

# **Skills Research Initiative**

## **Initiative de recherche sur les compétences**

### **The Training Divide: A Canada-US Comparison of Employee Training**

Nicole Fortin (University of British Columbia)  
Daniel Parent (McGill University)

Working Paper 2006 B-09

---

Human Resources and Social Development Canada/Ressources humaines et Développement social Canada  
Industry Canada/Industrie Canada  
Social Sciences and Humanities Research Council/Conseil de recherches en sciences humaines du Canada

---

**Working Paper Series / Collection Documents de travail**



Government  
of Canada

Gouvernement  
du Canada

Canada

In the context of the federal government's innovation strategy, Human Resources and Social Development Canada (HRSDC), Industry Canada (IC) and the Social Sciences and Humanities Research Council Initiative on the New Economy (SSHRC-INE) are partnering to design and fund a multi-year skill-related research program—the HRSDC-IC-SSHRC Skills Research Initiative (HISSRI). The research is grouped into four themes:

- A. Labour Market and Skills Implications of Population Aging;
- B. Employer-Supported Training;
- C. Adjustments in Markets for Skilled Workers;
- D. International Mobility of Skilled Workers.

The HISSRI Working Paper Series provides a forum for the discussion of analytical issues related to the themes covered under the research partnership. Working Papers are circulated in the language in which they were written. The papers reflect the views of the authors and no responsibility for them should be attributed to HRSDC, IC or the SSHRC. Comments on the papers are invited and may be sent directly to the authors.

Dans le cadre de la stratégie d'innovation du gouvernement fédéral, Ressources humaines et Développement social Canada (RHDSC), Industrie Canada (IC) et l'Initiative de la nouvelle économie du Conseil de recherches en sciences humaines (INE-CRSH) se sont associés pour concevoir et financer un programme pluriannuel de recherches sur les compétences, appelé Initiative de recherche sur les compétences de RHDSC-IC-CRSH. Ce programme comprend quatre grands thèmes :

- A. les incidences du vieillissement de la population sur le marché du travail et la main-d'œuvre spécialisée;
- B. la formation en entreprise;
- C. l'adaptation du marché du travail aux travailleurs spécialisés;
- D. la mobilité des travailleurs spécialisés dans le monde.

La collection Documents de travail de l'Initiative de recherche servira de tribune où seront abordées plusieurs questions analytiques liées aux thèmes susmentionnés. Les documents de travail sont diffusés dans la langue dans laquelle ils ont été écrits. Les opinions qui y sont exprimées sont celles des auteurs et n'engagent pas RHDSC, IC ou le CRSH. Le lecteur est prié de faire part de ses commentaires aux auteurs.

# **Skills Research Initiative Initiative de recherche sur les compétences**

## **The Training Divide: A Canada-US Comparison of Employee Training**

Nicole Fortin (University of British Columbia)  
Daniel Parent (McGill University)

Working Paper 2006 B-09

IC 60104

---

Human Resources and Social Development Canada/Ressources humaines et Développement social Canada  
Industry Canada/Industrie Canada  
Social Sciences and Humanities Research Council/Conseil de recherches en sciences humaines du Canada

---

To obtain copies of the documents published under the  
HRSDC-IC-SSHRC Skills Research Initiative, please  
visit [http://strategis.ic.gc.ca/epic/internet/ineas-aes.nsf/en/h\\_ra01877e.html](http://strategis.ic.gc.ca/epic/internet/ineas-aes.nsf/en/h_ra01877e.html) or contact:

Publications Coordinator  
Micro-Economic Policy and Analysis  
Industry Canada  
10<sup>th</sup> Floor, East Tower  
235 Queen St.  
Ottawa, Ontario K1A 0H5

Tel.: (613) 952-6411; Fax.: (613) 991-1261  
E-mail: [mepa.apme@ic.gc.ca](mailto:mepa.apme@ic.gc.ca)

Pour obtenir des exemplaires des documents publiés  
dans le cadre du Programme de recherches sur les  
compétences de RHDSC-IC-CRSH, cliquer sur  
[http://strategis.ic.gc.ca/epic/internet/ineas-aes.nsf/fr/h\\_ra01877f.html](http://strategis.ic.gc.ca/epic/internet/ineas-aes.nsf/fr/h_ra01877f.html) ou s'adresser à :

Coordinatrice des publications  
Analyse de la politique micro-économique  
Industrie Canada  
10<sup>e</sup> étage, tour Est  
235, rue Queen  
Ottawa (Ontario) K1A 0H5

Tél. : (613) 952-6411; Fax : (613) 991-1261  
Courriel : [mepa.apme@ic.gc.ca](mailto:mepa.apme@ic.gc.ca)



## Abstract

In the paper, we use data from the IALS (1994), a unique data set that is administered similarly across Canada and the United States, in particular, that contains answers to questions on literacy and numeracy skills, as well as information on the demographic background of the respondents. This allows us to explore many dimensions of training previously overlooked. Two broad themes emerge from our analysis. The first one is that while there is some evidence of cross-country differences in the provision and in the intensity of training in terms of magnitude, we think that the within-country factors related to ethnicity, language, or gender differences play a major role. The most solid statistical evidence in this paper concerns lower levels of training incidence and intensity for French Canadians than for English Canadians. We also find similar evidence, although not quite as strong, for a difference between African Americans and White Americans. Secondly, where we find strong evidence of major differences between Canada and the United States, it is not so much in terms of the amount of training provided to its workforce, but rather in terms of the very different effects that the literacy measures seem to have on training. In particular, the surprisingly negative association between quantitative literacy and training found in the United States is not part of the training structure in Canada. The benefit of having standardized questions asked on both training and literacy to each individual in both countries makes for a meaningful analysis of the determinants of training by country. Together these two sets of findings are strongly suggestive that two fruitful avenues for future research would be first to further explore the link between language/ethnicity type factors and post-schooling human capital accumulation. The second possible research avenue would be to further investigate the reasons why, for example, more quantitatively literate workers in the United States are less likely to receive training whereas the opposite is true in Canada, which is the traditionally expected outcome.

## Résumé

Les auteurs ont utilisé des données provenant de l'Enquête internationale sur l'alphabétisation des adultes (EIAA, 1994), ensemble de données qui est administré de la même façon au Canada et aux États-Unis, en particulier, qui contient des réponses aux questions sur la littératie et l'habileté arithmétique, ainsi que des renseignements sur les antécédents démographiques des répondants. Les auteurs ont ainsi pu étudier plusieurs dimensions de la formation qui avaient auparavant été laissées de côté. Deux grands thèmes ont émergé de leur analyse. Premièrement, bien que les auteurs constatent certaines différences entre les pays pour ce qui est de la prestation et de l'intensité de la formation sur le plan de l'ampleur, ils pensent que les facteurs, au sein d'un même pays, liés à l'origine ethnique, à la langue ou au sexe jouent un rôle important. La preuve statistique la plus solide de cette étude a trait à la fréquence et à l'intensité de la formation qui sont moins élevées chez les Canadiens-français que chez les Canadiens-anglais. Les auteurs ont trouvé une preuve semblable, bien que pas aussi évidente, d'une différence entre les Américains africains et les Américains blancs. Deuxièmement, les grandes différences que les auteurs ont observées entre le Canada et les États-Unis ne se situent pas tant dans la quantité de formation offerte à la main-d'œuvre que dans les

effets très différents que les mesures de littératie semblent avoir sur la formation. En particulier, la surprenante relation négative entre la capacité de lecture de textes au contenu quantitatif et la formation observée aux États-Unis ne fait pas partie de la structure de la formation au Canada. Le fait de poser à chaque personne des deux pays des questions normalisées sur la formation et la littératie a l'avantage de permettre la production d'une analyse significative des déterminants de la formation par pays. Ensemble, ces deux séries de constatations laissent fortement supposer que deux voies pour la recherche s'annoncent très prometteuses. Premièrement, il faudrait étudier davantage le lien entre les facteurs d'ordre linguistique ou ethnique et l'accumulation de capital humain après les études. Deuxièmement, il faudrait essayer de comprendre, par exemple, pourquoi un plus grand nombre de travailleurs américains possédant une capacité de lecture de textes au contenu quantitatif sont moins susceptibles de recevoir de la formation, alors que le contraire est vrai au Canada, ce qui est le résultat habituellement attendu.

## Summary and Highlights

- **Data Source and Types of Adult Education and Training Studied**

Like Tuijnman and Boudard (2001), we use as source of data the International Adult Literacy Survey (IALS), which was conducted in Canada and the United States in 1994. The study thus takes a look back at the determinants of training more than a decade ago. To make our policy discussion more current, we include descriptive statistics from the AETS surveys for 1993, 1997 and 2002. Our analysis covers various types of employee training including job-related training, employer-sponsored training, and employer-provided training. The IALS contains unique information about the respondents' literacy and numeracy skills, as well as information on the ethnic/cultural/racial background of respondents.

- **Canada/US Differences in the Incidence and Intensity of Training**

Like others (Tuijnman and Boudard, 2001; Lin and Tremblay, 2003), we find an unadjusted employee training divide between Canada and the United States ranging from 4 to 9 percent depending on the type of training. When we correct for standard covariates such as age, gender, immigrant and ESL status, education levels and firm size, we generally do not find a significant negative effect of being Canadian vs. American in terms of the incidence of training. Like others, we find a positive difference in the raw average annual hours of employee training in favour of Canada, but given the large standard deviations, the difference is not statistically significant. Correcting for covariates, the Canada/U.S. difference becomes negative and significant.

- **Canada/US Differences in the Determinants of Training**

Interestingly, our analysis of the incidence of training reveals opposite effects of literacy and numeracy scores between the two countries. Similarly, our analysis of the intensity of training show that the effects of the main determinants such as education, age and firm size sometimes run in opposite direction in the two countries.

- **Within-Country Differences Greater than Cross-Country Differences**

An important original contribution of this study is to highlight the important differences across demographic groups in the incidence and intensity of training. The IALS asks information about belonging to demographic groups relevant to each country of interest that is belonging to a racial group in the United States and to French/English groups in Canada. Beyond cultural factors, because of historical institutional factors African Americans and French Canadians had very limited access to higher education until the 1970s, it is thus interesting to consider these groups in particular.

- **French/English Canadian Differences**

We find that a raw training divide between French and English-Canadians ranging from 11 to 21 percent depending on the type of training, a training divide much larger than the Canadian/American divide. In addition, the positive effect of being an English-Canadian is robust

to the addition of a complete set of covariates, including industry and occupation dummies. The French/English divide in the intensity of training is even larger and more significant.

- **Training Exclusion**

In both countries, we find that other Americans and other Canadians are also at disadvantage with regards to employee training by comparison with the dominant group. Immigrant/ESL status is a negative factor that is significant in many, but not all, regressions: in fact, we find that male immigrants in Canada have longer training spells than non immigrants.

- **Policy Implications**

While the results of the 1994 IALS indicate a substantial training divide between English Canadians and French/Other Canadians, the results from the 2003 AETS indicate that the training gap between Quebec, New Brunswick, Manitoba, on the one hand, and the other provinces, on the other hand, has largely closed. A persistent concern is the lower incidence of training among other Canadians. While a formal study of the policies adopted by the province of Quebec with regards to employer-supported training is needed, preliminary evidence suggests that the impact of the Quebec policy by comparison with the potential impact of demographic factors is relatively small. We thus conclude that policies aimed at maintaining or improving educational attainment and/or school quality, as well as basic literacy skills, would likely represent a very fruitful area for intervention with potentially far-reaching equity-enhancing impacts.

## 1 Introduction

In an era of increased technological change and global competition, the importance and intensity of adult training is a topic of great interest for both industry leaders and policy makers around the world. A potentially troublesome pattern in view of the growing productivity difference between Canada and the United States are the differences in the incidence and intensity of employee training between the two countries. Many authors (Tuijnman and Boudard, 2001; Lin and Tremblay, 2003) have reported differences, ranging from 5 to 10 percent, in the unadjusted proportions of Canadians and Americans undertaking various types of employee training. This has raised the question of whether employers in Canada are investing enough in human capital.

Although the Canadian and the U.S. economies share very similar features, there are some significant differences in industrial structure, distributions of firms by size, and level of unionization, as well as in the educational attainment and ethnic origins of their workers. This raises the question of whether or which of these differences can account for the cross-country differences in employee training. Of particular concern is the possibility that particular public policies and institutions in Canada may have deleterious effects on employee training.

Earlier studies have indeed focused on institutional differences between Canada and the United States to explain the differences in training across the two countries. Green and Lemieux (2001) for example have investigated the impact of unionization on the incidence and sources of payment for training in Canada. They find that the higher incidence of training among union workers disappears once they control for a variety of factors such as age, education, and in particular firm size and seniority. The authors thus conclude that everything else being equal, unions have little effect on the provision of training in Canada.

In this paper, we use the 1994 International Adult Literacy and Skills Survey (IALS), which asked the same questions about adult education and training across different countries. This enables us to consider the impact of differences in economic structure between Canada and the United States on employee training without the usual problems of mismatch between education levels, industrial coding and the like. The survey also contains information on immigrant status, language skills and literacy proficiency, as well as information on ethnic/cultural background. This allows us to investigate another hypothesis rooted in the historical development of the education systems in both countries that demographic groups historically at a disadvantage with respect to educational attainment may also be at a disadvantage with respect to adult education and training.

Our main finding is indeed of important differences in both the incidence and intensity of various types of training across demographic groups, a finding that is both stark and robust. This first finding underlines the need for public policies with regard to employee training that are equity-enhancing along a previously overlooked dimension. Given that one of the critical findings on the U.S. training policy evaluation pertains to the heterogeneity of impact across groups, this sort of finding is important in informing the debate about the impact of training on inequality. Another major finding of this paper is that the usual determinants of training act in different and

sometimes opposite ways in the two countries. This raises a potential role for public policies to support employers who provide remedial general training.

The paper is organized as follows. In section 2, we outline the conceptual framework that guides our choice of explanatory factors and anticipated results. We reiterate the main tenants of the literature on general and firm-specific human capital, but we also introduce elements that provide the foundations of our novel hypothesis. In section 3, we address the data issues. Our analysis begins in Section 4 with a descriptive analysis of the incidence of training in Canada and the United States. It is followed by Probit analyses of the incidence of various types of training and Tobit analyses of the intensity of various types training. We also include some simulations of the incidence of training using the reweighing procedure developed in DiNardo, Fortin, Lemieux (1996). There we show what the outcomes in Canada would have been if Canadian employees had individual characteristics similar to their U.S. counterparts and vice-versa. The policy implications of the findings are discussed in section 5, which includes some more recent statistics on the incidence of training across the Canadian provinces. Finally, we conclude in section 6 with some recommendations for future research.

