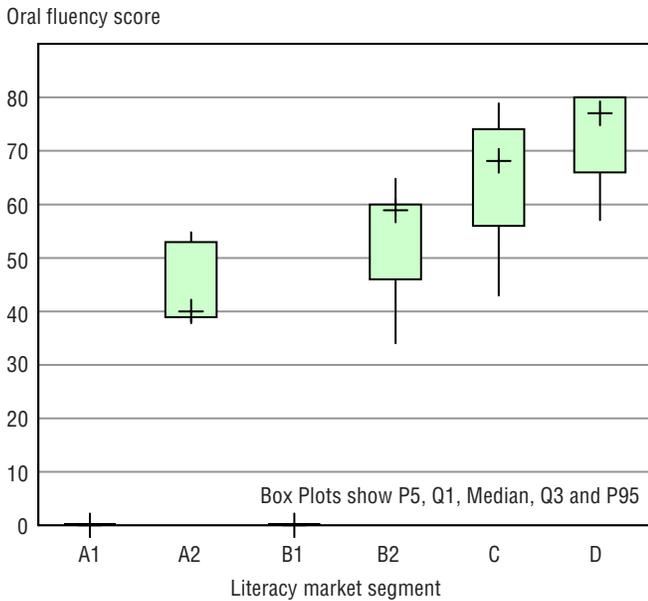
The figure shows two interesting findings, as follows:

The median oral fluency score for every literacy market segment falls above oral fluency Level 4.

Median oral fluency scores rise with market segment, a pattern that we take as confirmation that oral fluency and prose literacy positively reinforce each other.

Figure 3.6

Oral fluency score distributions by literacy market segments, Non-official language immigrant adults aged 16 and over, Canada, 2005



Source: ISRS, 2005.

The Figure reveals that:

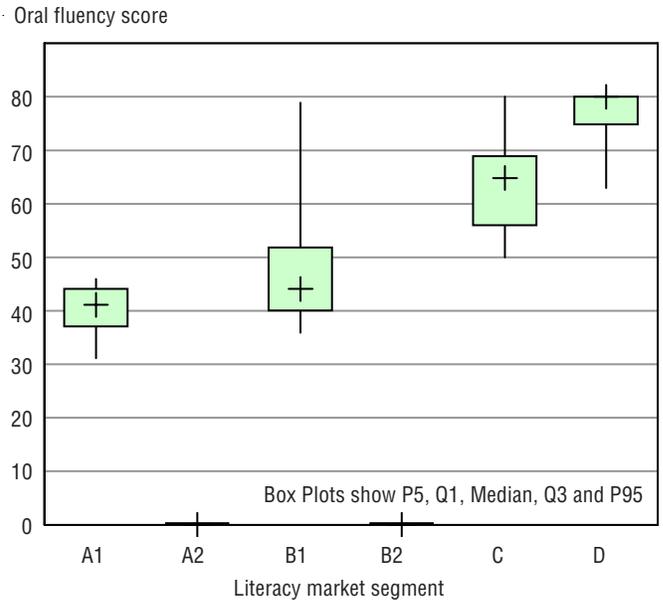
Median oral fluency scores for market segments A2 and B2 fall below the threshold for Level 5, a finding that suggests that these groups will face significant disadvantage in the Canadian labour market.

Although the median oral fluency scores for market segments C and D fall in Levels 5 and 6 a significant minority of these adults have skills below the Level 5

Figure 3.7 plots the oral fluency distributions for Canadian-born adults with non-official language mother tongues – a mixed group that includes a significant proportion of Aboriginal Canadians.

Figure 3.7

Oral fluency score distributions by literacy market segments, Canadian-born non-official language adults aged 16 and over, Canada, 2005



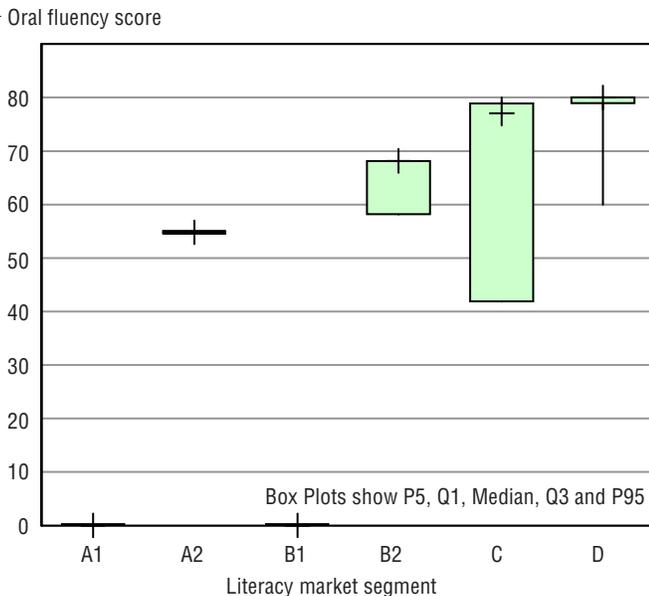
Source: ISRS, 2005.

The Figure reveals that:

Median oral fluency scores for market segments A1 and B1 fall below the threshold for Level 5, a finding that suggests that these groups will face significant disadvantage in the Canadian labour market.

Although the median oral fluency scores for market segments C and D fall in Levels 5 and 6 a significant minority of these adults have skills below the Level 5

The fourth Figure presents similar data for immigrants whose mother tongue is either English or French.

Figure 3.8**Oral fluency score distributions by literacy market segments, official language immigrants, adults aged 16 and over, Canada, 2005**

Source: ISRS, 2005.

The Figure reveals that:

Median oral fluency scores for market segments A2 falls just below the threshold for Level 5, a finding that suggests that these groups will face a slight disadvantage in the Canadian labour market.

Although the median oral fluency scores for market segments B2, C and D fall in Levels 5 and 6 a significant minority of these adults have skills below the Level 5. This is particularly so for adults in this group in segment C.

The forgoing analysis confirms two expected results, including that:

Adults with mother tongues other than English and French have oral fluency scores that are low enough to suggest disadvantage in Canada's labour markets

Oral fluency and prose literacy scores rise with market segment, a finding that confirms the mutually reinforcing relationship predicted in the literature summarized in Chapter 2

Understanding how performance is related across skill domains

Program planners and policy makers who focus their attention on Essential Skills share an interest in understanding the degree to which individuals exhibit

consistent skill levels across domains. This information is critical to the nature of the policy response. If individuals are consistent in their performance across domains one would need a very simple surveillance system, focused on the easiest skill to measure, to identify those whose skill level places them at risk. If, however, individuals display complex patterns of skill by level across domains the needs assessment system would need to assess each skill in order to identify those at risk and to identify appropriate remedial responses. In order to place the relationship of oral fluency to prose literacy, document literacy and numeracy into the proper context one must have a clear sense of how much skill levels vary in these latter dimensions.

How prose literacy, document literacy and numeracy skill are correlated

The relationship between oral fluency and other skills can be summarized by presenting the correlations among the different skill domains. Figure 3.9 below shows the correlations among prose literacy, document literacy and numeracy proficiency scores and proficiency levels.

Figure 3.9

Inter-domain Correlations, Prose literacy, document literacy, numeracy and problem solving, adults aged 16 and over, Canada

	Prose	Document	Numeracy	Problem Solving
	Percent			
Prose	100	95	78	81
Document	95	100	79	81
Numeracy	78	79	100	83
Problem Solving	81	81	83	100

Source: IALSS, 2003.

The data reveal the expected result i.e. that the scores and levels are highly, but not perfectly, correlated.

The relationship between oral fluency and the other domains

We now extend the forgoing analysis to explore how oral fluency is related to proficiency in the other domains. The first question to be addressed has to do with establishing the degree to which individuals with weak literacy and numeracy skills also have weak oral fluency skills. This relationship carries important implications for policy and practice. Higher proportions of adults

with weak literacy and numeracy skills and weak oral fluency skills would be expected to greatly reduce the efficiency and effectiveness of remedial instruction in the former domains.

The first stage of this analysis is to explore the correlation between oral fluency and each of the other skill domains i.e. prose literacy, document literacy and numeracy. Given the fact that the majority of the population acquire both skills early in life with relatively little effort one might expect to see a strong correlation between the two scales. The research summarized in Chapter 2 suggests, however, that the two domains are both distinct and largely independent of each other i.e. they use different sensory input channels and are processed in different parts of the brain. Thus, proficiency in one domain does not necessarily depend on proficiency in the others. This conclusion fits with what is known about the emergence of language and literacy. Language has been around at least 250,000 years whereas literacy evolved roughly 10,000 years ago. Many vibrant cultures managed to flourish without literacy and a significant minority of the world’s population still get by without becoming literate. Conversely small proportions of the adult population manage to function without oral language, including adults with mother tongues other than English or French. In reality, one expects to see several relationships among skill domains in Canada because of the complex interaction between mother tongue, language of the test, years of schooling and language of schooling and length of time in Canada.

Figure 3.10 below reveals that the overall inter-domain correlations display an interesting pattern of strength and weakness.

Figure 3.10

The correlation between oral fluency, prose literacy, document literacy, numeracy and problem solving, adults aged 16 and over, Canada, 2005

	Oral Fluency	Prose	Document	Numeracy	Problem Solving
	Percent				
Oral Fluency	100	50	46	41	43
Prose	50	100	95	78	81
Document	46	95	100	79	81
Numeracy	41	78	79	100	83
Problem Solving	43	81	81	83	100

Source: IALSS, 2003 and ISRS, 2005.

The table reveals several important facts, including:

Oral fluency is only moderately correlated with prose literacy (50%)

The correlations of oral fluency with the other domains are weaker: 46% for document, 41% for numeracy and 43% for problem solving

In sharp contrast prose and document proficiency are very highly correlated (95%).

The correlations of numeracy and problem solving to prose skill are markedly lower: 78% and 81% respectively

These findings are important for policy and practice. The first important insight is that knowing a person’s level of oral fluency does not provide a reliable indication of their skill in other domains. At best predictions would be wrong at least half the time.

The apparent weakness of the relationship between oral fluency and prose skill might simply reflect heterogeneity in the characteristics of the adult population. Tables 3.11A and B below provides estimates of the strength of the correlations among skill domains by market segment.

Table 3.11.A

A The correlation between oral fluency, prose literacy, document literacy and numeracy, by education, immigrant status and mother tongue, adults aged 16 and over, Canada, 2003

Education		Domain	Prose Score Percent	Document Score Percent	Numeracy Score Percent	Problem Solving Score Percent
Immigrants with English/French mother tongue						
Education	No post-secondary education	Prose Score	100			
Sample Size	47	Document Score	94	100		
		Numeracy Score	64	69	100	
		Problem Solving Score	84	82	70	100
		Overall Oral Fluency Score	31	29	22	42
Education	Some post-secondary education	Prose Score	100			
Sample Size	43	Document Score	95	100		
		Numeracy Score	84	91	100	
		Problem Solving Score	88	92	85	100
		Overall Oral Fluency Score	64	64	49	61
Education	Total	Prose Score	100			
Sample Size	91	Document Score	94	100		
		Numeracy Score	73	80	100	
		Problem Solving Score	85	87	78	100
		Overall Oral Fluency Score	42	41	32	48
Immigrants without English/French Mother Tongue						
Education	No post-secondary education	Prose Score	100			
Sample Size	104	Document Score	95	100		
		Numeracy Score	70	77	100	
		Problem Solving Score	72	78	90	100
		Overall Oral Fluency Score	79	79	64	65
Education	Some post-secondary education	Prose Score	100			
Sample Size	81	Document Score	90	100		
		Numeracy Score	75	77	100	
		Problem Solving Score	76	70	81	100
		Overall Oral Fluency Score	64	60	68	66
Education	Total	Prose Score	100			
Sample Size	185	Document Score	95	100		
		Numeracy Score	79	82	100	
		Problem Solving Score	80	80	89	100
		Overall Oral Fluency Score	75	74	68	69
Non-Immigrants with English/French Mother Tongue						
Education	No post-secondary education	Prose Score	100			
Sample Size	964	Document Score	93	100		
		Numeracy Score	71	72	100	
		Problem Solving Score	74	76	78	100
		Overall Oral Fluency Score	42	38	40	31
Education	Some post-secondary education	Prose Score	100			
Sample Size	378	Document Score	93	100		
		Numeracy Score	73	71	100	
		Problem Solving Score	72	70	76	100
		Overall Oral Fluency Score	0	-1	-3	4
Education	Total	Prose Score	100			
Sample Size	1,342	Document Score	94	100		
		Numeracy Score	77	77	100	
		Problem Solving Score	78	78	81	100
		Overall Oral Fluency Score	34	30	30	27

Table 3.11.A (concluded)

A The correlation between oral fluency, prose literacy, document literacy and numeracy, by education, immigrant status and mother tongue, adults aged 16 and over, Canada, 2003

Education		Domain	Prose Score	Document Score	Numeracy Score	Problem Solving Score
			Percent			
Non-Immigrants without English/French Mother Tongue						
Education	No Post-secondary education	Prose Score	100			
Sample Size	47	Document Score	87	100		
		Numeracy Score	89	89	100	
		Problem Solving Score	78	82	86	100
		Overall Oral Fluency Score	82	67	72	55
Education	Some Post-secondary education	Prose Score	100			
Sample Size	13	Document Score	95	100		
		Numeracy Score	76	76	100	
		Problem Solving Score	80	81	88	100
		Overall Oral Fluency Score	37	19	9	15
Education	Total	Prose Score	100			
Sample Size	60	Document Score	88	100		
		Numeracy Score	88	84	100	
		Problem Solving Score	80	83	87	100
		Overall Oral Fluency Score	80	62	67	55
Total						
Education	No Post-secondary education	Prose Score	100			
Sample Size	1,162	Document Score	94	100		
		Numeracy Score	73	75	100	
		Problem Solving Score	78	79	81	100
		Overall Oral Fluency Score	57	53	48	46
Education	Some Post-secondary education	Prose Score	100			
Sample Size	515	Document Score	93	100		
		Numeracy Score	75	75	100	
		Problem Solving Score	77	75	79	100
		Overall Oral Fluency Score	27	23	20	30
Education	Total	Prose Score	100			
Sample Size	1,678	Document Score	95	100		
		Numeracy Score	78	79	100	
		Problem Solving Score	81	81	83	100
		Overall Oral Fluency Score	50	46	41	43

Source: IALSS, 2003 and ISRS, 2005.

As expected the table yields a dramatically different and very complex picture of the relationships.

Oral fluency score is much more highly correlated with prose scores for the population of non-official language immigrants and Canadian born adults with non-official language mother tongues.

Notwithstanding this general finding, the table also reveals large differences in the degree to which oral fluency scores are correlated with prose scores. The inter-domain correlations are significantly weaker for adults without any post-secondary education and stronger for those having some education at the post-secondary level. Two possible interpretations of these data are possible. First, post-secondary education might be imparting skills

that serve to reduce skill gaps between domains. Alternatively, these findings might simply be selection effects caused by more skilled students being preferentially being granted access to or seeking post-secondary education. Data from the PISA/YITS study would allow this question to be answered. For the time being it is enough to know that oral fluency scores are not uniformly good predictors of prose scores. Any skill surveillance or program triage system would need to test both skills.

It might be that the observed differences in correlations for immigrants are simply a reflection of the integration process. Table 3.11B provides estimated inter-skill domain correlations by the number of years in Canada for the same groups.

Table 3.11.B

The correlation between oral fluency, prose literacy, document literacy and numeracy, by immigrant status, years in Canada and mother tongue, adults aged 16 and over, Canada, 2003

Education		Domain	Prose Score	Document Score	Numeracy Score	Problem Solving Score
			Percent			
Immigrants with English/French Mother Tongue						
Years in Canada	0-9	Prose Score	100			
Sample Size	13	Document Score	82	100		
		Numeracy Score	61	82	100	
		Problem Solving Score	88	86	75	100
		Overall Oral Fluency Score	48	36	39	59
Years in Canada	10 +	Prose Score	100			
Sample Size	72	Document Score	96	100		
		Numeracy Score	75	79	100	
		Problem Solving Score	87	89	80	100
		Overall Oral Fluency Score	50	50	37	50
Years in Canada	Total	Prose Score	100			
Sample Size	91	Document Score	94	100		
		Numeracy Score	73	80	100	
		Problem Solving Score	85	87	78	100
		Overall Oral Fluency Score	42	41	32	48
Immigrants without English/French Mother Tongue						
Years in Canada	0-9	Prose Score	100			
Sample Size	87	Document Score	95	100		
		Numeracy Score	83	86	100	
		Problem Solving Score	84	86	90	100
		Overall Oral Fluency Score	80	81	75	75
Years in Canada	10 +	Prose Score	100			
Sample Size	97	Document Score	95	100		
		Numeracy Score	79	82	100	
		Problem Solving Score	80	80	89	100
		Overall Oral Fluency Score	75	74	68	69
Years in Canada	Total	Prose Score	100			
Sample Size	185	Document Score	94	100		
		Numeracy Score	77	77	100	
		Problem Solving Score	78	78	81	100
		Overall Oral Fluency Score	34	30	30	27
Non-Immigrants with English/French Mother Tongue						
Years in Canada	Total	Prose Score	100			
Sample Size	1,342	Document Score	94	100		
		Numeracy Score	77	77	100	
		Problem Solving Score	78	78	81	100
		Overall Oral Fluency Score	34	30	30	27
Non-Immigrants without English/French Mother Tongue						
Years in Canada	Total	Prose Score	100			
Sample Size	60	Document Score	88	100		
		Numeracy Score	88	84	100	
		Problem Solving Score	80	83	87	100
		Overall Oral Fluency Score	80	62	67	55
Total						
Years in Canada	Total	Prose Score	100			
Sample Size	1,678	Document Score	95	100		
		Numeracy Score	78	79	100	
		Problem Solving Score	81	81	83	100
		Overall Oral Fluency Score	50	46	41	43

Note: The table reveals that the observed differences in correlation do not simply reflect the integration process as the correlations change little with time in Canada. Again, there are two possible interpretations of these data. Either skill is developing at the same rate in both domains or the differences reflect deeper, more complex processes associated with skill use and rates of adult learning.

Source: IALSS, 2003 and ISRS, 2005.

As expected the table yields a dramatically different picture of the relationships.

A simple cross-classification of these relationships provides further insight into the relationships among skill domains. Figures 3.11 to 3.16 below plot the relationships between oral fluency level and prose literacy. Parallel charts for document literacy and numeracy level have been included in Annex C. As noted earlier in this report the PhonePass classifies individuals into one of six oral fluency levels. For the purposes of this analysis individuals classified at Levels 5 or 6 are judged to face no risk in the Canadian labour market, those at Levels 4 to be at some risk and those at Levels 3, 2 and 1 are likely to be at a profound disadvantage in the Canadian labour market. This grouping based on the definitions of the levels, recalling that anyone at Level 3 or below has difficulty following a native-paced conversation, uses pronunciation that may be unintelligible, and speaks slowly and pauses when talking. Level 4 individuals can generally follow a conversation and express themselves on familiar topics but nonetheless have difficulty participating in a native-paced conversation. While this is a reasonable hypothesis, the extent of labour market disadvantage attributable to lower levels of the Phone Pass scale has not been empirically validated.

Two Figures are presented. The first Figure displays the distribution of proficiency levels within each oral fluency level. The second Figure presents the distribution of oral fluency within each proficiency level.

Figure 3.12
Prose literacy proficiency level by oral fluency proficiency level 1 and 2 prose literacy, adults aged 16 and over, Canada, 2003

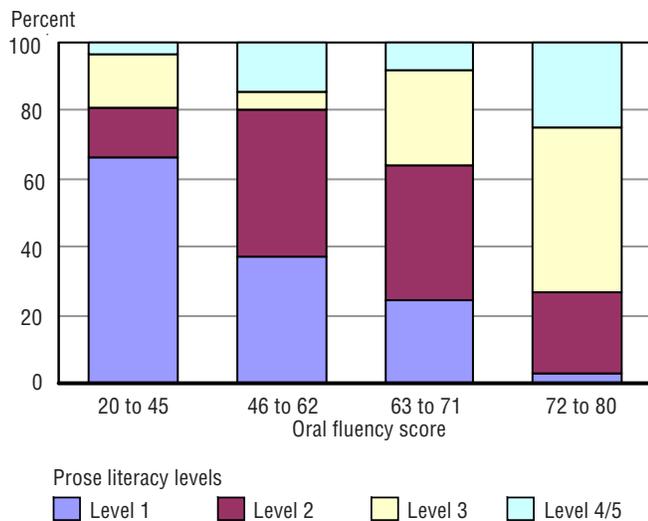
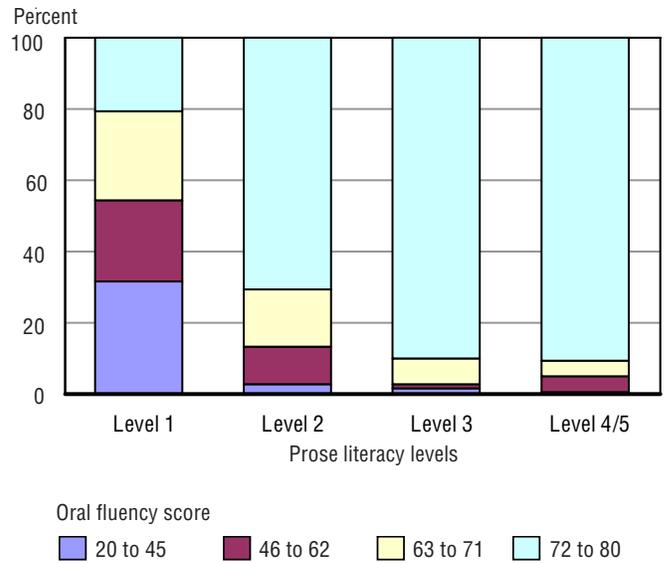


Figure 3.13
Oral fluency proficiency level by level 1 and 2 prose literacy proficiency level, adults aged 16 and over, Canada, 2003



The figure reveals several important facts, including that:

Only adults at prose literacy Levels 1 and 2 have a significant risk of having low oral fluency levels.

Over 50% of prose Level 1 adults have oral fluency skills below Level 5. The majority of these are in the lowest three oral fluency levels.

The risk of having less than adequate oral fluency skills for prose Level 2 falls to less than half of that faced by prose Level 1 adults.

