



MINISTRY OF EDUCATION

Te Tāhuhu o te Mātauranga

Adult literacy and numeracy in New Zealand
– A regional analysis

Perspectives from the Adult Literacy and Life Skills Survey

This series covers research on teaching and learning in literacy, language and numeracy and analyses of international surveys on adult literacy and numeracy.

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SUMMARY

This report explores the geographical distribution of literacy and numeracy skills among people aged 25 to 65 in New Zealand in 2006. It investigates whether there were geographical concentrations of people with higher literacy and numeracy and with low literacy and numeracy.

The populations of North Shore City and Rodney District, and the Wellington region were found to have higher skills, and Counties-Manukau lower skills, than the norm.

Auckland City did not have higher literacy and numeracy levels in spite of a high education, occupation and industry profile.

Populations in rural areas, and some provincial regions, had levels of literacy and numeracy roughly equivalent to main urban centres, in spite of education, occupation and industry profiles that indicate that skill levels would be expected to be lower.

Three key factors provide a good account for the distribution of high and low literacy and numeracy:

- computer use, especially at work
- completed education
- first language (English or not)

The computer has become a key literacy and numeracy tool. Broadly, work computer use or non-use can be seen as dividing jobs into those requiring and those not requiring higher literacy and numeracy. Home computer use was associated with greater involvement in personal literacy activities.

These three key factors account for the unexpected results, as well as more predictable findings.

Of the three key factors, the one which most closely paralleled the regional distribution of literacy and numeracy was the percentage of people in a region using a computer at work.

Framework for analysis

This report is based on the Adult Literacy and Life Skills (ALL) Survey 2006, and analyses regional variation in English prose literacy and numeracy among people aged 25-65. People in this age range have relatively stable residence and most have completed secondary or tertiary education and are in employment. Three different geographical classifications are used:

- a detailed breakdown into 13 regional units
- two broad regional groupings (the group consisting of the Auckland, Wellington, Canterbury and Otago regions, compared with the rest of New Zealand)
- urban/rural profile as defined by Statistics New Zealand

The literacy and numeracy measures used for the first two classifications were the percentages of people aged 25-65 with higher English prose literacy and with higher numeracy (where 'higher' refers to the international standard cognitive levels 3 to 5 used in ALL analyses). The measures used for the urban/rural profile were mean prose literacy and numeracy scores.

Regional variation in literacy and numeracy

In the detailed regional analysis, the averages for comparison were the percentages of people with higher prose literacy and with higher numeracy in New Zealand as a whole. Two regions were significantly above average in terms of both the prose literacy and numeracy measures, namely North Shore-Rodney (North Shore City and Rodney District) and the Wellington Region. One region, Counties-Manukau, was significantly below average in both prose literacy and numeracy, and one region, Waitakere City, was significantly below average in prose literacy but not in numeracy.

In the analysis by broad regional grouping, the 'metropolitan' grouping of the Auckland, Wellington, Canterbury and Otago Regions had significantly greater percentages of people aged 25-65 with higher prose literacy and with higher numeracy than the rest of New Zealand. Most of these differences were concentrated in the 45-65 age group.

The analysis by urban/rural profile compared rural areas and two types of urban area, main or satellite urban areas, and independent urban areas. Independent urban areas can be described approximately as towns beyond commuting range of a main urban area. There were no significant differences in the measure of prose literacy among the three area types. However, there was a significantly lower mean numeracy score in independent urban areas on the one hand, compared with main or satellite urban areas on the other; while the mean numeracy score in rural areas was not clearly distinct from either category of urban area.

Key factors in regional variation

Completed education was one of the key factors related to the variation in prose literacy and numeracy. In general, the greater the percentage of people in a geographical area with upper secondary or tertiary education, the greater the percentage of people with higher prose literacy and numeracy. However, there were a number of geographical areas where the percentage of people with upper secondary or tertiary education was significantly below average, but the prose literacy and numeracy rates were average. These were Waikato, Bay of Plenty, Taranaki and Manawatu-Wanganui and the South Island apart from Canterbury and Otago. The same applied in rural areas when compared with main or satellite urban areas. There was one region (Auckland City) where the percentage of people with upper secondary or tertiary education was significantly above average, but the prose literacy and numeracy measures were average.

These results can be explained by reference to two other key characteristics associated with higher prose literacy and numeracy: having English as a first language, and using a computer at work.

The geographical areas where the percentage of people with upper secondary or tertiary education was below average were ones where the percentage of people with English as a first language was above average. On the other hand, Auckland City had a percentage of people with upper secondary or tertiary education which was above average but a percentage of people with English as a first language which was below average. In all these cases the effects of education and first language were in opposition and approximately cancelled each other out.

Computer use at work broadly identifies people in jobs requiring extensive literacy and numeracy activities (as opposed to people who were either not employed or employed in jobs with lower literacy and numeracy requirements) and so is an indicator of higher literacy and numeracy skills. Work computer use was only moderately correlated with education: people with tertiary education were more likely than others to use a computer at work but 40 per cent of work computer users had no tertiary education.

The geographical areas which were significantly above average in terms of prose literacy and numeracy were the ones where at least two of the three key characteristics (upper secondary or

tertiary education, English as a first language, work computer use) were above average. These geographical areas were North Shore-Rodney, Wellington Region, and the grouping of the Auckland, Wellington, Canterbury and Otago Regions compared with the rest of New Zealand.

Similarly, geographical areas where at least two of the key characteristics were significantly below average were likely to have below average numeracy. This was the case for Counties-Manukau and independent urban areas compared with main or satellite urban areas. For Counties-Manukau, all three of the key characteristics were below average, and in this region the measure of prose literacy was below average as well. Independent urban areas had below average levels of education and work computer use, and had below average numeracy (but not prose literacy) in spite of having an above average percentage of people with English as a first language. The exception to this generalisation was the South Island apart from Canterbury and Otago, which had below average levels of education and work computer use (and an above average percentage of people with English as a first language), but had average numeracy (and prose literacy).

Other geographical areas, which did not have at least two key characteristics significantly above or below average, had average measures for prose literacy and numeracy. The one exception to this was Waitakere City, where the measure for prose literacy was significantly below average, even though only one of the key characteristics (English as a first language) was significantly below average.

Of the three key characteristics, the one which most closely mirrored the pattern (in terms of average and above and below average) of prose literacy and numeracy was computer use at work. In fact, for the geographical areas compared in this report, this mirroring was almost exact for numeracy (the one exception being the South Island apart from Canterbury and Otago), while there were two exceptions for prose literacy (Waitakere City had average work computer use but below average prose literacy, and independent urban areas had below average computer use but average prose literacy). This may be because this characteristic relates most closely to respondents' recent circumstances, while first language and education are more distant parts of the respondents' backgrounds in general.

Other factors

The geographical areas where prose literacy and numeracy were significantly above average (North Shore-Rodney, Wellington, the metropolitan grouping, and main or satellite urban areas) were in general the areas which were also significantly above average in terms of the percentages of people who were managers, professionals or technicians, the percentages of people who worked in finance, business or community services (including education and health), and the percentages of people with personal incomes of \$40,000 or more. (The one exception to this pattern was Auckland City, which was above average in these three characteristics but average in terms of prose literacy and numeracy, reflecting its above average percentage of people whose first language was not English).

However, geographical areas which were significantly below average in terms of occupation, industry or income were not necessarily significantly below average in measures of prose literacy or numeracy. The areas which fitted this description were Northland, Counties-Manukau, Waikato, the South Island apart from Canterbury and Otago, and rural areas (compared with main or satellite urban areas). Of these areas only Counties-Manukau was below average (for both prose literacy and numeracy), while the others were average (for both prose literacy and numeracy). This suggests that in these average areas, people with higher prose literacy or numeracy were spread across a relatively wide range of occupations and industries and could not necessarily earn above average incomes.

Limitations of the analysis

Because the analysis is based on survey and not census data, it is not possible to produce results for small geographical areas. It is likely that there were localised pockets of high and low literacy and numeracy, but that these were balanced out within the regions used in this study, giving rise to a large number of regions with 'average' literacy and numeracy.

This observation applies in particular to the category 'rural areas' which includes areas on the outskirts of major urban centres through to areas remote from any urban settlement. There could be significant variations in literacy and numeracy within this category but it has not been possible to subdivide this category given the relatively small number of respondents residing in rural areas.

1 INTRODUCTION

This report explores the geographical distribution of literacy and numeracy skills among people aged 25 to 65 in New Zealand in 2006. It investigates whether there were geographical concentrations of people with higher literacy and numeracy and with low literacy and numeracy. It also attempts to account for geographical variation in literacy and numeracy in terms of a set of educational, social and economic factors. It is based on analyses reported in Lane (2010), *Adult literacy and numeracy in New Zealand – Key factors*, and summarised in section 1.6 below.

1.1 The Adult Literacy and Life Skills (ALL) Survey 2006

The Adult Literacy and Life Skills (ALL) Survey was an international survey coordinated by the Organisation for Economic Cooperation and Development (OECD) and Statistics Canada. The New Zealand survey was carried out between May 2006 and March 2007. All survey respondents were interviewed face-to-face and their English literacy, numeracy and problem solving skills were directly tested during the interviews. The survey achieved a representative national sample of 7,131 New Zealanders aged 16 to 65. The survey also collected extensive background information on demographic characteristics, language, education, employment, income, health, literacy and numeracy practices and the use of information and communication technologies.

1.2 Age range used in this analysis

The respondents in the ALL Survey formed a representative sample of people aged 16 to 65. The analyses in this report, however, are based only on the data from the subset of people aged 25 to 65. Initial study of the full sample indicated that the key factors related to literacy and numeracy included the highest level of education completed and employment-related factors such as occupation and computer use at work. These factors do not apply to the majority of people aged 16 to 24 who are still in education. People in this age group also tend to be geographically mobile, with many moving between regions for secondary and tertiary study. They are not necessarily in their region of origin and are not necessarily living in their current region of residence on a long-term basis. Accordingly a separate analysis is required for the 16-24 age group.

1.3 Literacy and numeracy in ALL

The ALL survey measured skills across four domains using English-based tests:

- **Prose literacy** – the ability to read continuous texts, such as news stories and instruction manuals
- **Document literacy** – the ability to read discontinuous texts, such as maps and timetables
- **Numeracy** – the ability to read and work with numeric information
- **Problem solving** – the ability to reason in situations where no routine procedure exists.

The tests were designed to assess skills across the full range of competency, from limited to highly-developed skills. The tests were designed to cover general, cognitive skill levels and did not attempt to assess specialist knowledge and skills (Satherley and Lawes, 2007).