## **2 Conceptual Framework**

### **2.1 General vs. Occupation/Industry vs. Firm-specific**

An essential point of departure in every discussion of human capital accumulation is Becker's (1964) fundamental distinction between general human capital, which is portable across all employers, and firm-specific capital, which is of use only within the employment relationship where the accumulation of skills takes place. As is well known, the nature of human capital accumulated through training, more particularly firm-provided training, in principle determines the identity of the party who should pay for such training. As long as training is perceived as providing workers with totally transferable skills, they should pay for it through reduced wages during the training phase, and they should reap the full returns to training afterwards due to the competitive bidding process for their services. On the other hand, if there is an element of firm-specificity attached to the training, this creates incentives for the worker and the firm to share both the cost and the return to such training. The prediction that wages should grow with experience because productivity grows with experience has found ample support in the literature (see e.g. Lynch (1992) and Parent (1999) looking at the United States). Parent (2003) performed a similar analysis for Canada exploiting the limited training questions contained in the Follow-up to the School Leavers Survey. In both countries, there is very little evidence that workers pay for the training they receive through reduced wages, but there is strong evidence that firms pay for direct expenses (Parent, 1999). Even when a statistically and economically significant negative wage effect is found, such as in Barron, Berger, and Black (1999), it is much too small to even partially outweigh the gains following training for any reasonable discount rate. The immediate consequence of having very little evidence showing that workers finance the acquisition of general training is that one would expect to have socially sub-optimal provision of such training. Firm-level data would be needed to assess whether the under provision problem is severe or not in Canada in the absolute sense. In this paper, because we can compare the United States to

Canada, we can however provide suggestive evidence as to whether the extent of private-sector training under provision appears more severe in Canada relative to the United States.

There are two salient reasons related to public policies and institutional backgrounds why the incidence of employer-sponsored or employer-provided training could be different in Canada than in the United States. First, the degree of unionization is very different. As discussed in detail in Green and Lemieux (2001), the effect of unions on the incidence of training can be complex. Given that unions capture rents that otherwise would accrue to firms, this should discourage firms from investing in firm-specific skills. In addition, by setting wages that are higher than what they would be in the absence of a collective bargaining agreement, unions prevent credit-constrained workers from being able to pay for general training through reduced wages. However, by having largely pre-determined post-training wages, firms can pocket some of the returns to investment in general human capital. Overall, the effect of unions on the provision of training turns out to be an empirical matter as the theoretical effects are ambiguous. While Green and Lemieux find very little effect of unions on the provision of training, they offer limited support for the notion that unions may actually encourage the participation of firms in employer-financed training. In contrast with the evidence reported by Green and Lemieux, Lynch (1992) shows that unions are positively associated with the incidence of on-the-job or apprenticeship training programs provided firms in the United States.

The second factor that could affect the provision of training differently in Canada than in the United States is the minimum wage. As explained in Hashimoto (1982), minimum wages should have the unambiguous effect of reducing the provision of general and firm specific training by depriving workers paid wages that are close to the minimum the ability to finance investments in skills through reduced wages. While the level of minimum wages is not dramatically higher in Canada than in the United States, it is higher relative to the average nationwide wage. Consequently, it should have the unambiguous effect of lowering the incidence of training relative to the United States. To preview the results below, while it is true that the raw data from the International Adult Literacy Survey show a lower incidence of training in Canada, once we properly control for the observed characteristics of the workers, that discrepancy disappears for essentially all forms of training present in the data.

On the theoretical side, a recent paper by Lazear (2003) refines the old beckerian framework by first noticing that while it is very easy to find examples of general human capital, typically we have a much harder time coming up with examples of firm-specific human capital. One almost invariably has to invoke either fuzzy concepts like organizational culture, or come up with somewhat trivial examples such as knowing the person to contact to change the light bulbs or knowing how to find the restrooms. Lazear argues that basically all skills are general, but that firms differ in terms of the mix of such general skills that they use. In what he defines as a “thick market” for a certain combination of skills, a large number of firms in this market may require more or less the same set of skills from their workers. Hence, the standard theory of general human capital is likely to provide a very good approximation of how skills are rewarded. On the other hand, in “thin markets”, only a relatively small number of firms require a certain combination of skills. In the limit, there could be only one firm requiring its workers to possess a given mix of skills. In the case, we are back to a bilateral monopoly bargaining problem. The

Lazear model helps explain why empirical researchers have been hard pressed to find any evidence that workers finance general training: since firms differ in terms of their required skill mix, they exert some form of ex-post monopsony power, and hence they are willing to pay, at least, for some part of the human capital acquired by their trained workers. Acemoglu and Pischke (1998) also argue that asymmetric information confers ex-post monopoly power to the firms.

An overall consequence of the models of Acemoglu and Pischke (1998) and Lazear (2003) is that the extent of the under-provision of training is perhaps nowhere near as severe as one would think. In summary, theoretical considerations suggest that differences in the incidence of training in Canada and the United States may be largely independent of the differences in institutions such as unions and minimum wages and, in the end, be more dependent on individual and firm characteristics.

## **2.2 Complementarity/Substitutability of Employer-Specific Training and General Human Capital**

An important area of research with regards to on-the-job training, where a cross-country study is particularly useful, focuses on the potentially different interactions between general human capital, such as formal education, and employer-sponsored or employer-provided training. At issue is the fundamental question of pinning down the exact role of post schooling training. Is such training largely remedial in nature or is it instead added on as a complement to the skills the individual already has? Alternatively, on-the-job training could also be totally independent of any schooling.

The main difficulty which arises in evaluating these alternative hypotheses is that education could also serve as a "filter". Firms could use the information conveyed about individual productivity by one's level of education to decide which workers should undertake training programs. Under such a scenario, education does not facilitate on-the-job learning but simply makes it more likely that a person is selected into training by the employer.

The literature on private sector training in the United States (e.g. Loewenstein and Spletzer (1997, 1999)) universally finds that more educated people are more likely to receive training, although at times the estimates are not that precise (see, e.g. Lynch (1992) or Altonji and Spletzer (1991)). Given that educational attainment does not show much year-to-year variation for those permanently in the labour force, it is difficult to assess the extent to which this positive relationship simply reflects omitted ability bias or really suggests that formal education and schooling are complements. Some of the attempts at correcting for selection into training based on unobservable characteristics through the use of standard panel data methods, as is done in Parent (2003), are not totally convincing because the coefficients associated with education are by necessity identified only by the individuals whose level of education change from one period to the next. First, there are relatively few of individuals upgrading their education, and secondly, it may be a stretch to draw population-wide inferences from the measured impacts on those individuals.

Interestingly, selectivity issues tied to the relationship between educational attainment and the incidence of employer-provided training are always discussed in terms of positive

selection: researchers expect the effect of educational attainment on training to be upward biased due to omitted ability. If one found a negative effect of education on training, it would be hard to dismiss the substitutability hypothesis by which a worker would need less training the more educated she or he is. No one in the literature has found evidence of such a relationship, perhaps due to selectivity issues. This can occur if the upward bias caused by positive selection more than offsets the true negative effect.

Here, because we possess measures of ability in terms of the literacy and numeracy scores, we will be able to address this issue contrasting the potentially differential impact of the interactions between formal schooling and literacy proficiency on training.

### **2.3 Ethnic/Cultural Divide**

In the education and income mobility literatures, it has long been understood that an individual's position in the income distribution or in the educational attainment distribution may depend on that individual's background. For example, all else being held equal, someone whose parents have relatively low levels of education will also tend to have lower levels of education. The same is true for earnings mobility across generations. In fact, the last ten or fifteen years have seen a proliferation of papers trying to measure the inter-generational correlation coefficient between the income of the children and that of the parents, typically, sons and father (Solon (2002), Corak and Heisz (1999)). More recent studies (Hertz, 2002) have highlighted differences across demographic groups in the transmission of income.

The same sort of mechanism is also considered in studies focusing on the degree of economic assimilation among immigrants and their descendants relative to non immigrants. To the extent that these intergenerational transmission mechanisms differ across ethnic or cultural groups, it may help in explaining, at least partially, why economic outcomes differ across those groups even after accounting for the effect of all individual and firm characteristics. The role of language and literacy proficiency is also intimately linked the ease of acquisition on new skills, including on-the-job training.

We do have good reasons to believe that this sort of mechanism is at play here. To give an idea of the cross-country differences in the relationship between the outcomes of the parents and the children's, we computed the correlation coefficient between the average educational attainment of the respondents' parents (as measured by the standardized ISCED classification) and that of the respondents themselves, disaggregated by gender, age group, and demographic group, language in the case of Canada and race in the case of the United States. One limitation in the calculation of those correlations is that the education of the parents is aggregated at a somewhat crude level, which takes away some of the extra variation we would have had years of schooling been reported both for the respondent and his/her parents. Nonetheless, we find that the degree of persistence in one's educational attainment across generations is higher in Canada than in the United States (at least in the case of males), with correlation coefficients of 0.57 for Canadians and 0.43 for Americans. Interestingly, differences are relatively minor in the case of females. Beyond the cross-country differences, the most remarkable thing about such figures is their magnitude, which is strongly suggestive of long run persistence across generations. If training outcomes are also affected by one's family background, then this may help explain

persistent differences between the two countries in either the incidence or the intensity of training, and also, more importantly in our view, differences within countries between different demographic groups.

### **3. Data Issues**

#### **3.1 Data Selection**

Like Tuijnman and Boudard (2001), we use as source of data the International Adult Literacy Survey (IALS), which was conducted in Canada and the United States in 1994. These data sets contain unique information about the respondents' literacy and numeracy skills, as well as information about the incidence and intensity of adult participation in education and training. In addition and importantly for our findings, the ethnic/cultural/racial background of respondents is available in those data. We note that answers to similar questions are suppressed in the public use files of the Adult Education and Training Surveys (AETS), the main Canadian source of information on the subject. On the other hand, we note that the province of residence is unavailable in the IALS; instead the province where the respondent was born and where he/she pursue their secondary education is reported.

Because our focus is on employee training and because of the relatively small sample size of the IALS, we include in our analysis all active labour market participants aged 16-65.<sup>1</sup> The detailed definition of what an active labour market participant is, as well as the detailed definitions of all variables uses are given in Appendix A. The Canadian sample over-samples French Canadians, thus all computations reported use the provided sample weights. Because our analysis most often combined quantitative variables and the literacy scores, we do not use the jackknife methodology suggested for each of these types of variables. We are thus cautious in inferring statistical significance.

#### **3.2 Construction of training variables**

Our analysis covers various types of employee training including job-related training, employer-sponsored training and employer-provided training. We also document participation in any form of training, as well as in personal interest training. This is useful in considering a possible substitution between employee and employer motivated training. Respondents to the IALS were first asked whether, during the past 12 months, they received any form of adult education and training: the incidence of any training is measured by an affirmative answer to that question. Respondents were then asked about the number of courses they took in the past 12 months, and detailed questions about the type and characteristics of the training are asked only about the first three occurrences. Our data on the more detailed types of training is thus censored. We were hoping to be able to account for that censoring by using the information on the number of courses taken but, unfortunately, that information is unavailable for about half of our sample. Because of this censoring, which is more severe in the United States than in Canada, it is possible that we somewhat underplay Canada/U.S. differences.

---

<sup>1</sup> Observations with missing information were also deleted.

The incidence of the different types of training studied is measured using an indicator variable that takes a value of 1 if an individual reported having taken that type of training in one of possibly three occurrences. It is thus an individual based rather than an event based measure. For example, if an individual reports three occurrence of training, two of which are job-related and one of which is for personal interest, this will generate an indicator of 1 for both the job-related category and personal interest category of training. Thus the sum of the proportions in these two categories may exceed the proportion in the any training category.

A training event was classified as job-related or personal interest, depending on the main reason given to undertake the training. This job-related training category may be occupation/industry-specific but not necessarily firm-specific. A training event that was financially supported by an employer is deemed “employer-sponsored” training, while a training event that was given by “a producer or supplier of equipment” or “an employer or a parent company” is called “employer-provided” training. We regard this latter type of training as the more tightly linked to firm-specific human capital or, at least, to more narrowly defined firm needs in terms of human capital.

We measure the intensity of training in each of the type of training analyzed in terms of the total annual hours of training received by each respondent. For each of up to three training events, we compute the annual number of hours as the product of hours per day times days per week time weeks per year. If a respondent reports more than one training event of a given type, we add up the annual hours of training of all relevant events.

### **3.3 Construction of explanatory variables**

As explained in section 2, formal schooling and firm size have been identified as important determinants of training incidence and intensity. Comparing education levels across countries is always a challenge because of cross-country differences in education systems. For example, the associate two-year college degree in the United States does not have an equivalent in Canada. However, because the IALS asked the number of years of completed schooling as well as the education level, we are able to provide a better correspondence between the Canadian and American education levels than is possible with most other surveys. We construct five categories of schooling: primary level or less, some secondary, completed secondary, some post-secondary and completed university degree.

The IALS, by comparison with other surveys used to study employee training, include fewer questions on the employer. It does however have information on the number of persons employed by the employer at all locations. As summarized by Chaykowski and Slotsve (2003), many studies find empirical evidence that the incidence and intensity of training increases with firm size, it is thus important to include this variable.

We also include in our analyses age interval dummies, which generally prove to have significant effects. We either include a gender dummy or perform the analyses separately for men and women. Part-time status is another important determinant of employee training that we include.

Beyond these commonly used variables, we include an indicator of immigrant status and of French or English as a second language (ESL). As discussed earlier, because French Canadians

and African Americans in particular had limited access to higher education until the 1970s, we include indicator variables of belonging to these country-specific demographic groups. While it is relatively straightforward to classify Americans according to their answers to the question on racial groups, the classification of Canadians into ethnic/cultural groups (French Canadians, English Canadians and other Canadians) appeals both to ancestry and language most often spoken at home during youth. The construction of the demographic groups is discussed in detail in Appendix A.

### **3.4 Literacy and numeracy proficiency variables**

Another particularity of the IALS, and the reason it was designed, is to capture the potentially different levels of literacy performance across languages and cultures. As explained in Boudard (2001), there are various concepts of literacy used in surveys performance of industrialized nations. Literacy used to be defined in terms of a basic reading ability which most individuals in developed countries are now expected to attain. For economic performance, literacy is more usefully defined in terms of an individual's ability to use written information effectively in their work environment. In the IALS, literacy is defined in terms of this latter behavioural mode and measured on three separate dimensions:

- a) "Prose literacy—the knowledge and skills needed to understand and use information from texts including editorials, news stories, poems, and fiction;
- b) Document literacy—the knowledge and skills required to locate and use information contained in various formats, including job applications, payroll forms, transportation schedules, maps, tables, and graphics; and
- c) Quantitative literacy—the knowledge and skills required to apply arithmetic operations, either alone or sequentially, to numbers embedded in printed materials, such as balancing a check book, calculating a tip, completing an order form, or determining the amount of interest on a loan from an advertisement." (Statistics Canada, 2001).

A respondent's proficiency in these three dimensions is measured in terms of a series of five plausible values for each of the three literacy domains, where the two upper categories were merged. As shown in appendix table A1, we do find significantly lower proportions of respondents in the upper categories among our historically educationally challenged groups—French Canadians and Africans Americans.