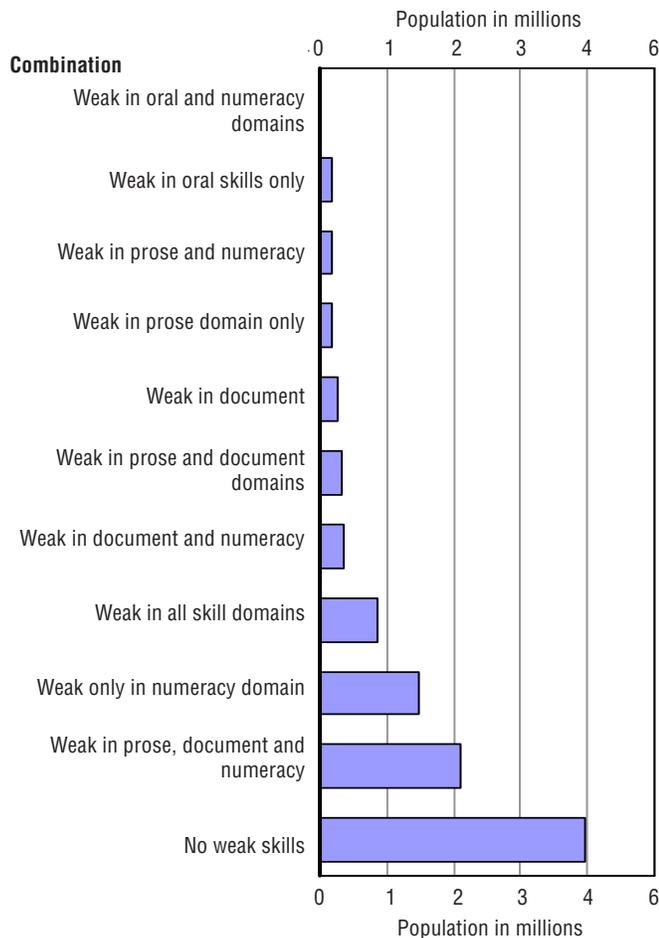
Very small proportions prose Levels 3, 4 and 5 have low oral fluency levels.

Patterns of strength and weakness in oral fluency, prose literacy, document literacy and numeracy levels

Figure 3.17 below identifies the eleven largest combinations and permutations in skill levels across the oral, prose, document and numeracy domains. For this analysis, weakness in oral fluency is defined by having oral fluency below Level 5. For prose literacy, document literacy and numeracy weakness is defined by having skills below Level 3.

Figure 3.17

Combinations of proficiency level across skill domains, oral fluency, prose literacy, document literacy and numeracy, adults aged 16 and over, 2005



Source: IALSS, 2003.

The Figure reveals that Canadian adults exhibit a very diverse pattern of performance by proficiency level across the oral, prose literacy, document literacy and numeracy domains.

The Figure shows that:

84% of the total population, an estimated 16,750,000 fall into 4 groups.

7,900,000, or 40% of the population, have no apparent weakness in any skill domain.

1,700,000, or 9% of the adult population, are weak in every skill domain.

An additional 4,200,000, or 21%, have adequate oral fluency skills but weak skills in all three other domains.

2,950,000, or 15%, of all adults have adequate oral, prose and document skills but weak numeracy skills.

The balance of the population display variable patterns of strength and weakness. The table shows that:

Only 7% of adults have consistent results by level – a finding that implies that 93 of adults have one or more weaker (or stronger domain)

An estimated 44% of adults have Level 3 proficiency or above in prose literacy, document literacy and numeracy

The balance of the adult population – representing 56% of all adults - are weak in one or more of these skill domains

In total 11,620,000 adults (58%) have weak prose literacy, document literacy and/or numeracy skills

2,250,000 people (11%) have weak oral fluency skills

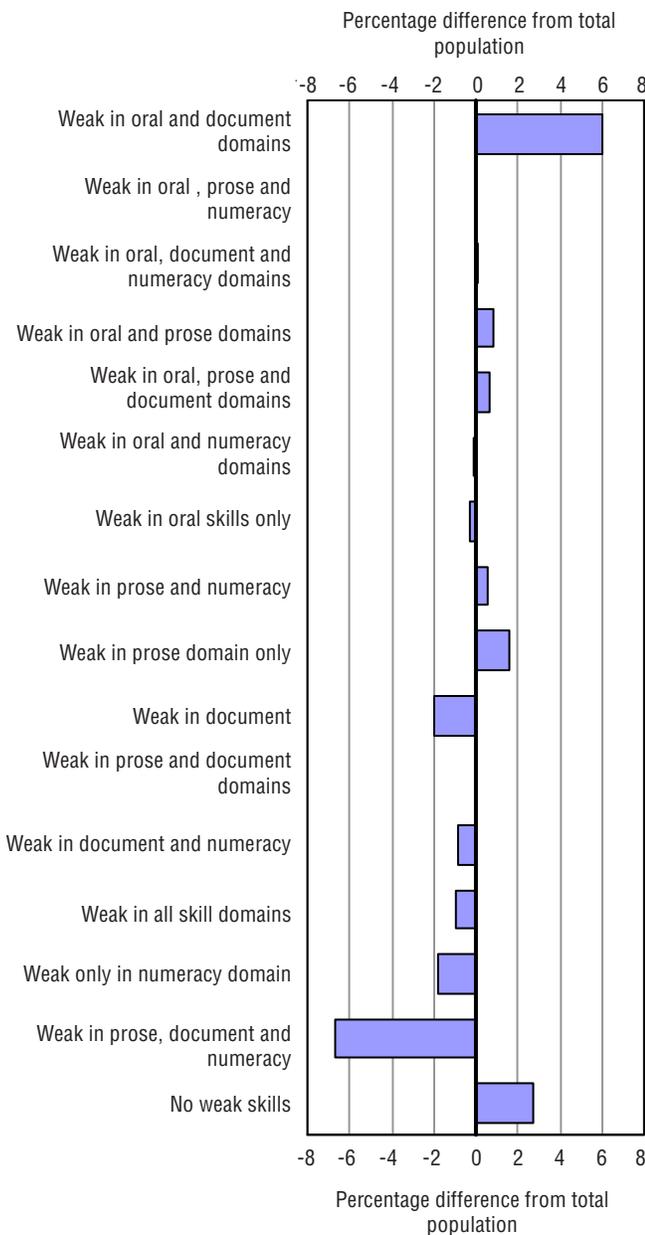
1,910,000 or 85 of those with weak oral fluency skills also have weak skills in one or more of the other skill domains

These findings carry important implications for both policy and practice. The fact that over half of the adult population has weak skills suggests a problem of a scale that would tax even the most ambitious public policy. The diversity of patterns suggests a need for an equally diverse suite of assessment tools and a highly differentiated offering of remedial products and services.

Figure 3.18 below provides a more nuanced overview of the patterns of skill deficiency in the adult population. In this Figure and individual is classified as being at risk if they fall below the level thought to be needed to support full and active use of the skill in daily life. For prose literacy, document literacy and numeracy this is assumed to be Level 3 (Statistics Canada and OECD 2005). For oral fluency it is taken to be Level 5.

Figure 3.18

Relative over/under advantage of immigrants in their patterns of weakness across skill domain, adults aged 16 and over, 2005



The figure shows several interesting findings, including:

Immigrants are 6 more likely to be classified in the “weak in oral and document domains” group

Immigrants are 3% more likely to be classified in the “No weakness in any skill domain” group

Immigrants are over 6% less likely to be classified in the “weak in prose, document and numeracy” group

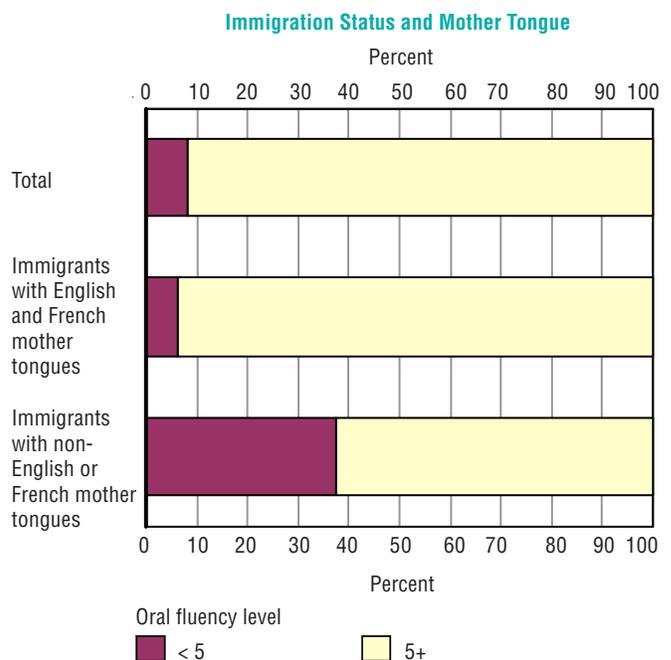
These findings suggest that immigrants have patterns of strength and weakness that are roughly comparable to those of the non-immigrant population. While some differences exist these differences are not as large as might be expected.

The social distribution of oral fluency skill

The foregoing analysis suggests that adults non-official language mother tongues are much more likely than their official language peers to have weak oral fluency skills. Figure 3.19 summarizes the risk of different immigrant and mother tongue groups having oral fluency less than level 5.

Figure 3.19

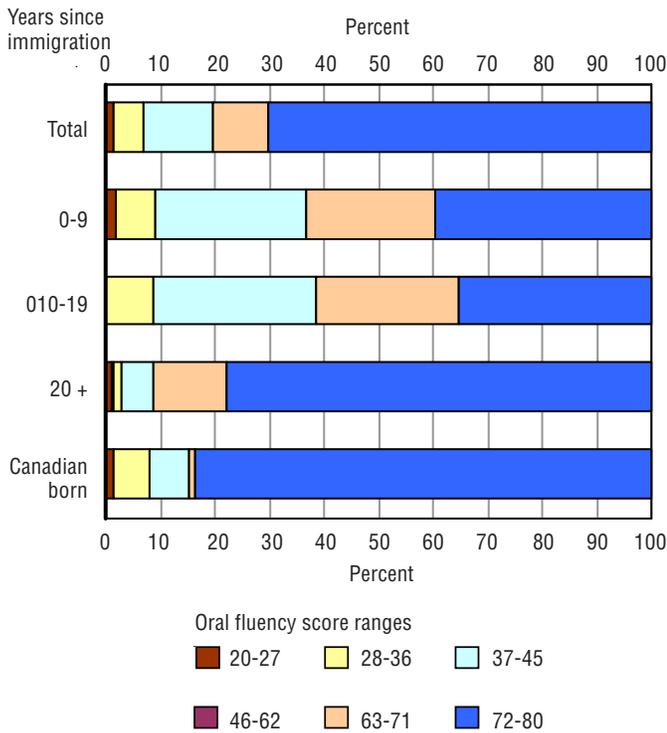
Proportion of the population with oral fluency scores less than Level 5, adults aged 16 and over by immigrant status and official language, Canada, 2005



The figure reveals the expected finding that immigrants with non-official languages as their mother tongues face a significantly higher risk – over 30% - of having weak oral fluency skills. The figure also reveals a startling fact that over 40% of Canadian-born adults with non-official language mother tongues, the majority of whom are Aboriginal Canadians, have oral fluency scores below Level 5.

Figure 3.20 plots the distribution of immigrants oral fluency skill by the length of time they have been in Canada.

Figure 3.20
Distribution of oral fluency scores by proficiency level by years in Canada, immigrants aged 16 and over, Canada, 2005

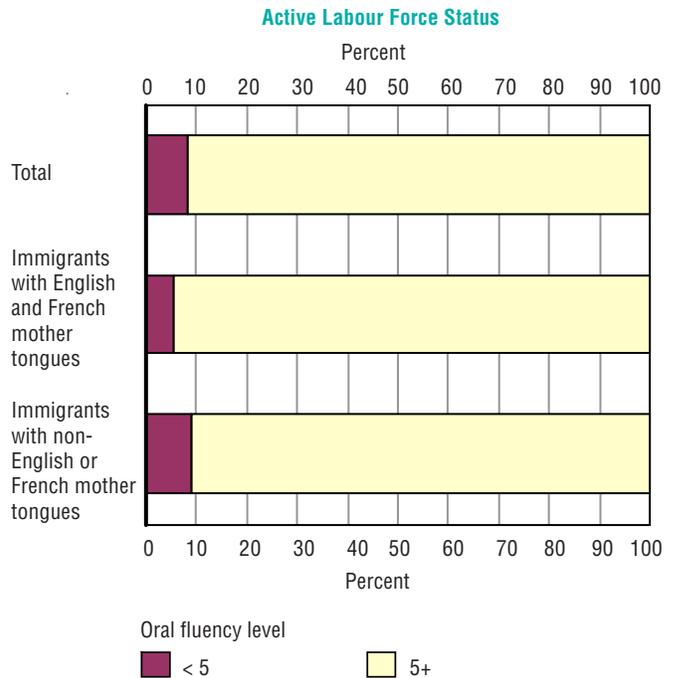


The Figure reveals the expected pattern of results over the long term i.e. that after 20 years immigrants have a very low probability of having inadequate oral fluency skills. The data, however, reveal an interesting inversion. More recent immigrants are actually less likely to have oral fluency scores that fall below Level 5. This finding might be the result of a shift in the official language skills of immigrants at entry and/or in the quality of instruction offered to immigrants after their arrival.. Current data do not allow one to disaggregate the relative impact of these two effects.

The following Figures explore the distribution of oral fluency risk for other characteristics.

Figure 3.21 plots the relative risk of having weak oral fluency skills by labour force status.

Figure 3.21
Proportion of the population with oral fluency scores less than Level 5, adults aged 16 and over by labour force status, Canada, 2005

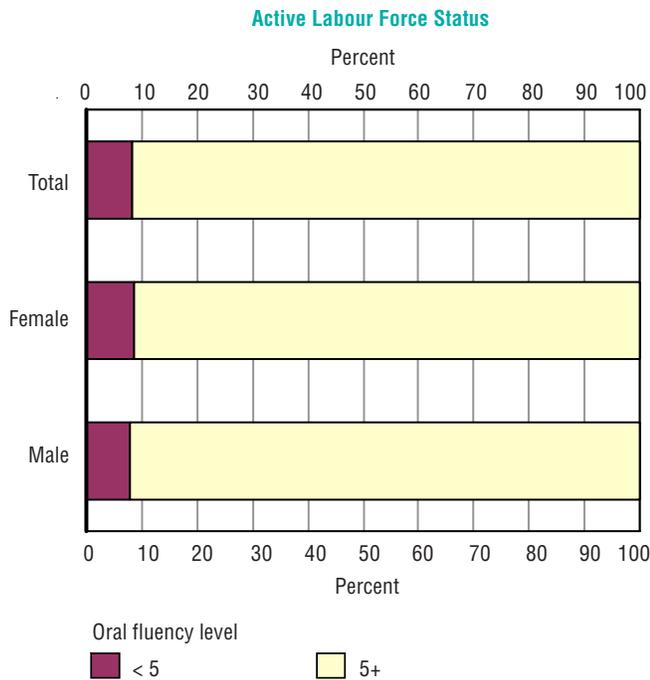


The figure reveals that adults with oral fluency skills below Level 5 more less likely to be in the labour force, a finding that belies the fact that Canadian labour markets generally select heavily on skill.

Figure 3.22 plots the relative risk of having weak oral fluency skills by gender.

Figure 3.22

Proportion of the population with oral fluency scores less than Level 5, adults aged 16 and over by gender, Canada, 2005



The figure reveals that men are slightly more at risk of having low oral fluency skills than women.

Figure 3.23 plots the risk of having weak oral fluency skills by age group.

Somewhat surprisingly youth aged 16 to 25 face higher levels of risk than their older peers.

Figure 3.24 plots the risk of having weak oral fluency skills by educational attainment.

Figure 3.23

Proportion of the population with oral fluency scores less than Level 5, adults aged 16 and over by age group, Canada, 2005

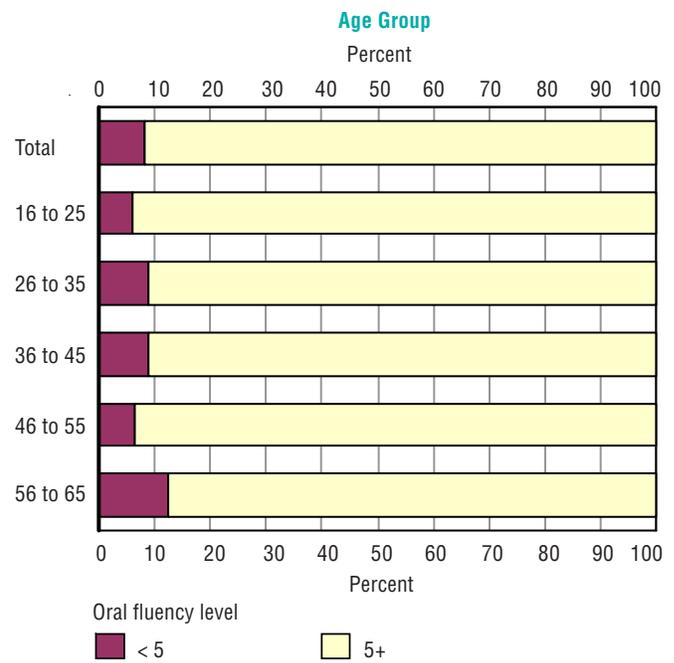
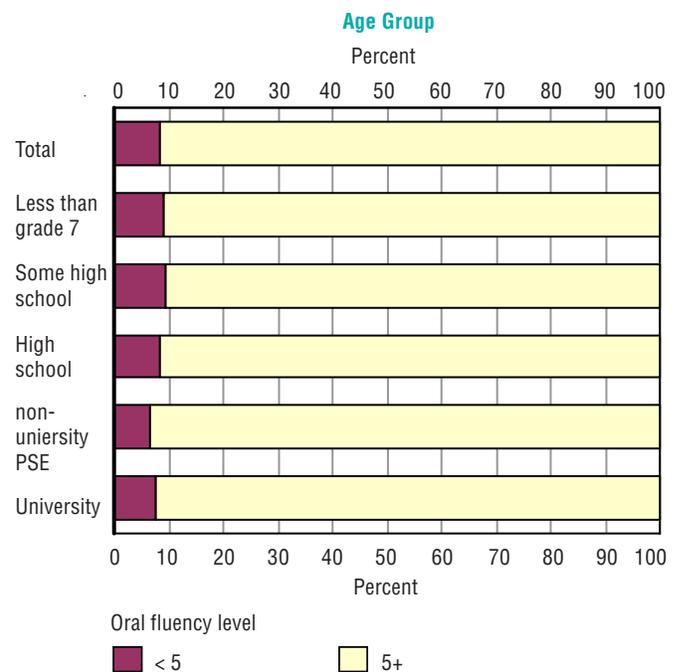


Figure 3.24

Proportion of the population with oral fluency scores less than Level 5, adults aged 16 and over by educational attainment, Canada, 2005



The figure reveals a steady decline in the risk of having weak oral fluency skills with rising educational attainment. Somewhat out of pattern the risk of having low oral fluency skills rises slightly for university educated adults.

The following Figure provides a sense of the relative level of risks faced by various population sub-groups. In this case risk is defined in terms of having a prose literacy proficiency level lower than that identified in the Essential Skills profiles for their occupation. Adults whose skill levels are lower than their ES reading text profile are labeled as being in literacy skill shortage.

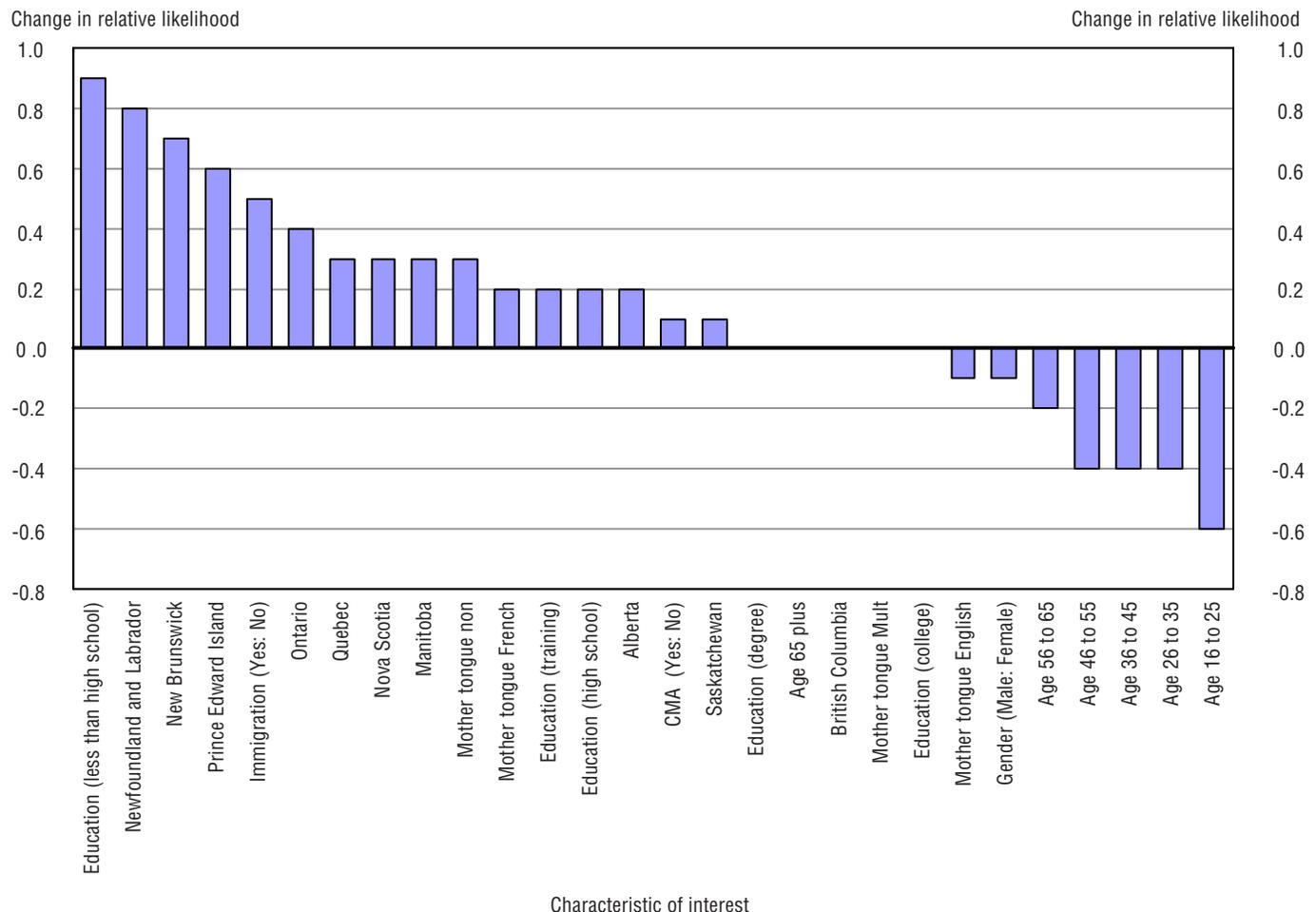
It is possible that the apparent relative disadvantage of certain demographic groups is attributable to a combination of variables. For example, the high level of risk faced by immigrants might simply be a function of their lower levels of education or the fact that they are

The following Figure presents the relative risks of various groups being in literacy skill shortage after they have been adjusted for obvious differences in composition.