The literacy and numeracy skills measured in the ALL survey are reported either as scores ranging from 0 to 500, or more commonly, in terms of five levels, from Level 1 (very low skills) to Level 5 (very high skills). A detailed description of the levels is given in Chapter 6. In this report the levels are grouped into low skills (Levels 1 and 2) and higher skills (Levels 3, 4 and 5).

The four skills measured in the ALL survey are highly correlated with one another, as shown in Table 1. The strongest correlation was between document literacy and prose literacy. The weakest correlations were between prose literacy and numeracy and between numeracy and problem solving.

Table 1
Correlations between skills for people aged 25-65

	Document literacy	Numeracy	Problem Solving
Prose literacy	0.93	0.83	0.90
Document literacy		0.89	0.89
Numeracy			0.83

The focus in this report is on prose literacy and numeracy. Of the literacy or numeracy measures, these are the most distinct. If there are different patterns for literacy and numeracy, the differences should be clearest between prose literacy and numeracy. The patterns for document literacy can be expected to fall between those for prose literacy and numeracy. Together these two measures provide a good overall picture of literacy and numeracy.

In later chapters, the main statistic used as a measure of prose literacy or numeracy among people in a particular category is the percentage of people aged 25-65 in Levels 3, 4 and 5 ('higher prose literacy' or 'higher numeracy'). Higher prose literacy or numeracy can then be directly compared with a number of variables in their more easily expressed form (for example, 'using a computer at work' rather than 'not using a computer at work' – or 'having English as a first language' rather than 'not having English as a first language'). Expressing the associated variables in this way also avoids potential technical problems with the statistical reliability of estimates.¹

Readers may be particularly interested in the percentage of people with low literacy or numeracy, that is, the percentage in Levels 1 and 2. If the percentage with higher literacy or numeracy (Levels 3, 4 and 5) is x , then the percentage with low literacy or numeracy (Levels 1 and 2) is simply $100-x$.

1.4 Comparison with International Adult Literacy Survey (IALS) 1996

Regional variation in adult literacy in New Zealand has previously been studied using results from the International Adult Literacy Survey (IALS) 1996.

The International Adult Literacy Survey was the precursor of the Adult Literacy and Life Skills Survey. The international results have been summarised in reports by the OECD and Statistics Canada (1995, 2000). Data collection for IALS took place in New Zealand in 1996, with 3,311 respondents completing the full survey and another 922 only basic demographic data. IALS

¹ Almost all estimates provided in this report are of acceptable data quality in terms of Statistics Canada's (2002) guidelines for the ALL survey. However, a small number of estimates are of marginal reliability in terms of these guidelines. Where this is the case, the marginal quality of the estimates will be expressly stated in a note to the relevant table or figure.

provided measures of prose literacy and document literacy which are comparable with the ALL measures. IALS also included a measure of 'quantitative literacy' which differed in important ways from numeracy as measured in ALL, so that quantitative literacy in IALS is not comparable with numeracy in ALL.

Culligan et al. (2004) carried out an analysis of the IALS data from the 3,311 respondents who completed the full survey, and developed a set of estimates for the proportion of people with low literacy in New Zealand territorial local authorities. These estimates were based on a classification tree model which was then applied to 1996 Census data.

Their measure of low literacy was a composite variable derived from the three literacy measures: prose, document and quantitative. Because ALL has no quantitative literacy measure it is not possible to calculate a comparable statistic from the ALL data. However, their TLA estimates for the proportions of people with low literacy are almost all below the IALS national estimates for Level 1 and Level 2 prose literacy (47 per cent) and document literacy (51 per cent) as reported by Satherley, Lawes and Sok (2008a), which suggests that their definition of low literacy leads to systematically lower proportions than a definition based on aggregating Level 1 and Level 2 (as used in this report).

1.5 Previous research on regions

Two research programmes have provided regional information and useful classifications and frameworks on which to base the analyses in this report.

New Zealand Regions 1986-2001, Population Studies Centre, University of Waikato

The Population Studies Centre conducted a programme of research on New Zealand regions using Census data from 1986 to 2001 and focusing on regional comparisons and changes over time in a wide range of demographic and economic characteristics. The findings have been published in a series of Discussion Papers, of which four are referred to here (Pool et al. 2005a, 2005b, 2005c, 2006). These four papers analyse trends in factors which all have associations with adult literacy and numeracy, namely education, labour force status, industry, occupation and income.

Education

Pool et al. (2005a, pp.19-20) in their Discussion Paper on education and qualifications summarise their findings as follows:

This paper shows that the stocks and flows of human capital are not equitably spread throughout the regions of New Zealand. As in other papers in this series there are clear disadvantaged and advantaged regions, especially Auckland, Wellington and Canterbury among the latter. But in terms of stocks of university qualified one can add Otago, and, to a lesser extent, Nelson-Tasman. By virtue of being in regions with universities, Waikato and Manawatu-Wanganui also just enter this list. But when one turns to flows of human capital being newly generated Auckland does not stand out, but fits instead with other northern regions where school retention rates are lower. In contrast, Wellington, Canterbury, Otago and Nelson-Tasman are notable for their strong flows of new human capital.

Highly qualified human capital typically provides the impetus for regional development. Such a resource can be generated internally (e.g., Otago and Canterbury) or can migrate to zones in which economic growth is being generated (e.g., Auckland). In Wellington's case, both factors are operating. At the other end of the spectrum are the regions with

both low stocks and weak flows (e.g., Bay of Plenty). This correlates with the low levels of development noted in other papers in this series.

Pool et al. (2005a, pp.3-4) compare regions in terms of percentages of adults with different levels of qualification (standardised for age and gender). The percentage with no qualifications was at or below the national percentage in four regions: Auckland, Wellington, Canterbury and Otago. These four regions also had the highest percentages with university qualifications. On this basis the country can be divided into two broad regional groupings: Auckland, Wellington, Canterbury and Otago Regions on the one hand, and the rest of New Zealand on the other. These broad regional groupings provide one basis for reporting regional comparisons of literacy, numeracy and associated factors.

Labour force status

Pool et al. (2006) report detailed analyses of labour force participation, full- and part-time employment, and unemployment, emphasising demographic as well as regional differences.

Men had higher labour force participation than women, with the gap being similar across regions. However, women's participation increased gradually over time across all regions, while men's participation decreased across all regions, with the biggest drop accompanying restructuring and recession in the early 1990s. This period also saw increasing divergence in participation between regions.

Pākehā had higher labour force participation than Māori, with the gap increasing over the 1986-2001 period, particularly for men. At the same time regional differences in participation increased, again especially for Māori men.

Participation increased for people aged 60-64 but declined for people aged 15-19.

Unemployment rates were increasingly higher for younger people and for Māori over the period, and the differences between regions increased, particularly for younger people and Māori.

Industry

Pool et al. (2005c) distinguish four broad categories of industry: primary; secondary (manufacturing, building and construction); less skilled tertiary (personal, household, restaurant and hotel services; retail, wholesale, transport and storage); and more skilled tertiary (business and financial services, public services, social services and utilities). These categories provide a useful basis for classifying industries in this report.

Pool et al. (2005c, pp.6-8) compare the percentages of employed people (standardised for age and gender) working in each industry category across regions. The clearest differences are for primary industries and more skilled tertiary industries.

Auckland and Wellington regions had very small percentages in primary industries (under 4 per cent), while the percentages were relatively large (15 to 20 per cent) in Northland, Waikato, Gisborne, Taranaki, West Coast, Southland, Nelson-Tasman and Marlborough.

Wellington had the greatest percentage working in more skilled tertiary industries (over 50 per cent in 2001), with relatively large percentages also in Auckland, Manawatu-Wanganui, Canterbury and Otago, and relatively small percentages in West Coast and Southland.

Occupation

Pool et al. (2005c) distinguish three broad categories of occupation: professional (professional, technical and related workers; administrative and managerial workers); service/clerical (clerical

and related workers; sales workers; service workers); and manual (agriculture, forestry and fishery workers and hunters; production, transport, trade and elementary workers). These categories provide a useful basis for classifying occupations in this report.

Pool et al. (2005c, pp.20-22) compare the percentages of people (standardised for age and gender) employed in these occupational categories across regions. The clearest differences show up in the professional and manual categories.

Auckland and Wellington regions had particularly large percentages of people in professional occupations in 2001, and particularly small percentages in manual occupations.

West Coast and Southland had the smallest percentages of people in professional occupations, and the regions with large percentages in manual occupations were Northland, Waikato, the Bay of Plenty, Gisborne, Hawke's Bay, Taranaki, West Coast, Southland and Nelson-Tasman.

Income

Pool et al. (2005b, pp.3-5) compare median annual incomes (standardised for age and gender) across regions. The Auckland and Wellington regions had the highest median incomes, and were the only regions with median income higher than the national median income. The lowest median incomes were in Northland, Gisborne and West Coast.

Urban/rural profile, Statistics New Zealand

The urban/rural profile is a classification of urban and rural areas developed by Statistics New Zealand (2004). It is an experimental classification which differs from the standard classification of urban and rural areas which is based on population size. Urban areas are not defined by local authority or regional boundaries but instead refer to areas of contiguous urban settlement.

In both the standard classification and the urban/rural profile, a 'main urban area' has a population of 30,000 or greater. The urban/rural profile is then based on how smaller urban areas relate to main urban areas, and how rural areas relate to urban areas, in terms of the locations of people's employment.

'Satellite urban areas' and 'independent urban areas' have populations less than 30,000. In satellite urban areas, 20 per cent or more of employed residents work in a main urban area, while in independent urban areas the percentage is less than 20.

Rural areas are graded into four categories depending on the extent to which residents work in urban areas, and the size of those urban areas. At one end of this scale are 'rural areas with high urban influence', in which a significant proportion of employed residents work in a main urban area. At the other end are 'highly rural/remote areas', which have very few employed residents or very few employed in urban areas of any size. The intermediate categories are 'rural areas with moderate urban influence' and 'rural areas with low urban influence'.

Appendix A lists New Zealand urban areas according to their classification as main, satellite or independent urban areas.

Each category in the urban/rural profile has distinct characteristics in terms of demographics and economy. The urban/rural profile thus provides a way of looking at geographical variation which offers another perspective on differences in literacy and numeracy.

