Reading Engagement and Literacy for Men and Women

ELLiot LAWES *

Abstract

The distribution and flow of skills in the adult population of New Zealand, particularly in the labour market, is an issue of key economic and social importance and has motivated a substantial amount of analytical work. This analytical work has not often incorporated the attitudes of members of the adult population. However, as this paper aims to demonstrate, attitudinal information may provide insights which are otherwise unavailable. The Adult Literacy and Life Skills (ALL) survey provides the evidence base for this demonstration. This large-scale survey – with an achieved sample size of 7131 respondents (representing a response rate of 64%) was conducted in New Zealand in 2006. A distinguishing feature is that it directly measured the English literacy skill of respondents. The ALL survey data are rich enough to allow the factor-analytic construction of an attitudinal measure: reading engagement (i.e. attitude to reading, disposition toward reading). Using linear regression techniques on the ALL survey data, it is apparent that after controlling for age, ethnicity and time spent in formal education, women tended to have higher literacy skill than men. However, this difference in literacy skill can be explained by the fact that women tend to engage more with reading than men.

Background

It is far from usual to include attitudinal factors such as reading engagement (i.e. attitude to reading, disposition toward reading) in demographic or economic analyses of New Zealand’s adult population. This paper argues that inclusion of attitudinal factors, where possible, might provide insights unavailable when more standard factors alone are used in analysis.

* Ministry of Education, New Zealand. Email: elliot.lawes@minedu.govt.nz
The importance of skill, its acquisition and flow are of key importance in many demographic and economic analyses. For example, a recent labour-market analysis by Maré and Stillman (2009), examines how the supply of immigrants in particular skill-groups affects the employment and wages of the New Zealand-born and of earlier migrants. They find, “…little evidence that immigrants negatively affect either the wages or employment opportunities of the average New Zealand-born worker”. They do find however “some evidence that increases in the number of high-skilled recent migrants have small negative impacts on the wages of high-skilled New Zealand-born workers, which are offset by small positive impacts on the wages of medium-skilled New Zealanders” (p.3). There are many other recent examples of analyses where skill is of primary interest (for example, Szeto & McLoughlin, 2008; Hunter, 2007; Bedford, 2003).

In many skill-based analyses, educational attainment (usually either level of qualifications and/or time spent in formal education) is used as a proxy for skill. However, this proxy has its limits, which are only able to be quantified when skill is measured (Earle, 2009a; Smyth & Lane, 2009). Earle (2009b) uses the Adult Literacy and Life Skills (ALL) survey – which measures literacy and numeracy skill – to show that (among other things) New Zealanders with English as a second language are “more likely to have lower wages and incomes than people with English as a first language, even after accounting for differences in qualifications and English-based literacy and numeracy.” Unfortunately, data that contain measures of skill (as opposed to proxies for skill) are few and far between, especially in the adult population.

Gender is another factor of primary importance in demographic and economic analyses, especially those relating to the distribution and movement of skill. Badkar et al. (2007a) investigate the gender distribution among Asian migrants to New Zealand entering through the Skilled/Business stream and Temporary categories from 1997/98 to 2005/06. They find that “although men dominate the overall Skilled/Business stream and Temporary categories, there is large diversity by nationality and women from some Asian countries are critical players in the migration process” (p.127). Johnston (2005), investigating the participation of women in New Zealand’s labour market, finds that high fertility rates and low labour-market participation of mothers with young children is likely to explain low labour-market participation of younger New
Zealand women. Johnston also finds that “while New Zealand women tend to leave the labour force when they have children, they also tend to return strongly to paid employment when their children get older” (p.34). Other recent examples of skill- and gender-based demographic and economic analyses include Bean, 2005; Badkar et al., 2007b; and Dixon, 2004.

In addition to being key factors in demographic and economic analysis, gender and skill (especially literacy skill) are also key factors in educational research within the compulsory schooling context. There, unlike the case for the adult population, the distribution of skill is measured relatively frequently in a number of different ways. For example, New Zealand participates in the Organisation for Economic Co-operation and Development’s (OECD) Programme for International Student Assessment (PISA). PISA aims to measure the reading, science, and mathematics literacy skills of 15-year-olds in the compulsory schooling sector in an internationally comparable way (see, for example, OECD, 2007). New Zealand also participates in the Progress in International Reading Literacy Study (PIRLS), which is coordinated by the International Association for the Evaluation of Educational Achievement (IEA). PIRLS aims to measure the reading literacy achievement of Grade 4 (in New Zealand, Year 5) students in an internationally comparable way (see for example, Mullis et al. 2007).