## **4. Results**

### **4.1 Descriptive Statistics**

In Tables 1 to 3, we provide descriptive statistics on the incidence and intensity of employee training, by country, demographic groups, by demographic groups and age. We now highlight the main points from these tables. First, comparing all American and all Canadians in Table 1 shows the 5-10 percentage differences, reported elsewhere (Tuijnman and Boudard, 2001; Lin and Tremblay, 2003), in the incidence of various types of employee training. More interesting are the differences across demographic groups. For all types of training, the proportion

of English Canadians engaged in those activities is at least as large, if not larger, than the proportion of White Americans. The proportion in the African and Other Americans and French Canadians and Other Canadians are similar, with the exception of training for personal interest in which French Canadians participate at higher rate. The bottom panel of Table 1 shows that the numbers among French Canadians are substantially similar to those among respondents whose secondary education took place in the province of Quebec.

Table 2 further explores the differences across demographic groups in Canada. Given the historical differences in access to higher education, our leading hypothesis to explain the French/English differences implies that these differences should be smaller among younger individuals. The proportion of active labour force participants receiving training is thus divided by age groups in Table 2. The numbers do indeed show a substantially lower proportion of respondent aged 56-65 in 1994 (thus 32-41 in 1970) participating in all types of training. There are however significant differences of 10 to 20 percent for all age groups, with French Canadian and Other Canadians participating in lower proportions. There is an interesting exception: the proportion of 15-25 year among French Canadians receiving training for personal interest is about 10 percentage points higher than among English Canadians. Note that when we look at specific occupational groups (results not shown); we find that among “production workers”, there are smaller differences across demographic groups, and actually no differences for employer-provided training.

Table 3 reports the intensity of training, measured by the average annual number of positive hours of training received in total (for up to three training events) for each type of training. The average annual hours spent in any training or job-related training range from 116 to 250 hours, while the average annual hours spent in employer-sponsored or employer-provided training range from 50 to 130 hours. Employees thus receive a substantial amount of job training that is not employer-sponsored. This pattern is strongest among Other Americans and Other Canadians. Like others before us (Tuijnman and Boudard, 2001; Lin and Tremblay, 2003), we find that these unadjusted numbers indicate a higher intensity of training (from 15 hours to 100 hours) in Canada than in the United States. Given the large standard deviations and relatively small numbers of observations, the Canada/U.S. differences of 15-30 hours are not significant in the employer-sponsored and employer-provided categories. French Canadians received less training than English Canadians (and Other Canadians) in the employer-sponsored and employer-provided categories, but not in the any training and job-related categories.

As these descriptive statistics indicate, there are many confounding factors that can explain the lower level of training among French Canadians, for example. As shown in table A1, their level of educational attainment, in particular the proportion with a university degree and their affiliation to larger firms are lower. Are these factors sufficient to explain away the difference highlighted above? To evaluate this and other issues, we now turn to regression analyses to assess the impact of the different factors in conjunction.

## 4.2 Probit Analyses of the Incidence of Training

We report in Tables 4 and 5 the marginal effects from a Probit model of various explanatory variables on the incidence of receiving training. Letting  $T$  be an indicator variable

take the value 1 if an active labour market participant receives a type of training and 0 otherwise, we estimate the probability of receiving training using the model

$$\Pr(T = 1|X) = \Pr(T^* > 0|X) = \Phi(X'\beta)$$

where  $X$  denotes a vector of covariates,  $\Phi$  is the cumulative normal distribution, and the latent variable  $T^*$  is determined by

$$T^* = X'\beta + \varepsilon, \quad T = 1[T^* > 0],$$

where  $1[\cdot]$  denotes an indicator function. Because we cannot identify the parameters  $\beta$ 's independently of the nuisance parameter  $\sigma$ , the standard error of the normal distribution, we only identify the ratio  $\beta/\sigma$ . It is thus convenient to normalize  $\sigma$  to one, but interpreting the Probit coefficients would require thinking in the  $Z$  (normal quantile) metric, rather we discuss of the marginal effects of the explanatory variables.<sup>2</sup> The marginal effects of a variable  $x_j$  on

$p(X) = \Pr(T = 1|X)$  are obtained from the partial derivative  $\partial p(X)/\partial x_j = \phi(X'\hat{\beta})\hat{\beta}_j$  in the case where  $x_j$  is continuous and from  $\Delta \Pr(T = 1|X) \approx [\phi(X'\hat{\beta})\hat{\beta}_j]\Delta x_j$  in the case where  $x_j$  is discrete.

Given our relatively small sample sizes, many of our regressions combine men and women together while including a gender dummy. We also perform some analyses separately by gender. In all specifications, we use the same basic set of covariates, including part-time, education, age and firm size dummies. For each of the different types of training, we use the same format to examine the effect of additional covariates, in particular the country and demographic group dummies. In columns (1) and (4), we investigate the robustness of the Canadian effect to the inclusions of an immigrant dummy and a French/English as a second language dummy (ESL). In columns (2) and (5), we include indicators of belonging in the demographic groups of interest: French Canadian, English Canadians, Other Canadians, White Americans, African Americans with Other Americans becoming the omitted category. Finally in columns (3) and (6), we add literacy and numeracy scores dummies, as well as industry and occupation dummies. We first discuss the impact of nationality and ethnic/cultural group since it represents the novel aspect of our study. Then we comment on the impact of the better-known covariates.

For all types of training with the exception of employer-sponsored training, the Canadian dummy in columns (1) or (4) is found to be negative, but not statistically significant. With employer-sponsored training, being Canadian reduces the probability of receiving training by 5%, but this effect is only statistically significant at the 10% level substantially. Turning to column (2) and (5), we find that for all types of training the positive effect of being an English Canadian (by contrast with Other Americans) is substantial 12% to 16% and statistically different from the impact of being French Canadian, although only at the 10% level in the case of employer-provided training. In columns (3) and (6), however the magnitude and significance of the English Canadian effect both fade away once the literacy score dummies and the industry and occupation dummies are introduced. The effect of being White American is positive and statistically different

<sup>2</sup> See the STATA manual on `probit` and `dprobit` for more details.

from being African American, although not different from the English Canadian effect. The negative effect of being French Canadian is comparable to that of Other Canadians thus somewhat smaller than the African American effect. Tests confirm that the French Canadian effect is significantly different from the English Canadian effect.

In summary, we find substantial differences across demographic groups in the incidence of all types of training in Canada. Using the 1998-99 WES, Lochhead (2002) found significant differences in the incidence of training among employees between recent immigrants, earlier immigrants and Canadian-born. He also remarked that the AETS does not include information on immigrant status or period of immigration. On the other hand, we are unaware of other studies pointing out the French/English differences, we are confident that these differences are sufficiently large not to be an artefact of our sample. It would however be interesting to confirm the phenomenon with another source of data.

Turning to the effect of education, age and firm size, the results displayed in Tables 4 and 5 indicate that participation in all types of training increases with education levels. These marginal effects are the largest effects found: a university or some post-secondary education increases the odds of receiving any training or job related training by 40% to 50%; they increase the odds of receiving employer-sponsored or employer-provided training by 20% to 30%. For any training and job-related training, these effects are robust to the introduction of literacy score dummies and industry and occupation dummies. This however does not hold for employer-sponsored training and employer-provided training. While the effects of educational attainment still increases with higher levels, the effects are not longer statistically significant. Given these results, we pay particular attention to the effect of literacy proficiency in Tables 6 and 7.

The marginal effects of age can be interpreted as experience proxy; since age is available only by intervals, it is not possible to construct a measure of potential experience. It may also capture to some extent a degree of potential attachment to the firm. This effect is also partially captured by the part-time dummy. While not significant when we consider any training or job related training, the marginal effect of working part-time on the incidence of employer-sponsored training and employer-provided training is negative and substantial: -10% and -6%, respectively.

We generally find that there are two age groups that distinguish themselves from others: the 16-25 year olds and the 56-65 year olds. The younger workers, 16-25 year olds, have a higher participation rates in any training and job related training but lower participation rates in employer-sponsored training and employer-provided training. For the group of older workers, the 56-65 year olds, the pattern is reversed: their odds of receiving any training or job related training is about 15% lower than the younger group. Apart from the group of younger workers, the marginal effects of receiving employer-sponsored training and employer-provided training decreases with age, consistent with a diminishing marginal impact of on-the-job training.

Another important determinant of training is firm size, many empirical studies have found that the incidence of training increases with firm size. Here our results are consistent with this result. We find that, for all types of training considered, the marginal effects of working for a large firms (500 employees and over) by contrast with working for a medium size firm (20-199 employees) range from 16% to 20%. We also find that, for employer-sponsored training and employer-provided training, the marginal effects of working for a small firm (less than 20

employees) by contrast with working for a medium size firm (20-199 employees) are significantly negative at  $-10\%$  and  $-6\%$ , respectively for the two types of training. These results are broadly consistent with the qualitative findings of others (Chaykowski and Slotsve, 2003). The magnitude of the effects seem however larger than those found by Green and Lemieux (2003) who use the 1993 and 1997 AETS. This raises the possibility of country-specific effects, which we explore in more details when we investigate the incidence-intensity of training in Tables 10 to 13.

We now explore the potentially different impacts by country of the literacy proficiency scores. Interestingly, we saw in Tables 4 and 5 that the introduction of these variables significantly reduced the explanatory power of the educational attainment variables.

### 4.3 Literacy and the Incidence of Training

One question in the training literature that has received little attention is how basic skills acquired prior to entering the labour force interact with the provision of training. As mentioned earlier, one usually finds that trainees are so-called positively selected into private sector training programs. In short, the firms select the best workers in its workforce to enter training programs, presumably because these workers' overall higher skill level will interact positively with their new acquired skills to increase productivity more than would be the case for the less productive workers.

The IALS provides us with a unique opportunity to take a closer look at this issue. In the next series of tables, we show how the different measures of literacy proficiency affect training incidence across genders and countries. We first start by looking at the impact of literacy on each separate type of training, pooling observations within each country. Then, in Tables 6-7, we disaggregate the results by gender for the three types of training we consider, job-related, employer-sponsored, and employer-provided. The latter category represents what we think is the cleanest measure of training that is directly related to one's job and for which the employer is most directly involved.

Looking at Table 6, we find strikingly different results in terms of the role of each dimension of literacy in the training equation across countries. While document literacy seems to matter little in the United States, it is very important in Canada. However, whereas the effect of document literacy proficiency becomes quantitatively less important in Canada moving from column 2 to columns 5 and 8, the reverse happens in the United States, although the coefficients reported in column 9 are not precisely estimated. Looking at prose literacy, however the scenario is completely reversed: prose literacy is positively associated with all forms of training in the United States but appears to play no significant role in Canada.

Finally, quantitative literacy offers the most startling contrasts in terms of the role of literacy proficiency in the acquisition/provision of training in the two countries. Looking first at Canada, we find that being quantitatively literate does not play a major role for training that is not employer-provided, but it becomes more important for employer-provided training. We can interpret this as evidence that the closer the training is to the direct interest of the employer, which we think is the case for employer-provided training, the more likely is the employer to select the “more able” workers. The problem with this explanation is that, as shown in columns

(3), (6), and (9), it does not seem to characterize training in the United States. In fact, the coefficients associated with higher quantitative literacy are *negative*, which is difficult to reconcile with any positive-selection-into-training story. These results, on the contrary, suggest that the role of training in the United States is to alleviate these skill deficiencies. One possibility is that employers still select the better workers for training, even those who are not endowed with a lot of measured skills, but who may somehow possess a relatively high level of unmeasured (to the analyst) skills. In other words, firms are confident that these workers will learn and make up for their deficiencies through proper training.

We turn next to Table 7 where we looked at these impacts disaggregated further along the gender line. We can see in columns (1)-(4) that basically all of the positive association between document literacy and job related training reported for Canada in Table 6 was driven by females. In fact, the impact of document literacy for females is extremely large as someone possessing the highest degree of literacy is more than 55% more likely to get job related training. Turning to prose literacy, although the relationship between this variable and job related training is of opposite signs for males and females, the lack of precision precludes drawing any firm conclusion. For the United States, though while being literate in prose matters for both males and females, it clearly seems to matter more for males: the coefficients for males are substantially larger and they are quite precisely estimated. This latter aspect is actually fairly remarkable considering that the size of the samples is not very big. Differences across genders come again to the fore when we look at the relationship between quantitative literacy and job related training. In fact, the gender differences go in opposite directions in Canada vs. the United States. For Canada, there is fairly strong evidence that the more males are quantitatively literate, the more likely they are of receiving job-related training. For females, there is some suggestive evidence that it is the opposite. In the United States, we can see that basically all of the negative effect measured in the aggregate is driven by males. Again, it is very surprising to find such a strong negative association between the quantitative literacy and the incidence of job-related training.

The same general observations emerge from the results in columns (5) to (12), where the focus is now employer-sponsored and employer-provided training. There are two notable differences though, between job-related training and these two types of training, and both related to the United States. The first one is that the negative association between quantitative literacy and training in the United States is not quite as apparent here, especially for males. The second difference is that the importance of prose literacy is more evenly distributed across genders than is the case in columns (3) and (4). In fact, not only is the role of prose literacy as a determinant of training in the United States not quite as important for males relative to females, it is actually substantially less important in the case of employer-provided training. For Canada, much of the same conclusions emerge, except for the fact that, as we can see in columns (9) and (10), the positive role played by quantitative literacy in the incidence of employer-provided training is actually more prominent than it is for the other two forms of training. Indeed, a case can be made, when one looks in succession at the columns of Table 7, that as the type of training becomes presumably more dependent on the employer actually providing it, as opposed to the looser definition of job-related training, the more likely are the employers to select quantitatively literate males.

As a general conclusion to this discussion of the role of literacy proficiency on the provision of training, at least two major differences between the countries are worth pointing out. The first one is that the U.S. employees, males in particular, who exhibit more deficiencies in terms of quantitative literacy, are actually more likely to be trained, whereas it is the opposite in Canada. One then cannot help but wonder whether training performs a different role in Canada vs. the United States. Is it because U.S. trainees who enter the labour market have received lower quality schooling than their Canadian counterparts and firms find themselves having to make up for it?

The second major difference between Canada and the United States is the fact that document literacy is never found to really matter in the United States, for either males or females. In Canada, it is found to be a very important correlate of all forms of training for females. On the other hand, there is no robust evidence that it plays a major role for Canadian males. Why would that be? A potential candidate explanation would be the differences in the industrial/occupational structure across both genders and countries. However, although a more refined analysis might support this hypothesis, we should point out that all the coefficients reported in Tables 6 and 7 do control for occupations and industries.

While these questions take us well beyond the scope of the present paper, the fact that we observe such stark contrast between the two countries and between genders within the same country calls for further analysis looking at some of the questions raised above.