1.6 Key factors associated with literacy and numeracy

This report builds on Lane (2010), *Adult literacy and numeracy in New Zealand – Key factors*, which analyses a number of variables relevant to accounting for regional differences, and explores their relationships with English prose literacy and numeracy among people aged 25-65. These variables include:

- Level of education completed, and recent upskilling
- Labour force status
- Computer use at work and at home
- Occupation, industry and income
- First language, main language spoken at home, place of birth and ethnic identification
- Age and gender

Over 40 per cent of the variation in prose literacy and numeracy scores can be accounted for in statistical models which include completed education, labour force status, work and home computer use, and first language and main home language. Occupational, age, gender and ethnicity variables have significant but relatively small additional effects.

Higher prose literacy and numeracy scores were strongly associated with having upper secondary or tertiary education, being employed, using a computer at work, using a computer at home for five or more hours per month, and having English as both first and main home language. The computer use variables are found to be strongly related to white collar employment, to involvement in upskilling and to the intensity of involvement in literacy and numeracy activities at work and in personal reading. Computer use at work distinguishes within occupation and within industry between jobs requiring or not requiring high involvement in literacy and numeracy activities.

Higher prose literacy and numeracy were also associated with working in a managerial, professional or technical occupation. After controlling for education, computer use, language and occupation, the additional characteristics of being male or the combination of having English as a first language and being Māori or Pasifika favoured low prose literacy (though the effects were relatively small); while being older, being female or the combination of having English as a first language and being Māori or Pasifika favoured low numeracy (although the age and gender effects were relatively small).

The various factors are now considered in a little more detail.

Education

There was a strong association between level of education completed and the percentage of people with higher prose literacy or numeracy. People whose highest completed level was lower secondary (Year 11 or less) were much less likely to have higher prose literacy or numeracy (i.e. more likely to have low prose literacy or numeracy) compared with people who had completed upper secondary or tertiary education. People who had completed bachelors or postgraduate degrees were much more likely than those who had not, to have higher prose literacy and especially higher numeracy.

At every level of completed education, people who had completed formal or non-formal courses in the past year were more likely to have higher prose literacy and higher numeracy than people who had not taken courses.

Labour force status, computer use and employment related factors

Among people aged 25-65, those who were employed and students were most likely to have higher prose literacy and higher numeracy, although there were very few people in this age range whose main labour force status was student.

People who had been employed in the past year were significantly more likely to have higher prose literacy and numeracy than people who had not, although the advantage of being employed was confined mainly to people who had used a computer at work.

People aged 25-65 who had been employed and used a computer at work in the past year were significantly more likely to have higher literacy and numeracy compared with people who had not been employed or who had been employed and not used a computer at work.

Use of a computer at work was strongly associated with being employed in managerial, professional, technical or clerical occupations, although a significant proportion of workers in other occupational groups also used computers. People who had used a computer at work in the past year were likely to be involved in a much wider range of regular work activities related to literacy and numeracy than those who had not, and those who were involved in a greater number of types of regular literacy or numeracy activities were more likely to have higher literacy or numeracy. Computer use at work appears to pinpoint, more effectively than occupational categories, those jobs which require or encourage regular literacy and numeracy activities, and this probably reflects the importance of the computer as a tool for literacy and numeracy activities. The difference in mean prose literacy and numeracy between work computer users and non-users within occupations was comparable with the difference between occupations, and was considerably greater than the differences between industries.

Similarly, people who used a computer at home were more likely to engage in a wide range of regular personal reading activities. There was a straightforward relationship between increase in the number of types of regular personal reading and higher literacy and numeracy scores.

Computer use at work and computer use at home were only moderately correlated with each other, and have separate and cumulative effects in the statistical models. Taken together they form a four-step scale, such that people who used a computer at work and also used a computer at home were more likely to have higher prose literacy or numeracy than those who used a computer only at work, who were more likely to have higher prose literacy and numeracy than those who used a computer only at home, who in turn were much more likely to have higher prose literacy or numeracy than those who did not use a computer in either location.

Those who used a computer both at work and at home, or who had used a computer at work, were significantly more likely to have taken formal or non-formal courses in the past year than those who used a computer at home but not at work, and these people were significantly more likely to have taken courses than people who did not use a computer at home or at work. The association between computer use and upskilling held across all levels of completed education.

There was a small but significant additional effect (incorporated in the extended statistical models) of occupation, with managers, professionals and technicians having higher prose literacy and numeracy than clerks and service workers and farmers, fishers and tradespeople, who in turn had higher prose literacy and numeracy than machine operators and elementary workers.

People in the industry category 'finance, business and community services' were more likely to have higher prose literacy and numeracy than people in other industries. Prose literacy and numeracy also correlated with income: people with higher personal incomes were more likely to have higher prose literacy or numeracy than people with lower incomes.

However, industry and personal income are redundant in the statistical models for prose literacy and numeracy once other factors (including labour force status, computer use and occupation) are taken account of, because of the correlations that industry and income have with those other variables; and the computer use variables have stronger predictive value in the statistical models.

On the basis of previous research it could be expected that there would be a relationship between the variables of work and home computer use and the measures of prose literacy and numeracy. How it would compare with employment-related factors such as occupation and industry was not clear.

It is therefore remarkable to find that the computer use variables are such strong predictors of prose literacy and numeracy, and that they are somewhat stronger than occupation and industry as predictors (when education is controlled for). Computer use at work in fact accounts for some of the variation between different occupations, but has a bigger effect within occupations and industries.

Language and ethnic identification

Of all people aged 25-65, 84 per cent had English as a first language, and 99 per cent of these had English as their main home language. Five per cent did not have English as a first language but had English as their main home language, while 10 per cent did not have English either as a first language or as their main home language.

There was a strong association between these language categories and higher prose literacy and numeracy. A majority of people with English as a first language had higher prose literacy and higher numeracy, while only a minority of people whose first language was not English had higher prose literacy or numeracy. Among those people whose first language was not English, those whose main home language was English were more likely to have higher prose literacy than those whose main home language was not English.

People whose first language was not English were much more likely to have a degree than native English speakers, but were significantly less likely to be employed, and if employed, to have used a computer at work.

There was a close relationship (though not an exact match) between language variables and ethnic identification. A minority of people aged 25-65 who identified as Asian (15 per cent) and Pasifika (33 per cent) had English as a first language, while a majority of people who identified as New Zealand European (97 per cent), Māori (94 per cent) and Other (65 per cent) were native English speakers.

In the statistical models, the language variables account for a large part of the relative advantage in prose literacy and numeracy of Europeans, and a large part of the relative disadvantage of Pasifika and Asian people.

However, the language variables do not account for the relative disadvantage of Māori and Pasifika who were native English speakers. This is dealt with in the extended statistical models by the inclusion of independent variables combining having English as a first language with having Māori or Pasifika ethnic identification, which have significant but small effects in improving the model of prose literacy, but much larger and also significant effects on the model of numeracy.

Age and gender

People aged 55-65 were significantly less likely to have higher prose literacy than people aged 45-54 or 35-44, but not significantly less likely than people aged 25-34. People aged 55-65 were significantly less likely to have higher numeracy than people aged 45-54, 35-44 or 25-34.

The percentage of men and women aged 25-65 with higher prose literacy was not significantly different, but there was a significantly greater percentage of men (57 per cent) with higher numeracy than women (46 per cent).

Age and gender were also considered together, with age divided into two bands (25-44 and 45-65) for statistical robustness.

There were no significant differences among the age/gender categories in the percentage with higher prose literacy, but there were significant differences in numeracy. Within each age band, men were significantly more likely to have higher numeracy than women, but younger women were on a par with older men. The percentage of younger and older men with higher numeracy was not significantly different, but younger women were significantly more likely to have higher numeracy than older women. In fact, the percentage of older women with higher numeracy was significantly less than that for each of the other three age/gender groups.

Women, especially older women, were disadvantaged in terms of education, employment and computer use. Once these gender differences were controlled for, women emerged as having a significant advantage in prose literacy.

These complexities are dealt with in the extended statistical models by including age and gender variables, with being older a negative predictor of higher numeracy, and being male a negative predictor of higher prose literacy but a positive predictor of higher numeracy.

Combined effect of education, computer use and language

A large number of variables have been considered in Lane (2010), and all of them show some relationship with prose literacy or numeracy. Trying to account for regional differences in prose literacy and numeracy in terms of all these variables could be a recipe for confusion. However, Lane (2010) has identified a set of key factors which account for a large part of the variation in prose literacy and numeracy, and which provide a basis for a focused approach to comparing regions. These key factors are: level of completed education, work and home computer use, and first language and main home language.

The combined effect of the three key factors identified can be represented by a variable (the *key factor scale*) based on three characteristics which favour higher literacy and numeracy, namely having upper secondary or tertiary education (as opposed to lower secondary or less), using a computer at work (as opposed to not being employed, or being employed but not using a work computer), and having English as a first language (as opposed to not having English as a first language). The key factor scale is the number of these characteristics held by an individual, so that a scale value of zero represents anyone with lower secondary education or less who did not use a computer at work and who did not have English as a first language. A scale value of 1 or 2 represents anyone with any one or any two of the characteristics favouring higher prose literacy and numeracy. And a scale value of 3 represents anyone with upper secondary or tertiary education who used a computer at work and had English as a first language.

Of the estimated 2,122,000 people aged 25-65, 893,000 (42 per cent) had low prose literacy and 1,040,000 (49 per cent) had low numeracy. 1,230,000 (58 per cent) had higher prose literacy and 1,083,000 (51 per cent) had higher numeracy.

Among the 56,000 people with a key factor scale value of zero (i.e. low education, no work computer use, first language not English), 97 per cent had low prose literacy (Levels 1-2) and 97 per cent also had low numeracy (Levels 1-2). This group accounted for an estimated 54,000 (6 per cent) of those with low prose literacy and also 54,000 (5 per cent) of those with low numeracy. The numbers in this group with higher prose literacy or higher numeracy were too small to be reliably estimated.

Among the 399,000 people with a key factor scale value of 1 (i.e. only one of the characteristics favouring higher literacy and numeracy), 77 per cent had low prose literacy (and so 23 per cent had higher prose literacy) and 83 per cent had low numeracy (hence 17 per cent had higher numeracy). This group accounted for 307,000 (34 per cent) of those with low prose literacy and 333,000 (32 per cent) of those with low numeracy. This group also included 93,000 (8 per cent) of those with higher prose literacy and 66,000 (6 per cent) of those with higher numeracy.

Of the 702,000 people with a scale value of 2, 49 per cent had low prose literacy (and so 51 per cent had higher prose literacy) and 56 per cent had low numeracy (thus 44 per cent had higher numeracy). This group accounted for 343,000 (39 per cent) of those with low prose literacy and 394,000 (38 per cent) of those with low numeracy. This group also included 359,000 (29 per cent) of those with higher prose literacy and 308,000 (29 per cent) of those with higher numeracy.