The Figure reveals a slight reduction in the risks faced by immigrants and no reduction for those adults with non-official language mother tongues when compared to unadjusted risks. This finding suggests that their disadvantage cannot be explained by either age or education. It would be simple to attribute the residual risk faced by immigrants to discrimination on the part of Canadian employers. Green and Riddell's analysis of IALSS data by have shown, however, that literacy and numeracy lie at the heart of this disadvantage - in fact low skills explain all of the relative labour market disadvantage being experienced by recent immigrants, despite them having higher levels of education than the Canadian-born, and than previous cohorts of immigrants (Green and Riddell, 2006).

Figure 3.25

Adjusted likelihoods of being in prose literacy shortage, selected characteristics, 2006

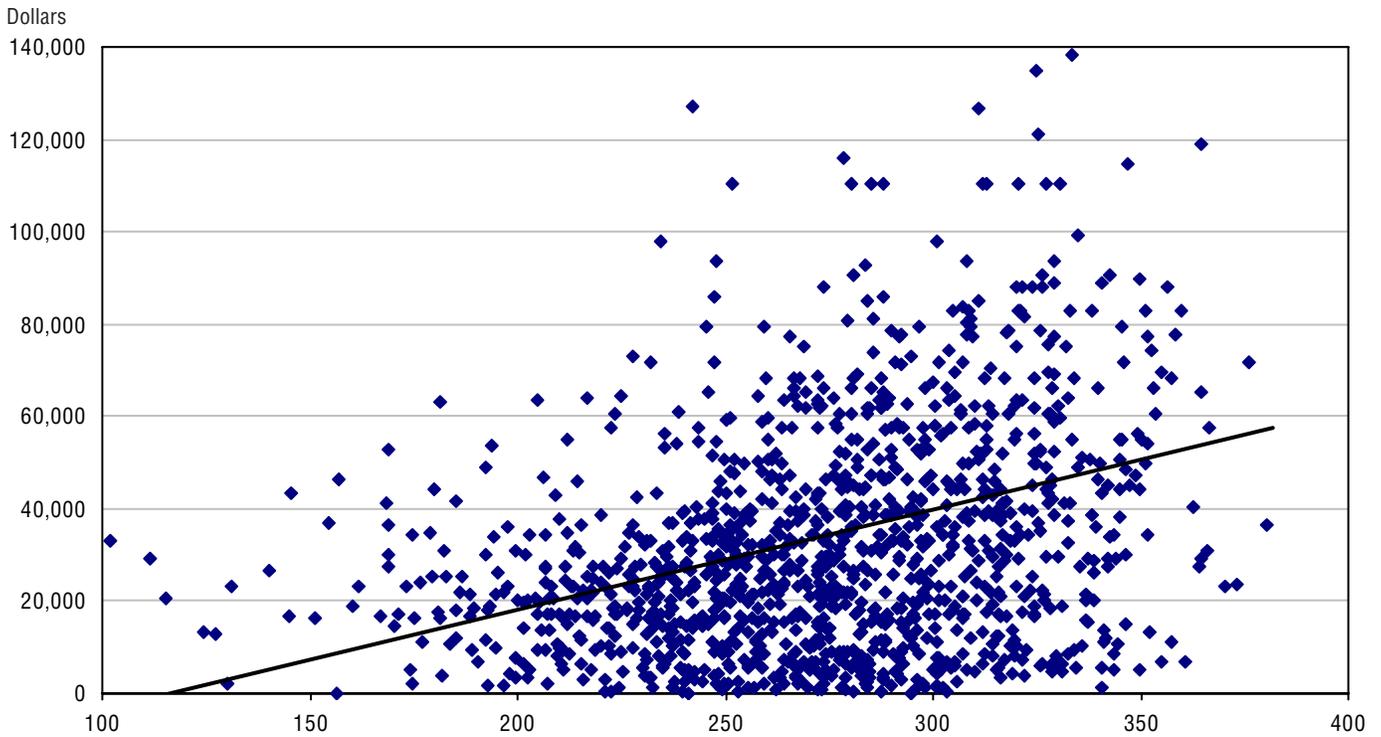


The foregoing sections reveal that adults whose mother tongues were other than English or French face much higher risks of having inadequate oral fluency skills than their official language skills irrespective of whether they are born in Canada or not. The next section of the

report explores whether Canadian employers recognize and reward oral fluency skill. More specifically, the next three Figures these differences in prose literacy and oral fluency translate into meaningful differences in earnings differences in annual earnings.

Figure 3.27

Annual earnings by prose literacy score, adults aged 16 and over, Canada, 2003

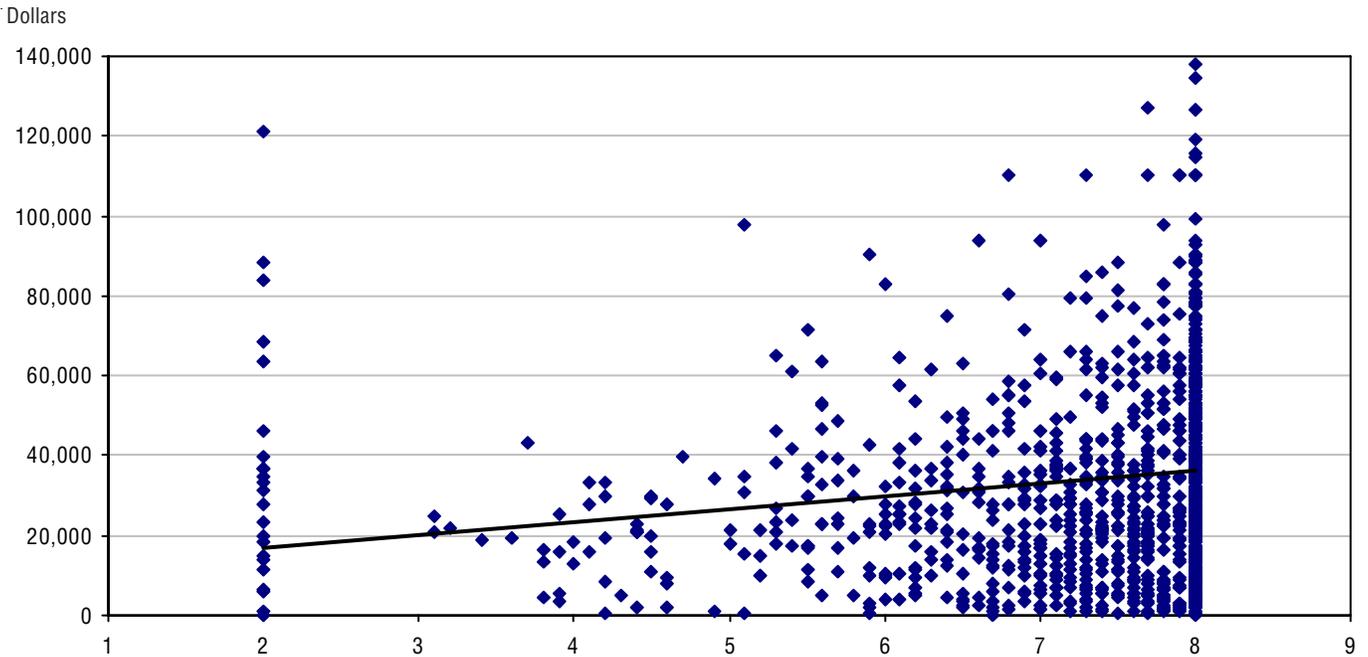


The figure reveals a strong relationship exists between prose literacy skill and earnings, a fact that suggests that employers are able to identify, value and reward prose skill. At a more abstract level this finding suggests that prose literacy skill is an economically productive asset.

Figure 3.28 plots annual earnings by oral fluency score.

Figure 3.28

Annual earnings by oral fluency score, adults aged 16 and over, Canada, 2003

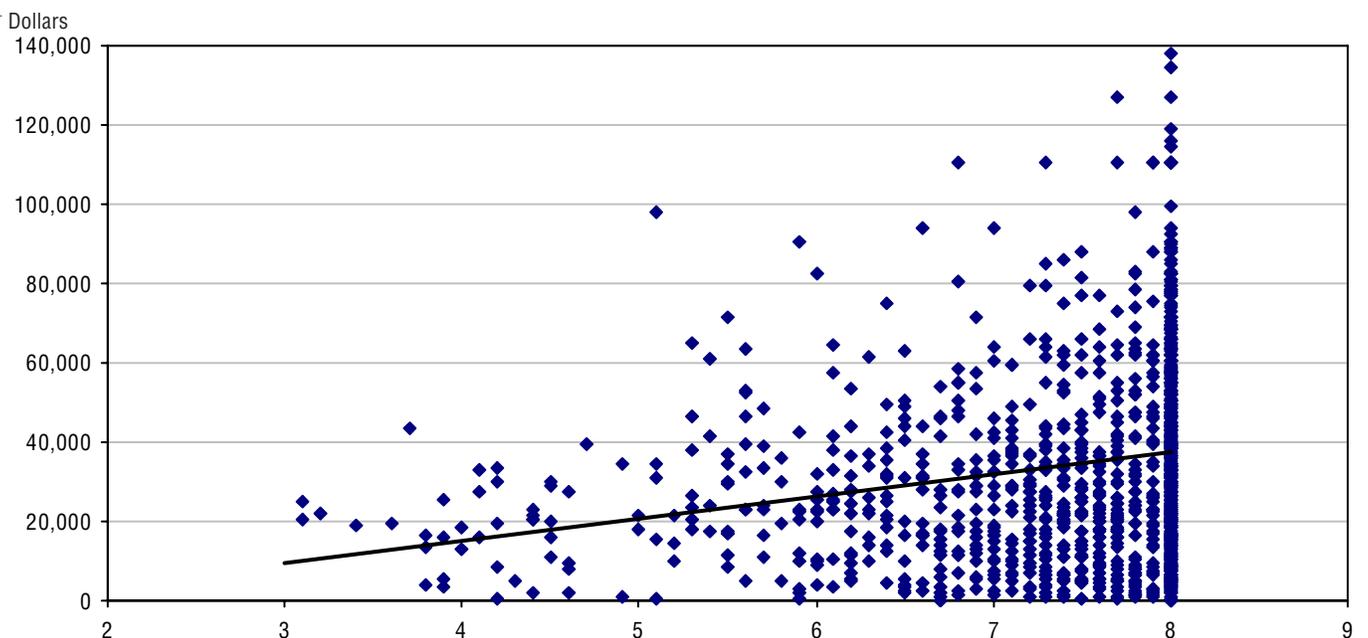


The Figure reveals that oral fluency and earnings are related but that the relationship is weaker than that observed between prose literacy and annual earnings.

Figure 3.28 plots the same annual earnings by oral fluency score but omits adults at Levels 1 and 2.

Figure 3.29

Annual earnings by oral fluency score at Level 3 and over, adults aged 16 and over, Canada, 2003



The Figure reveals the presence of a much stronger correlation between annual earnings and oral fluency as measured by the PhonePass assessment. Put simply, higher oral fluency scores are associated with large increases in annual earnings.

Regressions of earnings against prose and oral literacy controlling for demographic predictors

Common sense and the foregoing data suggest that both oral fluency and prose literacy are economically-productive assets that are recognized and rewarded by employers. The next section of the analysis presents the results of a regression analysis that attempts to isolate the independent effects of the two skills on employment and annual earnings.

Six separate regressions were undertaken that attempted to tease out the marginal impact of oral fluency upon employment and earnings, whilst controlling for a large number of background variables as specified below.

Dependent Variables

- Earnings (Yes/No) – Participation Rate-Logistic Regression
- Earnings (amount) – Normal Regression

Independent Variables

- The usual variables Plus:
- Prose Literacy only
- Oral Fluency only
- Prose Literacy & Oral Fluency

The results are summarized below.

Figure 3.30
The impact of oral fluency on employment and earnings, various specifications, Canada, 2005

	Usual variables		
	Plus: Oral Fluency only	Plus: Prose Literacy only	Plus: Prose Literacy and Oral Fluency
Logistic (Earnings Yes/No)	Oral is significant	Prose is significant	Prose and oral are both significant
OLS regression (Earnings level)	Oral is not significant	Prose is significant	Prose is significant and oral is not significant

Clearly, both prose literacy and oral fluency both matter to economic success. Both skills have a significant independent impact on employment. Unexpectedly oral fluency is not important to annual earnings whereas prose is. This result is partly attributable to the fact that adults with low oral fluency levels are much less likely to be employed and have earnings than their more orally-skilled peers. The result may also be attributable to the fact that the overwhelming majority of adult Canadians, including immigrants, have Level 5 or 6 oral fluency skill, a fact that provides little variance to explain.

This chapter has documented the distribution of oral fluency skill and its relationship to other economically-important skills. The analysis reveals that most adults, including immigrants, appear to have adequate oral fluency skill and oral fluency skill does not appear to be highly correlated prose literacy, document literacy or numeracy at the overall level. This finding can be attributed, in large part, to the fact that recent immigrants with non-official language mother tongues and Canadian born with non-official language mother tongues are the only two population sub-groups that seem to have oral fluency skills below Level 5. Recent immigrants with English or French as their mother tongue, immigrants who have been in Canada ten or more years and non-immigrants have a very high probability of having strong oral fluency skills.

The chapter has also explored the patterns of skill adequacy for four groups defined by immigrant status and official language status. The analysis reveals a very diverse pattern of skill by level across the skill domains. Although a significant number of adults have no apparent skill weakness in any of the four domains, a relatively small number of adults are weak in all four domains. Adults whose mother tongues are other than English and French, most both immigrants and Aboriginal Canadians, appear to face higher risks than other groups. Finally, the chapter profiles the demographic characteristics of adults with weak oral fluency. The analysis shows the expected relationship to age, immigrant status, aboriginal status and education. The analysis also confirms that weak oral and prose skills are associated with large differences in employment rates. Unexpectedly, the results suggest only prose literacy skill has an impact on annual earnings.

Chapter 4

What the IALSS CLB link reveals

The Canadian Language Benchmarks provide national standards in English and French for describing, measuring and recognizing second language proficiency of adult immigrants and prospective immigrants for living and working in Canada. The Benchmarks are described as practical, fair and reliable national standards of second language proficiency throughout Canada in educational, training, community and workplace settings. The availability of the data from the CLB/IALSS linkage study provides a unique opportunity to explore the reliability and fairness of the CLB benchmarks empirically.

About the Canadian Language Benchmarks

The Canadian Language Benchmarks (CLB) have been used by teachers in language training centers across Canada to provide practical, comprehensive and standardized learning objectives and evaluation guidelines. The Centre for Canadian Language Benchmarks promotes the recognition of the CLB tools in their quest to establish it as a national standard for describing, measuring and recognizing the importance of *English language proficiency* for adult immigrants and prospective immigrants. The CLB focuses primarily on English language proficiency as a tool to communicate in common everyday life and work situations. For immigrants and prospective immigrants, as for native-born Canadians, language proficiency in an official language of the country is key to living well in Canada.

In economic terms, the Canadian Language Benchmarks serve to improve the speed and success of immigrants' social and economic integration. Language proficiency in fact plays a major role in immigrant integration. In recent years, studies have shown that Canadian immigrants with higher levels of language and literacy skills have more chances of being employed; they generally have better remuneration and are also more likely to work in their field of expertise (Ferrer et al., 2004). Indeed, a substantive portion of immigrants would even benefit more than would native-born Canadians from higher English skill levels (Bonikowska et al., 2008).

Educationally the Benchmarks are meant to improve the quality and focus of instructional and evaluation practice.

The CLB provides proficiency scales and associated proficiency levels for speaking, listening, reading and writing. A learner's proficiency level is assumed to develop along a continuum which is presented in the CLB framework as three consecutive stages of progression: I (Basic), II (Intermediate), and III (Advanced). Each of these progression stages are comprised of four levels of ability, or benchmarks, for a total of 12 benchmarks associated with each specific language skill.

In CLB, oral Communication pertains primarily to the use of speech to give and exchange thoughts and information by workers in an occupation. **Four levels** of complexity based on **four dimensions** of oral communication:

- the range and complexity of communication functions, i.e., why and how one communicates;
- the range and complexity of the information about which one communicates;
- the range and complexity of the communication context, i.e., to whom and in what circumstances one communicates; and
- the risk level in failing communication intent, i.e., how serious are the consequences if communication fails.

Each level of the CLB oral communication scale is defined with reference to all four dimensions. Tasks that are more difficult on one dimension of the complexity rating scale may be more or less difficult on the others as the four dimensions function somewhat independently. For example, the complexity of "range and complexity of information" may fit in Level 2 while the complexity of "risk levels in failing communication intent" fits in Level 3. The complexity rating assigned to a task is the best summary description of its level of complexity.

About the CLB/IALSS Linkage Study

The CLB/IALSS study was undertaken by Statistics Canada, HRSDC and CIC to shed light on the relationships between CLB and IALSS proficiency levels. The basic design involved having a sample of 1,000 relatively young and educated respondents with known CLB levels take the IALSS document and numeracy assessments. Both the CLB-PT and the IALSS literacy assessments were administered through Language Instruction for Newcomers to Canada (LINC) at participating centres across Canada. Participants were immigrants and new Canadians being evaluated for placement in English language training programs.

There are many variations of the CLB instruments: this study assessed participants using the Canadian Language Benchmark Placement Test (CLB-PT) versions 1 and 2. The CLB-PT evaluates four different language skills..

About Essential Skills and the Essential Skills Profiles

Essential Skills are defined as the skills needed for work, learning and life. Essential skills are thought to provide the foundation for learning all other skills and to enable people to evolve with their jobs and adapt to workplace change.

In economic terms, the Essential Skills Profiles define the level of demand that is associated with satisfactory job performance in Canadian occupations.

In educational terms, the Profiles can be thought of as providing educators with a set of real benchmarks against which the skills of their learners can be compared.

The Canadian framework identifies nine Essential Skills:

- Reading Text
- Document Use
- Numeracy
- Writing
- Oral Communication
- Working with Others
- Continuous Learning
- Thinking Skills
- Computer Use

Essential Skills profiles have been developed for most occupations of the *National Occupational Classification*. Each profile identifies the level of skill associated with satisfactory job performance

The current analysis is focuses on a subset of the Essential Skills and their associated complexity ratings i.e. reading text, document ruse, numeracy and oral communication.

The following tables present the proposed concordances between CLB and IALSS prose and document scales based upon a conceptual comparison of the two frameworks.

Figure 4.1

Notional concordance between CLB reading levels and IALSS prose literacy/ES reading text levels

CLB Levels	CLB STAGE 1				CLB STAGE 2				CLB STAGE 3			
	1	2	3	4	5	6	7	8	9	10	11	12
					ES Level 1 of 4							
						ES Level 2 of 4						
									ES Level 3 of 4			
											ES Level 4 of 4	

Figure 4.2

Notional concordance between CLB document use levels by IALSS document literacy/ES document use levels

CLB Levels	CLB STAGE 1				CLB STAGE 2				CLB STAGE 3			
	1	2	3	4	5	6	7	8	9	10	11	12
					ES Level 1 of 4							
						ES Level 2 of 4						
								ES Level 3 of 4				
										ES Level 4 of 4		

Figure 4.3

Observed concordance between CLB proficiency levels and IALSS/ES levels

IALSS	CLBPT	Benchmarks										
		0	1	2	3	4	5	6	7	8		
Document	Reading	Level 1 IALSS		Level 2 IALSS			Level 3 IALSS		Level 4 IALSS			
Document	Listening	Level 1 IALSS		Level 2 IALSS			Level 3 IALSS		Level 4 IALSS			
Document	Writing	n/a	Level 1 IALSS		Level 2 IALSS			Level 3 IALSS		Level 4 IALSS		
Prose	Reading	Level 1 IALSS		Level 2 IALSS			Level 3 IALSS		Level 4 IALSS			
Prose	Writing	n/a	Level 1 IALSS		Level 2 IALSS			Level 3 IALSS		Level 4 IALSS		
Prose	Listening	Level 1 IALSS		Level 2 IALSS			Level 3 IALSS		Level 4 IALSS			

The following concordance Figure summarizes an analysis of the CLB/IALSS data undertaken by Plouffe and Cartwright using provisional IALSS item parameters (Statistics Canada, 2009).

Although the Figure reveals the expected relationship – that skill increases in an orderly way across levels - the empirically observed concordance does not match the theoretically predicted concordance. More specifically, one sees considerable classification error at the boundaries between levels. The following Figure identifies where the apparent misclassification appears.