#### 4.4 Counterfactual Results

In Tables 8 and 9, we report simulated proportions of active labour force participants receiving training obtained using the DiNardo, Fortin and Lemieux (1996) DFL reweighing procedure. If we want to ask what would have been the proportion of Canadians ( $C = 1$ ) undertaking training if their individual characteristics have been similar to those of Americans ( $A = 1$ ), we first estimate the probabilities of belonging to either group using two Probit models:

$$\Pr(C = 1|X_C) = \Phi(X'_C\beta_C) \quad \text{and} \quad \Pr(A = 1|X_A) = \Phi(X'_A\beta_A).$$

Using the estimated coefficients, we can construct the predicted probabilities that a Canadian be an American as  $\hat{\Pr}(A = 1|X_C) = \Phi(X'_C\hat{\beta}_A)$ , then the counterfactual weight that transform the Canadians into Americans is given by

$$\psi_{AC}(X) = \frac{\hat{\Pr}(A = 1|X_C)}{\hat{\Pr}(C = 1|X_C)}.$$

We can construct the counterfactual weight that transforms Americans into Canadians in an

analogous fashion:  $\psi_{CA}(X) = \frac{\hat{\Pr}(C = 1|X_A)}{\hat{\Pr}(A = 1|X_A)}$ , where  $\hat{\Pr}(C = 1|X_A) = \Phi(X'_A\hat{\beta}_C)$ .

Counterfactual proportions are then obtained by multiplying the original sample weights by the  $\psi$ 's functions and computing the proportions as sample means. Intuitively what the procedure does, when the objective is to make the Canadian sample more similar to the American

one for example, is to systematically give more weight to Canadians that are more educated and/or work in firms of large sizes. One advantage of this procedure is that only one set of coefficients per counterfactual experiment needs to be estimated and can then be applied to all the different types of training. By contrast with an Oaxaca-Blinder procedure, the coefficients of the determinants of training would have to estimate for each of the different types of training.

Other counterfactual experiments are performed by substituting other demographic groups, such American women and Canadian women or French Canadians and English Canadians, for Americans and Canadians. Each counterfactual experiment requires the estimation of its own set of estimated Probits.

The results of the simulations where respondents switch country are presented in Table 8, which also displays the country-specific (original) proportions for men and women, separately. We present simulations using two choices of explanatory variables. A first parsimonious specification corresponds to columns (2) and (5) of Tables 4-5, of course excluding the demographic group variables. The more complete specification adds the literacy and numeracy scores, as well as industry and occupation dummies. We also report the percentage of the group differences in training that remains accounted for by the reweighing. For example in panel B, we ask what would the proportions of American receiving training had been if their characteristics, including education, age and firm size, had been like those of Canadians. The percentage differences between panel B and panel D reported in the adjacent column indicates that for any training, job related training and employer provided training, the simulations essentially explain away any Canada/U.S. differences. However, the simulations are less successful at accounting for differences in employer-sponsored training and wanted job training, and not particularly successfully at accounting for differences in personal interest training. The varying degrees of success of the simulations are related to whether or not the included covariates capture the determinants of training that operate similarly in the two countries.<sup>3</sup> For example, lowering the weights of U.S. employees of larger firms from 46% to 41% to mimic the Canadian employment composition will not lower the percentage of workers receiving employer-sponsored training by as much as it will lower the percentage of workers receiving employer-provided training because the marginal effects of belonging to a larger firm are greater for employer-sponsored training (0.219) than for employer-provided training (0.174).

As another case in point, in panel C of Table 8, we perform the same simulation as in panel B but we use the complete set of covariates. Interestingly, as was pointed out in the discussion of section 4.3, because some of the determinants of training, in terms of the literacy and numeracy scores go in opposite direction in two countries, our ability to explain the Canada/U.S. difference is in fact reduced by the addition of the more complete set of covariates.<sup>4</sup>

In panel E of Table 8, we perform the opposite counterfactual experiment, that is, we ask what have been the proportions of Canadians receiving training if their individual characteristics have been similar to those of Americans. Panel E is thus compared to panel A to evaluate how successful the counterfactual experiment is. This counterfactual experiment is not as successful as

<sup>3</sup> A shortcoming of the DFL decomposition is that it does not differentiate the impact of changes in characteristics from the impact of changes in returns to characteristics. However, issues similar to the choice of reference wage structure in the Oaxaca decomposition arise.

the first one. Basically, when we give Canadians the same characteristics as Americans, they do not receive training in quite as high proportions as Americans. This is due to the fact that the marginal effects of the explanatory variables on the incidence of training are different in the two countries. For example, increasing the weights of Canadian employees of larger firms from 41% to 46% to mimic the American employment composition will not increase the percentage of Canadians receiving employer-provided training as much as the opposite exercise lowers the percentage of Americans receiving employer-provided training because the marginal effects of belonging to a larger firm on employer-provided training are smaller in Canada (0.116) than in the United States (0.174). Also, for the same reasons as above, the complete specification comparing panels F and A does not perform as well as the parsimonious one.

Next we explore whether there is something special about some groups of Canadians in terms of their response to the known determinants of training. We perform this exercise in Table 9 where we try to make French and English Canadians similar in terms of training.

The first counterfactual experiment asks what would have been the proportions of French Canadians receiving training if their individual characteristics had been similar to those of English Canadians. Recall that the proportions of French Canadians who have a university degree or who work for larger firms is substantially smaller than the proportions of English Canadians. To evaluate the success of that experiment, we compare panels B and C to panel D. One first interesting fact is that the complete specification in panel C does a lot better than the more parsimonious specification in panel B. In effect, the counterfactual experiment generally bridges a substantial portion of the training divide. In particular, when French Canadians are given the same characteristics as English Canadians, they received the same higher level of any training and of employer-provided training.

The second counterfactual experiment asks what have been the proportions of English Canadians receiving training if their individual characteristics have been similar to those of French Canadians. The success of the experiment is evaluated by comparing panels E and F to panel A. Here, the counterfactual experiment is a lot less successful, the proportions of English Canadians receiving training does not drop as much as the proportions of French Canadians receiving training increased in the preceding counterfactual experiment. This indicates that there is a factor that we cannot account for that explains the higher proportions of English Canadians receiving training. For example, studying the determinants of training among English Canadians indicates that the usual upward training gradient by firm size is not present in our sample of relatively small size. Thus as we reweigh the proportion of English Canadians employed in larger firms from 48% down to 40%, this will not have the effect of reducing the percentage of employees receiving training. These results would need to be reassessed using a larger sample such as the AETS.

Nevertheless, these counterfactual experiments indicate that our set of explanatory variables is quite comprehensive as we successfully simulated the incidence of training of Americans mimicking Canadians and of French Canadians mimicking English Canadians.

#### 4.5 Tobit Results of the Intensity of Training

To analyze the intensity of training, we appeal to the classic Tobit Model. Letting  $H$  be a variable that captures the hours spent in training, which is essentially continuous over strictly positive values but takes on the value zero with a positive probability, we estimate the probability of receiving training using the model

$$H^* = X\beta + u, \quad u|X \approx \text{Normal}(0, \sigma^2)$$

$$H = \max(0, H^*)$$

where  $H^*$  is a latent variable,  $X$  denotes a vector of covariates and  $\beta$  is the parameter vector. Note here that we report the marginal impact of each explanatory variables on the average observed hours trained:

$$\frac{\partial E(H|X)}{\partial x_j} = (\beta_j / \sigma) \Phi(X\beta / \sigma).$$

This is different than the actual estimated coefficient which measures the effect of the covariates on the “latent” or desired hours, not the actual hours.<sup>5</sup> It is also different from the marginal impact of the covariates conditional on a positive number of hours spent training. This latter quantity takes as a given that some training is taking place and thus abstract from the occurrence of training. By contrast, the impact of the covariates on the average observed hours captures *both* the impact on the incidence as well as the effect on the intensity conditional on being trained.

It is well known that the Tobit model is more sensitive to misspecification than the Probit. In particular, it tends to be sensitive to outliers and so-called “long-tailed” distributions. Hence we chose to top-code the maximum value for the annual hours spent training. Instead of choosing more or less arbitrarily a certain numeric value for the top-code, we recoded all annual hours above the value of the 99<sup>th</sup> percentile to be equal to that value. In short, we top code the upper percentile of the distribution. This gets around the problem that some extreme values might have undue influence.<sup>6</sup> The main advantage of looking at duration compared to just the incidence of training is that we can potentially get more refined results if it turned out that some individual characteristics have more explanatory power due to the duration dimension.

Looking first at Table 10, we can see that coefficients become more statistically significant when compared to the corresponding Probit results. For example, comparing columns 3 and 6 of Tables 4-5 to the four columns of Table 10, there are differences in the increased importance of the relationship between demographic characteristics and the number of hours spent training during the year. Table 10 provides strong evidence that gender and ethnicity matter in explaining the amount of time in training. Additional evidence of that phenomenon can be seen more formally by looking at the bottom of the table where we report the results from testing the equality of the “ethnicity” parameters.

<sup>5</sup> If the dependent variable had no mass point at zero and the censoring occurred due to top-coding only, then it would make sense to report the marginal effect on the latent outcome as it would have some meaning. But in this case, with a mass point at zero, much like in the labour supply literature, it does not really make sense to talk about negative desired hours of training.

<sup>6</sup> Although it would appear preferable to use semi-parametric estimators such as the censored least-absolute deviations estimator, which are robust to these type of misspecifications, in practice these techniques work relatively well only with larger samples than the ones we have here.

In all but two cases we reject the hypothesis that the relevant pairs of coefficients are equal at conventional levels. The tests are particularly convincing in the case of French-Canadians vs. English-Canadians: whatever form of training is considered, there is strong evidence that French-Canadians experience shorter spells of training. Interestingly, while the test results show that there is a statistically significant difference between English-Canadians and White Americans, this appears to be increasingly true going from column (1) for the most general definition of adult education and training to column (4) for the most specialized, firm-relevant, definition. Another result worth mentioning in Table 10 is the presence of significant gender effects, something which were never found to be significant in the Probit results obtained for a specification similar.

Looking at the effect of firm size, it seems as though that while firm size matters, especially in the case of employer-sponsored and employer-provided training, the magnitude of the coefficients is relatively modest compared to some of the other explanatory variables. In this case it would appear from the results of Tables 4-5 that firm size plays a more important role on the extensive margin (training or no training) compared to the intensive margin (how many hours for those who are trained).

The next set of tables breaks down the results first by country only (Table 11), and then by country and gender (Tables 12 and 13). The first thing to note in Table 11 is the significant difference in the measured relationship between educational attainment and all forms of training across the two countries. Not only is the absolute magnitude of the coefficients much larger in the United States for either job related or employer-provided training, but in fact the signs go in opposite directions. Only in the case of employer-provided training do we get some statistically significant evidence that more educated workers receive less training than those with only primary schooling. Secondly, we can see strong evidence again that French-Canadians spend a fewer number of hours in training than their English-Canadian counterparts. Thirdly, the relationship between immigrant status and training duration goes in opposite directions in Canada and the United States, with immigrants in Canada enjoying longer training spells. Finally, the same is true for African Americans vs. White Americans, once we consider either employer-sponsored or employer-provided training. Again, the within-county differences across gender and ethnicity are a major part of the story.

In Tables 12 and 13, where we further disaggregate by gender across countries, some interesting new contrasts emerge. First, it would appear that the African Americans vs. White Americans result in Table 11 was essentially driven primarily by females. For males, as we can see at the bottom of Table 13, the test results are above the usual critical thresholds, although the test for the equality of the coefficients in the case of employer-provided training is actually border-line. Secondly, male immigrants in Canada are more likely to have longer training spells relative to non-immigrants whereas in the United States the opposite would be the case, although the coefficients are never statistically significant. A plausible explanation is that the positive effect associated with being an immigrant in Canada may be related to the differences in the immigration policies of each country, where the point system favoured by Canada results mechanically (at least for the independent immigrant category) in selecting a more educated group of immigrants. Finally, it seems as though the negative coefficients associated with

educational attainment in Canada are primarily driven by females. For Canadian males, the relationship bounces around somewhat and only one of the schooling coefficients associated with either employer-sponsored or employer-provided training is significant. This compares to a much more stable education-training gradient in the United States.

## **5. Policy Implications**

A first basic concern addressed in this paper is whether Canada and the United States differ markedly in terms of the incidence of various types of employee training, in particular employer-sponsored training and employer-provided training. Based on our findings, we can confidently conclude that this is not the case: as long as one controls for worker characteristics, there is very little evidence of a major discrepancy in training incidence and intensity in the two countries. Instead we show that “within country” differences, for example African American vs. White Americans in the United States, or French Canadians vs. English Canadians in Canada, matter more than between country differences. We address these concerns by considering in turn policy interventions aimed at employers and policy interventions that strengthen the employees’ incentives. We also address horizontal equity issues related to the discrepancies we find in the incidence of training across groups differing by their socio-demographics, appealing to more recent data from the AETS.

### **5.1 Interventions On the Employer Side.**

As pointed out in Lin and Tremblay (2003), one key issue in any discussion of policies aimed at increasing the amount of training is whether to implement firms incentives versus employees incentives (or possibly a combination of both) policies. This question basically boils down to which party is more constrained than the other. If firms would like to provide more training but do not because of free rider considerations by which each firm competing in a given industry waits for the others to train their workers so that it can then poach them away, then there might be a real scope for intervention on the firm side. On the other hand, if the real problem is that workers face credit constraints severe enough that they under-invest in themselves, some form of individual assistance would represent a more sensible alternative. Drawing on our findings, we attempt to assess the relative merits of either type of intervention.

#### **5.1.1 The Free Rider Problem**

Is the standard free rider problem such a big concern? Whereas a lot of attention has been devoted to this issue in the theoretical literature, it has always been a hard problem to address from an empirical standpoint because it is virtually impossible to form a reasonable approximation of the counterfactual state of affairs: how much training would firms provide if there were no potential poaching by competitors. Our strongest evidence on this issue comes not from our results on Canada, but instead comes from our U.S. results. Thanks to the availability of data on literacy, we find evidence suggestive that U.S. firms provide some form of remedial training in the sense that workers with lower levels of quantitative literacy were more likely to receive employer-supported training, although the estimates were sometimes imprecise. Almost by definition, remedial training is general by nature hence firms face very little incentive to provide this type of training if they think they will lose their workers after training them. The fact

that we observe this for the United States is actually even more surprising in the sense that we generally consider the U.S. economy to be more competitive than the Canadian economy: in short, there are many more firms that could potentially poach trained workers in the United States than there are in Canada. Consequently, U.S. firms should have even less incentives to provide general training than is the case in Canada.

Other evidence on this issue comes from elsewhere in the literature. As is well-known, the free rider problem would be relatively irrelevant if firms enjoyed some form of monopsony power over the workers: firms would enjoy rents from their workforce and hence would not hesitate to enhance their general skill level knowing they would reap some of the returns. The evidence on the impact of the minimum wage in the United States is certainly consistent with the view that firms do enjoy some form of market power in the low skill labour market, arguably the segment most in need of training. In addition, both Parent (1999) for the United States, and Parent (2003) for Canada, show that worker mobility declines quite a bit after completion of on-the-job (for the United States) or employer-supported (for Canada) training programs, even though the wage impact is modest at best. Thus, in our view, the weight of the evidence points toward a rather limited role for interventions on the firm side.

As we mentioned above, assessing the importance of market failures that distort the decisions to train away from the optimum is difficult. Still, our reading of both our results and of the literature leads us to argue that market failures may simply not be such a major issue.