A large number of studies, including PISA and PIRLS, confirm that in the compulsory schooling sector, on average, girls tend to have higher (reading) literacy skill than boys (for example, Wagemaker, 1996; Chamberlain, 2007 and 2008; Crooks & Flockton, 2005; Sturrock & May, 2002). In the international context, much work has been done to explain and address this gender disparity (for example, Younger et al., 2005; Condie et al., 2006), but it continues to be of high concern in the education sector.

This concern has translated into a body of work investigating the factors that are associated with both gender and literacy skill (and other measures of educational achievement) in the compulsory schooling context. Student attitudes, beliefs and practices are some of the factors that are most strongly associated with both gender and literacy skill (see, for example, Marsh and Yeung, 1998).

There are many aspects to students’ attitudes, beliefs and practices, and each of these aspects has its particularities. For example, students’ self-concept has been described as a hierarchical, multifaceted construct
influenced by both situation and significant others (Hattie, 1992). Students’ self-concept in particular subject areas has also been studied: Chapman and Tunmer (1995) isolated three aspects of students’ reading self-concept: reading motivation; self-concept as a reader; and value of reading. Self-efficacy (in various subject areas), work avoidance, recognition and motivation orientations have also been studied (using New Zealand data: OECD, 2007; Meyer et al., 2009, and using American data: Baker & Wigfield, 1999). The attitudinal factor of interest in the current paper is reading engagement. This is a combination of reading enjoyment and reading activities.

Reading enjoyment and activities, and their relationship with gender and reading literacy skill have been studied in the compulsory schooling context. Notably, Schagen and Twist (2008) use modelling techniques that incorporate student data (from England) from different time-points, account for other, potentially correlated, factors and allow for differences in variation at different data-levels to examine the relationships between self-motivated reading practices, enjoyment of reading, gender and reading achievement. One of their conclusions is that after controlling for prior achievement, “…most of the gender difference in reading attainment in grade 4 is mediated by reading enjoyment and personal reading activities” (Schagen & Twist, 2008, p. 6). Analyses of similar scope have not been carried out in New Zealand.

Unsurprisingly, the relationship between gender and literacy skill in the compulsory schooling context continues in the adult population (Satherley & Lawes, 2008a). Given the key nature of skill and gender in demographic and economic analyses (which largely focus on the adult population), a question of interest is then: What role does reading engagement play in the relationship between gender and skill in the adult population?

The author is not aware of any recent analytical work that incorporates attitudinal factors in economic and demographic analyses in the context of the adult population of New Zealand. However, policy interest is growing (New Zealand Treasury, 2008), and the international literature incorporating attitudinal factors in analyses, while not large, is also growing. This literature is largely economic in focus and often loosely uses the term “non-cognitive skills” for what this paper refers to (again, loosely) as “attitudinal factors” or “attitudes, beliefs and practices”. It mostly focuses on explaining income using non-cognitive skills such as individual
motivation (Goldsmith et al., 2000), behavioural problems in high school (Cawley et al., 2001) and mental health (for example, Mullahy & Sindelar, 1993). In one study with a somewhat broader perspective, Waddell (2006) finds that, relative to others in their cohort, youth with poor attitude and self-esteem tend to: attain fewer years of postsecondary education; be less likely to be employed 14 years following high school; and, when employed, realise lower earnings. In another study investigating the relationship (in a sample of Dutch university students) between cognitive skills (IQ) and non-cognitive skills (including performance-motivation, preference for leisure, positive fear of failure, negative fear of failure, internal locus of control, social desirability, enjoyment of success, resilience, curiosity, emotional stability, introversion, openness, agreeableness and conscientiousness), Borghans et al. (2007) find that performance on cognitive tests is strongly associated with non-cognitive skills.

Responding to a question similar to the above, Jacob (2002) investigates the role that non-cognitive skills (academic effort, behaviour and maturity) play in explaining the gender disparity in tertiary attendance (favouring women) in the United States. He finds that after controlling for other factors, “… higher non-cognitive skills and college premiums among women account for nearly 90 percent of the gender gap in higher education.” Clearly, in this case at least, attitudinal factors (i.e. non-cognitive skills) provided substantial insight.

**Objective**

The background section above argued that the inclusion of attitudinal factors, where possible, might provide further insights in demographic and economic analyses. The aim of the remainder of this paper is to provide a fairly simple piece of evidence demonstrating the value of including the attitudinal factor “reading engagement” in an analysis of the gender disparity in the distribution of literacy skill in the adult population. In particular, the evidence addresses the question, “what role does reading engagement play in the relationship between gender and skill in the adult population?” The Adult Literacy and Life Skills (ALL) survey provides data containing attitudinal information as well as measures of literacy. Consequently, the ALL survey data will be used as the source of evidence in this paper.
Methodology

Data

The ALL survey was an investigation of the distribution of several types of literacy skill among people aged 16 to 65 years. Each type of literacy was measured using English-language tests. The survey was conducted across a number of countries, as well as providing information specific to New Zealand (Satherley & Lawes, 2007). In this paper, analysis is restricted to New Zealand’s ALL data.