Figure 4.4

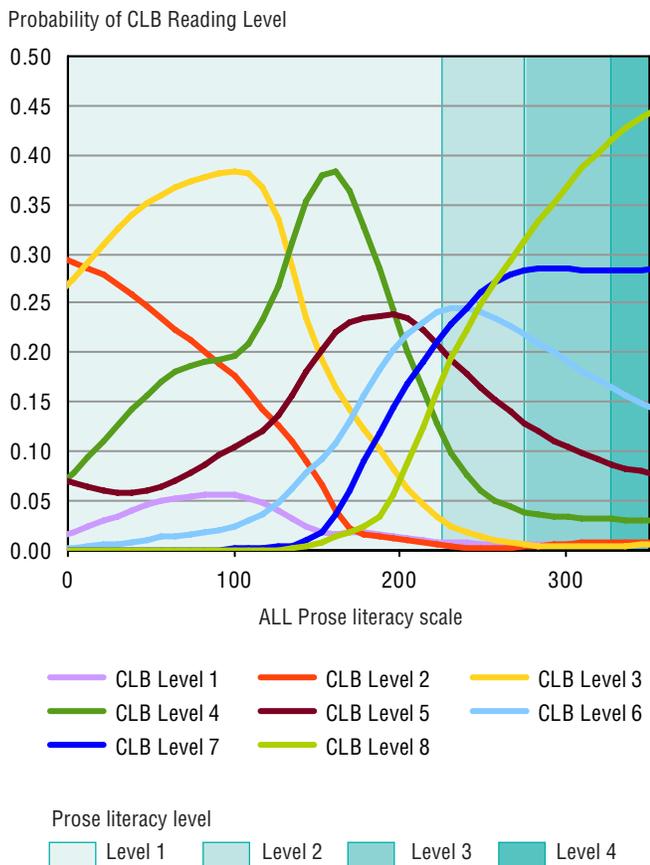
A comparison of predicted and observed concordance of IALSS and CLB proficiency levels, LINC participants, 2005

IALSS/CLB scale	Conceptual range (IALSS=CLB)	Observed range (IALSS=CLB)	Observed misfit
Document/ Reading	1=3 -5	1=0 -5	CLB 0, 1 and 2
	2=5 -6	2=6 -7	CLB 5, CLB 7
	3=7 -8	3=8	CLB 7
Prose/ reading	1=3 -5	3=0 -3	CLB 0, 1 and 2
	2=6	2=4 -6	CLB 4, 5
	3=7 -8	3=7, 8	-

The IALSS proficiency levels employed in the foregoing analysis were based upon provisional item parameters with the result that some of the observed misfit might be the result of classification error in the IALSS estimates.

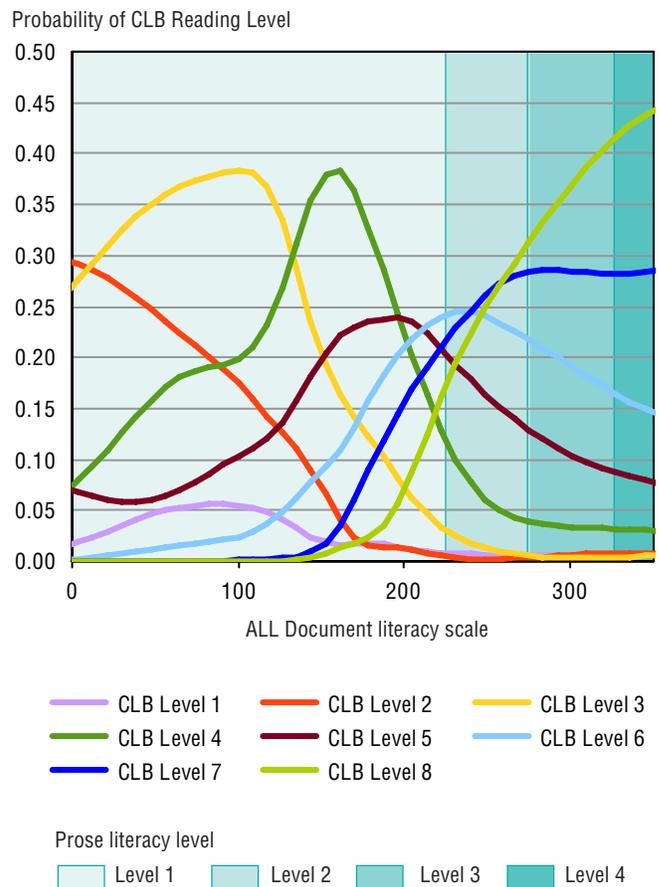
The following Figures plot, for each CLB reading level, the distribution of scores on the IALSS prose and document scales using more precise IALSS scores that have been based on the final IALSS item parameters.

Figure 4.5
The distribution of CLB reading scores by IALSS prose literacy scores, LINC participants, 2005



Source: Analysis using the CLB IALSS linked file with final IALSS item parameters.

Figure 4.6
The distribution of CLB reading scores by IALSS document literacy scores, LINC participants, 2005



Source: Special analysis by the authors using the CLB IALSS linked file.

Two examples help illustrate what these plots reveal. According to the predicted relationship between CLB and IALSS scales scores for CLB Level 3, plotted in bright yellow, should be clustered in IALSS Level 1. The figure shows that this group actually has scores that range from zero to 275 on the IALSS prose scale, a range that covers the full score range of IALSS Levels 1 and 2. Similarly, according to the predicted relationship between CLB and IALSS CLB Level 7, plotted in dark green, should all have IALSS scores above 275. In reality this CLB level displays IALSS scores that range from 125 to 350 with a significant proportion of scores falling below 275.

Thus, the Figures confirm the relationships documented in the earlier Statistics Canada analysis i.e. each CLB level includes adults who exhibit a broad range of IALSS skill.

In testing terms, test takers with CLB scores outside of the score ranges that define IALSS proficiency levels can be considered to be errors. Testing defines two types of such error – Type I and Type II (see box)

In statistical hypothesis testing, there are two types of errors that can be made (incorrect conclusions) that can be drawn. To understand these, consider the case where a learner is being tested for their reading level. Typically, the null hypothesis is that he or she has skill at a given level, while the alternative hypothesis is that they have skill in another level. If the null hypothesis is rejected when it is in fact true (and the test taker is at the level), this is called a **Type I error**. In this example, because the test's results suggest higher or lower skill (i.e., do not reject the alternative hypothesis of skill being at a level), it is also known as a "false positive." On the other hand, a **Type II error** occurs when a null hypothesis is not rejected despite being false. In this case, it is a "false negative," giving the test-taker a false illusion of skill.

The Greek letter α is used to denote the probability of type I error, and the letter $\hat{\alpha}$ is used to denote the probability of type II error.

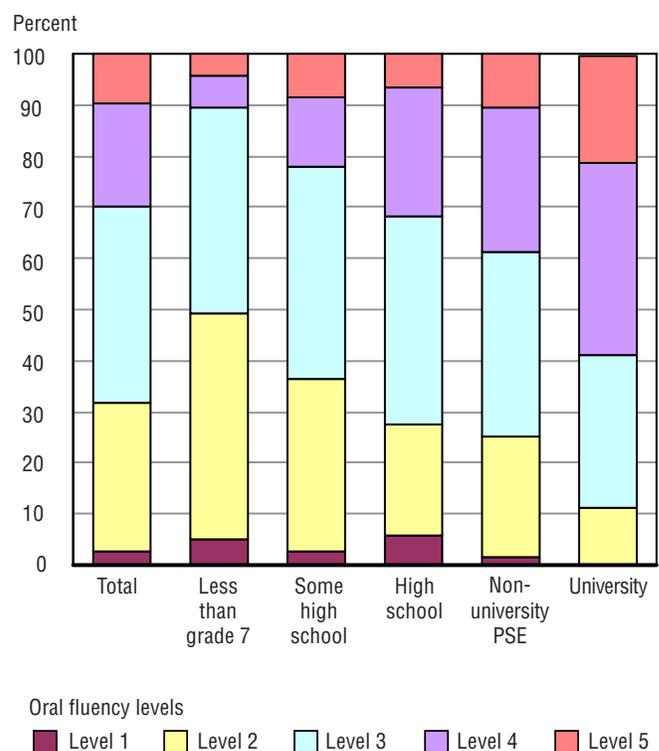
These findings carry important implications for the interpretation and use of the Benchmarks.

In statistical terms these results imply that CLB levels are very poor predictors of someone's actual skill level. This characteristic does not necessarily impair the utility of the Benchmarks for instructional purposes, which is what the CLB is primarily designed to do. Instructors tend to use test results as approximations of students actual skill levels and are able to adjust their instruction as needed. The apparent unreliability of the CLB classification would, however, greatly impair the utility of the Benchmarks for labour market purposes; and this is an important consideration in exploring the CLB's potential for expanded application as a labour market assessment tool, if this were desired. The utility of any credential depends upon the degree to which it can be trusted as a reliable indicator of someone's skill at the level demanded. This latter condition is an important one – both labour market theory and the available empirical evidence suggests that there are significant costs associated with misfits between skill demand and supply on both the over and under-qualification side (Riddell and Green, 2008; DataAngel, 2010).

The IALSS dataset provides a sense of the level of oral fluency skill demanded by jobs in the Canadian labour market using the Essential Skills proficiency levels.

The following Figure plots the overall level of oral fluency skill demand as indicated in the Essential Skill profile for employed workers and how the distribution of oral fluency demand varies the education level of the incumbent workers. This work builds on a series of literacy segmentation analyses undertaken by DataAngel for HRSDC and seven of the provinces and territories (DataAngel, 2010). Demand levels are defined by the prose literacy skill level associated with each occupation in the ES profile at the occasional or complex level.

Figure 4.8
Proportions of employment by proficiency level demanded by education level, oral fluency, adults aged 16 and over, Canada, 2003



The figure reveals that 35% of all jobs require Level 2 oral fluency, 46% require level 3 and 18% require level 4.

The differences in the distribution of demand by level among the different levels of educational attainment suggests that the labour market does a reasonable good job of sorting adults with lower levels of education into jobs that demand lower levels of oral fluency.

The following series of figures plots the same distributions of demand for four population sub-groups defined by immigrant status and mother tongue.

Figure 4.9

Proportions of employment by proficiency level demanded by education level, oral fluency, official language immigrant adults aged 16 and over, Canada, 2003

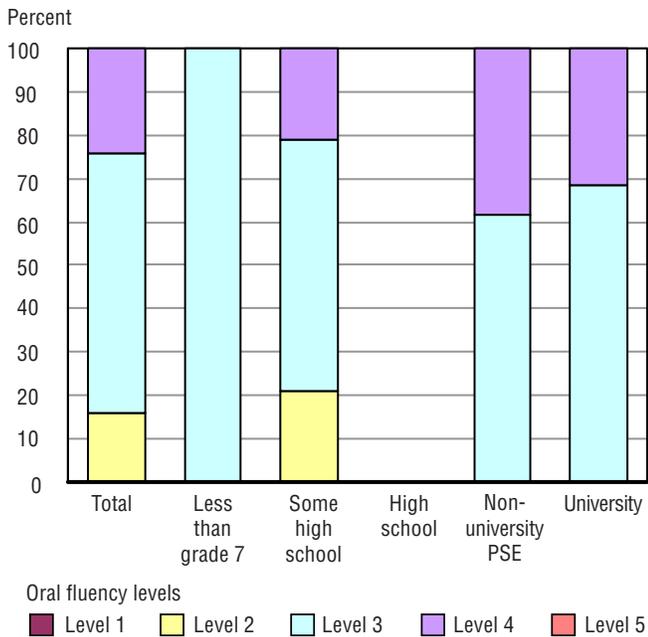


Figure 4.11

Proportions of employment by proficiency level demanded by education level, oral fluency, Canadian born adults with English and French mother tongues aged 16 and over, Canada, 2003

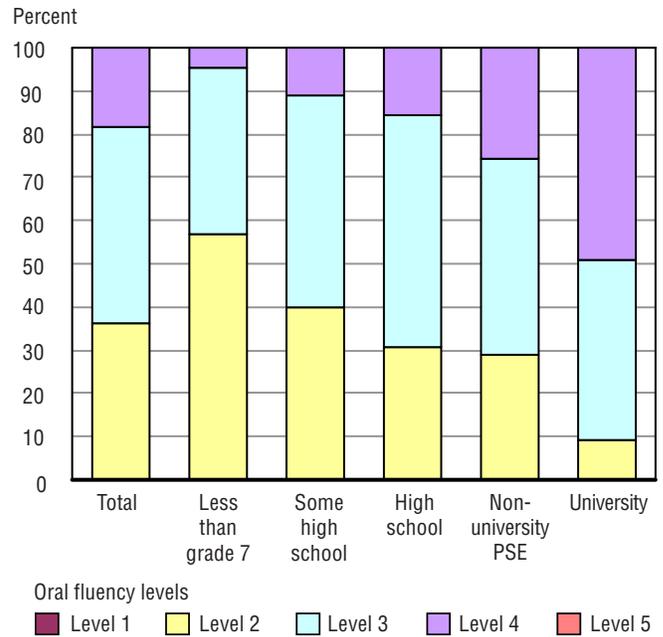


Figure 4.10

Proportions of employment by proficiency level demanded by education level, immigrants with non-English or French mother tongues, oral fluency, adults aged 16 and over, Canada, 2003

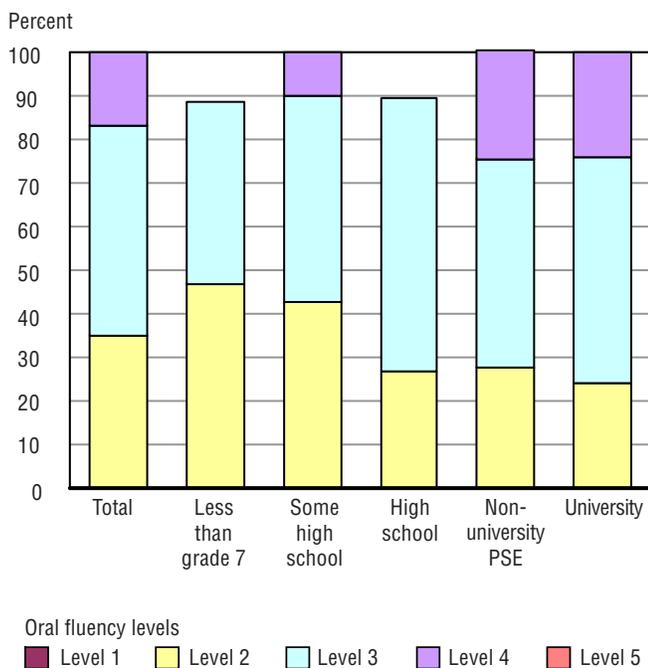
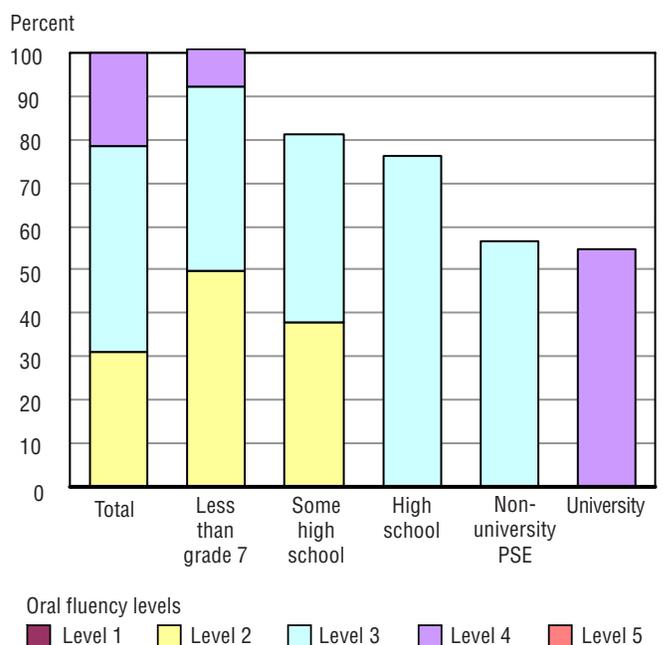


Figure 4.12

Proportions of employment by proficiency level demanded by education level, oral fluency, Canadian born adults with non-official language mother tongues aged 16 and over, Canada, 2003



Source: IALSS, 2005.

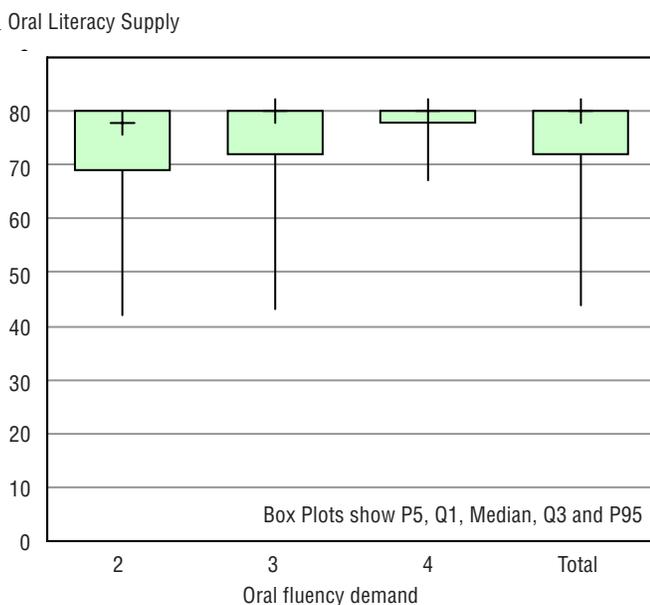
The figures reveal that immigrants with English and French as a mother tongue and non-immigrants with other than English and French as a mother tongue face slightly different demand profiles than their peers.

These charts reveal that the overwhelming majority of immigrants work in occupations that demand relatively high levels of skill, a finding that is in keeping with their relatively high level of education.

The next figures plot the occupational demand for oral fluency skill indicated in the Essential Skills Profiles by the distribution of skill observed in the PhonePass results.

If one assumes, for the sake of argument, that the scales are measuring the same thing, and that they both cover approximately the same range of skill, then it is clear that the distribution of PhonePass scores are truncated at every level of oral fluency demand. Moreover, the degree of truncation seems to rise with increasing demand. Notwithstanding these results, however, the PhonePass does identify population subgroups at demand Levels 2 and 3, amounting to roughly 20% of the population in those jobs, who have a discernable weakness in their PhonePass oral fluency. Ensuring the rapid and successful labour market integration of these immigrants would seem to require higher levels of skill than the CLB is delivering.

Figure 4.11
Occupational skill demand for prose literacy by IALSS prose literacy skill, by proficiency level, Non-official language immigrants, Canada, 2003



Source: IALSS, 2003

CLB vs PhonePass Oral fluency

The study also offers a means to indirectly compare the distribution of oral fluency generated by the CLB to that observed in the ISRS oral fluency test. This latter analysis is tricky because the CLB sample is relatively small and, more importantly, is not representative of the adult population. Valid comparison of the two data sets requires matching the ISRS sample to the CLB/IALSS sample. As set out below the CCLB has proposed a concordance table between CLB speaking and listening and ES/IALSS/ISRS oral fluency proficiency levels. The proposed analysis would document the degree to which the empirical evidence confirms the assumed concordance for CLB and IALSS/ES/ISRS oral fluency scales and sub-scales.

CLB Speaking by ES oral fluency/ISRS oral fluency

	CLB STAGE 1				CLB STAGE 2				CLB STAGE 3			
CLB Levels	1	2	3	4	5	6	7	8	9	10	11	12
					ES Level 1 of 4							
						ES Level 2 of 4						
									ES Level 3 of 4			
											ES Level 4 of 4	

CLB Listening by ES oral fluency/ISRS oral fluency

	CLB STAGE 1				CLB STAGE 2				CLB STAGE 3			
CLB Levels	1	2	3	4	5	6	7	8	9	10	11	12
					ES Level 1 of 4							
						ES Level 2 of 4						
									ES Level 3 of 4			
											ES Level 4 of 4	

The sample in the CLB-IALSS linkage study was sufficiently unique as to preclude comparison to the ISRS oral fluency measures.

Chapter 5

Summary and Conclusions

This study explored the distribution of oral fluency skill in Canada and how it relates to skill in other Essential Skill domains for which population skill distributions are available: prose literacy, document literacy and numeracy. Chapter 1 introduces the policy issues that motivated the research.

Chapter 2 provides a synthesis of what the research literature reveals about oral fluency and its relationship to literacy for various groups of learners: typical first language learners, atypical first language learners, typical second language learners and atypical language learners. The synthesis reveals that most children manage to acquire language with little effort using processes that primarily engage the left hemisphere. Acquisition does not appear to depend to a great extent upon phonetic mastery. In contrast fewer children acquire literacy as it appears to depend much more on formal instruction. Literacy acquisition has been shown to depend on phonetic mastery to a greater extent than the acquisition of language. Interestingly, literacy engages the right hemisphere of the brain and there is evidence that good readers develop strategies that engage both hemispheres of the brain. This latter effect seems to have a positive effect on function in both skill domains. The fact that the overwhelming majority of Canadian adults, including a significant proportion of immigrants with non-official language mother tongues, score in the highest two levels of the PhonePass oral fluency assessment suggests that the test fails to discriminate in the upper regions of this skill domain.

Chapter 3 explores the relationships between oral fluency and prose literacy, document literacy and numeracy. Interestingly, oral fluency is not highly correlated with skill in the other domains at the overall level. An analysis of the patterns of strength and weakness reveals that 84% of the total population, an estimated 16,750,000 adults, fall into only 4 groups:

7,900,000, or roughly 40% of the population, have no apparent weakness in any skill domain

1,700,000, or 9% of the adult population, are weak in every skill domain.

An additional 4,200,000, or 21%, have adequate oral fluency skills but weak skills in all three other domains.

2,950,000, or roughly 15%, of all adults have adequate oral, prose and document skills but weak numeracy skills.

The remaining 16% of the population display variable patterns of strength and weakness.

Additional analysis reveals that immigrants and non-immigrants with mother tongues other than English or French are much more likely to have oral fluency skills below Level 5. Low levels of education also translate into higher levels of risk of weak oral fluency scores. The analysis shows the expected relationship to age and aboriginal status. The analysis also confirms that weak oral and prose skills are associated with relatively small differences in employment rates. Those adults who are in the labour force are more likely to have weak oral fluency scores. Unexpectedly, the results suggest only prose literacy skill has an impact on annual earnings. Restricting the analysis to the two populations that face a high probability of having weak oral fluency scores – recent immigrants with non-official languages and Canadian born adults with non-official language mother tongues – suggests that oral fluency does have economic value.

Chapter 4 used data from the CLB/IALSS link to explore the relationship between CLB proficiency levels and IALSS prose and document literacy proficiency levels. The evidence presented suggests that the observed alignment of CLB and IALSS levels differs from the notional alignment proposed on the CLB website. The empirical analysis presented also shows that the CLB levels are clustered in the lower regions of the IALSS scales. Together, these findings raise concerns about the utility of the CLB reading benchmarks for labour market purposes. A comparison of the Essential Skills occupational demand levels for oral fluency to the distribution of oral fluency skill amplifies these concerns.