Finally, of the 965,000 people with a scale value of 3 (i.e. those with upper secondary or tertiary education, who used a computer at work and had English as a first language), 20 per cent had low prose literacy (and so 80 per cent had higher prose literacy) and 27 per cent had low numeracy (hence 73 per cent had higher numeracy). This group accounted for 189,000 (21 per cent) of those with low prose literacy and 259,000 (25 per cent) of those with low numeracy. This group also included 776,000 (63 per cent) of those with higher prose literacy and 706,000 (65 per cent) of those with higher numeracy.

1.7 Structure of this report

The following three chapters explore three different approaches to the analysis of geographical variation in prose literacy and numeracy. Chapter 2 uses a division of the country into 13 regions based on the 16 regions in Statistics New Zealand's regional classification. Chapter 3 analyses the differences between two broad regional groupings, namely the Auckland, Wellington, Canterbury and Otago Regions on the one hand, and the rest of New Zealand on the other; this allows some comparisons which cannot be pursued at the more detailed regional level because of data limitations. Chapter 4 uses categories in Statistics New Zealand's urban/rural profile to look at the relations between prose literacy and numeracy and the kind of settlements people live in. Each of these three chapters is self-contained and explores the distribution of prose literacy and numeracy, and the various associated variables, across geographical units. Together, these three chapters build up an overall picture of how literacy and numeracy vary regionally and of what factors lie behind that regional variation.

Chapter 5 attempts to crystallise that overall picture, and Chapter 6 and Appendix A provide further in-depth and technical information on the variables and methods used in this study.

2 LITERACY AND NUMERACY BY REGION

This chapter is aimed at identifying regional clusters of low or higher prose literacy and numeracy using the smallest possible regional units given the limitations of the survey data. It also attempts to account for any clear differences between the regional units in literacy and numeracy by reference to the key characteristics identified in Lane (2010), namely completed education, work computer use and first language, as well as taking note of regional differences in other factors considered in Lane (2010), namely upskilling, employment, home computer use, occupation, industry and income.

2.1 Regions used for this analysis

The starting point for this analysis was the standard set of 16 regions used by Statistics New Zealand, which are based on Regional Council boundaries. However, there were too few survey respondents in some regions to provide statistically reliable estimates, and thus there was a need to aggregate some regions. On the other hand, the Auckland Region accounted for over 30 per cent of the respondents, so that it was possible to subdivide that region and still obtain reliable estimates. The final choice of regions for analysis is set out in Table 2.² It required a balance between maximising the number of regions and minimising the margins of error on the estimates for the percentages of people with higher prose literacy and numeracy in those regions.

Table 2
Regions for analysis

Region	Estimated population aged 25-65	Estimated population aged 25-65 as percentage of total
Northland Region	77,000	4
North Shore City & Rodney District	178,000	8
Waitakere City	108,000	5
Auckland City	232,000	11
Counties-Manukau	214,000	10
Waikato Region	177,000	8
Bay of Plenty Region	134,000	6
Gisborne & Hawke's Bay Regions	97,000	5
Taranaki & Manawatu-Wanganui Regions	162,000	8
Wellington Region	253,000	12
North & Central Canterbury	241,000	11
South Canterbury & Otago	125,000	6
Rest of South Island	124,000	6
New Zealand	2,122,000	100

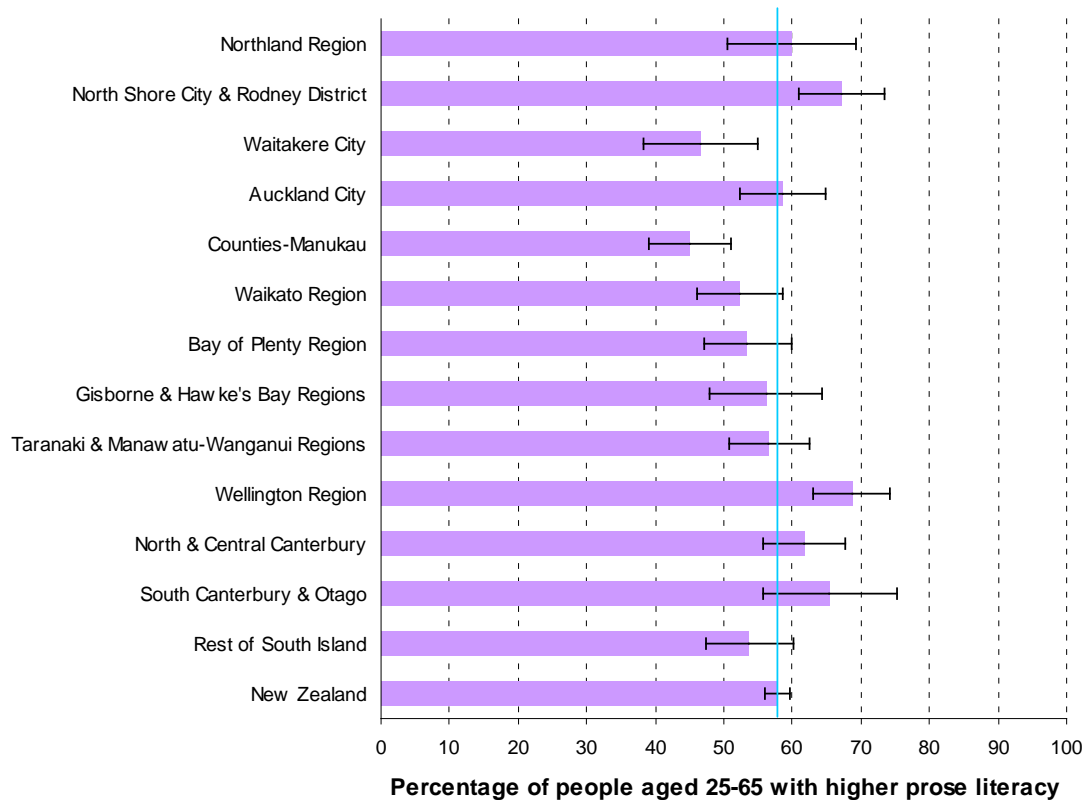
² See chapter 6 Data and definitions for a detailed specification of the regions.

2.2 Prose literacy and numeracy

Figure 1 shows the percentages of people aged 25-65 with higher prose literacy in each region. The percentage with higher prose literacy was significantly greater than the national percentage (58 per cent) in North Shore and Rodney District (67 per cent) and in the Wellington Region (69 per cent), while it was significantly less than the national percentage in Waitakere City (47 per cent) and in Counties-Manukau (45 per cent).

Figure 1

Percentage of people aged 25-65 with higher prose literacy (Levels 3-5) by region

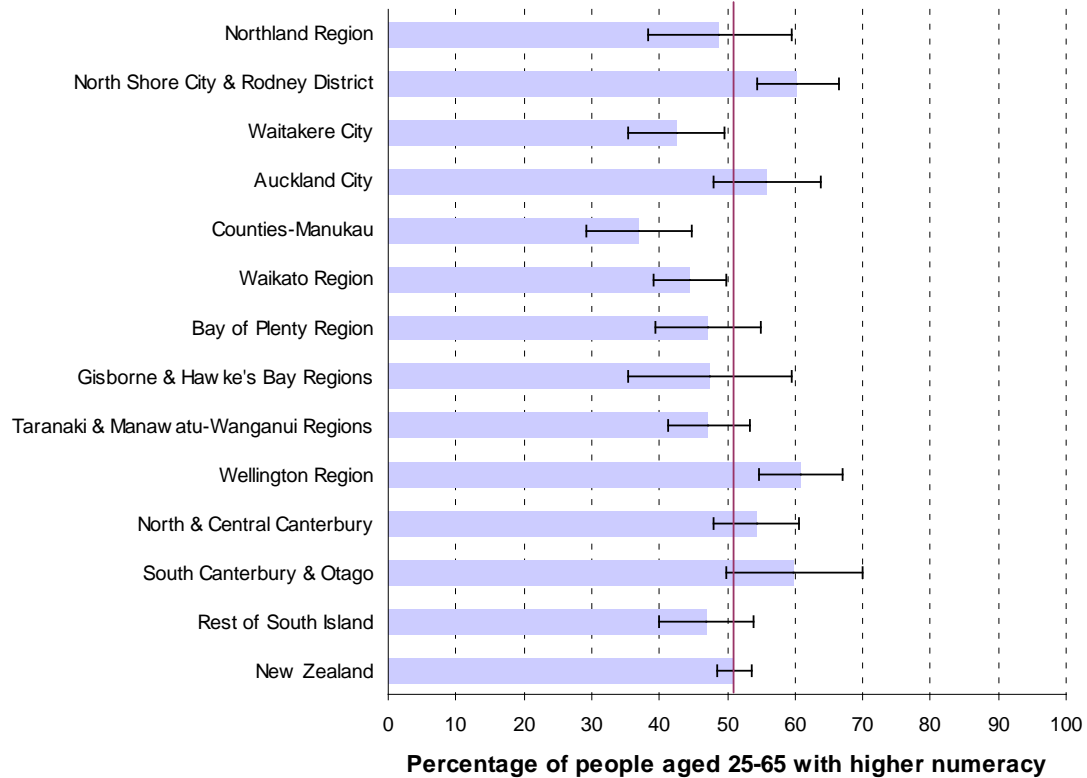


Source: New Zealand results of the Adult Literacy and Life Skills Survey. Ministry of Education calculations.

Note: For an explanation of the categories see Chapter 6. The bars around estimates represent the margins of error (at the 95% confidence level). The solid vertical line marks the estimated national percentage.

The pattern for numeracy was similar, as shown in Figure 2. The percentage of people aged 25-65 with higher numeracy was significantly greater than the national percentage (51 per cent) in North Shore City and Rodney District (60 per cent) and in the Wellington Region (61 per cent), but it was significantly less than the national percentage only in Counties-Manukau (37 per cent).³

Figure 2
Percentage of people aged 25-65 with higher numeracy (Levels 3-5) by region



Source: New Zealand results of the Adult Literacy and Life Skills Survey. Ministry of Education calculations.

Note: For an explanation of the categories see Chapter 6. The bars around estimates represent the margins of error (at the 95% confidence level). The solid vertical line marks the estimated national percentage.

³ The percentage was low in Waitakere City and Waikato, but when the margin of error on the national percentage is taken into account, these two percentages were not significantly less than the national percentage.