Much of the surveys methodology was internationally prescribed (OECD 2005a) and was ultimately driven by international policy concern around key competencies (Rychen & Salganik, 2003). The survey had a nationally representative probability-based sample with an over-sample of Maori and Pasifika peoples. The target population was all persons aged 16 to 65 usually resident in New Zealand and living in private households at the time of data collection. One eligible person per household was selected and interviewed face to face. Interviews were structured, and took place in the respondent’s house. Exactly 7,131 interviews were achieved during the data-collection period (May 2006 - March 2007). The response rate was 64%.

An ALL interview included a background questionnaire – which collected socio-demographic information – and a task booklet. The interview consisted of the interviewer administering the background questionnaire and task booklet to the respondent. The task booklet was in two parts – a short ‘core’ booklet, and a longer task booklet. Literacy tasks involved text and diagram comprehension – correct completion of these tasks involved both closed and open-ended responses. The purpose of the core booklet was to screen out those with extremely low literacy from attempting the more demanding, longer task booklet while still collecting sufficient information to compute literacy ability scores. Those with high enough literacy completed the core booklet (that is, correctly answered at least three of the six items in the core booklet) and then moved on to attempt the longer task book. The interviews lasted an average of about 90 minutes (including the assessment). Sample assessment items are publicly available (OECD 2005a).
Analyses

The analytical approach in this paper was to create a robust measure of reading engagement using factor-analytic techniques; create a first linear regression model of literacy skill accounting for standard demographic variables such as age, ethnicity, gender and time spent in formal education; create a second linear regression model of literacy skill accounting for all of the factors in the first model as well as the measure of reading engagement; and compare the two models.

To further illuminate this process, the variables included in these linear regression models are now described.

Gender is an indicator variable for being male and age measures the age (in years) of respondents. Age squared (measuring the square of the age of respondents) was included in the modelling to allow for a non-linear relationship between age and literacy skill. Ethnicity was recorded in the ALL survey by multiple-response. That is, a single respondent could identify with up to five ethnic groups. This is reflected in the modelling process by use of a number of indicator variables (Maori, Pasifika, Asian, Other) representing identification with the appropriate ethnic group. The default identification in the model is with the New Zealand European ethnic group.

The time that respondents spent in formal education was distributed quite differently for those who had a tertiary-level education than for those who did not. For this reason the variable time spent in formal education was standardised (i.e. transformed to have mean 0 and standard deviation 1) separately for those who had a tertiary-level education and those who did not. The variable tertiary education, indicating possession of a tertiary level education, was also included. For the purposes of this analysis, a tertiary-level education consists of having the equivalent of at least a level 4 certificate in New Zealand's National Qualifications Framework (New Zealand Qualifications Authority, 2009).

To further explain, a respondent who had an above-average value for time in formal education and who had a tertiary level education had spent more than the average time in formal education when compared to others with a tertiary level education. Another respondent who had the same value for time in formal education but did not have a tertiary level education had
spent more than the average time in formal education when compared to others without a tertiary level education.

Several different literacy skills were measured in the ALL survey (Satherley & Lawes, 2007). In this paper, a one-parameter item response theory model was used to estimate the “prose literacy” skill scores of respondents (Baker & Kim, 2004). Briefly, prose literacy skill is a measure of the respondents’ ability in reading and understanding continuous text (in English) such as that found in a book or newspaper (Satherley & Lawes 2007). The ALL sampling methodology was such that a randomly selected 5,470 respondents had their prose literacy skills measured. Consequently, only these respondents were used in the analysis for this paper.1

Literacy skills were distributed quite differently in different sectors of New Zealand’s adult population (Lawes, 2008; Satherley & Lawes, 2008a, 2008b; Satherley et al., 2008a, 2008b). For example, the prose literacy skills of men in New Zealand tended to be lower than those of women (Satherley & Lawes, 2008a). This is illustrated (for all age-bands in the ALL survey) in Figure 1.

Figure 1: Mean prose literacy score for men and women by age-band

Note: In Figure 1, Prose literacy scores are standardised to have an overall mean of 100 and a standard deviation of 15.
In addition to literacy information, the ALL survey collected a wide range of background information from respondents. Some of this information was related to their engagement with reading. In particular, the survey asked respondents how frequently they visited libraries and bookshops, how frequently they used books to obtain information, how many books were in their homes, as well as several questions about their attitudes to activities related to reading. See Table 1.