If confirmed by additional research, the results presented in this report are of import for policy. Although the PhonePass results suggest that a small proportion of adults have weak oral fluency skills those that do are concentrated in population sub-groups that have also been shown to have literacy skills that impair their relative labour market success. Non-official language immigrants and Aboriginal adults with mother tongues other than

English and French appear to face the highest levels of combined risk in oral fluency and reading. The fact that the CLB reading benchmarks appear to only discriminate in the lower regions of the IALSS scales and that they appear to be subject to very large classification errors would limit their utility as reliable indicators for employers. Even recent immigrants work in jobs that demand much higher levels of oral and reading skill than their tested CLB levels, a finding that places these workers at a serious disadvantage in Canadian skill-biased labour markets.

Confirming these findings will depend upon administering the IALSS prose literacy, document literacy and numeracy measures, and the ISRS reading component and oral fluency measures to a much larger, more representative sample of recent immigrants for whom CLB scores are available. The data from such a study would allow for a much more reliable equating of the CLB, IALSS and ES proficiency scales.

Three research projects are currently underway that will provide some of the requisite data.

The Social Research Demonstration Corporation (SRDC) is currently designing an intervention study involving workers in the food and accommodation industry. Workers will have their oral fluency, document literacy and numeracy tested and those found to have skills below the needed levels will be randomly assigned to receive remedial training. Participants will be re-tested at program exit and a year after program exit to allow the estimation of skill gain. As most of the targeted workers will be non-official language immigrants for whom CLB scores are available, these data can be used to equate the CLB and IALSS/ES oral, document and numeracy scales.

Bow Valley College is developing and validating a web-based assessment system for oral fluency, prose literacy, document literacy, numeracy and reading components. The validation sample will contain a sufficient number of adults for whom CLB scores are available to equate the CLB and IALSS/ES oral fluency, reading and reading scales.

The third project is being undertaken by the Association of Community Colleges of Canada in cooperation with several of ACCC's college members. The project will involve the provision of remedial instruction provided to workers and/or college students. Workers will have their oral fluency, document literacy and numeracy tested and those found to have skills below

the needed levels will receive remedial training. Participants will be re-tested at program exit and a year after program exit to allow the estimation of skill gain. As some of the targeted workers will be non-official language immigrants for whom CLB scores are available, these data can also be used to equate the CLB and IALSS/ES oral, document and numeracy scales.

The analysis of PhonePass results presented in this volume suggest the presence of a ceiling effect, a finding that implies that the tool measures only the lower regions of the full oral fluency range. The presence of the ceiling effect will limit the utility of the PhonePass tool for establishing skill gain associated with Enhanced Language Training for immigrants destined for jobs that demand ES Level 4 oral fluency. The PhonePass tool can, however, be used to identify adults in needs of language upgrading who are destined for jobs that demand ES Level 2 and 3 oral fluency.

The oral fluency data available from the CLB/IALSS linkage does not provide much insight into how the CLB oral fluency scales relate to the PhonePass scales or to the Essential Skills demand levels. It would be useful to administer the PhonePass test to a sufficiently large sample of adults for whom CLB oral scores exist, ideally LINC and ELT participants.

It would also be useful to administer the PhonePass and CLB oral fluency tests to a sample of federal workers with known advanced speaking and listening levels. The federal governments language assessments are valid, reliable, precise and, importantly for the current context, cover the full range of oral fluency skill. Such data would shed light on the how far up the scale the PhonePass is able to discriminate oral fluency skill.

To move forward, the literature reviewed in this volume suggests that future research should focus less on phonemic awareness which has created an adult population of second language learners that are good decoders, but has struggled to help this population in other areas of language acquisition. Research should investigate and create a system that utilizes oral language to help adult learners become not only improved decoders, but improved comprehenders and composers of literacy. This would involve:

- Focussing on the connection between oral language acquisition and programs that improve oral language and literacy in both first and second languages.
- Focussing on key factors explored in the typical and atypical oral language acquisition literature.

- Focussing on on-line programming for adult language and literacy learners who can not attend classes due to time, money, family obligations, etc.
- Create high interest, job specific, computer, text-based assessment and instructional modules that match with the learner's life agendas.

Failure to do so will result in outcomes similar to those found by Whitehouse (2009). Whitehouse conducted a longitudinal study of young adults who had participated in language-based research as children. He compared their psycho-social outcomes. It was found that the SLI group was the one most likely to pursue vocations and vocational training that did not require high levels

of verbal language or literacy ability, thereby creating a working class with limited oral and written language skills. These findings exemplify the case Stanovich makes with the Matthew effect. If we fail to understand depth and breadth of the connections between adult oral language and literacy, we will continue to watch the literacy-rich get richer and literacy-poor get poorer.

At a more general level there is a need for research that focuses on the joint acquisition of language and literacy in adults, particularly as it relates to L1 and L2 language learners and how language acquisition and literacy acquisition interact synergistically as learners move up the proficiency scales.

Annex A

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Annex B

Statistical Tables

Table 3.0.A

Proportion correct on the spelling component by book reading frequency, English, Canada excluding Territories, population aged 16 to 65, 2005

	Book reading frequency							
	Never		Rarely		Less than once a week		At least once a week	
	percent	standard error	percent	standard error	percent	standard error	percent	standard error
Spelling								
Component proportion correct								
Less than 0.6	21.9	(6.5)	10.5	(3.8)	F	F	5.5	(2.4)
0.6 to 0.8	25.0	(5.3)	16.1	(4.8)	6.8	(1.7)	5.4	(1.2)
Greater than 0.8	53.1	(6.3)	73.4	(6.5)	89.9	(2.1)	89.1	(2.0)

F too unreliable to be published

Table 3.0.B

Proportion correct on the spelling component by book reading frequency, French, Canada excluding Territories, population aged 16 to 65, 2005

	Book reading frequency							
	Never		Rarely		Less than once a week		At least once a week	
	percent	standard error	percent	standard error	percent	standard error	percent	standard error
Spelling								
Component proportion correct								
Less than 0.6	23.0	(3.9)	12.8	(4.3)	10.7	(3.4)	6.5	(1.7)
0.6 to 0.8	28.1	(4.5)	25.0	(4.8)	18.2	(4.8)	11.3	(2.2)
Greater than 0.8	48.8	(6.2)	62.2	(6.1)	71.1	(4.6)	82.2	(2.9)

F too unreliable to be published

Table 3.1**Oral fluency score distributions by literacy market segments, adults aged 16 and over, Canada, 2005**

Overall oral fluency	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6
	A1	A2	B1	B2	C	D
Median	46		51		69	78
Q1	41		44		60	73
P5	20		36		42	59
P95	80		79		80	80
Q3	65		68		77	80
N	67	10	60	9	309	427

Table 3.2**Repeat fluency score distributions by literacy market segments, adults aged 16 and over, Canada, 2005**

Repeat fluency	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6
	A1	A2	B1	B2	C	D
Median	65		57		78	80
Q1	36		37		65	80
P5	30		30		28	59
P95	80		80		80	80
Q3	80		80		80	80
N	67	10	60	9	309	427

Table 3.3**Pronunciation score distributions by literacy market segments, adults aged 16 and over, Canada, 2005**

Pronunciation subscore	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6
	A1	A2	B1	B2	C	D
Median	52		43		72	80
Q1	34		41		57	80
P5	32		37		41	56
P95	80		80		80	80
Q3	74		77		80	80
N	67	10	60	9	309	427

Table 3.4**Repeat accuracy score distributions by literacy market segments, adults aged 16 and over, Canada, 2005**

Repeat accuracy	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6
	A1	A2	B1	B2	C	D
Median	49		44		61	67
Q1	42		37		51	61
P5	29		33		24	50
P95	71		72		80	80
Q3	58		52		72	76
N	67	10	60	9	309	427

Table 3.5**Oral fluency score distributions by literacy market segments, Non-official language immigrant adults aged 16 and over, Canada, 2005**

Overall Oral Fluency	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6
	A1	A2	B1	B2	C	D
Median	0	40	0	59	68	77
Q1	0	39	0	46	56	66
P5	0	38	0	34	43	57
P95	0	55	0	65	79	80
Q3	0	53	0	60	74	80

Table 3.6**Oral fluency score distributions by literacy market segments, Canadian-born non-official language adults aged 16 and over, Canada, 2005**

Overall oral fluency	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6
	A1	A2	B1	B2	C	D
Median	41	0	44	0	65	80
Q1	37	0	40	0	56	75
P5	31	0	36	0	50	63
P95	46	0	79	0	80	80
Q3	44	0	52	0	69	0

Table 3.7**Oral fluency score distributions by literacy market segments, Canadian-born official language adults aged 16 and over, Canada, 2005**

Overall oral fluency	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6
	A1	A2	B1	B2	C	D
Median	63	0	66	0	74	80
Q1	56	0	54	0	67	77
P5	20	0	48	0	49	67
P95	80	0	80	0	80	80
Q3	66	0	70	0	80	80

Table 3.8**Oral fluency score distributions by literacy market segments, official language immigrant adults aged 16 and over, Canada, 2005**

Overall oral fluency	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6
	A1	A2	B1	B2	C	D
Median	0	55	0	68	77	80
Q1	0	55	0	58	42	79
P5	0	55	0	58	42	60
P95	0	55	0	68	80	80
Q3	0	55	0	68	79	80

Table C.12**Prose literacy Level 1 and 2 proficiency level by oral fluency proficiency level by, adults aged 16 and over, Canada, 2003**

	Prose			
	20 to 45	46 to 62	63 to 71	72 to 80
	Number			
Total	881,302	743,637	753,719	17,240,250
Level 1	568,433	253,101	236,690	967,410
Level 2	251,365	273,868	331,919	4,339,911
Level 3	38,181	205,548	101,379	7,846,789
Level 4/5	23,324	11,120	83,731	4,086,139
	Percent			
Total	22	18	18	422
Level 1	14	6	6	24
Level 2	6	7	8	106
Level 3	1	5	2	192
Level 4/5	1	0	2	100

Table D.1**Document literacy Level 1 and 2 proficiency level by oral fluency proficiency level by, adults aged 16 and over, Canada, 2003**

	Document			
	20 to 45	46 to 62	63 to 71	72 to 80
	Number			
	881,302	743,637	753,719	17,240,250
Level 1	467,330	253,824	194,801	1,283,516
Level 2	314,972	298,561	325,314	4,562,784
Level 3	75,677	128,175	166,920	7,846,495
Level 4/5	23,324	63,077	66,684	3,547,455
	Percent			
Total	25	21	21	486
Level 1	13	7	5	36
Level 2	9	8	9	129
Level 3	2	4	5	221
Level 4/5	1	2	2	100

Table D.3

Numeracy Level 1 and 2 proficiency by oral fluency proficiency level by, adults aged 16 and over, Canada, 2003

	Numeracy			
	20 to 45	46 to 62	63 to 71	72 to 80
	Number			
Total	881,302	743,637	753,719	17,240,250
Level 1	6,391,90	350,955	315210	2,552,497
Level 2	170,010	182,097	269998	5,384,251
Level 3	53,650	205,898	80732	6,144,375
Level 4/5	18,453	4,687	87779	3,159,127
	Percent			
Total	28	24	24	546
Level 1	20	11	10	81
Level 2	5	6	9	170
Level 3	2	7	3	194
Level 4/5	1	0	3	100

Table 3.17

Combinations of proficiency level across skill domains, oral fluency, prose literacy, document literacy and numeracy by immigrant status and mother tongue, adults aged 16 and over, 2005

Vector of oral fluency, prose, document and numeracy proficiency levels	Percent Distribution if N >= 40					Total
	Population	Immigrants with English or French mother tongues	Immigrants with other mother tongues	Non-immigrants with English or French mother tongues	Non- immigrants with other mother tongues	
	Number	Percent				
Total	19,900,000	12	7	74	7	100
6333	2,560,000	14	2	82	3	100
6332	1,920,000	8	3	83	5	100
6222	1,530,000	23	7	64	6	100
6443	1,220,000	27	2	66	5	100
6334	1,200,000	16	8	73	3	100
6444	800,000	11	0	85	4	100
6221	750,000	10	2	83	5	100
6433	470,000	30	8	61	1	100
6322	460,000	2	2	95	0	100
6223	440,000	6	4	80	9	100
5111	380,000	2	7	88	4	100
6323	370,000	2	1	91	5	100
3111	370,000	0	19	14	66	100
5222	360,000	4	17	70	9	100
6233	320,000	0	9	91	0	100
4111	300,000	5	7	62	26	100
6111	290,000	29	7	60	4	100
6232	250,000	11	10	79	0	100
6434	250,000	0	15	70	14	100
6442	230,000	1	0	99	0	100
6445	230,000	0	0	100	0	100
4222	220,000	3	12	69	16	100
5221	210,000	4	7	51	38	100
6331	210,000	11	0	88	1	100
6441	200,000	4	0	96	0	100
6343	190,000	2	0	98	0	100
6212	180,000	11	0	84	4	100
6344	170,000	29	0	71	0	100
6324	160,000	0	13	87	0	100
4221	150,000	2	73	16	8	100
5333	140,000	0	54	45	1	100
4443	140,000	53	0	47	0	100
6211	130,000	16	0	82	2	100
5331	130,000	0	0	100	0	100
5443	130,000	0	0	90	10	100
3121	130,000	98	0	0	2	100
6321	120,000	19	0	72	10	100
6435	120,000	1	0	99	0	100
5223	110,000	0	0	100	0	100
5332	100,000	4	26	56	15	100
1333	100,000	0	0	100	0	100
4121	90,000	0	68	21	11	100
6432	90,000	2	22	76	0	100
6112	90,000	0	0	87	13	100
5343	80,000	0	64	36	0	100
5112	80,000	0	10	60	31	100
6453	70,000	0	0	100	0	100
5211	70,000	0	15	73	11	100
4112	70,000	0	52	14	33	100
6335	60,000	0	0	88	12	100
2111	60,000	0	8	2	89	100
6342	60,000	0	0	96	4	100
5334	60,000	0	29	68	3	100
5322	60,000	0	54	46	0	100
6224	50,000	0	0	100	0	100
5232	50,000	0	0	100	0	100

Table 3.17 (concluded)

Combinations of proficiency level across skill domains, oral fluency, prose literacy, document literacy and numeracy by immigrant status and mother tongue, adults aged 16 and over, 2005

Vector of oral fluency, prose, document and numeracy proficiency levels	Percent Distribution if N >= 40					Total
	Population	Immigrants with English or French mother tongues	Immigrants with other mother tongues	Non-immigrants with English or French mother tongues	Non- immigrants with other mother tongues	
	Number	Percent				
4211	50,000	0	10	48	42	100
6454	50,000	0	84	16	0	100
1211	50,000	0	0	100	0	100
5121	50,000	0	0	99	1	100
4433	40,000	0	0	100	0	100
1112	40,000	0	0	100	0	100
4233	40,000	0	100	0	0	100
6554	40,000	0	0	100	0	100
6231	40,000	0	24	76	0	100
4223	40,000	0	0	44	56	100
5454	30,000	0	0	100	0	100
1221	30,000	0	52	48	0	100
6422	30,000	0	0	100	0	100
1111	30,000	0	0	66	34	100
6121	30,000	37	11	52	0	100
5233	30,000	0	0	100	0	100
4322	30,000	0	99	1	0	100
6543	30,000	0	0	100	0	100
3112	30,000	0	19	0	81	100
4232	30,000	0	31	36	33	100
4212	20,000	19	53	19	9	100
6213	20,000	0	0	100	0	100
1331	20,000	0	0	100	0	100
1222	20,000	0	0	100	0	100
5321	20,000	0	98	2	0	100
3221	20,000	0	0	77	23	100
5122	20,000	0	0	7	93	100
4334	20,000	0	0	100	0	100
6122	20,000	0	0	51	49	100
1544	10,000	100	0	0	0	100
1332	10,000	0	0	100	0	100
4122	10,000	56	0	5	39	100
5432	10,000	0	0	0	100	100
3331	10,000	0	0	0	100	100
1445	10,000	0	0	100	0	100
3223	10,000	0	100	0	0	100
1122	10,000	100	0	0	0	100
1334	10,000	0	0	100	0	100
4332	10,000	0	0	24	76	100
6234	10,000	94	6	0	0	100
5113	10,000	0	0	100	0	100
4323	10,000	0	0	100	0	100
5212	10,000	0	5	49	46	100
5323	10,000	0	0	84	16	100
4455	10,000	0	0	100	0	100
1442	-	100	0	0	0	100
5234	-	0	100	0	0	100
2211	-	0	0	0	100	100
3211	-	0	0	0	100	100
6113	-	0	0	100	0	100
5231	-	0	0	100	0	100
3213	-	0	0	0	100	100
3231	-	0	0	0	100	100

Table 3.18

Patterns of weakness in skill domains, selected groups, adults aged 16 and over, Canada, 2005

Vector of oral fluency, prose, document and and numeracy proficiency levels							
	Total		Immigrants with English and French mother tongues	Immigrants with non-official language mother tongues	Non-immigrants with English or French mother tongues	Non-immigrants with non-official language mother tongues	Immigrants Sub total+
	Number	Percent					
0000	7,900,000	40	1,150,668	432,929	6,057,340	259,063	1,583,597.17
0001	2,950,000	15	193,248	112,033	2,516,665	128,054	305,280.65
0010	540,000	3	8,409	25,294	485,025	21,272	33,703.10
0011	690,000	3	31,974	63,127	583,363	11,536	95,101.03
0100	360,000	2	9,433	27,832	322,735	-	37,264.65
0101	340,000	2	28,142	34,095	277,763	-	62,236.51
0110	630,000	3	27,339	17,345	544,151	41,165	44,684.14
0111	4,200,000	21	583,653	261,789	2,992,382	362,176	845,442.31
1000	340,000	2	84,461	-	255,539	-	84,460.70
1001	50,000	0	-	-	32,412	17,588	-
1010	10,000	0	-	-	10,000	-	-
1011	30,000	0	-	29,572	428	-	29,571.53
1100	40,000	0	-	40,000	-	-	40,000.00
1101	30,000	0	-	9,185	10,775	10,040	9,184.84
1110	50,000	0	-	10,000	17,494	22,506	10,000.00
1111	1,700,000	9	171,924	369,522	632,568	525,986	541,446.07
	19,860,000						

Vector of oral fluency, prose, document and and numeracy proficiency levels							
	Total		Immigrants with English and French mother tongues	Immigrants with non-official language mother tongues	Non-immigrants with English or French mother tongues	Non-immigrants with non-official language mother tongues	Immigrants Sub total+
	Percent						
0000	40		50	30	41	19	43
0001	15		8	8	17	9	8
0010	3		0	2	3	2	1
0011	3		1	4	4	1	3
0100	2		0	2	2	0	1
0101	2		1	2	2	0	2
0110	3		1	1	4	3	1
0111	21		25	18	20	26	23
1000	2		4	0	2	0	2
1001	0		0	0	0	1	0
1010	0		0	0	0	0	0
1011	0		0	2	0	0	1
1100	0		0	3	0	0	1
1101	0		0	1	0	1	0
1110	0		0	1	0	2	0
1111	9		8	26	4	38	15

Note: 0 denotes adequate skills, 1 denotes weak skills. Oral fluency = 0 if Level = 5 or 6, otherwise =1, prose literacy, document literacy and numeracy = 0 if Level 3, 4 or 5, otherwise =1

Table 3.19

Proportion of the population with oral fluency scores less than Level 5, adults aged 16 and over by immigrant status and official language, Canada, 2005

	Oral fluency level		
	Total	< 5	5+
	Percent		
Total	100	8	92
Immigrant with official language mother tongue	100	6	94
Immigrant with non-official language mother tongue	100	37	63

Table 3.20

Distribution of oral fluency scores by proficiency level by years in Canada, immigrants aged 16 and over, Canada, 2005

Years in Canada	Oral fluency levels						
	Total	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6
	Percent						
Total	100	1	0	6	1	10	70
0 to 9	100	2		7	28	24	40
10 to 19	100			9	30	26	35
20 +	100	1	1	1	6	14	78
CAn	100	2		6	7	1	84

Table 3.21

Proportion of the population with oral fluency scores less than Level 5, adults aged 16 and over by labour force status, Canada, 2005

Active Labour Force Status	Oral fluency level		
	Total	< 5	5+
	Percent		
Total	100	8	92
No	100	6	94
Yes	100	9	91

Table 3.22

Proportion of the population with oral fluency scores less than Level 5, adults aged 16 and over by gender, Canada, 2005

	Oral fluency level		
	Total	< 5	5+
	Percent		
Total	100	8	92
Female	100	9	91
Male	100	8	92

Table 3.23**Proportion of the population with oral fluency scores less than Level 5, adults aged 16 and over by age group, Canada, 2005**

Age group	Oral fluency level		
	Total	< 5	5+
		Percent	
Total	100	8	92
16 to 25	100	6	94
26 to 35	100	9	91
36 to 45	100	9	91
46 to 55	100	6	94
56 to 65	100	12	88

Table 3.24**Proportion of the population with oral fluency scores less than Level 5, adults aged 16 and over by educational attainment, Canada, 2005**

Education	Oral fluency level		
	Total	< 5	5+
		Percent	
Total	100	8	92
Less than Grade 7	100	9	91
Some High School	100	9	91
High School	100	8	92
Non-Univ. PSE	100	6	94
University	100	8	92

Table 3.25

Adjusted likelihoods of being in prose literacy shortage, selected characteristics, 2006

Adjusted likelihoods	
Education (Less than High school)	190
Newfoundland	180
New Brunswick	167
Prince Edward Island	159
Immigration (Yes:No)	154
Ontario	140
Quebec	134
Nova Scotia	133
Manitoba	130
Mother_Tongue_Non-	
English/French	129
Mother_Tongue_French	120
Education (Training)	117
Education (High school only)	116
Alberta	116
Census Metropolitan	
Area_YN	111
Saskatchewan	108
Education (Degree)	100
Age_65_Plus	100
British Columbia	100
Mother_Tongue_Multiple	100
Education (college)	100
Mother_Tongue_English	88
Gender (Male : Female)	86
Age_56_65	80
Age_46_55	64
Age_36_45	63
Age_26_35	57
Age_16_25	42

Source: From Canada segmentation analysis.