### **5. 1.2 The Quebec Experience**

Another way to look at the issue of firm side interventions is to examine one particular case in which we know there was a policy intervention and draw preliminary conclusions from what we can observe in the data. As is well known, Quebec introduced in 1995 the so-called “1% of payroll” fiscal incentive to firms having a payroll equal to or above \$250,000. The policy asked that covered firms dedicate 1% of their payroll to training expenses. Although a full assessment of that program is beyond the scope of this paper, we can nevertheless get a preliminary idea of its potential impact by exploiting the fact that the Adult Education and Training Surveys were conducted both before and after the introduction of the policy. In Table 14, we look at the incidence of both formal job-related training and employer-supported formal job related training, the latter category being arguably more relevant for the purpose of gauging the effectiveness of the Quebec policy.

In our opinion, the evidence presented in Table 14 is not suggestive of a strong impact of the Quebec policy by comparison with the potential impact of demographic factors. It is true that training incidence in Quebec increased the most across all provinces between 1997 and 2002 (11.5% for job-related training and 9.5% for employer-supported training), but New Brunswick comes as strong second (9.6% for job-related training and 6.5% for employer-supported training) with Manitoba not far behind when considering any formal job-related training, which increased by 9.3% in this province. On the other hand, there was little change in Quebec between 1993 and 1997. Yet, the policy had already been in place for nearly two years by 1997. Unless one argues that firms reacted quite slowly to the fiscal incentive, which to us appears unlikely given how well publicized-and criticized by the business community-the program was, the increase between

1997 and 2002 was much more likely to be due to other factors. Specially, since it was to some extent shared by the other two provinces with substantial French Canadian populations.

There are also some confounding factors. First, the Quebec economy in general, and the Montreal economy in particular, were at a trough in 1997 and rebounded quite strongly afterwards relative to the other provinces. Secondly, female enrolments in universities, which increased throughout Canada starting in the early 80's, lagged somewhat in Quebec relative to other provinces. Indeed, if we were to break down the gender differentials by province, we would see that while Quebec showed little improvement in training incidence between 1994 and 1997, although it did increase somewhat for employer supported training, females made the largest progress relative to males and relative to other provinces. One potential reason for this, given the relationship between educational attainment and training shown earlier is that females in Quebec became more educated over that time period. Finally, males' training incidence actually declined rather substantially from 22.9% to 18% between 1993 and 1997 (for job-related training). It is hard to see how the policy could actually lead to a negative impact. Of course, the males' decline in training incidence could have been even worse in the absence of the policy hence we should be cautious before providing strong conclusions regarding the efficacy of the 1%-of-payroll policy. It is also possible that there were substantial lags in the application of the policy because of the declining state of the Quebec economy in the mid 90's. As we mentioned above, a full and careful evaluation of the Quebec 1%-of-payroll policy would be required before reaching any definitive conclusions.

## **5.2 Employee Side Interventions**

The results contained in this paper are strongly suggestive, on the other hand, that "employee fundamentals" matter a lot in terms of who gets on-the-job training and who does not. By fundamentals, we simply mean the collection of employee characteristics developed before one's entry into the labour force that make someone more likely to be selected into training, sometimes called "pre-market" factors. Indeed, one of our main result shows that background characteristics such as literacy skills or language group, are strong predictors of training. Of course, no policy intervention can change someone from being French Canadian to English Canadian, or vice versa. Instead, we interpret the evidence presented in this paper as being strongly suggestive that long run factors, often associated with family background characteristics and propensities to attend post-secondary education, play a major role in determining training outcomes. Consequently, policies aimed at maintaining or improving educational attainment and/or school quality, as well as basic literacy skills, would likely represent a very fruitful area for intervention, for three fundamental reasons.

First, there would be a direct effect on the current generation benefiting from broad based interventions aimed at making sure that individuals make their transition into the labour market with the best possible set of basic skills. Secondly, the direct effect would trigger an intergenerational "catch-up" effect. The latter effect cannot be underestimated in terms of horizontal equity considerations. In numerous papers, Heckman and various co-authors have showed the limited effectiveness of publicly sponsored re-training type interventions aimed at relatively older workers. Thus, it is probably an illusion to think that we can correct all

imbalances in short order across demographic groups with any sort of policies. Instead, taking the long run view may be at once more realistic and also more effective.

Third, while the numbers presented in Table 14 show a substantial improvement in training opportunities for French Canadians not only in Quebec, but also likely in New Brunswick and Manitoba, it is not at all clear that Other Canadians are making similar progress. Because the data is suppressed in the AETS public use files, we cannot provide direct evidence on this issue. However, given that Ontario is major recipient of immigrants, it is indicative that the incidence of employer-supported job-related training in this province has declined from 1997 to 2002, whereas it has progressed in most other provinces. Whereas we do not find direct evidence that immigrant status has a negative impact on training opportunities, second and third generations Canadians, likely classified as Other Canadians, may both be the group more likely challenged in the educational system and more likely to benefit from improvement in their basic literacy skills.

## **6. Conclusion and direction of future research**

In the paper, we use data from the IALS (1994), a unique data set that is administered similarly across Canada and the United States, in particular, that contains answers to questions on literacy and numeracy skills, as well as information on the demographic background of the respondents. This allows us to explore many dimensions of training previously overlooked. Two broad themes emerge from our analysis. The first one is that while there is some evidence of cross-country differences in the provision and in the intensity of training in terms of magnitude, we think that the within-country factors related to ethnicity, language, or gender differences play a major role. The most solid statistical evidence in this paper concerns the very strong negative association between French-Canadian status and training incidence and intensity. We also find similar evidence, although not quite as strong, for a difference between African Americans and White Americans. Secondly, where we find strong evidence of major differences between Canada and the United States, it is not so much in terms of the amount of training provided to its workforce, but rather in terms of the very different effects that the literacy measures seem to have on training. In particular, the surprisingly negative association between quantitative literacy and training found in the United States is not part of the training structure in Canada. The benefit of having standardized questions asked on both training and literacy to each individual in both countries makes for a meaningful analysis of the determinants of training by country.

Together these two sets of findings are strongly suggestive that two fruitful avenues for future research would be first to further explore the link between language/ethnicity type factors and post-schooling human capital accumulation. More particularly, we think that one research theme could be broadly labelled “pre-market factors and training”. This first theme would focus on questions such as the effect of family background variables, including parents' educational attainment, on children's training outcomes. Strangely enough, perhaps due to data constraints, to the best of our knowledge this has never been extensively explored in the training literature. The goal of this type of analysis would be to investigate whether training outcome differentials could be explained by some underlying “long-term” learning appetite or ability factor. Perhaps, as one does not expect most children of low educated parents to get a Ph.D., one should not be too

surprised if these children were also less likely to invest in post-schooling training as well, controlling for educational attainment.

The second possible research avenue would be to further investigate the reasons why, for example, more quantitatively literate workers in the United States are less likely to receive training whereas the opposite is true in Canada, which is the traditionally expected outcome. In the same vein, we saw that even across genders, across countries, there are significant differences in the role played by literacy proficiency. Are those gender differences the results of some sort of occupational segregation that entails a different relationship between training and literacy skills? These and other related questions would certainly enhance our understanding of what is emerging as a fairly fundamental issue.

In summary, the use of particular data base that contains information on language skills, immigrant status, ethnic/racial groups, as well as literary proficiency on various dimensions, has allowed us to paint a somewhat difference picture of the incidence and intensity of training than is usually found in the literature.

## REFERENCES

- Acemoglu, Daron and Jorn-Steffen Pischke, "Why Do Firms Train? Theory and Evidence", *Quarterly Journal of Economics*, vol. 113 (1998): 79-119.
- Altonji, Joseph G., and James R. Spletzer, "Worker Characteristics, Job Characteristics, and the Receipt of On-the-Job Training", *Industrial and Labor Relations Review*, vol. 45, no. 1 (1991): 58-79.
- Barron, John M., Mark C. Berger, and Dan A. Black, "Do Workers Pay for On-the-Job Training?", *The Journal of Human Resources*, Vol. 34, no. 2 (Spring 1999): 235-252.
- Becker, G. *Human capital: a theoretical and empirical analysis*, University of Chicago Press, 1964.
- Boudard, Emmanuel. *Literacy Proficiency, Earnings, and Recurrent Training-A Ten Country Comparative Study*, Studies in Comparative and International Education no.57, Stockholm University, 2001.
- Chaykowski, Richard and George Slotsve, "Employer-Sponsored Training by Firm Size," Skills Research Initiative, Working Paper no. 2003 B-02. Human Resources Development Canada and Social Sciences and Humanities Research Council.
- DiNardo, J., N.M. Fortin and T. Lemieux, "Labor Market Institutions and the Distribution of Wages, 1973-1992: a Semi-parametric Approach," *Econometrica*, Vol. 64 (September 1996): 1001-1046.
- Eschuk, G. "New Forms of Work Organization, Skills and Training", Applied Research Branch, Strategic Policy, Human Resources Development Canada, SP-580-08-03E, July 2003.
- Frazis, H., M. Gittleman, and M. Joyce. 2000. "Correlates of Training: An Analysis Using Both Employer and Employee Characteristics." *Industrial and Labor Relations Review*, Vol. 53(3):443-61.
- Green, David and Thomas Lemieux, "The Impact of Unionization on the Incidence of and Sources of Training in Canada: A Study Based on the Adult Education and Training Survey", mimeo, University of British Columbia Department of Economics, 2001.
- Hashimoto, Masanori, "Minimum Wage Effects on Training on the Job", *American Economic Review*, vol. 72, no. 5 (1982): 1070-1087.
- Hertz, Thomas. "Intergenerational Economic Mobility of Black and White Families in the United States." Paper presented at the Society of Labor Economists Annual Meeting, May 2002.
- Lazear, Edward P., "Firm-Specific Human Capital: A Skill-Weight Approach", National Bureau of Economic Research Working Paper 9679, Cambridge, MA, 2003.
- Lin, Z. and J.-F. Tremblay, *Employer-Supported Training in Canada: Policy-Research Key Knowledge Gaps and Issues*, Skills Research Initiative, HRDC-ID-SSHRC, Working Paper 2003 B-01.

Loewenstein, Mark A. and James R. Spletzer, "Delayed Formal On-the-Job Training", *Industrial and Labor Relations Review*, vol. 51, no. 1, 1997: 82-99.

Loewenstein, Mark A. and James R. Spletzer, "Formal and Informal Training: Evidence from the NLSY", *Research in Labor Economics*, vol. 18, JAI Press INC., Stamford, Connecticut, 1999: 403-438.

Lynch, Lisa M and Sandra E. Black. 1995. "Beyond the Incidence of Training: Evidence from a National Employers Survey," NBER Working Paper No.w5231. National Bureau of Economic Research: Cambridge, MA. (published as "Capital Investments and Productivity", AER Papers and Proceedings, Vol. 86, No. 2, pp.263-267. and *Industrial and Labor Relations Review*, Vol.52, no.1 (Oct. 1998))

Lynch, L.M. "Private-sector Training and the Earnings of Young Workers." *American Economics Review*, Vol. 82 (March 1992): 299-312.

Lochhead, C. "Employment Sponsored Training among Recent Immigrants," Canadian Labour and Business Centre, 2002.

Parent D. "Wages and Mobility: The Impact of Employer-Provided Training." *Journal of Labor Economics*, Vol. 17, No. 2 (April 1999): 298-317.

Parent, D. "Employer-supported Training in Canada and Its Impact on Mobility and Wages," *Empirical Economics* Vol. 28 (2003): 431-459.

Peters, Valerie, "Working and Training: First Results of the 2003 Adult Education and Training Survey," Ottawa: No. 81-595-MIE, Statistics Canada and Human Resources Development Canada, 2004.

Solon, G. "Cross-Country Differences in Intergenerational Earnings Mobility," *Journal of Economic Perspectives*, Vol. 16 (Summer 2002), 59-66.

Statistics Canada, "International Adult Literacy Survey — Microdata User's Guide," 2001.

Tuijnman, A. and E. Bouchard, "Adult Education Participation in North American: International Perspectives," Ottawa: No. 89-574-XPE, Statistics Canada and Human Resources Development Canada, 2001.

Turcotte, J., A. Léonard, and C. Montmarquette. *New Evidence on the Determinants of Training in Canadian Business Locations*. W-02-9E. Ottawa: Applied Research Branch, Human Resources Development Canada. (April 2003).

U.S. Department of Labor. Bureau of Labor Statistics. *Reports on the amount of formal training and informal training received by employees*. Technical Report, Washington D.C., 1996.

## APPENDIX A – Definition of the variables

**Active labour market participants:** Individuals who were either employed at the time of the interview or had been employed in the previous 12 months; we thus exclude students and retirees.

**Any training:** Respondents were asked whether in the previous 12 months, they received any training or education including courses, private lessons, correspondence courses, private lessons, correspondence courses, workshops, on-the-job training, apprenticeship training, arts, crafts, recreation courses or any other training or education. This question was coded as a one for an affirmative answer and zero otherwise.

**Job-related training:** Respondents who answered that they had received any training in the previous 12 months were asked “What was the main reason you took this training or education?” If the answer was 1) career/job related purposes, the training was coded as job related training.

**Personal interest training:** Respondents who answered that they had received any training in the previous 12 months were asked “What was the main reason you took this training or education?” If the answer was 2) personal interest, the training was coded as personal interest training.

**Employer-sponsored training:** Respondents who undertook some training were asked “Was this training or education financially supported by?” If the answer was “An employer,” the training was coded as employer-sponsored training.

**Employer-provided training:** Respondents who undertook some training were asked “Was this training or education given by?”. If the answer was “A producer or supplier of equipment” or “An employer or a parent company”, the training was coded as employer-provided training.

**Firm size:** The number of persons employed by the business at all locations in Canada available in five categories: less than 20, between 20 and 99, between 100 and 199, between 200 and 499, 500 or more.

**French, English and Other Canadians:** Respondents were asked to “To which ethnic or cultural groups did your ancestors belong?” in the Canadian survey, which recorded as valid answers 1) French, 2) English, or 16) Canadian or 96) Declined. Respondents who answered French or English were classified as French or English Canadians, notwithstanding the restriction below. The respondents who answered “Canadian” or declined to answer (32 percent) were classified into the French, English or Other group according to their answer to the question “What language did you first speak as a child?”, for which the only answers recorded were the language of the interview, French, English and Other. A respondent who did not answer French among the languages in the answer to the question “When you were growing up, what language or languages were usually spoken in your home?” was removed from the French Canadian category. Canadians who were classified as neither French nor English Canadian, were classified as Other.

**White, African and Other Americans:** In the United States, the question referring to the relevant demographic group was the following: “Which of the groups on this card best describes your race?” The answers recorded were: White, Black (African American), Pacific Islander, Asian, Spanish or Hispanic, and North American Indian. We simply distinguish Whites, African American and Others.