2.3 Education

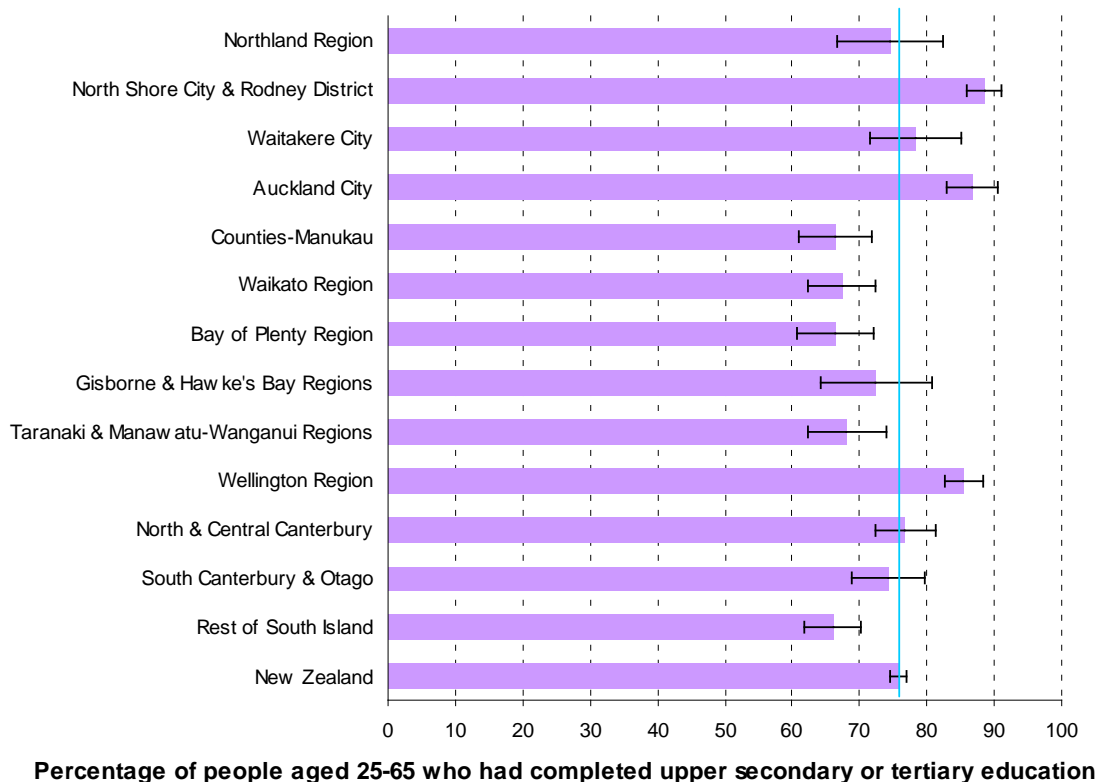
Completed education

Higher prose literacy and numeracy are strongly associated with completion of upper secondary⁴ or tertiary education, and particularly strongly associated with completion of a bachelors or postgraduate degree.

Figure 3 shows the percentage of people who had completed upper secondary or tertiary study by region. The percentage was significantly greater than the national percentage (76 per cent) in North Shore City and Rodney District (89 per cent), Auckland City (87 per cent) and Wellington Region (86 per cent), and significantly less in Counties-Manukau (66 per cent), Waikato Region (67 per cent), Bay of Plenty Region (66 per cent), Taranaki and Manawatu-Wanganui Regions (68 per cent) and Rest of South Island (66 per cent).

Figure 3

Percentage of people aged 25-65 who had completed upper secondary (Year 12-13/Level 1-3) or tertiary education, by region



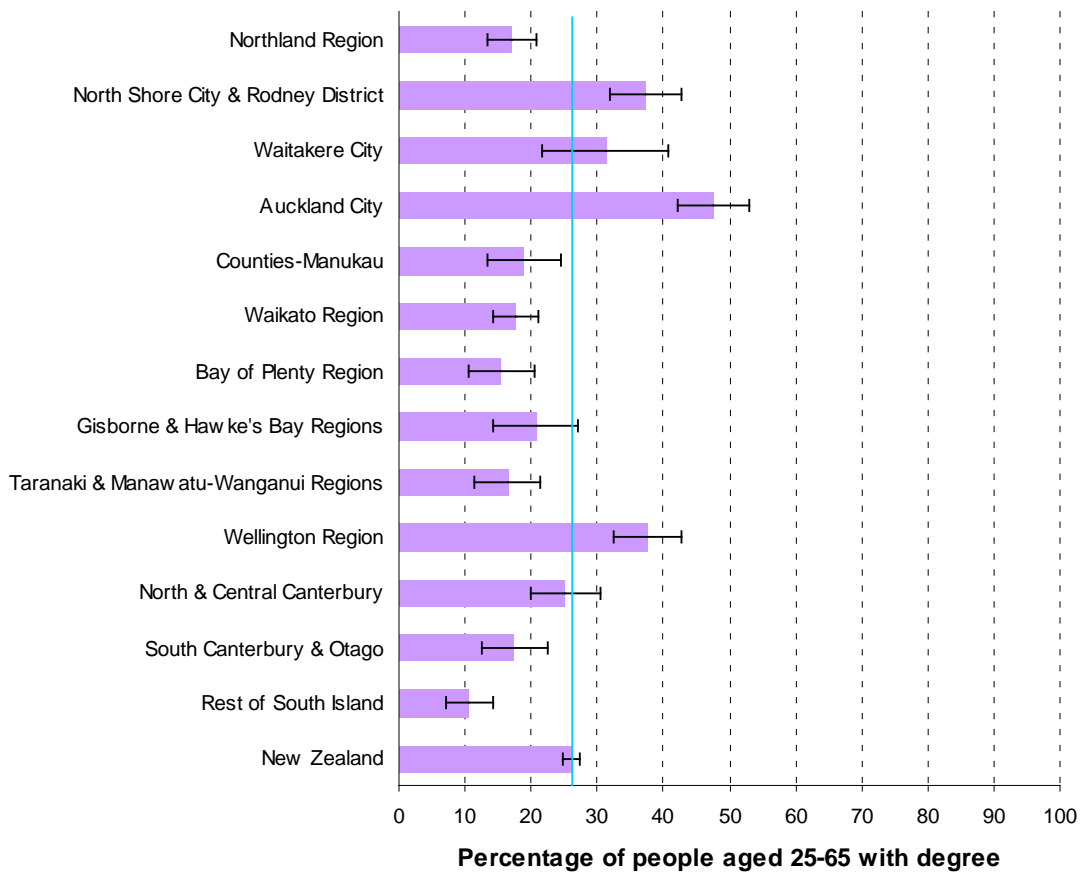
Source: New Zealand results of the Adult Literacy and Life Skills Survey. Ministry of Education calculations.

Note: For an explanation of the categories see Chapter 6. The bars around estimates represent the margins of error (at the 95% confidence level). The solid vertical line marks the estimated national percentage.

⁴ 'Upper secondary' in this report refers to either of two categories of completed education: Year 12-13 or Level 1-3 certificate. These categories are not subdivided further in the survey data.

Figure 4 shows the percentage of people aged 25-65 in each region who have completed a degree (bachelors or postgraduate). The pattern is similar to that for upper secondary and tertiary but there is a sharper divide between regions. The same three regions have a significantly greater percentage than the national figure (26 per cent), namely North Shore-Rodney (37 per cent), Auckland City (48 per cent) and Wellington Region (38 per cent). However, a larger number of regions have percentages significantly less than the national figure, namely Northland Region (17 per cent), Counties-Manukau (19 per cent), Waikato Region (18 per cent), Bay of Plenty Region (16 per cent), Taranaki and Manawatu-Wanganui Regions (16 per cent), South Canterbury and Otago (17 per cent) and Rest of South Island (11 per cent).

Figure 4
Percentage of people aged 25-65 who had completed a degree, by region



Source: New Zealand results of the Adult Literacy and Life Skills Survey. Ministry of Education calculations.

Note: For an explanation of the categories see Chapter 6. The bars around estimates represent the margins of error (at the 95% confidence level). The solid vertical line marks the estimated national percentage.

There were thus three regions which stood out from the rest in terms of having a significantly greater percentage of people aged 25-65 who had completed upper secondary or tertiary education, and also in terms of having a significantly greater percentage of people with degrees, namely North Shore City and Rodney District, Auckland City, and Wellington Region.

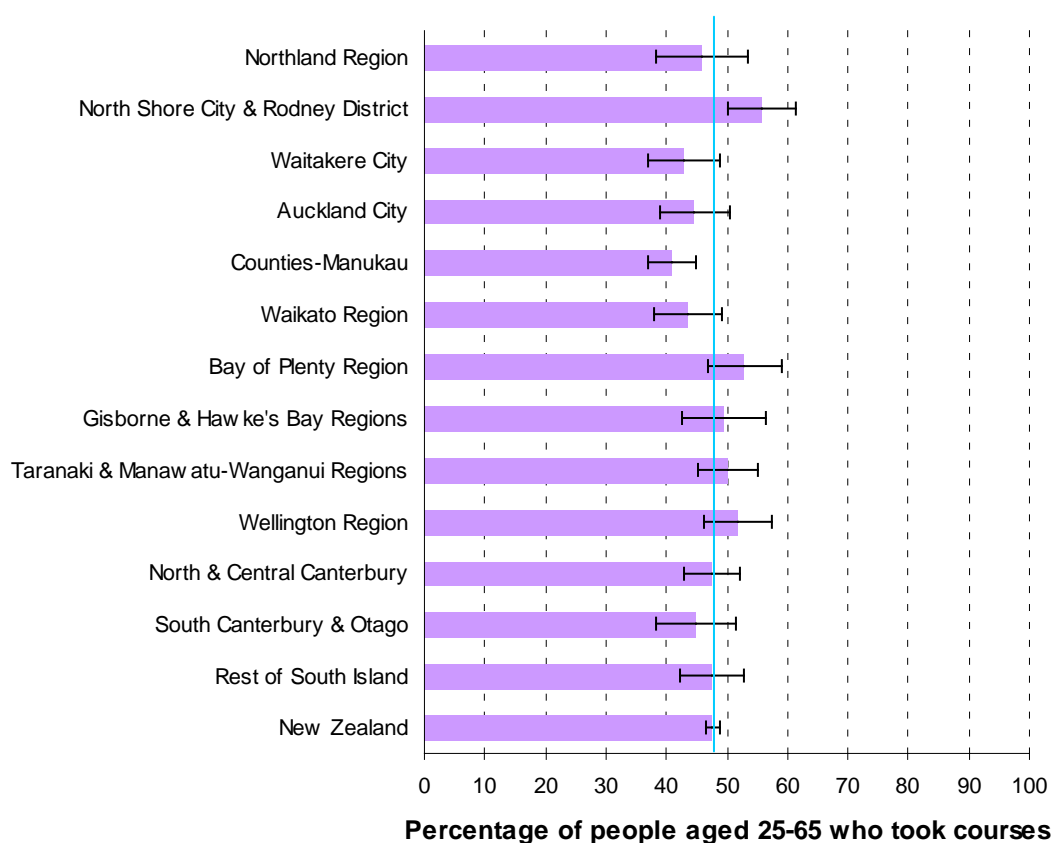
Formal and non-formal upskilling

Higher prose literacy and numeracy are associated with taking courses of study or training, whether they are formal (counting for a qualification) or non-formal (not counting for a qualification).