Table 3.30

The impact of oral fluency on employment and earnings, various specifications, Canada, 2005

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The LOGISTIC Procedure			
Model Information			
Data Set	PROJECT.SELECTED_VARIABLES		
Response Variable	earnings_YN		
Number of Response Levels	2		
Weight Variable	weight		
Model	binary logit		
Optimization Technique	Fisher's scoring		
Number of Observations Read	1678		
Number of Observations Used	1678		
Sum of Weights Read	19900840		
Sum of Weights Used	19900840		
Response Profile			
Ordered Value	earnings_YN	Total Frequency	Total Weight
1	0	1229	14891942
2	1	449	5008898

Probability modeled is earnings_YN=0.

Model Convergence Status

Convergence criterion (GCONV=1E-8) satisfied.

Model Fit Statistics

Criterion	Intercept Only	Intercept and Covariates
AIC	22455601	13119704
SC	22455606	13119965
-2 Log L	22455599	13119608

Testing Global Null Hypothesis: BETA=0

Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	9335990.88	47	<.0001
Score	8534661.89	47	<.0001
Wald	.	46	.

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The LOGISTIC Procedure

WARNING: The information matrix is singular and thus the convergence is questionable.

NOTE: The following parameters have been set to 0, since the variables are a linear combination of other variables as shown.

Age_56_65 = Intercept - Age_16_25 - Age_26_35 - Age_36_45 - Age_46_55
 Age_65_Plus = 0
 Mother_Tongue_Mult = Intercept - Mother_Tongue_Eng - Mother_Tongue_Fre - Mother_Tongue_Non
 BC = Intercept - Nfld - PEI - NS - NB - QUE - ONT - MAN - SASK - ALTA
 LF_NILF = Intercept - LF_Act - LF_Unempl

Analysis of Maximum Likelihood Estimates

Parameter	DF	Estimate	Standard Error	Wald Chi-Square	Pr > ChiSq
Intercept	1	-4.6038	5.3674	0.7357	0.3910
Imm_YN	1	0.4560	0.00216	44486.5021	<.0001
Educ_1	1	-16.4671	0.00277	35432555.1	<.0001
Educ_2	1	-16.4991	0.00225	53867901.1	<.0001
Educ_3	1	-16.2825	0.00317	26456496.9	<.0001
Educ_4	1	-16.7647	0.00232	52033742.8	<.0001
Educ_5	0	-17.7810	.	.	.
Gender	1	0.4858	0.00164	87962.9357	<.0001
Age_16_25	1	1.6713	0.00303	304369.370	<.0001
Age_26_35	1	1.2190	0.00275	197118.752	<.0001
Age_36_45	1	0.3814	0.00247	23820.4450	<.0001
Age_46_55	1	0.4467	0.00255	30589.6640	<.0001
Age_56_65	0	0	.	.	.
Age_65_Plus	0	0	.	.	.
Mother_Tongue_Eng	1	1.2445	0.00725	29430.8426	<.0001
Mother_Tongue_Fre	1	3.0597	0.00785	151735.183	<.0001
Mother_Tongue_Non	1	1.3481	0.00765	31042.0410	<.0001
Mother_Tongue_Mult	0	0	.	.	.
Nfld	1	2.1350	0.0128	27707.9573	<.0001
PEI	1	1.0643	0.0145	5416.2060	<.0001
NS	1	-0.3278	0.00664	2440.2647	<.0001
NB	1	1.4876	0.0104	20567.1163	<.0001
QUE	1	-1.0949	0.00561	38151.9520	<.0001
ONT	1	-0.0421	0.00410	105.3057	<.0001
MAN	1	1.1314	0.00943	14386.1264	<.0001
SASK	1	1.7593	0.0131	18171.8545	<.0001
ALTA	1	0.5824	0.00602	9362.2483	<.0001
BC	0	0	.	.	.
Nfld_CMA_YN	1	-0.2658	0.0161	271.4475	<.0001
PEI_CMA_YN	1	-3.0948	0.0358	7480.4889	<.0001
NS_CMA_YN	1	1.6582	0.00773	46008.3285	<.0001
NB_CMA_YN	1	1.3198	0.0306	1862.4980	<.0001

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Table 3.30 (continued)

The impact of oral fluency on employment and earnings, various specifications, Canada, 2005

The LOGISTIC Procedure					
Analysis of Maximum Likelihood Estimates					
Parameter	DF	Estimate	Standard Error	Wald Chi-Square	Pr > ChiSq
QU_CMA_YN	1	1.0463	0.00349	90112.7801	<.0001
ONT_CMA_YN	1	1.1488	0.00269	182805.097	<.0001
MAN_CMA_YN	1	1.6630	0.0117	20221.3749	<.0001
SASK_CMA_YN	1	-0.5976	0.0139	1849.0562	<.0001
ALTA_CMA_YN	1	-0.2710	0.00530	2612.0431	<.0001
BC_CMA_YN	1	0.6860	0.00431	25385.5413	<.0001
LF_Act	1	-0.7663	0.00267	82411.8999	<.0001
LF_Unempl	1	-0.0186	0.00495	14.0965	0.0002
LF_NILF	0	0	.	.	.
SOC_A	1	20.7252	5.3674	14.9095	0.0001
SOC_B	1	21.9158	5.3674	16.6717	<.0001
SOC_C	1	21.2379	5.3674	15.6563	<.0001
SOC_D	1	23.2752	5.3674	18.8041	<.0001
SOC_E	1	23.0383	5.3674	18.4234	<.0001
SOC_F	1	20.0418	5.3674	13.9424	0.0002
SOC_G	1	20.6056	5.3674	14.7379	0.0001
SOC_H	1	21.0582	5.3674	15.3925	<.0001
SOC_I	1	20.6117	5.3674	14.7467	0.0001
SOC_J	1	22.0309	5.3674	16.8473	<.0001
Aborig_YN	1	-0.6716	0.0310	470.4272	<.0001
OVERALL_oRAL	1	-0.1489	0.000815	33366.3474	<.0001

Odds Ratio Estimates			
Effect	Point Estimate	95% Wald Confidence Limits	
Imm_YN	1.578	1.571	1.585
Educ_1	<0.001	<0.001	<0.001
Educ_2	<0.001	<0.001	<0.001
Educ_3	<0.001	<0.001	<0.001
Educ_4	<0.001	<0.001	<0.001
Gender	1.625	1.620	1.631
Age_16_25	5.319	5.288	5.351
Age_26_35	3.384	3.366	3.402
Age_36_45	1.464	1.457	1.471
Age_46_55	1.563	1.555	1.571
Mother_Tongue_Eng	3.471	3.422	3.521
Mother_Tongue_Fre	21.322	20.996	21.653
Mother_Tongue_Non	3.850	3.793	3.908
Nfld	8.457	8.247	8.672
PEI	2.899	2.818	2.982
NS	0.720	0.711	0.730
NB	4.426	4.337	4.517
QUE	0.335	0.331	0.338

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Table 3.30 (continued)

The impact of oral fluency on employment and earnings, various specifications, Canada, 2005

The LOGISTIC Procedure			
Odds Ratio Estimates			
Effect	Point Estimate	95% Wald Confidence Limits	
ONT	0.959	0.951	0.967
MAN	3.100	3.043	3.158
SASK	5.808	5.661	5.959
ALTA	1.790	1.769	1.812
Nfld_CMA_YN	0.767	0.743	0.791
PEI_CMA_YN	0.045	0.042	0.049
NS_CMA_YN	5.250	5.171	5.330
NB_CMA_YN	3.743	3.525	3.974
QU_CMA_YN	2.847	2.828	2.866
ONT_CMA_YN	3.154	3.138	3.171
MAN_CMA_YN	5.275	5.156	5.397
SASK_CMA_YN	0.550	0.535	0.565
ALTA_CMA_YN	0.763	0.755	0.771
BC_CMA_YN	1.986	1.969	2.003
LF_Act	0.465	0.462	0.467
LF_Unempl	0.982	0.972	0.991
SOC_A	>999.999	>999.999	>999.999
SOC_B	>999.999	>999.999	>999.999
SOC_C	>999.999	>999.999	>999.999
SOC_D	>999.999	>999.999	>999.999
SOC_E	>999.999	>999.999	>999.999
SOC_F	>999.999	>999.999	>999.999
SOC_G	>999.999	>999.999	>999.999
SOC_H	>999.999	>999.999	>999.999
SOC_I	>999.999	>999.999	>999.999
SOC_J	>999.999	>999.999	>999.999
AboRig_YN	0.511	0.481	0.543
oVERALL_oRAL	0.862	0.860	0.863

Association of Predicted Probabilities and Observed Responses			
Percent Concordant	85.9	Somers' D	0.721
Percent Discordant	13.8	Gamma	0.723
Percent Tied	0.3	Tau-a	0.283
Pairs	551821	c	0.861

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The REG Procedure			
Model: MODEL1			
Dependent Variable: earnings			
Number of Observations Read			1678
Number of Observations Used			1230
Number of Observations with Missing Values			448

Weight: weight					
Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	46	8.686458E15	1.88836E14	4.21	<.0001
Error	1183	5.308916E16	4.487672E13		
Corrected Total	1229	6.177562E16			

Root MSE	6699009	R-Square	0.1406
Dependent Mean	39170	Adj R-Sq	0.1072
Coeff Var	17102		

NOTE: Model is not full rank. Least-squares solutions for the parameters are not unique. Some statistics will be misleading. A reported DF of 0 or B means that the estimate is biased.
NOTE: The following parameters have been set to 0, since the variables are a linear combination of other variables as shown.

Table 3.30 (continued)

The impact of oral fluency on employment and earnings, various specifications, Canada, 2005

```

Age_56_65 = Intercept - Age_16_25 - Age_26_35 - Age_36_45 - Age_46_55
Age_65_Plus = 0
Mother_Tongue_Mult = Intercept - Mother_Tongue_Eng - Mother_Tongue_Fre - Mother_Tongue_Non
BC = Intercept - Nfld - PEI - NS - NB - QUE - ONT - MAN - SASK - ALTA
LF_NILF = Intercept - LF_Act - LF_Unempl
SOC_J = Intercept - SOC_A - SOC_B - SOC_C - SOC_D
        - SOC_E - SOC_F - SOC_G - SOC_H - SOC_I

```

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > t
Intercept	B	-13022	62361	-0.21	0.8346
Imm_YN	1	-2017.52114	5177.51269	-0.39	0.6969
Educ_1	1	9238.46923	46343	0.20	0.8420
Educ_2	1	11412	46258	0.25	0.8052
Educ_3	1	11575	46561	0.25	0.8037
Educ_4	1	30824	46237	0.67	0.5051
Educ_5	1	29094	46109	0.63	0.5282
Gender	1	-8047.85729	4081.44005	-1.97	0.0489

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The REG Procedure

Model: MODEL1

Dependent Variable: earnings

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > t
Age_16_25	B	-14272	6924.35647	-2.06	0.0395
Age_26_35	B	-7389.82202	6950.57726	-1.06	0.2879
Age_36_45	B	-1923.87020	7000.77416	-0.27	0.7835
Age_46_55	B	16907	7029.61778	2.41	0.0163
Age_56_65	0	0	.	.	.
Age_65_Plus	0	0	.	.	.
Mother_Tongue_Eng	B	25178	35794	0.70	0.4819
Mother_Tongue_Fre	B	24661	36012	0.68	0.4936
Mother_Tongue_Non	B	19475	36191	0.54	0.5906
Mother_Tongue_Mult	0	0	.	.	.
Nfld	B	-3556.85305	20140	-0.18	0.8598
PEI	B	-7875.50871	36958	-0.21	0.8313
NS	B	1151.59991	20609	0.06	0.9554
NB	B	-14062	18315	-0.77	0.4428
QUE	B	-3681.20635	15902	-0.23	0.8170
ONT	B	6385.63259	14088	0.45	0.6504
MAN	B	-3733.78828	23490	-0.16	0.8737
SASK	B	5525.15708	26711	0.21	0.8362
ALTA	B	5299.41787	17331	0.31	0.7598
BC	0	0	.	.	.
Nfld_CMA_YN	1	16427	22705	0.72	0.4695
PEI_CMA_YN	1	18946	145768	0.13	0.8966
NS_CMA_YN	1	-4185.30297	19782	-0.21	0.8325
NB_CMA_YN	1	9098.94789	27763	0.33	0.7432
QU_CMA_YN	1	3814.38024	8511.15415	0.45	0.6541
ONT_CMA_YN	1	-4543.33357	8212.96679	-0.55	0.5802
MAN_CMA_YN	1	2080.73410	23126	0.09	0.9283
SASK_CMA_YN	1	-12320	27640	-0.45	0.6559
ALTA_CMA_YN	1	-5470.72614	13996	-0.39	0.6960
BC_CMA_YN	1	35649	13592	2.62	0.0088
LF_Act	B	10938	5681.93359	1.93	0.0545
LF_Unempl	B	-4559.75659	9057.84406	-0.50	0.6148
LF_NILF	0	0	.	.	.
SOC_A	B	11337	9960.35535	1.14	0.2553
SOC_B	B	1120.12155	7722.54191	0.15	0.8847
SOC_C	B	10713	10295	1.04	0.2983
SOC_D	B	-11660	10323	-1.13	0.2589
SOC_E	B	-11138	9987.13313	-1.12	0.2650
SOC_F	B	-22192	13468	-1.65	0.0997
SOC_G	B	-14929	7110.66009	-2.10	0.0360
SOC_H	B	-4007.71998	7800.50068	-0.51	0.6075
SOC_I	B	-22541	12618	-1.79	0.0743
SOC_J	0	0	.	.	.
Aborig_YN	1	4743.01529	64652	0.07	0.9415

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Table 3.30 (continued)

The impact of oral fluency on employment and earnings, various specifications, Canada, 2005

The REG Procedure
Model: MODEL1
Dependent Variable: earnings

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > t
oVERALL_oRAL	1	2453.03286	1611.81699	1.52	0.1283

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The LOGISTIC Procedure

Model Information

Data Set	PROJECT.SELECTED_VARIABLES
Response Variable	earnings_YN
Number of Response Levels	2
Weight Variable	weight
Model	binary logit
Optimization Technique	Fisher's scoring

Number of Observations Read	1678
Number of Observations Used	1678
Sum of Weights Read	19900840
Sum of Weights Used	19900840

Response Profile

Ordered Value	earnings_YN	Total Frequency	Total Weight
1	0	1229	14891942
2	1	449	5008898

Probability modeled is earnings_YN=0.

Model Convergence Status

Convergence criterion (GCONV=1E-8) satisfied.

Model Fit Statistics

Criterion	Intercept Only	Intercept and Covariates
AIC	22455601	13119600
SC	22455606	13119861
-2 Log L	22455599	13119504

Testing Global Null Hypothesis: BETA=0

Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	9336094.64	47	<.0001
Score	8537980.92	47	<.0001
Wald	.	46	.

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Table 3.30 (continued)

The impact of oral fluency on employment and earnings, various specifications, Canada, 2005

The LOGISTIC Procedure

WARNING: The information matrix is singular and thus the convergence is questionable.

NOTE: The following parameters have been set to 0, since the variables are a linear combination of other variables as shown.

```

Age_56_65 = Intercept - Age_16_25 - Age_26_35 - Age_36_45 - Age_46_55
Age_65_Plus = 0
Mother_Tongue_Mult = Intercept - Mother_Tongue_Eng - Mother_Tongue_Fre - Mother_Tongue_Non
BC = Intercept - Nfld - PEI - NS - NB - QUE - ONT - MAN - SASK - ALTA
LF_NILF = Intercept - LF_Act - LF_Unempl

```

Analysis of Maximum Likelihood Estimates

Parameter	DF	Estimate	Standard Error	Wald Chi-Square	Pr > ChiSq
Intercept	1	-4.7311	5.3463	0.7831	0.3762
Imm_YN	1	0.4133	0.00215	36978.4066	<.0001
Educ_1	1	-16.5440	0.00303	29745988.1	<.0001
Educ_2	1	-16.5004	0.00231	50891061.4	<.0001
Educ_3	1	-16.3230	0.00324	25359566.4	<.0001
Educ_4	1	-16.7381	0.00235	50612570.4	<.0001
Educ_5	0	-17.6857	.	.	.
Gender	1	0.4942	0.00164	90931.4222	<.0001
Age_16_25	1	1.7639	0.00311	321228.907	<.0001
Age_26_35	1	1.2812	0.00281	207730.817	<.0001
Age_36_45	1	0.4381	0.00252	30266.9272	<.0001
Age_46_55	1	0.4813	0.00258	34763.0050	<.0001
Age_56_65	0	0	.	.	.
Age_65_Plus	0	0	.	.	.
Mother_Tongue_Eng	1	1.2876	0.00734	30802.8732	<.0001
Mother_Tongue_Fre	1	3.0724	0.00793	150156.462	<.0001
Mother_Tongue_Non	1	1.3840	0.00770	32298.4720	<.0001
Mother_Tongue_Mult	0	0	.	.	.
Nfld	1	2.1963	0.0128	29410.9683	<.0001
PEI	1	0.9930	0.0144	4762.2227	<.0001
NS	1	-0.1883	0.00666	799.7807	<.0001
NB	1	1.4361	0.0104	19143.8069	<.0001
QUE	1	-1.0838	0.00560	37484.9048	<.0001
ONT	1	-0.0196	0.00412	22.6791	<.0001
MAN	1	1.0844	0.00947	13113.3094	<.0001
SASK	1	1.7295	0.0131	17546.3459	<.0001
ALTA	1	0.5368	0.00601	7988.7352	<.0001
BC	0	0	.	.	.
Nfld_CMA_YN	1	-0.1554	0.0162	92.3706	<.0001
PEI_CMA_YN	1	-3.0893	0.0359	7417.0840	<.0001
NS_CMA_YN	1	1.5213	0.00778	38276.3018	<.0001
NB_CMA_YN	1	1.3202	0.0306	1865.8884	<.0001

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Table 3.30 (continued)

The impact of oral fluency on employment and earnings, various specifications, Canada, 2005

The LOGISTIC Procedure

Analysis of Maximum Likelihood Estimates

Parameter	DF	Estimate	Standard Error	Wald Chi-Square	Pr > ChiSq
QU_CMA_YN	1	1.0681	0.00349	93780.1019	<.0001
ONT_CMA_YN	1	1.1583	0.00269	185619.045	<.0001
MAN_CMA_YN	1	1.6871	0.0117	20688.5651	<.0001
SASK_CMA_YN	1	-0.5964	0.0139	1838.1830	<.0001
ALTA_CMA_YN	1	-0.1907	0.00527	1307.4349	<.0001
BC_CMA_YN	1	0.7435	0.00430	29901.9825	<.0001
LF_Act	1	-0.7435	0.00265	78758.3091	<.0001
LF_Unempl	1	-0.0134	0.00493	7.4098	0.0065
LF_NILF	0	0	.	.	.
SOC_A	1	20.7663	5.3463	15.0873	0.0001
SOC_B	1	21.9197	5.3463	16.8098	<.0001
SOC_C	1	21.3372	5.3463	15.9283	<.0001
SOC_D	1	23.2873	5.3463	18.9728	<.0001
SOC_E	1	23.1160	5.3463	18.6946	<.0001
SOC_F	1	20.0174	5.3463	14.0187	0.0002
SOC_G	1	20.6528	5.3463	14.9227	0.0001
SOC_H	1	21.0956	5.3463	15.5695	<.0001
SOC_I	1	20.6522	5.3463	14.9219	0.0001
SOC_J	1	22.0648	5.3463	17.0330	<.0001
Aborig_YN	1	-0.7551	0.0309	597.8334	<.0001
Prose_Avg	1	-0.00404	0.000021	35651.0123	<.0001

Odds Ratio Estimates

Effect	Point Estimate	95% Wald Confidence Limits	
Imm_YN	1.512	1.505	1.518
Educ_1	<0.001	<0.001	<0.001
Educ_2	<0.001	<0.001	<0.001
Educ_3	<0.001	<0.001	<0.001
Educ_4	<0.001	<0.001	<0.001
Gender	1.639	1.634	1.644
Age_16_25	5.835	5.800	5.871
Age_26_35	3.601	3.581	3.621
Age_36_45	1.550	1.542	1.557
Age_46_55	1.618	1.610	1.626
Mother_Tongue_Eng	3.624	3.572	3.677
Mother_Tongue_Fre	21.594	21.261	21.932
Mother_Tongue_Non	3.991	3.931	4.051
Nfld	8.992	8.769	9.220
PEI	2.699	2.624	2.777
NS	0.828	0.818	0.839
NB	4.204	4.120	4.291
QUE	0.338	0.335	0.342

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Table 3.30 (continued)

The impact of oral fluency on employment and earnings, various specifications, Canada, 2005

The LOGISTIC Procedure					
Odds Ratio Estimates					
Effect	Point Estimate	95% Wald Confidence Limits			
ONT	0.981	0.973	0.989		
MAN	2.958	2.903	3.013		
SASK	5.638	5.495	5.784		
ALTA	1.711	1.691	1.731		
Nfld_CMA_YN	0.856	0.829	0.884		
PEI_CMA_YN	0.046	0.042	0.049		
NS_CMA_YN	4.578	4.509	4.648		
NB_CMA_YN	3.744	3.527	3.975		
QU_CMA_YN	2.910	2.890	2.930		
ONT_CMA_YN	3.185	3.168	3.201		
MAN_CMA_YN	5.404	5.281	5.529		
SASK_CMA_YN	0.551	0.536	0.566		
ALTA_CMA_YN	0.826	0.818	0.835		
BC_CMA_YN	2.103	2.086	2.121		
LF_Act	0.475	0.473	0.478		
LF_Unempl	0.987	0.977	0.996		
SOC_A	>999.999	>999.999	>999.999		
SOC_B	>999.999	>999.999	>999.999		
SOC_C	>999.999	>999.999	>999.999		
SOC_D	>999.999	>999.999	>999.999		
SOC_E	>999.999	>999.999	>999.999		
SOC_F	>999.999	>999.999	>999.999		
SOC_G	>999.999	>999.999	>999.999		
SOC_H	>999.999	>999.999	>999.999		
SOC_I	>999.999	>999.999	>999.999		
SOC_J	>999.999	>999.999	>999.999		
Aborig_YN	0.470	0.442	0.499		
Prose_Avg	0.996	0.996	0.996		
Association of Predicted Probabilities and Observed Responses					
Percent Concordant	85.9	Somers' D	0.721		
Percent Discordant	13.8	Gamma	0.723		
Percent Tied	0.3	Tau-a	0.283		
Pairs	551821	c	0.861		
		The SAS System	18:38	Thursday, February 24, 2011 165	
The REG Procedure					
Model: MODEL1					
Dependent Variable: earnings					
Number of Observations Read				1678	
Number of Observations Used				1230	
Number of Observations with Missing Values				448	
Weight: weight					
Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	46	9.268972E15	2.014994E14	4.54	<.0001
Error	1183	5.250665E16	4.438432E13		
Corrected Total	1229	6.177562E16			
Root MSE	6662156		R-Square	0.1500	
Dependent Mean	39170		Adj R-Sq	0.1170	
Coeff Var	17008				
NOTE: Model is not full rank. Least-squares solutions for the parameters are not unique. Some statistics will be misleading. A reported DF of 0 or B means that the estimate is biased.					
NOTE: The following parameters have been set to 0, since the variables are a linear combination of other variables as shown.					