**Literacy and Numeracy Dummies:** A respondent’s proficiency in three dimensions of literacy are measured in terms of a series of five plausible values for each of the three domains, where the two upper categories were merged. The three literacy domains include the ability to understand

and use information from texts (prose literacy), from different formats, including schedules, graphics and tables (document literacy) and requiring the application of arithmetic operations (quantitative literacy).

Table 1. Proportions of Active Labour Force Participants Receiving Training

	Any training	Number of courses taken	Job- related	Personal interest	Employer sponsored	Employer provided	Wanted job training
United States							
All	0.50	2.91	0.46	0.06	0.34	0.23	0.26
White Americans	0.54	2.90	0.50	0.06	0.37	0.25	0.26
Black Americans	0.40	2.62	0.38	0.05	0.31	0.19	0.23
Other Americans	0.41	3.20	0.35	0.07	0.20	0.14	0.31
Canada							
All	0.44	2.58	0.39	0.09	0.25	0.19	0.34
English Canadians	0.58	2.68	0.53	0.11	0.36	0.28	0.40
French Canadians	0.41	2.60	0.33	0.14	0.21	0.17	0.29
Other Canadians	0.38	2.49	0.34	0.07	0.20	0.15	0.32
Province where secondary education took place							
Atlantic Provinces	0.48	2.03	0.39	0.16	0.32	0.19	0.40
Quebec	0.43	2.81	0.35	0.11	0.21	0.14	0.35
Ontario	0.44	3.00	0.42	0.06	0.27	0.20	0.32
Prairies	0.56	2.42	0.49	0.11	0.28	0.23	0.42
Alberta	0.80	2.86	0.75	0.08	0.45	0.42	0.40
British Columbia	0.60	2.45	0.50	0.18	0.36	0.30	0.48

Source: IALS (1994) Individuals selected where either employed at the time of the interview or had been employed in the last 12 months. With around 1,000-2,000 observations per country, differences exceeding 0.025-0.03 are statistically significant at the 5% level. See Appendix A of for details of the classification into ethnic/cultural groups.

Table 2. Proportion of Active Labour Force Participants Receiving Training by Age Group

	Any training	Number of courses taken	Job- related	Personal interest	Employer sponsored	Employer provided	Wanted job training
<hr/>							
English Canadians							
16 - 25	0.70	3.59	0.62	0.13	0.22	0.20	0.33
26 - 35	0.56	2.72	0.51	0.09	0.38	0.28	0.52
36 - 45	0.55	2.19	0.51	0.10	0.38	0.26	0.37
46 - 55	0.55	2.18	0.51	0.16	0.36	0.35	0.38
56 - 65	0.60	3.75	0.59	0.01	0.50	0.35	0.37
French Canadians							
16 - 25	0.56	3.69	0.41	0.25	0.14	0.08	0.39
26 - 35	0.45	1.77	0.38	0.13	0.27	0.22	0.44
36 - 45	0.35	3.12	0.26	0.12	0.17	0.15	0.23
46 - 55	0.36	1.93	0.33	0.10	0.25	0.24	0.11
56 - 65	0.19	1.37	0.19	0.04	0.18	0.09	0.12
Other Canadians							
16 - 25	0.55	4.11	0.49	0.08	0.08	0.05	0.40
26 - 35	0.40	1.81	0.35	0.07	0.27	0.18	0.33
36 - 45	0.39	2.29	0.37	0.04	0.25	0.19	0.33
46 - 55	0.29	1.97	0.24	0.10	0.14	0.13	0.29
56 - 65	0.16	3.37	0.14	0.02	0.08	0.07	0.10

Source: IALS (1994) Individuals selected where either employed at the time of the interview or had been employed in the last 12 months. With around 100-200 observations per age group, differences exceeding 0.05-0.08 are statistically significant at the 5% level. See Appendix A for details of classification into ethnic/cultural groups.

Table 3. Annual Number of Hours of Training of Participants by Country/Demographic Groups

	Any training		Job-related		Employer-sponsored		Employer-provided	
United States								
All	141.6	(336.1)	130.7	(326.7)	70.9	(198.8)	60.8	(173.8)
White Americans	121.3	(285.)	115.8	(278.9)	63.1	(146.)	58.7	(179.4)
Black Americans	198.7	(457.5)	161.9	(434.3)	79.6	(243.6)	73.8	(150.2)
Other Americans	246.8	(508.1)	222.0	(510.7)	130.4	(421.3)	67.3	(140.3)
Canada								
All	239.5	(447.8)	222.5	(414.6)	85.4	(255.9)	89.0	(298.6)
English Canadians	233.5	(480.6)	195.6	(384.7)	94.9	(357.)	94.4	(400.1)
French Canadians	229.1	(367.8)	204.8	(361.6)	48.8	(85.3)	56.9	(165.8)
Other Canadians	249.6	(450.4)	254.2	(457.3)	90.5	(153.2)	98.3	(192.8)

Source: IALS (1994) Individuals selected where either employed at the time of the interview or had been employed in the last 12 months. Annual number of hours computed as the product of hours per day time days per week time weeks per year on up to three training events. Average computed only for respondents with positive hours. See text for details of classification into demographic. Standard deviations in parentheses.

Table 4.

## Marginal Effects of Explanatory Variables on the Incidence of Any Training and Job-related Training from a Probit Model

	Any Training			Job-related		
	(1)	(2)	(3)	(4)	(5)	(6)
Nationality (US omitted)						
Canadian	-0.011 (0.031)			-0.023 (0.030)		
Ethnic/Racial Group (Other American omitted)						
French Canadian		-0.007 (0.064)	-0.054 (0.067)		-0.069 (0.063)	-0.054 (0.067)
English Canadian		0.139 ** (0.059)	0.087 (0.063)		0.112 * (0.061)	0.087 (0.063)
Other Canadian		-0.033 (0.058)	-0.094 (0.062)		-0.054 (0.058)	-0.094 (0.062)
White American		0.062 (0.048)	0.032 (0.052)		0.059 (0.049)	0.032 (0.052)
African American		-0.100 * (0.059)	-0.071 (0.064)		-0.015 (0.063)	-0.071 (0.064)
French/English a Second Language Immigrant	-0.045 (0.059)	-0.020 (0.065)	0.043 (0.067)	-0.067 (0.058)	0.024 (0.055)	0.043 (0.067)
	-0.078 (0.058)	-0.074 (0.057)	-0.080 (0.056)	-0.072 (0.057)	-0.055 (0.055)	-0.080 (0.056)
Female	0.047 * (0.027)	0.052 ** (0.027)	-0.041 (0.030)	0.032 (0.027)	0.009 (0.028)	-0.041 (0.030)
Part-time work	0.021 (0.038)	0.015 (0.038)	-0.018 (0.040)	-0.008 (0.038)	-0.040 (0.039)	-0.018 (0.040)
Education (Primary Omitted)						
Some Secondary	0.126 (0.090)	0.124 (0.090)	0.064 (0.093)	0.103 (0.100)	0.047 (0.100)	0.064 (0.093)
Secondary	0.176 ** (0.087)	0.168 * (0.087)	0.018 (0.093)	0.184 * (0.094)	0.064 (0.097)	0.018 (0.093)
Some Post-secondary	0.362 *** (0.072)	0.359 *** (0.072)	0.185 ** (0.091)	0.364 *** (0.082)	0.246 *** (0.094)	0.185 ** (0.091)
University	0.447 *** (0.069)	0.438 *** (0.070)	0.215 ** (0.092)	0.450 *** (0.078)	0.308 *** (0.092)	0.215 ** (0.092)
Age Intervals (16-25 omitted)						
26 - 35	-0.087 ** (0.044)	-0.085 * (0.044)	-0.111 ** (0.045)	-0.047 (0.044)	-0.047 (0.045)	-0.111 ** (0.045)
36 - 45	-0.082 * (0.044)	-0.081 * (0.044)	-0.115 ** (0.046)	-0.055 (0.043)	-0.053 (0.044)	-0.115 ** (0.046)
46 - 55	-0.085 * (0.046)	-0.088 * (0.046)	-0.125 ** (0.048)	-0.064 (0.045)	-0.068 (0.046)	-0.125 ** (0.048)
56 - 65	-0.152 *** (0.051)	-0.155 *** (0.051)	-0.194 *** (0.050)	-0.104 *** (0.051)	-0.102 * (0.052)	-0.194 *** (0.050)
Firm size (20-199 omitted)						
Less than 20	-0.019 (0.039)	-0.026 (0.039)	-0.021 (0.040)	-0.029 (0.039)	-0.027 (0.039)	-0.021 (0.040)
200-499	0.088 * (0.050)	0.086 * (0.049)	0.077 (0.051)	0.063 (0.051)	0.060 (0.051)	0.077 (0.051)
500 and over	0.189 *** (0.034)	0.195 *** (0.034)	0.173 *** (0.035)	0.178 *** (0.034)	0.176 *** (0.034)	0.173 *** (0.035)
Literacy Scores Dummies	No	No	Yes	No	Yes	Yes
Industry and Occupations Dummies	No	No	Yes	No	No	Yes
Pseudo-R2	0.105	0.112	0.157	0.102	0.128	0.153
Predicted Probability At X-bar	0.497	0.497	0.494	0.450	0.450	0.445
Test: Fr. Canadian = Eng. Canadian		5.97 **	5.85 **		9.26 **	10.83 ***
Test: Wh. American= Af. American		14.23 ***	5.09 **		10.62 **	3.19 *

Source: IALS (1994) Individuals selected where either employed at the time of the interview or had been employed in the last 12 months, leaving 4664 observations. Robust standard errors in parentheses.

\*\*\* indicates significance at the 1% level, \*\* at the 5% level and \* at the 10% level.

Table 5.

## Marginal Effects of Explanatory Variables on Employer-Sponsored Training and Employer-Provided Training from a Probit Model

	Employer-Sponsored			Employer-Provided		
	(1)	(2)	(3)	(4)	(5)	(6)
Nationality (US omitted)						
Canadian	-0.049 *			-0.003		
	(0.026)			(0.023)		
Demographic Group (Other American omitted)						
French Canadian		-0.041	-0.080		0.017	-0.025
		(0.062)	(0.056)		(0.058)	(0.050)
English Canadian		0.119 *	0.076		0.135 **	0.082
		(0.067)	(0.067)		(0.067)	(0.063)
Other Canadian		-0.044	-0.089		-0.008	-0.048
		(0.052)	(0.049)		(0.043)	(0.040)
White American		0.079	0.056		0.059	0.035
		(0.046)	(0.049)		(0.037)	(0.039)
African American		-0.020	0.011		-0.028	-0.034
		(0.058)	(0.064)		(0.044)	(0.046)
French/English a	-0.117 **	-0.081	-0.055	-0.050	-0.020	-0.019
Second Language	(0.046)	(0.055)	(0.057)	(0.039)	(0.047)	(0.050)
Immigrant	-0.06	-0.054	-0.051	-0.062	-0.059	-0.052
	(0.048)	(0.048)	(0.046)	(0.035)	(0.034)	(0.034)
Female	0.022	0.026	-0.038	0.014	0.017	-0.002
	(0.024)	(0.024)	(0.027)	(0.020)	(0.020)	(0.022)
Part-time work	-0.106 ***	-0.111 ***	-0.114 ***	-0.067 **	-0.071 **	-0.072 **
	(0.032)	(0.032)	(0.032)	(0.027)	(0.027)	(0.027)
Education (Primary Omitted)						
Some Secondary	-0.003	-0.003	-0.042	0.073	0.074	0.037
	(0.094)	(0.094)	(0.085)	(0.092)	(0.091)	(0.083)
Secondary	0.087	0.081	-0.033	0.137 *	0.132	0.051
	(0.092)	(0.093)	(0.090)	(0.083)	(0.082)	(0.079)
Some Post-secondary	0.205 **	0.202 ***	0.023	0.202 **	0.200 ***	0.089
	(0.102)	(0.102)	(0.095)	(0.098)	(0.097)	(0.090)
University	0.282 ***	0.270 ***	0.040	0.237 ***	0.226 ***	0.121
	(0.096)	(0.097)	(0.096)	(0.091)	(0.091)	(0.089)
Age Intervals (16-25 omitted)						
26 - 35	0.256 ***	0.258 ***	0.219 ***	0.107 ***	0.109 ***	0.099 ***
	(0.049)	(0.050)	(0.051)	(0.041)	(0.041)	(0.041)
36 - 45	0.245 ***	0.245 ***	0.190 ***	0.071 *	0.071 *	0.066 ***
	(0.047)	(0.047)	(0.050)	(0.038)	(0.038)	(0.039)
46 - 55	0.236 ***	0.232 ***	0.179 ***	0.072 *	0.069 *	0.058 ***
	(0.050)	(0.050)	(0.052)	(0.042)	(0.041)	(0.040)
56 - 65	0.209 ***	0.203 ***	0.152 ***	0.083 *	0.079 *	0.083 ***
	(0.060)	(0.060)	(0.060)	(0.050)	(0.049)	(0.050)
Firm size (20-199 omitted)						
Less than 20	-0.104 ***	-0.107 ***	-0.104 ***	-0.054 *	-0.056 *	-0.059 ***
	(0.034)	(0.034)	(0.035)	(0.030)	(0.030)	(0.030)
200-499	0.107 **	0.107 ***	0.104 **	0.043	0.042	0.048 **
	(0.052)	(0.052)	(0.053)	(0.046)	(0.046)	(0.046)
500 and over	0.208 ***	0.212 ***	0.196 ***	0.168 ***	0.172 ***	0.162 ***
	(0.032)	(0.032)	(0.033)	(0.028)	(0.028)	(0.028)
Literacy Score Dummies	No	No	Yes	No	No	Yes
Industry and Occupations Dummies	No	No	Yes	No	No	Yes
Pseudo-R2	0.149	0.154	0.195	0.094	0.101	0.195
Predicted Probability At X-bar	0.293	0.293	0.281	0.198	0.197	0.189
Test: Fr. Canadian = Eng. Canadian		6.49 ***	7.73 ***		3.55 *	4.05 **
Test: Wh. American= Af. American		6.34 ***	1.22		7.78 ***	4.34 **

Source: IALS (1994) Individuals selected where either employed at the time of the interview or had been employed in the last 12 months, leaving 4664 observations. Robust standard errors in parentheses.

\*\*\* indicates significance at the 1% level, \*\* at the 5% level and \* at the 10% level.