Figure 5 shows the percentage of people aged 25-65 who had taken formal or non-formal courses in the past year in each region. The percentage in North Shore City and Rodney District (56 per cent) was significantly greater than the national percentage (48 per cent), while the percentage in Counties-Manukau (41 per cent) was significantly less. The percentage in all other regions was comparable to the national percentage.

Figure 5

Percentage of people aged 25-65 who took formal or non-formal courses in the past year, by region



Source: New Zealand results of the Adult Literacy and Life Skills Survey. Ministry of Education calculations.

Note: For an explanation of the categories see Chapter 6. The bars around estimates represent the margins of error (at the 95% confidence level). The solid vertical line marks the estimated national percentage.

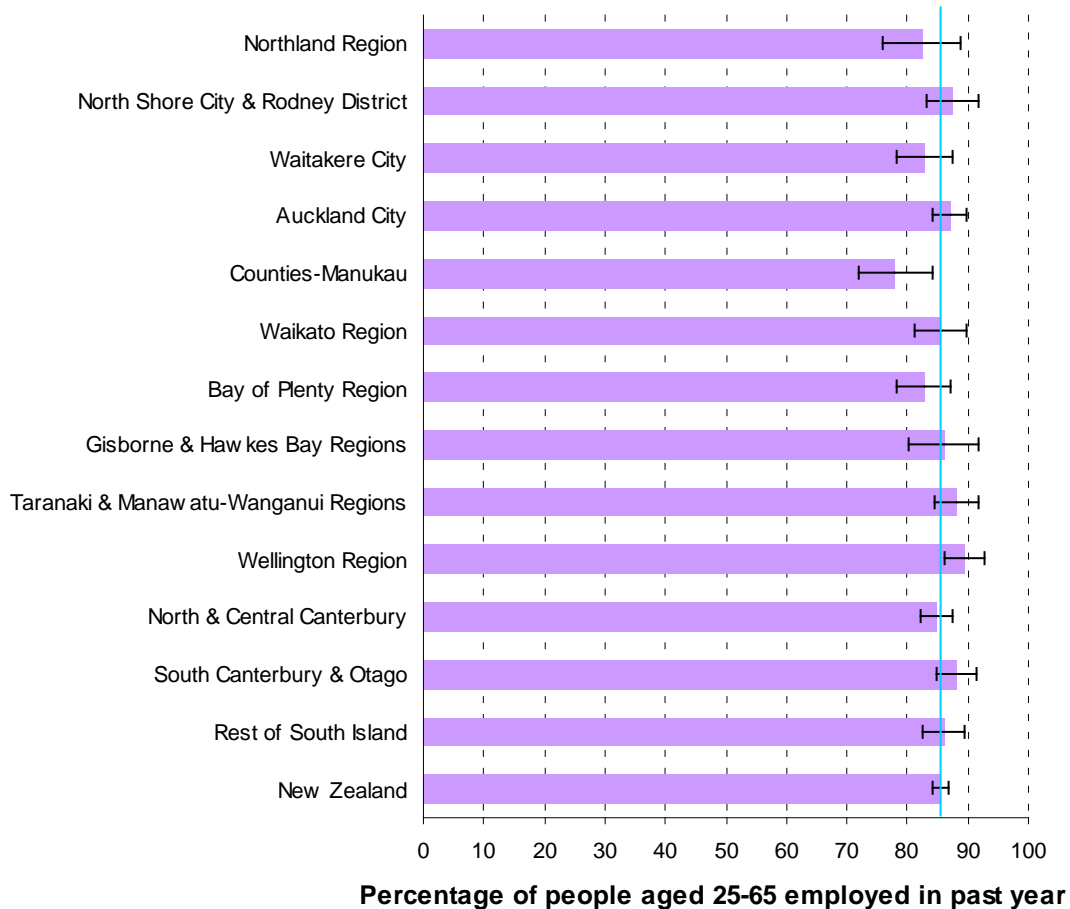
2.4 Employment

Higher prose literacy and numeracy are strongly associated with being employed rather than having another labour force status (apart from student, and there were few people in the 25-65 age group whose main labour force status was student).

Figure 6 shows the percentage of people employed in the past year in each region. Although there was some difference between the regional estimates, the only statistically significant difference between any region and the national percentage (86 per cent) was the low percentage for Counties-Manukau (78 per cent). Otherwise the percentage of people who had been employed in the past year was fairly uniform across the regions.⁵

Figure 6

Percentage of people aged 25-65 who were employed in the past year, by region



Source: New Zealand results of the Adult Literacy and Life Skills Survey. Ministry of Education calculations.

Note: For an explanation of the categories see Chapter 6. The bars around estimates represent the margins of error (at the 95% confidence level). The solid vertical line marks the estimated national percentage.

⁵ This uniformity may have been a temporary phenomenon. At the time the survey was carried out, in 2006 and the beginning of 2007, labour force participation was particularly high and unemployment particularly low, with the result that the percentage of people in employment would have been maximised. Pool et al. (2006) show that the rates of labour force participation and unemployment in different regions diverged during the recessionary period of the 1990s.

2.5 Computer use

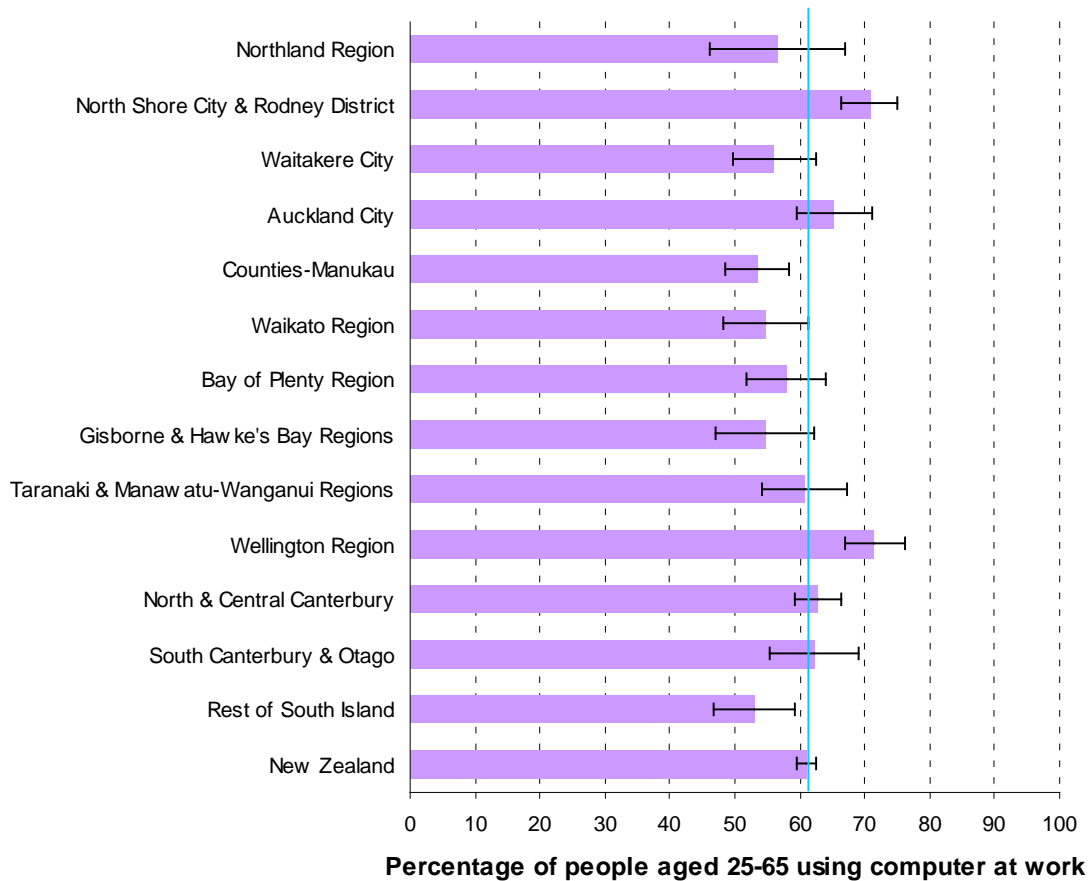
Computer use at work

Higher prose literacy and numeracy are strongly associated with being employed and using a computer at work.

Figure 7 shows the estimated percentages of all people aged 25-65 who were employed and using a computer at work by region. The only regions with percentages higher than the national percentage were North Shore City and Rodney District, Auckland City, Wellington Region, North and Central Canterbury and South Canterbury and Otago. This is an indication that these regions had a greater percentage of people employed in jobs involving a lot of regular literacy and numeracy activities. However, the margins of error are such that only the percentages for North Shore-Rodney (71 per cent) and Wellington (72 per cent) were greater than the national percentage (61 per cent) by a statistically significant margin, while only Counties-Manukau (54 per cent) and Rest of South Island (53 per cent) were less by a statistically significant margin.

Figure 7

Percentage of people aged 25-65 who had used a computer at work in the past year, by region



Source: New Zealand results of the Adult Literacy and Life Skills Survey. Ministry of Education calculations.

Note: For an explanation of the categories see Chapter 6. The bars around estimates represent the margins of error (at the 95% confidence level). The solid vertical line marks the estimated national percentage.