A factor analysis was performed to summarise responses to these questions. This factor analysis (using varimax rotation), suggested that there was a single factor underlying the responses to the above questions. This factor comprises the variable reading engagement included in the modelling process. The factor loadings are listed in Table 1.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Factor loading</th>
</tr>
</thead>
<tbody>
<tr>
<td>Library visit frequency</td>
<td>0.609</td>
</tr>
<tr>
<td>Bookshop visit frequency</td>
<td>0.684</td>
</tr>
<tr>
<td>Frequency of book use for information</td>
<td>0.754</td>
</tr>
<tr>
<td>Number of books in home</td>
<td>0.585</td>
</tr>
<tr>
<td>Disagreement with &quot;I read only if I have to&quot;</td>
<td>0.786</td>
</tr>
<tr>
<td>Agreement with &quot;Reading is one of my favourite activities&quot;</td>
<td>0.811</td>
</tr>
<tr>
<td>Agreement with &quot;I enjoy talking about what I have read ...&quot;</td>
<td>0.601</td>
</tr>
</tbody>
</table>

This factor (i.e. the variable reading engagement) explained around 48% of the variation in the listed variables.

The different outcome patterns of reading engagement for men and women (for all age-bands in the ALL survey) – analogous to those of prose literacy skill displayed in Figure 1 – are displayed in Figure 2.
Figure 2: Mean reading engagement score for men and women by age-band.

Note: In Figure 2, reading engagement scores are standardised to have an overall mean of 100 and a standard deviation of 15.

In addition to the variables described above, a number of interaction terms were included during the modelling process: Age by time in formal education allowed for different relationships between age and literacy skills for those who had spent different amounts of time in formal education; Pasifika by age allowed for a different relationship between age and literacy skills for Pasifika adults than for others. Age squared by time in formal education, Asian by age squared, Reading engagement by age and Reading engagement by tertiary education had analogous purposes.

Because of the survey’s complex design, replication methods were used to estimate standard errors in all linear regression analyses and mean calculations. Because of the sampling methodology (and in particular, the over-sample of Maori and Pasifika adults) weights were used in all linear regression analyses and mean calculations. At an early stage of modelling, age (by itself) was found to have a statistically non-significant relationship with literacy skill and was omitted from further modelling.

Standardised regression coefficients for the two linear regression models are displayed in Table 2.
Table 2: Standardised regression coefficients and error for prose literacy

<table>
<thead>
<tr>
<th>Variable</th>
<th>First model coefficients (standard error)</th>
<th>Second model coefficients (standard error)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age by time in formal education</td>
<td>-0.037 (0.014)</td>
<td>-0.033 (0.014)</td>
</tr>
<tr>
<td>Age squared</td>
<td>-0.090 (0.014)</td>
<td>-0.093 (0.012)</td>
</tr>
<tr>
<td>Age squared by time in formal education</td>
<td>0.024 (0.011)</td>
<td>0.023 (0.011)</td>
</tr>
<tr>
<td>Asian</td>
<td>-0.223 (0.012)</td>
<td>-0.199 (0.013)</td>
</tr>
<tr>
<td>Asian by age squared</td>
<td>0.080 (0.012)</td>
<td>0.075 (0.012)</td>
</tr>
<tr>
<td>Time in formal education</td>
<td>0.265 (0.013)</td>
<td>0.216 (0.014)</td>
</tr>
<tr>
<td>Gender</td>
<td>-0.075 (0.014)</td>
<td>-0.015 (0.012)</td>
</tr>
<tr>
<td>Māori</td>
<td>-0.100 (0.012)</td>
<td>-0.074 (0.012)</td>
</tr>
<tr>
<td>Other ethnic group</td>
<td>-0.030 (0.014)</td>
<td>-0.030 (0.013)</td>
</tr>
<tr>
<td>Pasifika</td>
<td>-0.234 (0.021)</td>
<td>-0.204 (0.019)</td>
</tr>
<tr>
<td>Pasifika by age</td>
<td>-0.097 (0.016)</td>
<td>-0.097 (0.016)</td>
</tr>
<tr>
<td>Tertiary education</td>
<td>0.287 (0.017)</td>
<td>0.222 (0.017)</td>
</tr>
<tr>
<td>Reading engagement</td>
<td>-</td>
<td>0.287 (0.016)</td>
</tr>
<tr>
<td>Reading engagement by age</td>
<td>-</td>
<td>0.023 (0.009)</td>
</tr>
<tr>
<td>Reading engagement by tertiary education</td>
<td>-</td>
<td>-0.073 (0.017)</td>
</tr>
</tbody>
</table>

All coefficients were significant at the 0.05-level except Age squared by time in formal education in the first stage model (which was significant at the 0.06 level) and gender in the second stage model. The variables in the first stage model explained around 25% of the variation in prose literacy. The variables in the second stage model explained around 30%.