Table 6. Marginal Effects of Literacy and Numeracy Scores for Different Types of Training by Country

	Job Related			Employer-Sponsored			Employer-Provided		
	Pooled	Canada	United States	Pooled	Canada	United States	Pooled	Canada	United States
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Quantitative Level 2	-0.067 (0.069)	0.095 (0.096)	-0.084 (0.076)	-0.026 (0.060)	0.124 (0.071)	-0.041 (0.065)	-0.071 (0.049)	0.115 (0.063)	-0.083 (0.052)
Quantitative Level 3	-0.121 (0.079)	0.059 (0.115)	-0.144 (0.087)	-0.067 (0.068)	0.054 (0.089)	-0.079 (0.075)	-0.114 (0.055)	0.135 (0.080)	-0.132 (0.058)
Quantitative Level 4	-0.221 (0.086)	-0.028 (0.133)	-0.240 (0.094)	-0.092 (0.074)	0.061 (0.107)	-0.105 (0.081)	-0.108 (0.058)	0.187 (0.105)	-0.126 (0.062)
Prose Level 2	0.206 (0.064)	-0.015 (0.093)	0.229 (0.069)	0.072 (0.067)	0.016 (0.066)	0.078 (0.073)	0.115 (0.059)	0.016 (0.061)	0.119 (0.064)
Prose Level 3	0.327 (0.070)	0.027 (0.108)	0.360 (0.075)	0.155 (0.075)	-0.015 (0.076)	0.179 (0.082)	0.098 (0.064)	-0.027 (0.066)	0.107 (0.070)
Prose Level 4	0.415 (0.068)	0.058 (0.135)	0.450 (0.071)	0.280 (0.086)	0.065 (0.100)	0.309 (0.093)	0.174 (0.079)	-0.048 (0.074)	0.196 (0.087)
Document Level 2	-0.011 (0.066)	0.144 (0.098)	-0.013 (0.072)	0.040 (0.064)	0.080 (0.063)	0.044 (0.070)	0.088 (0.055)	0.041 (0.056)	0.100 (0.061)
Document Level 3	0.033 (0.076)	0.192 (0.121)	0.027 (0.084)	0.072 (0.074)	0.192 (0.096)	0.062 (0.080)	0.115 (0.063)	0.123 (0.081)	0.120 (0.069)
Document Level 4	0.066 (0.088)	0.362 (0.126)	0.045 (0.097)	0.052 (0.082)	0.242 (0.115)	0.034 (0.089)	0.105 (0.074)	0.205 (0.107)	0.093 (0.081)
No. observations	4664	2671	1993	4664	2671	1993	4664	2671	1993
Pseudo-R2	0.131	0.110	0.140	0.156	0.152	0.157	0.105	0.121	0.108

Source: IALS (1994) The estimates are obtained from models with the same covariates as those in column 6 of Table 4.

Table 7. Marginal Effects of Literacy and Numeracy Scores for Different Types of Training by Country and Gender

	Job Related			Employer-Sponsored						Employer-Provided					
	Canada		United States		Canada		United States			Canada		United States			
	Females	Males	Females	Males	Females	Males	Females	Males	Females	Males	Females	Males	Females	Males	Females
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)			
Quantitative Level 2	0.046 (0.155)	0.162 (0.097)	0.017 (0.106)	-0.157 (0.098)	0.016 (0.116)	0.211 (0.088)	-0.002 (0.095)	-0.090 (0.087)	0.027 (0.093)	0.180 (0.075)	-0.018 (0.078)	-0.128 (0.062)			
Quantitative Level 3	-0.107 (0.175)	0.257 (0.126)	-0.045 (0.124)	-0.205 (0.1135)	-0.075 (0.119)	0.171 (0.116)	-0.099 (0.105)	-0.034 (0.108)	-0.005 (0.102)	0.276 (0.102)	-0.088 (0.084)	-0.153 (0.076)			
Quantitative Level 4	-0.208 (0.181)	0.220 (0.153)	-0.090 (0.141)	-0.308 (0.121)	-0.070 (0.127)	0.234 (0.148)	-0.138 (0.109)	-0.037 (0.121)	0.029 (0.123)	0.361 (0.140)	-0.115 (0.083)	-0.106 (0.092)			
Prose Level 2	-0.133 (0.152)	0.034 (0.106)	0.034 (0.107)	0.344 (0.088)	0.032 (0.124)	0.018 (0.077)	0.034 (0.098)	0.155 (0.096)	0.060 (0.111)	-0.037 (0.067)	0.023 (0.090)	0.164 (0.084)			
Prose Level 3	-0.086 (0.187)	0.057 (0.122)	0.226 (0.119)	0.409 (0.097)	0.003 (0.135)	-0.052 (0.084)	0.203 (0.117)	0.113 (0.109)	-0.027 (0.106)	-0.079 (0.074)	0.096 (0.105)	0.071 (0.091)			
Prose Level 4	-0.163 (0.199)	0.192 (0.162)	0.281 (0.127)	0.523 (0.084)	-0.070 (0.134)	0.161 (0.140)	0.345 (0.132)	0.240 (0.125)	-0.090 (0.103)	-0.056 (0.086)	0.160 (0.128)	0.170 (0.115)			
Document Level 2	0.191 (0.145)	0.100 (0.113)	0.014 (0.103)	0.009 (0.097)	0.262 (0.124)	-0.076 (0.061)	-0.012 (0.101)	0.083 (0.097)	0.089 (0.097)	0.016 (0.066)	0.026 (0.076)	0.189 (0.095)			
Document Level 3	0.371 (0.155)	0.002 (0.148)	0.100 (0.122)	0.001 (0.112)	0.432 (0.133)	-0.011 (0.102)	0.018 (0.119)	0.063 (0.109)	0.247 (0.130)	0.055 (0.093)	0.065 (0.092)	0.169 (0.104)			
Document Level 4	0.555 (0.140)	0.151 (0.171)	0.061 (0.149)	0.068 (0.128)	0.585 (0.141)	-0.036 (0.109)	-0.030 (0.130)	0.066 (0.122)	0.396 (0.164)	0.101 (0.124)	0.055 (0.112)	0.137 (0.120)			
N	1323	1348	957	1036	1323	1348	957	1036	1323	1348	957	1036			
Pseudo-R2	0.151	0.152	0.140	0.160	0.203	0.219	0.164	0.177	0.188	0.154	0.124	0.177			

Source: IALS (1994) The estimates are obtained from models with the same covariates as those in column 6 of Table 4.

Table 8. Simulated proportions of active labour force participants in training: Canada/US comparisons

	Any Training	% un- explained	Job- related	% un- explained	Personal interest	% un- explained	Employer sponsored	% un- explained	Employer provided	% un- explained	Wanted Job Training	% un- explained
United States												
A: Original												
All	0.50		0.46		0.06		0.34		0.23		0.26	
Women	0.53		0.48		0.08		0.34		0.23		0.27	
Men	0.48		0.45		0.05		0.34		0.22		0.26	
					with Canadian weights							
B: parsimonious specification												
All	0.45	-1.5	0.41	-4.6	0.06	33.2	0.29	-17.6	0.19	-1.5	0.26	23.8
Women	0.48	-4.1	0.42	-9.2	0.08	41.9	0.28	-12.2	0.18	0.2	0.27	22.2
Men	0.43	0.5	0.40	-1.0	0.05	16.6	0.30	-23.3	0.21	-4.4	0.25	24.4
C: complete specification												
All	0.50	-11.8	0.46	-16.6	0.07	26.0	0.33	-32.2	0.22	-15.5	0.28	17.4
Women	0.48	-4.2	0.42	-9.2	0.09	36.4	0.29	-15.5	0.19	-5.9	0.28	20.1
Men	0.49	-11.6	0.46	-14.8	0.06	-3.7	0.35	-42.6	0.23	-19.1	0.28	16.1
Canada												
D: Original												
All	0.44		0.39		0.09		0.25		0.19		0.34	
Women	0.46		0.39		0.14		0.25		0.18		0.35	
Men	0.43		0.40		0.06		0.25		0.20		0.33	
					with American weights							
E: parsimonious specification												
All	0.47	7.5	0.42	10.4	0.10	-61.3	0.28	18.1	0.20	13.9	0.33	-26.5
Women	0.49	6.5	0.43	10.7	0.15	-91.4	0.30	12.4	0.21	8.0	0.36	-30.9
Men	0.45	6.6	0.41	8.4	0.06	-26.3	0.26	22.9	0.19	16.3	0.32	-26.1
F: complete specification												
All	0.43	15.6	0.37	20.1	0.11	-65.1	0.23	30.2	0.18	20.5	0.30	-14.3
Women	0.46	13.3	0.38	19.9	0.14	-72.2	0.23	32.4	0.17	26.5	0.32	-16.7
Men	0.46	4.8	0.43	5.0	0.07	-43.9	0.27	18.2	0.20	9.3	0.33	-30.2

Source: IALS (1994) Individuals selected where either employed at the time of the interview or had been employed in the last 12 months. Simulated proportions are obtained using the standard DFL reweighing procedure. See text for details.

Table 9. Simulated proportions of active labour force participants in training: French/English Canada comparisons

	Any Training	% un- explained	Job- related	% un- explained	Personal interest	% un- explained	Employer sponsored	% un- explained	Employer provided	% un- explained	Wanted Job	% un- explained
A: Original	0.41		0.33		0.14		0.21		0.17		0.29	
B: parsimonious specification	0.54	-6.7	0.46	-13.2	0.14	23.8	0.28	-23.5	0.23	-17.0	0.38	-5.6
C: complete specification	0.59	1.0	0.50	-5.8	0.12	13.7	0.32	-10.7	0.27	-2.7	0.37	-8.8
D: Original	0.58		0.53		0.11		0.36		0.28		0.40	
E: parsimonious specification	0.52	27.7	0.47	44.5	0.12	-16.1	0.34	60.8	0.26	50.6	0.36	25.7
F: complete specification	0.49	18.8	0.44	34.4	0.09	-32.5	0.30	43.2	0.24	39.4	0.37	26.9

Source: IALS (1994) Individuals selected where either employed at the time of the interview or had been employed in the last 12 months. Simulated proportions are obtained using the standard DFL reweighing procedure. See text for details.

Table 10.

## Marginal Effects of Explanatory Variables on Annual Hours of Training from a Tobit Model

	Any Training (1)		Job-Related (2)		Employer- Sponsored (3)		Employer- Provided (4)	
Demographic Group (Other American omitted)								
French Canadian	-26.79 (6.41)	***	-66.40 (16.03)	***	-18.44 (5.40)	***	-11.85 (4.12)	***
English Canadian	-17.38 (10.36)	*	-20.20 (12.37)		-12.02 (3.81)	***	-8.88 (2.92)	***
Other Canadian	-26.28 (8.79)	***	-27.09 (10.61)	**	-14.91 (3.52)	***	-10.60 (2.80)	***
White American	-0.10 (6.01)		10.98 (7.26)		3.23 (2.27)		4.17 (1.78)	**
African American	-1.29 (7.89)		4.05 (9.46)		-2.18 (2.85)		-0.48 (2.21)	
French/English a	5.93 (8.16)		7.17 (9.70)		-4.39 (3.00)		-5.18 (2.38)	**
Second Language	-2.11 (7.27)		-0.84 (8.61)		-0.98 (2.57)		2.27 (1.99)	
Immigrant	-14.97 (3.53)	***	-19.28 (4.20)	***	-6.40 (1.25)	***	-1.87 (0.94)	**
Female								
Education (Primary Omitted)								
Some Secondary	23.64 (13.93)	*	10.81 (17.45)		-4.22 (5.14)		-1.11 (4.36)	
Secondary	27.82 (13.60)	**	33.36 (16.98)	**	4.68 (4.89)		5.18 (4.19)	
Some Post-secondary	63.72 (13.92)	***	79.65 (17.32)	***	10.58 (4.99)	**	7.98 (4.26)	*
University	51.49 (13.98)	***	61.94 (17.41)	***	9.77 (5.02)	*	8.13 (4.28)	*
Age Intervals (16-25 omitted)								
26 - 35	-57.14 (5.05)	***	-50.67 (6.02)	***	19.26 (2.19)	***	6.44 (1.53)	***
36 - 45	-61.56 (5.06)	***	-55.70 (6.03)	***	14.01 (2.19)	***	3.30 (1.54)	**
46 - 55	-63.85 (5.34)	***	-57.89 (6.37)	***	12.00 (2.29)	***	4.22 (1.61)	***
56 - 65	-67.75 (6.59)	***	-58.16 (7.83)	***	11.42 (2.63)	***	4.43 (1.87)	**
Firm size (20-199 omitted)								
Less than 20	-0.28 (4.88)		-3.32 (5.83)		-10.49 (5.47)	***	-5.72 (1.48)	***
200-499	5.78 (6.29)		3.24 (7.52)		1.35 (2.19)		-0.52 (1.75)	
500 and over	8.91 (4.23)	**	11.97 (5.02)	***	8.53 (1.49)	***	5.96 (1.15)	***
Literacy and Numeracy	Yes		Yes		Yes		Yes	
Scores Dummies								
Industry and Occupations	Yes		Yes		Yes		Yes	
Dummies								
Test: Fr. Canadian = Eng. Canadian	20.57	***	38.01	***	63.80	***	58.65	***
Test: Wh. American= Af. American	0.04	**	1.03		7.3	***	9.81	
Test: Wh. American= Eng. Canadian	4.32	**	10.35	***	41.37	***	60.72	***

Source: IALS (1994) Individuals selected where either employed at the time of the interview or had been employed in the last 12 months, leaving 4489 observations with valid durations. Standard errors in parentheses. \*\*\* indicates significance at the 1% level, \*\* at the 5% level and \* at the 10% level. Marginal effects measure the impact on E(Observed Annual Hours | X), as opposed to either the direct total coefficients which measure the impact on E(Latent Annual Hours | X), or the marginal impact on E(Observed Annual Hours | X, Hours>0).

Table 11.