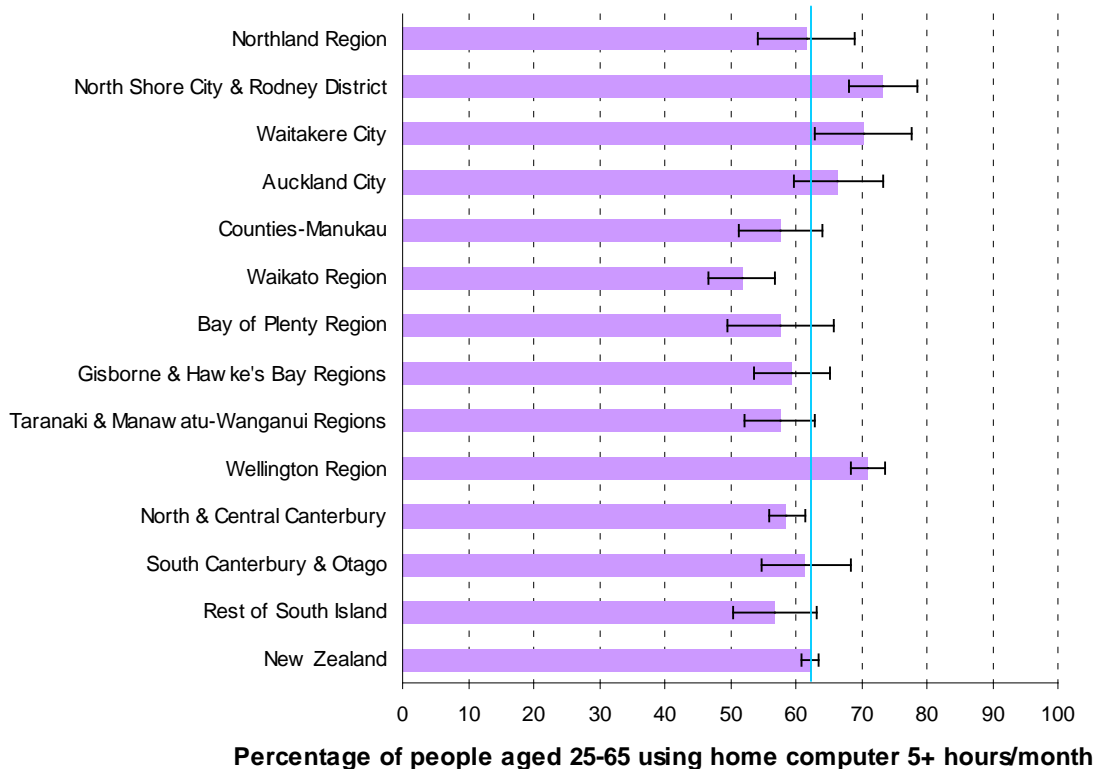
Home computer use

Higher prose literacy and numeracy are strongly associated with using a computer at home for 5 or more hours per month.⁶

Figure 8 shows the distribution of home computer use by region. This distribution is a little different from that for work computer use, for instance, home computer use in Waitakere City was relatively high, whereas work computer use was low to average. Only North Shore City and Rodney District, Waitakere City, Auckland City and Wellington Region had greater estimated percentages of home computer use than the national percentage (62 per cent), and among these only the differences for North Shore-Rodney (73 per cent) and Wellington (71 per cent) were statistically significant. Waikato (52 per cent) was the only region where the home computer use percentage was significantly less than the national percentage.

Figure 8

Percentage of people aged 25-65 using a home computer for 5 or more hours per month, by region



Source: New Zealand results of the Adult Literacy and Life Skills Survey. Ministry of Education calculations.

Note: For an explanation of the categories see Chapter 6. The bars around estimates represent the margins of error (at the 95% confidence level). The solid vertical line marks the national estimated percentage.

⁶ Five hours per month is taken as a minimum to ensure that respondents actually used a home computer if they had access to one. Those who used a home computer less than 5 hours per month could not be distinguished in the survey responses from those who did not use their home computers at all.

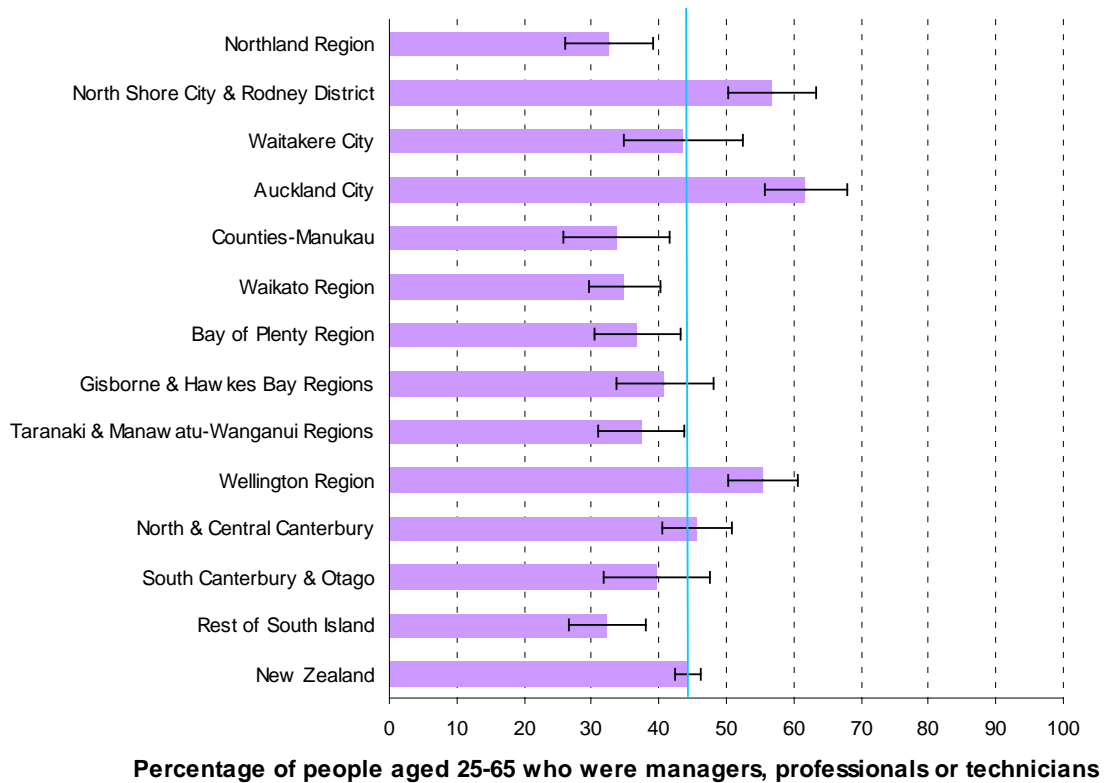
2.6 Occupation

Higher prose literacy and numeracy are associated with working in a managerial, professional or technical occupation.

Figure 9 shows the percentage of people aged 25-65 in each region who were managers, professionals or technicians, out of all people aged 25-65 with an assigned occupation⁷. The percentage was significantly above the national percentage (44 per cent) for people living in North Shore-Rodney (57 per cent), Auckland City (62 per cent) and Wellington Region (56 per cent), and significantly below the national percentage in Northland (33 per cent), Counties-Manukau (34 per cent), Waikato (35 per cent), and Rest of South Island (32 per cent).

Figure 9

Percentage of people aged 25-65 who were managers, professionals or technicians, by region



Source: New Zealand results of the Adult Literacy and Life Skills Survey. Ministry of Education calculations.

Note: For an explanation of the categories see Chapter 6. The bars around estimates represent the margins of error (at the 95% confidence level). The solid vertical line marks the estimated national percentage.

⁷ See chapter 6 for an explanation of how people were assigned to occupational categories.

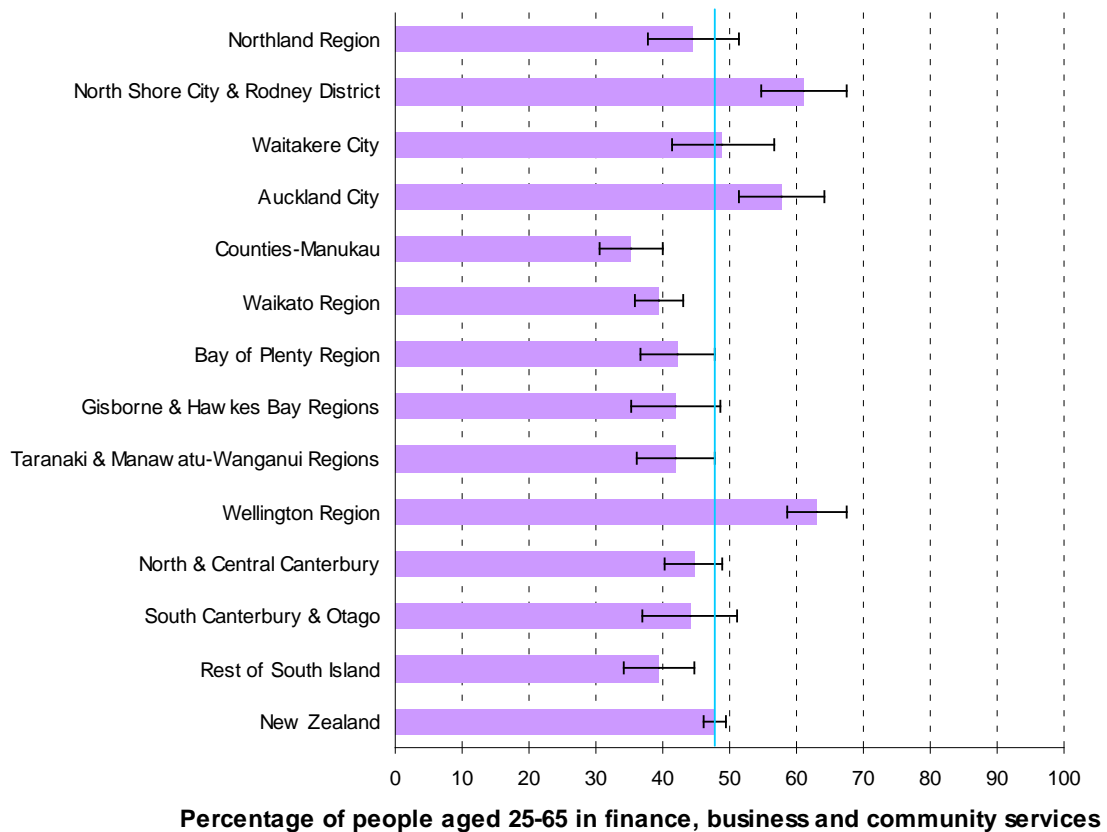
2.7 Industry

Higher prose literacy and numeracy are associated with working in the industry grouping of ‘Finance, business and community services’.⁸

Figure 10 shows the percentage of people aged 25-65 with an assigned industry who fell into the industry category ‘Finance, business and community services’ in each region. The pattern is similar to that for the occupational group ‘Managers, professionals and technicians’. The regions with significantly greater percentages of people involved in ‘Finance, business and community services’ than the national percentage (48 per cent) were North Shore City and Rodney District (61 per cent), Auckland City (58 per cent) and Wellington Region (63 per cent)⁹. The regions with significantly smaller percentages than the country as a whole were Counties-Manukau (35 per cent), Waikato Region (39 per cent) and Rest of South Island (39 per cent).