Results

Controlling for all other factors in the models except reading engagement:

- Women tended to have higher prose literacy skill than men. However after also controlling for reading engagement, this difference in skills became statistically non-significant. This is this paper’s main finding and demonstrates that attitudinal information may provide insights which are otherwise unavailable to economic and demographic analyses.

- When compared with those of middle age, both younger and older adults tended to have lower prose literacy skills. This effect persisted after also controlling for reading engagement.
• Those adults who had a tertiary level education tended to have higher prose literacy skills. After accounting for tertiary level education, those adults who had spent longer in formal education tended to have higher prose literacy skills. This effect persisted after also controlling for reading engagement.

• Adults who identified as Maori, Pasifika, Asian and Other ethnic group tended to have lower prose literacy skills than those who identified as New Zealand European. In addition, Asian adults of middle age tended to have lower prose literacy skills than both younger and older Asian adults. Also older Pasifika adults tended to have lower prose literacy skills than younger Pasifika adults. These effects persisted after also controlling for reading engagement.

It is also apparent that after controlling for all other factors in the model, those with higher levels of reading engagement, especially older adults, tended to have higher prose literacy skill. This effect was somewhat less for those with a tertiary level education.

Discussion

The main finding of this paper is that the gender disparity in prose literacy skill can be explained by the fact that women tend to engage more with reading than men, providing some evidence of the value of including attitudinal information in demographic and economic analyses. However, this should be interpreted with care. It does not mean that the reading engagement patterns of men and women cause the gender disparity in literacy skill in the adult population of New Zealand (or the reverse). It also does not rule out the possibility that other factors such as income, participation in further education and training, or even an attitudinal factor like civic participation might also explain the gender disparity in prose literacy skill. Rather, it roughly means that for men, the difference in prose literacy skill between those with high reading engagement and those with low reading engagement, while significant, was similar to that for women.

To investigate the causal or temporal relationships between reading engagement and reading literacy in the adult population would require analysis of longitudinal data. It is likely that for many, reading engagement and reading literacy are factors which are first (broadly) determined at a
young age. Therefore it seems beyond the scope of almost all current data collections to allow investigation of the causal relationships between reading engagement and reading literacy for adults with a broad range of ages. To investigate such important questions as why women tend to engage more with reading than men would require much more than analysis of longitudinal data. In the mean time, studies such as the ALL survey continue to provide valuable information.

The role that attitudinal factors (i.e. non-cognitive skills) might play in future analyses is unclear. Certainly some attitudinal factors will be better suited to some research questions than others, but the range of information that attitudinal factors might capture is vast. They might even be used as efficient proxies. For example, reading engagement – as constructed in this paper – is easy to measure: it is constructed from responses to 7 Likert-type items. Reading literacy skill, on the other hand, is difficult to measure: the average length of an ALL survey interview was about 90 minutes (mostly due to the literacy items). Therefore, when faced with issues of data-collection design, one might be tempted to use reading engagement (perhaps in combination with qualifications achieved or time spent in formal education) as a proxy for skill. Certainly, the use of attitudinal factors in demographic and economic analyses of New Zealand’s adult population seems to have much potential.

Elsewhere, Heckman (for example, Heckman et al., 2006) and collaborators have found considerable value incorporating non-cognitive skills into their economic analyses. Many of their analyses address the historical over-attribution of importance the contribution cognitive skills make to life outcomes. Instead, they seek to quantify the significant contributions of non-cognitive skills such as self-control and sociability. Similar analyses would likely provide substantial insights into New Zealand’s economic and demographic landscapes and contribute considerable challenges for policy analysts and makers alike.

Acknowledgements and Disclaimer

The author would like to thank Jit Cheung, Roger Smythe, Heleen Visser and other colleagues at the Ministry of Education for their useful comments. The author also gratefully acknowledges the improvements suggested by the reviewer. Opinions
expressed in this paper are those of the author and do not necessarily coincide with those of the Ministry of Education.

Note

1 These considerations do not apply in all analyses of the ALL data: OECD, 2005a; Satherley et al., (2008) are concerned with producing population estimates describing the distribution of literacy skills. Consequently, they use a two-parameter item response theory model and plausible value methodology (Baker and Kim, 2004; OECD, 2005b).

References