Marginal Effects of Explanatory Variables on Annual Hours of Training  
from a Tobit Model

	Canada			United States			
	Job Related (1)	Employer- Sponsored (2)	Employer- Provided (3)	Job Related (4)	Employer- Sponsored (5)	Employer- Provided (6)	
Demographic Group (Other American omitted)							
French Canadian	-49.31 (9.84) ***	-9.86 (1.92) ***	-6.14 (1.39) ***				
English Canadian	5.51 (7.97)	3.65 (1.44)	1.66 (1.05)				
White American				13.27 (9.30)	4.25 (2.97)	27.05 (11.90)	**
African American				0.45 (11.99)	-2.52 (3.71)	-7.53 (14.77)	
French/English a	-18.83 (13.25)	-2.49 (2.50)	-3.33 (1.83)	9.39 (13.51)	-4.39 (4.22)	-24.04 (11.90)	
Second Language Immigrant	17.92 (10.70) *	2.34 (1.92)	6.59 (1.35)	-12.06 (12.33)	-4.52 (3.70)	-19.20 (15.57)	
Female	-25.77 (8.03) ***	-5.23 (1.46) ***	-3.59 (1.09) ***	-17.26 (5.50) ***	-6.01 (1.67) ***	-5.11 (6.49)	***
Education (Primary Omitted)							
Some Secondary	-50.93 (21.98) *	-8.46 (5.24)	-6.05 (3.52)	32.00 (24.78)	-4.99 (6.99)	See note	
Secondary	-30.94 (22.12)	-3.17 (5.31)	-7.13 (3.61)	45.47 (24.12) *	3.63 (6.60)	39.94 (13.14)	***
Some Post-secondary	-4.62 (23.43)	-0.45 (5.45)	-6.52 (3.73)	100.39 (24.51) ***	9.75 (6.75)	53.90 (14.21)	***
University	-15.88 (23.65)	-3.44 (5.47)	-6.86 (3.73)	80.76 (24.61) ***	9.93 (6.77)	57.78 (14.48)	***
Age Intervals (16-25 omitted)							
26 - 35	-101.56 (10.34) ***	24.08 (2.38) ***	14.68 (1.75) ***	-39.54 (8.05) ***	15.84 (2.89) ***	15.49 (10.25)	
36 - 45	-100.91 (10.69) ***	21.20 (2.44) ***	13.00 (1.79) ***	-44.01 (8.02) ***	11.02 (2.88) ***	3.17 (10.28)	
46 - 55	-91.91 (11.78) ***	25.16 (2.59) ***	16.84 (1.91) ***	-47.79 (8.42) ***	8.10 (3.00) ***	3.24 (10.74)	
56 - 65	-85.44 (18.41) ***	26.42 (3.55) ***	9.88 (2.75) ***	-48.38 (10.13) ***	7.41 (3.43) ***	6.65 (12.39)	
Firm size (20-199 omitted)							
Less than 20	-11.67 (10.55)	-12.38 (2.23) ***	-6.20 (1.61) ***	-0.77 (7.68)	-7.88 (2.54) ***	-25.41 (10.05)	**
200-499	1.39 (14.63)	3.32 (1.68)	0.77 (1.93)	2.65 (9.79)	1.63 (2.94)	-4.13 (12.06)	
500 and over	11.09 (9.45)	3.32 (1.68) **	2.13 (1.24) *	14.96 (6.60) **	10.30 (2.02) ***	34.23 (7.99) ***	***
Literacy and Numeracy Scores Dummies	Yes	Yes	Yes	Yes	Yes	Yes	
Industry and Occupations Dummies	Yes	Yes	Yes	Yes	Yes	Yes	
Test: Fr. Canadian = Eng. Canad	37.33 ***	67.38 ***	44.22 ***				
Test: Wh. American= Af. American				2.28	7.20 ***	11.04 ***	***
No. of observations	2643	2643	2643	1846	1846	1846	

Source: IALS (1994) Individuals selected where either employed at the time of the interview or had been employed in the last 12 month  
Standard errors in parentheses. \*\*\* indicates significance at the 1% level, \*\* at the 5% level and \* at the 10% level  
Model in column 6 converged only if one additional education dummy was left out. Coefficients should thus be interpreted as the  
effect relative to workers with either primary or some secondary. Marginal effects measure the impact on  
 $E(\text{Observed Annual Hours} | X)$ , as opposed to either the direct tobit coefficients which measure the impact on  $E(\text{Latent Annual Hours} | X)$   
or the marginal impact on  $E(\text{Observed Annual Hours} | X, \text{Hours} > 0)$

Table 12.

Marginal Effects of Explanatory Variables on Annual Hours of Training  
from a Tobit Model: Females

	Canada			United States		
	Job Related (1)	Employer- Sponsored (2)	Employer- Provided (3)	Job Related (4)	Employer- Sponsored (5)	Employer- Provided (6)
Demographic Group (Other American omitted)						
French Canadian	-35.84 (13.04)	***	-5.29 (1.70)	***	-4.98 (1.43)	***
English Canadian	15.71 (10.95)		4.04 (1.32)		1.73 (1.08)	
White American				2.87 (9.73)	3.81 (3.10)	4.19 (2.28)
African American				-10.39 (12.35)	-2.71 (3.91)	0.08 (2.78)
French/English a	-2.19	*	8.44	***	-0.07	
Second Language	(16.98)		(2.14)		(1.75)	
Immigrant	-7.52 (15.25)		-1.92 (1.86)		1.54 (1.46)	
Education (Primary Omitted)						
Some Secondary	-25.25 (30.58)		-10.19 (4.90)	**	-7.09 (3.44)	**
Secondary	10.84 (30.10)		-10.02 (4.80)	**	-7.37 (3.39)	**
Some Post-secondary	4.95 (31.87)		-8.76 (4.96)	*	-6.73 (3.57)	*
University	18.23 (32.26)		-8.84 (4.99)	*	-7.61 (3.60)	*
Age Intervals (16-25 omitted)						
26 - 35	-103.61 (13.62)	***	13.69 (1.99)	***	11.27 (1.64)	***
36 - 45	-100.10 (14.23)	***	15.87 (2.05)	***	10.98 (1.70)	***
46 - 55	-88.37 (15.14)	***	14.92 (2.18)	***	12.95 (1.78)	***
56 - 65	-79.29 (28.43)	***	8.73 (3.70)	**	6.24 (3.06)	**
Firm size (20-199 omitted)						
Less than 20	5.63 (14.51)		-6.28 (2.02)	***	-6.42 (1.99)	***
200-499	11.71 (20.60)		7.35 (2.25)	***	2.95 (1.99)	***
500 and over	25.05 (13.32)	*	2.98 (1.58)	*	2.47 (1.29)	*
Literacy and Numeracy Scores Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Industry and Occupations Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Test: Fr. Canadian = Eng. Canadian	17.18	***	36.17	***	31.18	***
Test: Wh. American = Af. American				2.41	6.15	***
No. of observation	1309	1309	1309	875	875	875

Source: IALS (1994) Individuals selected where either employed at the time of the interview or had been employed in the last 12 month

Standard errors in parentheses. \*\*\* indicates significance at the 1% level, \*\* at the 5% level and \* at the 10% level

Model in column 6 converged only if one additional education dummy was left out. Coefficients should thus be interpreted as the effect relative to workers with either primary or some secondary. Marginal effects measure the impact on  $E(\text{Observed Annual Hours} | X)$ , as opposed to either the direct tobit coefficients which measure the impact on  $E(\text{Latent Annual Hours} | X)$  or the marginal impact on  $E(\text{Observed Annual Hours} | X, \text{Hours} > 0)$

Table 13. Marginal Effects of Explanatory Variables on Annual Hours of Training from a Tobit Model: Males

	Canada			United States		
	Job Related (1)	Employer- Sponsored (2)	Employer- Provided (3)	Job Related (4)	Employer- Sponsored (5)	Employer- Provided (6)
Demographic Group (Other American omitted)						
French Canadian	-54.38 (13.93) ***	-10.89 (2.89) ***	-5.13 (2.04) **			
English Canadian	-4.68 (11.06)	0.28 (2.18)	0.91 (1.59)			
White American				26.40 (15.03) *	4.67 (5.06)	3.29 (3.10)
African American				27.46 (19.58)	0.09 (6.22)	-0.82 (3.89)
French/English a Second Language	-28.24 (20.07)	-8.46 (4.18) **	-5.87 (2.87) **	34.91 (21.10) *	-5.09 (7.01)	-3.61 (4.45)
Immigrant	28.72 (15.89) *	9.03 (3.14) ***	14.20 (2.20) ***	-5.47 (3.67)	-2.72 (5.96)	-1.40 (3.89)
Education (Primary Omitted)						
Some Secondary	-66.94 (30.38) **	2.17 (7.48)	-0.03 (5.14)	See note	See note	See note
Secondary	-59.11 (31.90) *	3.90 (7.85)	-5.13 (5.38)	6.91 (14.45)	3.73 (4.85)	3.56 (2.88)
Some Post-secondary	-7.11 (33.36)	17.59 (8.04) **	-3.13 (5.55)	49.22 (16.05) ***	9.99 (5.34) *	6.11 (3.22) *
University	-25.87 (33.52)	11.13 (8.10)	-1.17 (5.58)	46.37 (16.18) ***	14.04 (5.35) ***	7.67 (3.26) **
Age Intervals (16-25 omitted)						
26 - 35	-91.29 (14.94) ***	30.36 (3.73) ***	13.81 (2.65) ***	-55.87 (12.56) **	11.00 (4.44) **	-0.50 (2.49)
36 - 45	-96.43 (15.20) ***	21.90 (3.77) ***	9.68 (2.67) ***	-61.38 (12.40) ***	4.95 (4.41) ***	-2.41 (2.45)
46 - 55	-82.75 (17.21) ***	34.41 (4.02) ***	15.57 (2.90) ***	-65.87 (13.77) ***	0.35 (4.72) ***	-3.66 (2.69)
56 - 65	-83.56 (24.44) ***	31.70 (5.02) ***	10.91 (3.64) ***	-61.85 (15.62) ***	-0.93 (5.33) ***	-2.77 (3.03)
Firm size (20-199 omitted)						
Less than 20	-13.55 (14.92)	-14.90 (3.60) ***	-4.92 (2.39) **	2.35 (11.92)	-10.65 (4.00) ***	-5.09 (2.42) **
200-499	1.21 (20.20)	0.65 (3.72)	-0.63 (2.87)	-14.22 (15.72)	-3.95 (4.72)	-5.95 (3.46) *
500 and over	12.55 (13.30)	4.34 (2.60)	1.49 (1.92)	13.07 (10.56)	8.46 (3.26) ***	3.58 (1.96) *
Literacy and Numeracy Scores Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Industry and Occupations Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Test: Fr. Canadian = Eng. Canadian	17.60 ***	25.59 ***	13.26 ***			
Test: Wh. American = Af. American				0.09	1.19	2.57
No. of observations	1334	1334	1334	971	971	971

Source: IALS (1994) Individuals selected where either employed at the time of the interview or had been employed in the last 12 months. Standard errors in parentheses. \*\*\* indicates significance at the 1% level, \*\* at the 5% level and \* at the 10% level. Model in column 6 converged only if one additional education dummy was left out. Coefficients should thus be interpreted as the effect relative to workers with either primary or some secondary. Marginal effects measure the impact on  $E(\text{Observed Annual Hours} | X)$ , as opposed to either the direct tobit coefficients which measure the impact on  $E(\text{Latent Annual Hours} | X)$  or the marginal impact on  $E(\text{Observed Annual Hours} | X, \text{Hours} > 0)$ .

Table 14.

## Training Participation of the Adult Workforce from the AETS

	Formal Job-Related Training			Employer-Supported Formal Job Related Training		
	(1)	(2)	(3)	(4)	(5)	(6)
	1993	1997	2002	1993	1997	2002
Gender						
Males	27.1	26.7	32.5	19.9	21.8	23.4
Females	25.0	30.5	37.2	16.2	23.2	26.8
Age						
25 to 34	31.8	32.6	41.5	19.2	22.6	29.0
35 to 44	30.6	29.5	34.6	22.3	24.1	25.9
45 to 54	24.5	27.8	33.8	18.8	23.9	24.5
55-64	8.8	14.9	22.9	6.7	13.1	15.6
Educational Attainment						
High School or Less	14.3	15.7	17.9	9.6	12.8	13.0
Some Postsecondary Education	35.9	30.9	38.3	20.4	24.0	25.8
Completed Postsecondary Certificate	33.4	32.3	38.1	23.4	25.2	28.1
Completed University Degree	42.8	42.8	51.7	32.0	33.5	36.7
Province						
Newfoundland and Labrador	18.1	22.9	29.5	11.3	16.4	19.9
Prince Edward Island	26.0	23.2	30.6	19.5	18.0	20.3
Nova Scotia	24.5	35.0	38.1	17.0	28.4	28.9
New Brunswick	18.3	25.1	34.7	13.6	19.3	25.8
Quebec	20.5	20.2	31.7	12.5	14.9	24.0
Ontario	27.2	31.1	34.6	19.4	25.2	24.5
Manitoba	29.4	29.3	38.6	22.8	24.3	27.9
Saskatchewan	27.6	31.5	37.7	20.7	27.0	27.4
Alberta	32.8	32.1	34.7	23.1	25.8	25.1
British Columbia	31.4	32.0	38.8	21.9	23.9	26.4

Data sources: 1994, 1998, and 2003 Adult Education and Training Surveys. From Peters (2004), Table 1a and 2a. The adult work force consists of the population aged 25 to 64 who were employed at some point during the reference year.

Table A1. Sample means

	Canada				United States			
	All	French	English	Other	All	African	White	Other
French	0.211	1.000	0.000	0.000	0.104	1.000	0.000	0.000
Canadian/African American								
English	0.292	0.000	1.000	0.000	0.747	0.000	1.000	0.000
Canadian/White American								
Other	0.497	0.000	0.000	1.000	0.149	0.000	0.000	1.000
Canadian/Other American								
Female	0.437	0.455	0.423	0.438	0.483	0.547	0.481	0.443
Immigrant	0.187	0.026	0.124	0.293	0.120	0.040	0.051	0.520
Second La	0.128	0.003	0.000	0.257	0.121	0.005	0.038	0.615
Part-time v	0.171	0.155	0.218	0.150	0.162	0.119	0.163	0.190
Education								
Primary	0.059	0.066	0.030	0.073	0.026	0.011	0.009	0.116
Some Sec	0.197	0.281	0.194	0.164	0.093	0.118	0.078	0.149
Secondary	0.353	0.332	0.331	0.374	0.387	0.413	0.399	0.311
Some								
Post-								
secondary	0.147	0.190	0.174	0.113	0.195	0.245	0.188	0.198
University	0.244	0.131	0.272	0.275	0.299	0.213	0.326	0.226
Age Intervals								
16 - 25	0.153	0.165	0.154	0.148	0.143	0.108	0.135	0.206
26 - 35	0.301	0.285	0.276	0.322	0.249	0.236	0.234	0.333
36 - 45	0.287	0.328	0.301	0.262	0.280	0.315	0.280	0.259
46 - 55	0.198	0.173	0.206	0.203	0.219	0.219	0.235	0.142
56 - 65	0.061	0.049	0.063	0.065	0.109	0.122	0.117	0.060
Firm size								
Less than :	0.292	0.256	0.308	0.298	0.255	0.158	0.267	0.260
20-199	0.138	0.148	0.124	0.142	0.134	0.136	0.130	0.154
200-499	0.071	0.129	0.053	0.057	0.089	0.080	0.092	0.078
500 and o	0.409	0.399	0.477	0.373	0.461	0.579	0.442	0.471
Literacy and numeracy scores								
Document	0.123	0.096	0.100	0.147	0.156	0.310	0.086	0.394
Document	0.252	0.355	0.231	0.222	0.236	0.385	0.221	0.204
Document	0.356	0.359	0.363	0.351	0.332	0.235	0.359	0.266
Document	0.269	0.190	0.305	0.280	0.276	0.069	0.333	0.136
Prose Leve	0.123	0.094	0.082	0.160	0.145	0.294	0.073	0.402
Prose Leve	0.242	0.266	0.222	0.243	0.252	0.357	0.241	0.232
Prose Leve	0.377	0.486	0.385	0.326	0.350	0.280	0.379	0.251
Prose Leve	0.258	0.154	0.311	0.271	0.254	0.070	0.307	0.115
Quantitativ	0.125	0.117	0.097	0.144	0.171	0.301	0.107	0.404
Quantitativ	0.242	0.333	0.207	0.225	0.252	0.383	0.242	0.214
Quantitativ	0.344	0.349	0.349	0.339	0.345	0.263	0.372	0.267
Quantitativ	0.289	0.202	0.347	0.292	0.231	0.053	0.279	0.115
No. obs.	2671	1098	715	858	1993	298	1239	456

Source: IALS (1994) Individuals selected where either employed at the time of the interview or had been employed in the last 12 months.