Table 3.30 (continued)

The impact of oral fluency on employment and earnings, various specifications, Canada, 2005

Age_56_65 = Intercept - Age_16_25 - Age_26_35 - Age_36_45 - Age_46_55
 Age_65_Plus = 0
 Mother_Tongue_Mult = Intercept - Mother_Tongue_Eng - Mother_Tongue_Fre - Mother_Tongue_Non
 BC = Intercept - Nfld - PEI - NS - NB - QUE - ONT - MAN - SASK - ALTA
 LF_NILF = Intercept - LF_Act - LF_Unempl
 SOC_J = Intercept - SOC_A - SOC_B - SOC_C - SOC_D
 - SOC_E - SOC_F - SOC_G - SOC_H - SOC_I

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > t
Intercept	B	-37127	61673	-0.60	0.5473
Imm_YN	1	-1950.77640	5149.06018	-0.38	0.7049
Educ_1	1	11649	46093	0.25	0.8005
Educ_2	1	8497.75251	46008	0.18	0.8535
Educ_3	1	8292.79368	46312	0.18	0.8579
Educ_4	1	26468	45997	0.58	0.5651
Educ_5	1	20963	45900	0.46	0.6480
Gender	1	-9104.87801	4067.16493	-2.24	0.0254

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The REG Procedure

Model: MODEL1

Dependent Variable: earnings

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > t
Age_16_25	B	-21284	7148.59953	-2.98	0.0030
Age_26_35	B	-13016	7083.92581	-1.84	0.0664
Age_36_45	B	-5852.01086	7046.18867	-0.83	0.4064
Age_46_55	B	12721	7084.30370	1.80	0.0728
Age_56_65	0	0	.	.	.
Age_65_Plus	0	0	.	.	.
Mother_Tongue_Eng	B	19254	35602	0.54	0.5887
Mother_Tongue_Fre	B	19565	35810	0.55	0.5849
Mother_Tongue_Non	B	19282	35910	0.54	0.5914
Mother_Tongue_Mult	0	0	.	.	.
Nfld	B	-3199.69768	19949	-0.16	0.8726
PEI	B	-3809.95158	36769	-0.10	0.9175
NS	B	-6113.29673	20416	-0.30	0.7647
NB	B	-9397.16744	18251	-0.51	0.6067
QUE	B	-1598.96238	15822	-0.10	0.9195
ONT	B	6010.82527	14011	0.43	0.6680
MAN	B	-1497.80887	23369	-0.06	0.9489
SASK	B	5013.59210	26562	0.19	0.8503
ALTA	B	6814.77738	17240	0.40	0.6927
BC	0	0	.	.	.
Nfld_CMA_YN	1	14492	22583	0.64	0.5212
PEI_CMA_YN	1	16966	144966	0.12	0.9069
NS_CMA_YN	1	3923.45949	19663	0.20	0.8419
NB_CMA_YN	1	9112.72874	27610	0.33	0.7414
QU_CMA_YN	1	2194.07984	8472.95489	0.26	0.7957
ONT_CMA_YN	1	-3338.40283	8128.20001	-0.41	0.6814
MAN_CMA_YN	1	3388.27765	23001	0.15	0.8829
SASK_CMA_YN	1	-9781.45009	27494	-0.36	0.7221
ALTA_CMA_YN	1	-6961.95365	13913	-0.50	0.6169
BC_CMA_YN	1	35190	13499	2.61	0.0093
LF_Act	B	11551	5642.79338	2.05	0.0409
LF_Unempl	B	-3280.02076	9003.65789	-0.36	0.7157
LF_NILF	0	0	.	.	.
SOC_A	B	6683.60619	9983.16637	0.67	0.5033
SOC_B	B	-316.14028	7673.57613	-0.04	0.9671
SOC_C	B	6189.53632	10311	0.60	0.5484
SOC_D	B	-13432	10275	-1.31	0.1914
SOC_E	B	-14527	9976.11560	-1.46	0.1456
SOC_F	B	-20235	13361	-1.51	0.1302
SOC_G	B	-16150	7078.14032	-2.28	0.0227
SOC_H	B	-4693.19616	7753.01195	-0.61	0.5451
SOC_I	B	-22086	12549	-1.76	0.0787
SOC_J	0	0	.	.	.
Aborig_YN	1	8903.27685	64306	0.14	0.8899

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Table 3.30 (continued)

The impact of oral fluency on employment and earnings, various specifications, Canada, 2005

The REG Procedure
Model: MODEL1
Dependent Variable: earnings

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > t
Prose_Avg	1	197.61828	50.24988	3.93	<.0001

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The LOGISTIC Procedure
Model Information

Data Set	PROJECT.SELECTED_VARIABLES
Response Variable	earnings_YN
Number of Response Levels	2
Weight Variable	weight
Model	binary logit
Optimization Technique	Fisher's scoring

Number of Observations Read	1678
Number of Observations Used	1678
Sum of Weights Read	19900840
Sum of Weights Used	19900840

Response Profile

Ordered Value	earnings_YN	Total Frequency	Total Weight
1	0	1229	14891942
2	1	449	5008898

Probability modeled is earnings_YN=0.

Model Convergence Status

Convergence criterion (GCONV=1E-8) satisfied.

Model Fit Statistics

Criterion	Intercept Only	Intercept and Covariates
AIC	22455601	13102369
SC	22455606	13102635
-2 Log L	22455599	13102271

Testing Global Null Hypothesis: BETA=0

Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	9353328.23	48	<.0001
Score	8544342.74	48	<.0001
Wald	.	47	.

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Table 3.30 (continued)

The impact of oral fluency on employment and earnings, various specifications, Canada, 2005

The LOGISTIC Procedure

WARNING: The information matrix is singular and thus the convergence is questionable.

NOTE: The following parameters have been set to 0, since the variables are a linear combination of other variables as shown.

```

Age_56_65 = Intercept - Age_16_25 - Age_26_35 - Age_36_45 - Age_46_55
Age_65_Plus = 0
Mother_Tongue_Mult = Intercept - Mother_Tongue_Eng - Mother_Tongue_Fre - Mother_Tongue_Non
BC = Intercept - Nfld - PEI - NS - NB - QUE - ONT - MAN - SASK - ALTA
LF_NILF = Intercept - LF_Act - LF_Unempl

```

Analysis of Maximum Likelihood Estimates

Parameter	DF	Estimate	Standard Error	Wald Chi-Square	Pr > ChiSq
Intercept	1	-4.1485	5.3469	0.6020	0.4378
Imm_YN	1	0.4259	0.00217	38527.5049	<.0001
Educ_1	1	-16.5372	0.00304	29638618.0	<.0001
Educ_2	1	-16.4828	0.00232	50332026.4	<.0001
Educ_3	1	-16.2936	0.00326	24984188.1	<.0001
Educ_4	1	-16.7192	0.00236	50244111.6	<.0001
Educ_5	0	-17.6851	.	.	.
Gender	1	0.4992	0.00164	92384.2665	<.0001
Age_16_25	1	1.7621	0.00311	321232.324	<.0001
Age_26_35	1	1.2932	0.00281	211964.925	<.0001
Age_36_45	1	0.4415	0.00252	30814.6034	<.0001
Age_46_55	1	0.4991	0.00258	37291.5078	<.0001
Age_56_65	0	0	.	.	.
Age_65_Plus	0	0	.	.	.
Mother_Tongue_Eng	1	1.2582	0.00732	29567.0753	<.0001
Mother_Tongue_Fre	1	3.0368	0.00792	147133.065	<.0001
Mother_Tongue_Non	1	1.2846	0.00772	27694.9617	<.0001
Mother_Tongue_Mult	0	0	.	.	.
Nfld	1	2.1167	0.0128	27193.1083	<.0001
PEI	1	0.9727	0.0144	4532.2031	<.0001
NS	1	-0.2581	0.00669	1490.2575	<.0001
NB	1	1.4091	0.0104	18378.5553	<.0001
QUE	1	-1.1076	0.00561	38934.5328	<.0001
ONT	1	-0.0276	0.00412	44.8316	<.0001
MAN	1	1.0930	0.00947	13323.2911	<.0001
SASK	1	1.7660	0.0131	18306.8322	<.0001
ALTA	1	0.5282	0.00601	7711.6282	<.0001
BC	0	0	.	.	.
Nfld_CMA_YN	1	-0.1978	0.0162	149.6694	<.0001
PEI_CMA_YN	1	-3.1219	0.0358	7619.1147	<.0001
NS_CMA_YN	1	1.5690	0.00779	40573.0445	<.0001
NB_CMA_YN	1	1.3045	0.0306	1821.5774	<.0001

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Table 3.30 (continued)

The impact of oral fluency on employment and earnings, various specifications, Canada, 2005

The LOGISTIC Procedure					
Analysis of Maximum Likelihood Estimates					
Parameter	DF	Estimate	Standard Error	Wald Chi-Square	Pr > ChiSq
QU_CMA_YN	1	1.0675	0.00349	93587.2933	<.0001
ONT_CMA_YN	1	1.1258	0.00269	174653.211	<.0001
MAN_CMA_YN	1	1.6625	0.0117	20118.6132	<.0001
SASK_CMA_YN	1	-0.6373	0.0139	2100.5969	<.0001
ALTA_CMA_YN	1	-0.2222	0.00529	1767.0318	<.0001
BC_CMA_YN	1	0.7000	0.00432	26233.3091	<.0001
LF_Act	1	-0.7715	0.00266	83922.0377	<.0001
LF_Unempl	1	-0.0415	0.00494	70.3404	<.0001
LF_NILF	0	0	.	.	.
SOC_A	1	20.7949	5.3468	15.1258	0.0001
SOC_B	1	21.9479	5.3468	16.8496	<.0001
SOC_C	1	21.3367	5.3468	15.9242	<.0001
SOC_D	1	23.3052	5.3469	18.9981	<.0001
SOC_E	1	23.1088	5.3468	18.6792	<.0001
SOC_F	1	20.0377	5.3468	14.0443	0.0002
SOC_G	1	20.6494	5.3468	14.9149	0.0001
SOC_H	1	21.1026	5.3468	15.5767	<.0001
SOC_I	1	20.6505	5.3468	14.9164	0.0001
SOC_J	1	22.0598	5.3468	17.0219	<.0001
Aborig_YN	1	-0.7592	0.0309	602.0129	<.0001
Prose_Avg	1	-0.00301	0.000023	17283.5776	<.0001
OVERALL_ORAL	1	-0.1097	0.000857	16380.5964	<.0001

Odds Ratio Estimates			
Effect	Point Estimate	95% Wald Confidence Limits	
Imm_YN	1.531	1.524	1.537
Educ_1	<0.001	<0.001	<0.001
Educ_2	<0.001	<0.001	<0.001
Educ_3	<0.001	<0.001	<0.001
Educ_4	<0.001	<0.001	<0.001
Gender	1.647	1.642	1.653
Age_16_25	5.825	5.789	5.860
Age_26_35	3.645	3.625	3.665
Age_36_45	1.555	1.547	1.563
Age_46_55	1.647	1.639	1.656
Mother_Tongue_Eng	3.519	3.469	3.570
Mother_Tongue_Fre	20.838	20.517	21.164
Mother_Tongue_Non	3.613	3.559	3.668
Nfld	8.304	8.098	8.516
PEI	2.645	2.571	2.721
NS	0.773	0.762	0.783
NB	4.092	4.010	4.176

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Table 3.30 (continued)

The impact of oral fluency on employment and earnings, various specifications, Canada, 2005

The LOGISTIC Procedure

Odds Ratio Estimates

Effect	Point Estimate	95% Wald Confidence Limits	
QUE	0.330	0.327	0.334
ONT	0.973	0.965	0.981
MAN	2.983	2.928	3.039
SASK	5.847	5.700	5.999
ALTA	1.696	1.676	1.716
Nfld_CMA_YN	0.820	0.795	0.847
PEI_CMA_YN	0.044	0.041	0.047
NS_CMA_YN	4.802	4.729	4.876
NB_CMA_YN	3.686	3.471	3.913
QU_CMA_YN	2.908	2.888	2.928
Ont_CMA_YN	3.083	3.066	3.099
MAN_CMA_YN	5.273	5.153	5.395
SASK_CMA_YN	0.529	0.514	0.543
ALTA_CMA_YN	0.801	0.792	0.809
BC_CMA_YN	2.014	1.997	2.031
LF_Act	0.462	0.460	0.465
LF_Unempl	0.959	0.950	0.969
SOC_A	>999.999	>999.999	>999.999
SOC_B	>999.999	>999.999	>999.999
SOC_C	>999.999	>999.999	>999.999
SOC_D	>999.999	>999.999	>999.999
SOC_E	>999.999	>999.999	>999.999
SOC_F	>999.999	>999.999	>999.999
SOC_G	>999.999	>999.999	>999.999
SOC_H	>999.999	>999.999	>999.999
SOC_I	>999.999	>999.999	>999.999
SOC_J	>999.999	>999.999	>999.999
Aborig_YN	0.468	0.441	0.497
Prose_Avg	0.997	0.997	0.997
OVERALL_ORAL	0.896	0.895	0.898

Association of Predicted Probabilities and Observed Responses

Percent Concordant	85.9	Somers' D	0.721
Percent Discordant	13.8	Gamma	0.723
Percent Tied	0.3	Tau-a	0.283
Pairs	551821	c	0.860

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The REG Procedure

Model: MODEL1

Dependent Variable: earnings

Number of Observations Read	1678
Number of Observations Used	1230
Number of Observations with Missing Values	448

Weight: weight

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	47	9.269043E15	1.972137E14	4.44	<.0001
Error	1182	5.250658E16	4.442181E13		
Corrected Total	1229	6.177562E16			
Root MSE		6664969	R-Square	0.1500	
Dependent Mean		39170	Adj R-Sq	0.1162	
Coeff Var		17016			

NOTE: Model is not full rank. Least-squares solutions for the parameters are not unique. Some statistics will be misleading. A reported DF of 0 or B means that the estimate is biased.

NOTE: The following parameters have been set to 0, since the variables are a linear combination of other variables as shown.

Table 3.30 (continued)

The impact of oral fluency on employment and earnings, various specifications, Canada, 2005

Age_56_65 = Intercept - Age_16_25 - Age_26_35 - Age_36_45 - Age_46_55
 Age_65_Plus = 0
 Mother_Tongue_Mult = Intercept - Mother_Tongue_Eng - Mother_Tongue_Fre - Mother_Tongue_Non
 BC = Intercept - Nfld - PEI - NS - NB - QUE - ONT - MAN - SASK - ALTA
 LF_NILF = Intercept - LF_Act - LF_Unempl
 SOC_J = Intercept - SOC_A - SOC_B - SOC_C - SOC_D
 - SOC_E - SOC_F - SOC_G - SOC_H - SOC_I

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > t
Intercept	B	-36759	62389	-0.59	0.5558
Imm_YN	1	-1950.96288	5151.23651	-0.38	0.7050
Educ_1	1	11640	46113	0.25	0.8008
Educ_2	1	8478.25901	46030	0.18	0.8539
Educ_3	1	8277.38309	46333	0.18	0.8582
Educ_4	1	26455	46018	0.57	0.5655
Educ_5	1	20924	45930	0.46	0.6488
Gender	1	-9099.56723	4071.07221	-2.24	0.0256

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The REG Procedure

Model: MODEL1

Dependent Variable: earnings

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > t
Age_16_25	B	-21295	7156.94718	-2.98	0.0030
Age_26_35	B	-13013	7087.41255	-1.84	0.0666
Age_36_45	B	-5852.48933	7049.17421	-0.83	0.4066
Age_46_55	B	12726	7088.53546	1.80	0.0729
Age_56_65	0	0	.	.	.
Age_65_Plus	0	0	.	.	.
Mother_Tongue_Eng	B	19192	35651	0.54	0.5904
Mother_Tongue_Fre	B	19504	35858	0.54	0.5866
Mother_Tongue_Non	B	19185	36007	0.53	0.5943
Mother_Tongue_Mult	0	0	.	.	.
Nfld	B	-3270.87172	20038	-0.16	0.8704
PEI	B	-3827.16765	36787	-0.10	0.9172
NS	B	-6221.31835	20605	-0.30	0.7628
NB	B	-9419.32459	18267	-0.52	0.6062
QUE	B	-1610.79851	15832	-0.10	0.9190
ONT	B	6013.54160	14017	0.43	0.6680
MAN	B	-1492.70066	23379	-0.06	0.9491
SASK	B	5028.87523	26576	0.19	0.8499
ALTA	B	6817.05870	17248	0.40	0.6927
BC	0	0	.	.	.
Nfld_CMA_YN	1	14506	22596	0.64	0.5210
PEI_CMA_YN	1	16938	145029	0.12	0.9070
NS_CMA_YN	1	4016.85911	19811	0.20	0.8394
NB_CMA_YN	1	9115.33547	27622	0.33	0.7415
QU_CMA_YN	1	2184.63797	8479.85550	0.26	0.7967
ONT_CMA_YN	1	-3372.85269	8177.62316	-0.41	0.6801
MAN_CMA_YN	1	3380.43235	23012	0.15	0.8832
SASK_CMA_YN	1	-9797.04278	27508	-0.36	0.7218
ALTA_CMA_YN	1	-6985.58652	13931	-0.50	0.6162
BC_CMA_YN	1	35161	13524	2.60	0.0094
LF_Act	B	11538	5655.48203	2.04	0.0416
LF_Unempl	B	-3297.80764	9018.55228	-0.37	0.7147
LF_NILF	0	0	.	.	.
SOC_A	B	6696.00637	9992.24587	0.67	0.5029
SOC_B	B	-296.15077	7693.24719	-0.04	0.9693
SOC_C	B	6178.74468	10319	0.60	0.5494
SOC_D	B	-13423	10282	-1.31	0.1920
SOC_E	B	-14529	9980.40251	-1.46	0.1457
SOC_F	B	-20191	13411	-1.51	0.1325
SOC_G	B	-16144	7082.48756	-2.28	0.0228
SOC_H	B	-4680.27492	7763.08501	-0.60	0.5467
SOC_I	B	-22085	12555	-1.76	0.0788
SOC_J	0	0	.	.	.
Aborig_YN	1	8899.84594	64333	0.14	0.8900

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Table 3.30 (concluded)

The impact of oral fluency on employment and earnings, various specifications, Canada, 2005

The REG Procedure										
Model: MODEL1										
Dependent Variable: earnings										
Parameter Estimates										
Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > t					
Prose_Avg	1	198.48687	54.80881	3.62	0.0003					
oVERALL_oRAL	1	-69.54554	1748.37785	-0.04	0.9683					
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Obs	Label				_LINK_	_TYPE_	_STATUS_			
1										
2	Logistic Earnings 01 Oral				LOGIT	PARMS	0 Converged			
3	OLS Earnings Oral					PARMS				
4	Logistic Earnings 01 Prose				LOGIT	PARMS	0 Converged			
5	OLS Earnings Prose					PARMS				
6	Logistic Earnings 01 Prose oral				LOGIT	PARMS	0 Converged			
7	OLS Earnings Prose oral					PARMS				
Obs	_NAME_	Intercept	Imm_YN	Educ_1	Educ_2	Educ_3	Educ_4	Educ_5	Gender	
1										
2	earnings_YN	-4.60	0.46	-16.47	-16.50	-16.28	-16.76	-17.78	0.49	
3		-13021.55	-2017.52	9238.47	11411.94	11575.32	30824.28	29094.47	-8047.86	
4	earnings_YN	-4.73	0.41	-16.54	-16.50	-16.32	-16.74	-17.69	0.49	
5		-37127.07	-1950.78	11648.93	8497.75	8292.79	26468.49	20963.08	-9104.88	
6	earnings_YN	-4.15	0.43	-16.54	-16.48	-16.29	-16.72	-17.69	0.50	
7		-36758.90	-1950.96	11640.00	8478.26	8277.38	26454.67	20923.93	-9099.57	
Obs	Age_16_25	Age_26_35	Age_36_45	Age_46_55	Age_56_65	Age_65_Plus	Mother_Tongue_Eng	Mother_Tongue_Fre	Mother_Tongue_Non	Mother_Tongue_Mult
1										
2	1.67	1.22	0.38	0.45	0	0	1.24	3.06	1.35	0
3	-14271.59	-7389.82	-1923.87	16907.00	0	0	25177.78	24661.33	19475.32	0
4	1.76	1.28	0.44	0.48	0	0	1.29	3.07	1.38	0
5	-21283.97	-13015.86	-5852.01	12720.98	0	0	19254.34	19565.36	19282.33	0
6	1.76	1.29	0.44	0.50	0	0	1.26	3.04	1.28	0
7	-21294.95	-13012.53	-5852.49	12726.26	0	0	19192.48	19504.42	19185.38	0
Obs	Nfld	PEI	NS	NB	QUE	ONT	MAN	SASK	ALTA BC	Nfld_CMA_YN
1										
2	2.13	1.06	-0.33	1.49	-1.09	-0.04	1.13	1.76	0.58	0
3	-3556.85	-7875.51	1151.60	-14062.07	-3681.21	6385.63	-3733.79	5525.16	5299.42	0
4	2.20	0.99	-0.19	1.44	-1.08	-0.02	1.08	1.73	0.54	0
5	-3199.70	-3809.95	-6113.30	-9397.17	-1598.96	6010.83	-1497.81	5013.59	6814.78	0
6	2.12	0.97	-0.26	1.41	-1.11	-0.03	1.09	1.77	0.53	0
7	-3270.87	-3827.17	-6221.32	-9419.32	-1610.80	6013.54	-1492.70	5028.88	6817.06	0
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Obs	PEI_CMA_YN	NS_CMA_YN	NB_CMA_YN	QU_CMA_YN	Ont_CMA_YN	MAN_CMA_YN	SASK_CMA_YN	ALTA_CMA_YN	BC_CMA_YN	LF_Act
1										
2	-3.09	1.66	1.32	1.05	1.15	1.66	-0.60	-0.27	0.69	-0.77
3	18945.73	-4185.30	9098.95	3814.38	-4543.33	2080.73	-12320.06	-5470.73	35648.52	10938.47
4	-3.09	1.52	1.32	1.07	1.16	1.69	-0.60	-0.19	0.74	-0.74
5	16965.95	3923.46	9112.73	2194.08	-3338.40	3388.28	-9781.45	-6961.95	35189.69	11551.20
6	-3.12	1.57	1.30	1.07	1.13	1.66	-0.64	-0.22	0.70	-0.77
7	16938.18	4016.86	9115.34	2184.64	-3372.85	3380.43	-9797.04	-6985.59	35161.35	11537.63
Obs	LF_Unempl	LF_NILF	SOC_A	SOC_B	SOC_C	SOC_D	SOC_E	SOC_F	SOC_G	SOC_H
1										
2	-0.02	0	20.73	21.92	21.24	23.28	23.04	20.04	20.61	21.06
3	-4559.76	0	11336.50	1120.12	10713.30	-11659.67	-11137.88	-22191.83	-14928.61	-4007.72
4	-0.01	0	20.77	21.92	21.34	23.29	23.12	20.02	20.65	21.10
5	-3280.02	0	6683.61	-316.14	6189.54	-13431.97	-14527.18	-20234.62	-16149.78	-4693.20
6	-0.04	0	20.79	21.95	21.34	23.31	23.11	20.04	20.65	21.10
7	-3297.81	0	6696.01	-296.15	6178.74	-13422.58	-14528.71	-20191.27	-16144.26	-4680.27
Obs	SOC_I	SOC_J	Aborig_YN	oVERALL_oRAL	_LNLIKE_	_MODEL_	_DEPVAR_	_RMSE_	earnings	Prose_Avg
1										
2	20.61	22.0309	-0.67	-0.15	-6559804.07					
3	-22541.33	0.0000	4743.02	2453.03		MODEL1	earnings	6699009.09	-1	
4	20.65	22.0648	-0.76		-6559752.18					-0.004
5	-22085.80	0.0000	8903.28			MODEL1	earnings	6662155.69	-1	197.618
6	20.65	22.0598	-0.76	-0.11	-6551135.39					-0.003
7	-22084.94	0.0000	8899.85	-69.55		MODEL1	earnings	6664968.81	-1	198.487

Annex C

About the CLB/IALSS Linkage Study

The CLB/IALSS study was undertaken by Statistics Canada, HRSDC and CIC to shed light on the relationships between CLB and IALSS proficiency levels. The basic design involved having a sample of respondents with known CLB levels take the IALSS document and numeracy assessments. Both the CLB-PT and the IALSS literacy assessments were administered through Language Instruction for Newcomers to Canada (LINC) at participating centres across Canada. Participants were immigrants and new Canadians being evaluated for placement in English language training programs. The following five centres agreed to partake in the project: Ottawa, Toronto (St-Charles, North York, Scarborough) and Calgary.

The target population was any client who obtained a CLB-PT assessment during the specified four month period (November, 2005 to March, 2006) at one of the participating LINC language assessment centres. Respondents were identified once an appointment was made for a CLB language assessment.

A sample of over 1,000 respondents was collected; this sample is representative of the newcomers at the participating centres during this four month period. All clients who received a CLB-PT assessment within the specified timeframe were invited to participate in this study, eliminating potential respondent bias and encouraging a variety of participants. This sample provided the necessary data for statistical analyses required for a worthwhile comparison of the CLB-PT and the IALSS assessment results.

The assessments were administered by trained professionals working in the LINC centres, licensed to administer the CLB-PT. Each centre needed sufficient client participation and was provided with an expected minimum and maximum number of participants required

based on specified scenarios and a 50 percent participation rate.

Description of the CLB/IALSS link Sample

Study participants answered a background questionnaire which enables the collection of demographic, linguistic, social, and economic information about each of the respondents. This, in turn, allowed us to describe the study sample in terms of a few important socio-demographic factors. The 2001 Census data was used in this section to provide a basis for comparison, this allowed an assessment of whether the study sample was representative of the Canadian recent immigrant population.

The table C.1 below shows the final number of participants in each assessment center with details about the number of refusals to participate, complete cases as well as participants excluded based on failed core tests. During the data collection phase, the Ottawa site encountered difficulties meeting its target for completed cases. However, the Toronto center was able to reach their maximum number of completed cases, which mitigated the lack of completed cases in the Ottawa site.

Table C.1

Final Number of Participants by Assessment Office and Administration Outcome

Centre	Total clients	Refusal	complete	Failed core
Ottawa	443	102	240	41
Toronto - Charles	196	2	190	1
Toronto - N. York	196	2	184	1
Toronto - Scarborough	163	9	151	0
Calgary	343	78	246	2
Total	1,343	193	1,011	45

First, the data shows that the study sample consists of *very recent* immigrants; in fact, 61.5% of the sample is comprised of individuals having been in Canada for two years or less and 91.5% represent individuals in Canada for five years or less. These individuals were mostly middle aged, with the majority of the sample (60.0%) being between 30 and 44 years of age. Young adults also represented a significant portion of the sample since 16 to 29 year olds encompass 28.4% of the study sample while 1.7% were older than 54 years of age. In terms of gender, the CLBPT-IALSS sample showed a difference between its proportions of male (46.2%) and female (52.8%), however these differences are not statistically significant.

The labour force status descriptors for participants are important in describing the overall characteristics of the study sample. Most participants reported being unemployed/looking for work (71.3%), whereas close to 20% of them were already working or self employed. Only small percentages of the overall sample consisted of students, home makers or retired individuals. This important finding is probably due to the fact that the CLBPT participants were all sampled through the LINC centres which are responsible for offering second language training to immigrants, most of which probably intend to better their language skills in order to gain access to employment. The great number of CLBPT participants without employment may also be a result of their very recent immigration into Canada.

Clearly, one of the most important sample characteristic for this study was the participants' education level. When asked about their highest completed level of schooling, an impressive 45.4% of respondents said they had a bachelor's degree and 19.3% reported having obtained a Master's degree. Small percentages of the sample consisted of individuals with less than a high school degree (2.7%) or high school graduates (8.3%). However, it is very difficult to know exactly how this extra education will impact their English language skills since most of the participants in the CLBPT sample completed their education outside Canada, meaning that this formal schooling might have been taken in a foreign language. Just over 17% of study participants reported having some post-secondary education, below that of a bachelor's degree.

The information collected from the CLBPT sample shows that 88.47% of respondents said they did not use English at home on a regular basis. In fact, of those sampled respondents who do make use of English in their home, 1.5% use it exclusively and just over 10% combine English along with other languages. However, for these individuals, the questionnaire did not provide a sense of English use's relative importance in terms of frequency. In sum, the CLBPT participants reported little use of the English language in their home.

Socio-demographic characteristics of the CLBPT-IALSS comparison study sample are different than those associated with the total recent immigration population as measured by the Census (2001) and the IALSS (2003). This makes it impossible to generalize directly all of the conclusions of the present study to the total Canadian recent immigrant population. The following characteristics describe certain key comparison aspects

of the Canadian recent immigrant population which according to the 2001 Census data represents 3.25% of the total Canadian population.

First, the overall employment rate for the recent immigrant population for Canada is close to 55%. According to 2001 Census data, the unemployment rate for recent immigrants in Canada in 2001 was 13.8%.

Second, in Canada's recent immigration population, approximately 22.5% of individuals had not graduated from high school. Looking at post-secondary education, a total of 32 of the recent immigration population had a university degree, which is very high even when compared to the total Canadian population where only 14.2% of citizens have a university degree.

Third, among the recent Canadian immigrant population 25% say English is the language used most often in their home. Even though 63.4% also report using a language other than French or English most often at home.

Canada's immigrant population represents a significant portion of its human capital. In fact, in 2001 Canada's immigrants accounted for 17.68% of the total population. With strict budget and time restrictions, it was not possible to elaborate a sampling strategy allowing collection of data from a representative sample of Canada's immigrant population. It would have been better to establish a close representativeness of the sample collected in the course of this study. This would have allowed us to apply the study results to a large and growing portion of our population. However, because of the nature of the sample as detailed in the paragraphs above, all conclusions of the present study may not be unequivocally applied to other groups of varied social and economic characteristics. Nonetheless, the conclusions presented in the subsequent sections provide some new information and shed light on a comparison never before attempted. Although the study results could not be directly applied to Canada's entire recent immigrant population, there are interesting and promising new applications for the conclusions of this study. This new source of information may help narrow the gap for the policy makers' ever growing need for applicable and pertinent research findings in the field of language proficiency and skills assessment.

Note : the Census data used to establish the comparisons in this chapter were all obtained directly from the CANSIM website and correspond to the 2001 Canadian Census.

Description of the CLB-PT assessment tool

The Canadian Language Benchmark Placement Tool is used in order to assign immigrants to the proper level of language training in LINC centres across Canada. For this reason, they tend to be relatively short tests which have been validated for use in low-stakes assessment contexts. Many of these tools are restricted to an assessment of benchmarks 1 through 8, as these are the levels most commonly associated with placement in language programs.

Of the available instruments, the Canadian Language Benchmarks Placement Test (CLBPT) is an obvious choice for comparison against the IALSS assessment tool. One advantage of using the CLBPT is the fact that it is readily available, efficiently administered (time and cost wise), widely used for the assessment of large groups of learners across Canada, and it provides uniform and standardised results. The speaking component of the test must, however, be administered individually; one assessor per student compared to the other components which can be administered by one assessor for a classroom full of students. Two potential drawbacks to using the CLBPT are as follows: the test is short and therefore may not be as reliable as some of the longer CLB based assessment instruments; and the test does not provide benchmarks for learners whose reading ability exceeds benchmark 8. The objective in developing the CLBPT was to keep the administration time as short as possible while still allowing trained assessors to place learners into the appropriate ESL classes. The design, format, and approach to the CLBPT represent the best possible compromise between the mandate for a very short test and the requirements of fully representing the domain of behaviours we wish to measure.

The CLBPT is an instrument widely used to determine the level of English communication proficiency for clients in LINC centres across Canada. It is applied by practitioners with the intent of assigning test-takers to appropriate language training programs. The CLB describes a learner's communication proficiency according to four specific language skills: Speaking, Listening, Reading and Writing. A learner's proficiency level is assumed to develop along a continuum which is presented in the CLB framework as three consecutive stages of progression: I (Basic), II (Intermediate), and III (Advanced). Each of these progression stages are comprised of four levels of ability, or benchmarks, for a total of 12 benchmarks associated with each specific language skill.

There are many variations of the CLB instruments: this study assessed participants using the Canadian Language Benchmark Placement Test (CLB-PT) versions 1 and 2. The CLB-PT evaluates four different language skills, as previously stated; however, only three were considered for analyses in this study.

Language Skill CLB-PT Test Description

Listening	<ul style="list-style-type: none"> • 5 to 15 minutes administration time • face-to-face or one-on-one administration • 7 parts at increasing levels of difficulty • Procedure is adaptive • Learners do not have to attempt all parts depending on their level of proficiency • A raw score is first assigned for test-takers at levels 3 and up, which is then transformed to a benchmark. Levels 0 to 2 are assigned a benchmark directly.
Reading	<ul style="list-style-type: none"> • 30 minutes administration time • 4 reading tasks • 29 multiple choice test items • Tasks progress in difficulty • Learners may stop when content becomes too difficult • Assessors may orally clarify instructions for Task 1
Writing	<ul style="list-style-type: none"> • 30 minutes administration time • 3 writing tasks • Tasks progress in difficulty • Learners may stop when tasks become too difficult • Assessors may orally clarify instructions for Task 1
Speaking	<ul style="list-style-type: none"> •

Listening component

There are seven parts to the CLBPT speaking and listening assessment and both skills are evaluated through one integrated process. Each part included in the assessment progresses in difficulty, and covers a broad range of oral and aural proficiency indicators. Because this is an adaptive instrument, not all parts are automatically administered to each of the test-takers. The assessor decides which parts to administer based on a holistic evaluation of the respondent's performance. Throughout the assessment process, the assessor takes

notes to help inform and justify the decisions made. The conversion grid shows how the raw scores are transformed into the benchmark levels. Benchmarks 0 to 3 are assigned holistically and therefore no raw score is given to the respondents who do not meet at least the minimum requirements of benchmark 4.

Listening Conversion Grid

Reading component

The CLBPT reading assessment consists of four tasks which progress in difficulty. The items for each task have been designed to address a variety of reading skills and strategies across the eight benchmarks. All items have a multiple-choice response format in order to address the high demand for time-efficiency without compromising reliability. Since all items follow the same format, participants do not waste time trying to understand different instructions and requirements for each task. The exclusion of open-ended items also protects against any tendency for the reading benchmark to be influenced by a participant's writing ability. This format also enables the test to be easily, efficiently, reliably and objectively scored by the assessors using the reading answer key provided with the assessment guide. Each item response is worth 1 (one) point, the total number of points achieved by the client is written on the cover of the test booklet as a total raw score. Once the raw score has been determined by the scoring procedure, the reading conversion grid is used to assign the appropriate benchmark.

Reading Conversion Grid

Raw Score	Benchmark
0 to 4	Pre-benchmark
5 to 7	Benchmark 1
8 to 10	Benchmark 2
11 to 13	Benchmark 3
14 to 16	Benchmark 4
17 to 19	Benchmark 5
20 to 22	Benchmark 6
23 to 25	Benchmark 7
26 to 29	Benchmark 8

Writing component

The CLBPT writing assessment consists of three tasks. The first, a copying task, is intended to make distinctions among learners from pre-benchmark to benchmark 2. The second task, a short paragraph on a

topic of personal relevance, is geared toward distinguishing performance at benchmarks 3, 4, and 5. The final task is the most challenging, and is meant to elicit performance which can be evaluated in order to set apart learners at benchmarks 6, 7, and 8. Each participant attempts all tasks. The scoring mechanism has been designed to support assessors in making reliable distinctions between different levels of writing proficiency.

Scoring procedures for the CLBPT writing assessment are based on a series of bands, which have been tailored to the unique requirements of each task. The bands incorporate elements of both holistic and analytic scoring approaches. The numerical indicators which correspond to each band have been weighted to ensure proper placement. Together, the tasks provide a composite profile of the learner's overall ability. In order for the placement to be as reliable as possible, it is essential that learners complete all three of the writing tasks. The band scores for all three writing tasks are then added up to arrive at the total raw score. The writing conversion grid is used to convert the raw score to a writing benchmark.

Writing Conversion Grid

Raw Score	Benchmark
0 to 1	Pre-benchmark
1 to 2	Benchmark 1
3 to 4	Benchmark 2
5 to 6	Benchmark 3
7 to 8	Benchmark 4
9 to 10	Benchmark 5
11 to 12	Benchmark 6
13 to 14	Benchmark 7
15 to 16	Benchmark 8

The IALSS instruments used in the CLB/IALSS linkage study

Two different IALSS test forms were created for this study. Questions of contrasting difficulty levels and covering the two literacy domains are included in each block (Block A, 13 items; and Block B, 12 items). Form 1 consisted of blocks A and B, whereas Form 2 presented the same blocks in reverse order to counter any motivation or fatigue effects in the overall results. The total test time was between 45 and 60 minutes for either forms of the test, although no strict time limit was imposed on the respondents.

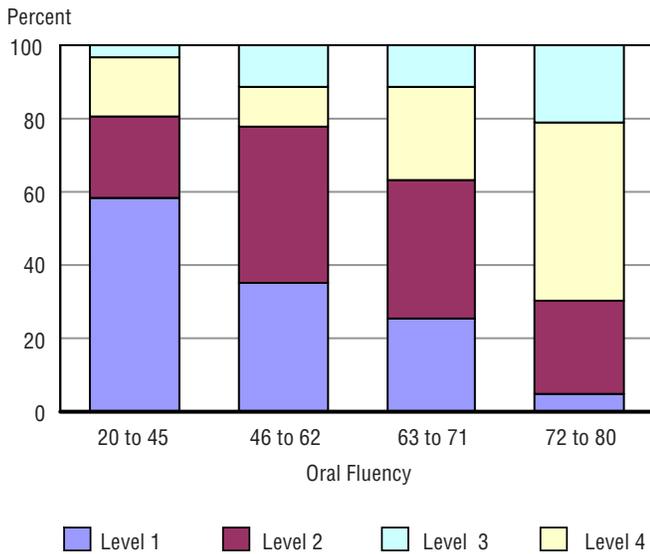
Over 60% of adults with the second most skilled oral fluency level have prose skills below Level 3.

Annex D

Joint distributions of oral fluency with document literacy and numeracy

Figure D.1

Level 1 and 2 document literacy proficiency level by oral fluency proficiency level by, adults aged 16 and over, Canada, 2003



Source: IALSS, 2003 and ISRS, 2005.

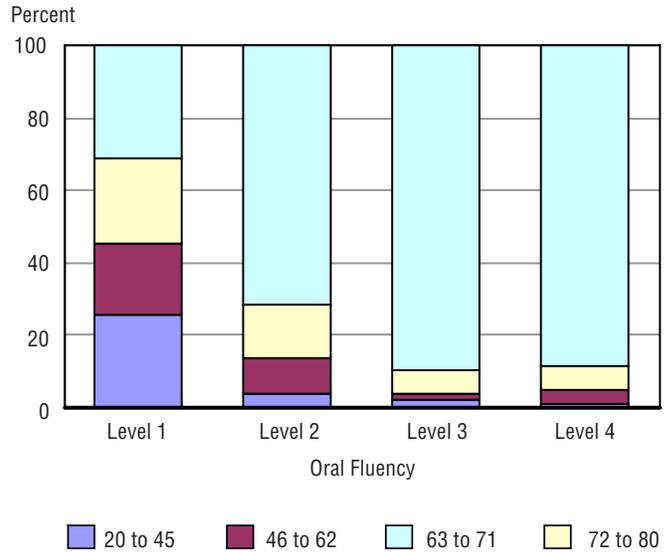
The figure reveals several important facts, including that:

Fully 80% of adults with the lowest three oral fluency levels have Levels 1 and 2 prose skills,

The proportion of adults with prose skills below Level 3 falls steadily with rising oral fluency level. 30% of adults in the most skilled oral fluency level have prose skills below Level 3.- the minimum level needed to cope with the reading demands Canadian society and of the majority of jobs being created in the Canadian economy (DataAngel, 2010)

Figure D.2

Oral fluency proficiency level by level 1 and 2 document literacy proficiency level, adults aged 16 and over, Canada, 2003



Source: IALSS, 2003 and ISRS, 2005.

The figure reveals several important facts, including that:

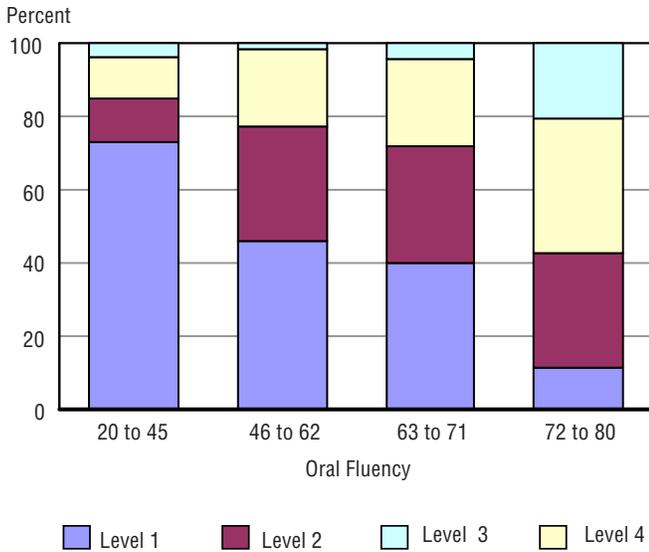
The risk of having low oral skills is distributed among document literacy levels in much the same way as for prose literacy level

The risk of having inadequate oral fluency skill falls steadily from a high 45% to a low of 5%.

The risk of having less than adequate oral fluency skills for document Level 2 falls fourfold of that faced by prose Level 1 adults.

Figure D.3

Level 1 and 2 numeracy proficiency level by oral fluency proficiency level by, adults aged 16 and over, Canada, 2003



Source: IALSS, 2003 and ISRS, 2005

The figures reveals several important facts, including that:

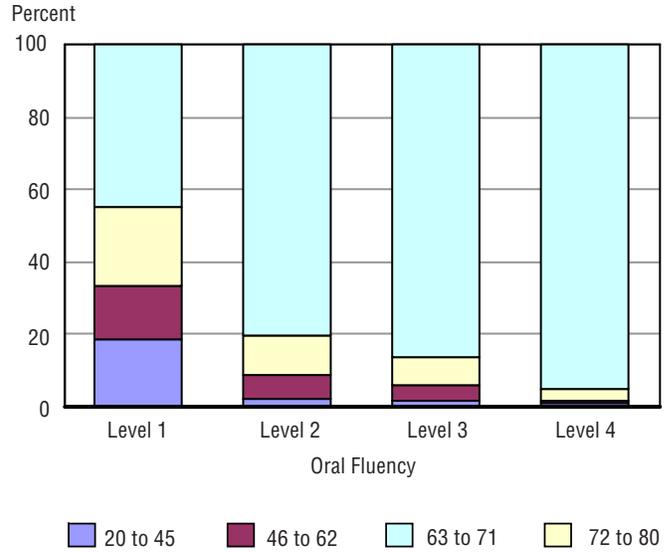
The proportions of adults with weak oral fluency skills are highest in those adults with Level 1 numeracy

A smaller proportion off adults with weak oral fluency skill have numeracy problems.

The only numeracy level with an appreciable proportion of adults with low numeracy skills is Level 1. the proportion of adults with weak numeracy skills at Level 2 falls dramatically to 10

Figure D.4

Oral fluency proficiency level by level 1 and 2 numeracy proficiency level, adults aged 16 and over, Canada, 2003



Source: IALSS, 2003 and ISRS, 2005.

These results were to be expected as the symbol set used to represent mathematics globally are very similar, and hence transferable across language and culture. Put a different way, immigrants with weak oral fluency skill in Canada’s official languages, or with weak prose or document literacy, are likely to be able to apply their mother tongue mathematics skill.