Figure 10

Percentage of people aged 25-65 working in finance, business and community services, by region



Source: New Zealand results of the Adult Literacy and Life Skills Survey. Ministry of Education calculations.

Note: For an explanation of the categories see Chapter 6. The bars around estimates represent the margins of error (at the 95% confidence level). The solid vertical line marks the estimated national percentage.

⁸ See chapter 6 for an explanation of how people were assigned to industry categories.

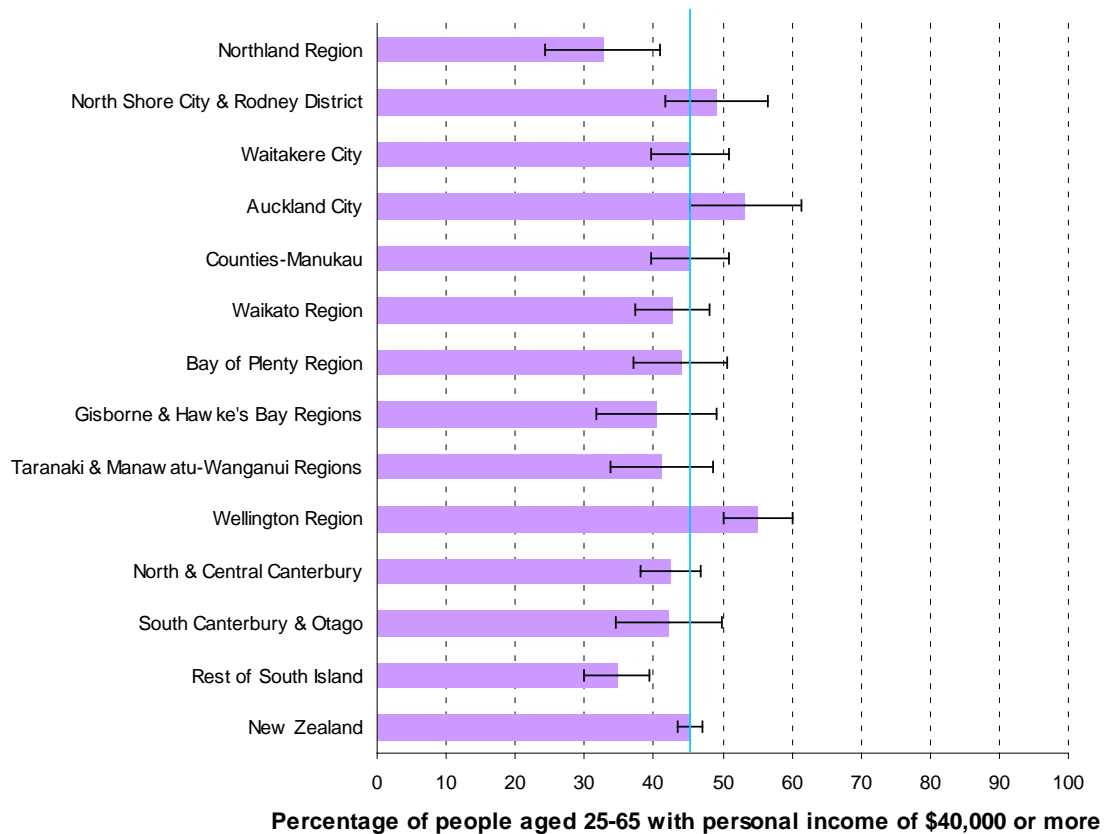
⁹ This pattern is in line with the observations of Pool et al. (2005c) based on 2001 Census data.

2.8 Income

Higher prose literacy and numeracy are strongly associated with annual gross personal income of \$40,000 or more.

Figure 11 shows the percentage of people aged 25-65 with a personal income of \$40,000 or more in each region. The percentage was significantly greater than the national percentage (45 per cent) only in the Wellington Region (55 per cent), and significantly less in the Northland Region (33 per cent) and Rest of South Island (35 per cent).

Figure 11
Percentage of people aged 25-65 with personal income of \$40,000 or more, by region



Source: New Zealand results of the Adult Literacy and Life Skills Survey. Ministry of Education calculations.

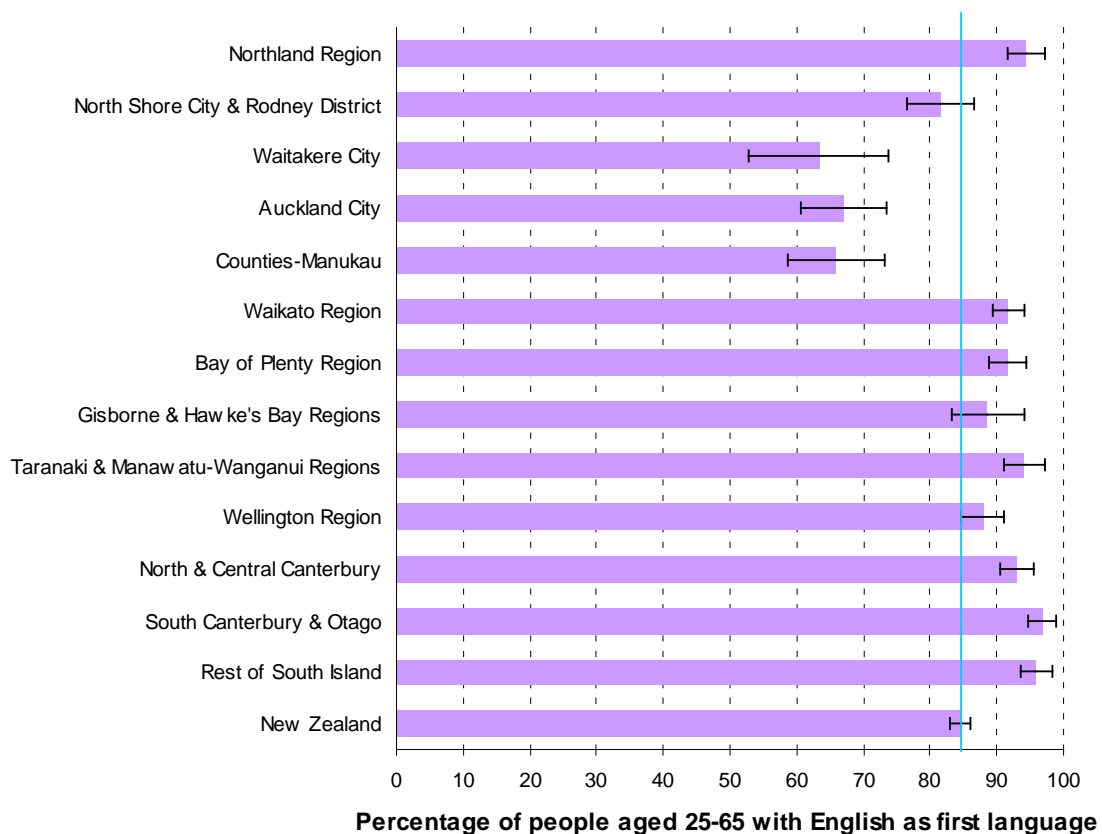
Note: For an explanation of the categories see Chapter 6. The bars around estimates represent the margins of error (at the 95% confidence level). The solid vertical line marks the estimated national percentage.

2.9 First language

Higher prose literacy and numeracy are strongly associated with having English as a first language. They are also strongly associated with having English as the main language spoken in the home. Because the group of people whose main home language was not the same as their first language was relatively small, the regional pattern for home language was very similar to that for first language.

Figure 12 shows the percentages of people aged 25-65 with English as a first language by region. The regions fall into three distinct groups. Compared with the national percentage (84 per cent), the percentage of native English speakers was significantly less in Waitakere City (63 per cent), Auckland City (67 per cent) and Counties-Manukau (66 per cent). The percentage of native English speakers was not significantly different from the national percentage in North Shore-Rodney (82 per cent), Gisborne and Hawke's Bay Regions (89 per cent) and the Wellington Region (88 per cent), while the percentage of native English speakers was significantly greater than the national percentage in the Northland Region (95 per cent), the Waikato Region (92 per cent), the Bay of Plenty Region (92 per cent), Taranaki and Manawatu-Wanganui Regions (94 per cent), North and Central Canterbury (93 per cent), South Canterbury and Otago (97 per cent), and Rest of South Island (96 per cent).

Figure 12
Percentage of people aged 25-65 with English as a first language, by region



Source: New Zealand results of the Adult Literacy and Life Skills Survey. Ministry of Education calculations.

Note: For an explanation of the categories see Chapter 6. The bars around estimates represent the margins of error (at the 95% confidence level). The solid vertical line marks the estimated national percentage.

2.10 Summary and discussion

The percentage of people aged 25-65 with higher prose literacy was significantly greater than the national percentage in North Shore City and Rodney District and in the Wellington Region, while it was significantly less than the national percentage in Waitakere City and in Counties-Manukau.

The pattern for numeracy was similar. The percentage of people aged 25-65 with higher numeracy was significantly greater than the national percentage in North Shore City and Rodney District and in the Wellington Region, but it was significantly less than the national percentage only in Counties-Manukau.

North Shore-Rodney and the Wellington Region were distinguished by having significantly greater percentages of people than the country as a whole with upper secondary¹⁰ or tertiary education, and significantly greater percentages of people using a computer at work and at home, but both regions were not significantly different from the country as a whole in the percentage of people with English as a first language.

However, Auckland City had even better figures for completed education than North Shore-Rodney and Wellington, yet the percentages of people with higher prose literacy and numeracy in Auckland City were not significantly different from the national percentage. Auckland City differs from the other two regions mainly in having much greater percentages of people whose first language or home language was not English. The percentages of people using a computer at work and at home in Auckland City were also not significantly different from the national percentages, whereas in North Shore-Rodney and Wellington they were significantly greater.

Counties-Manukau had a significantly smaller percentage of people with upper secondary or tertiary education than the country as a whole, a significantly smaller percentage using a computer at work, and a significantly smaller percentage with English as a first language. In other words, Counties-Manukau scored low on the three main factors associated with higher literacy and numeracy, and this was consistent with the relatively small percentage of people in this region with higher prose literacy and numeracy.

There were a number of regions with education statistics similar to Counties-Manukau. However, those other regions had much greater percentages of people with English as a first language than Counties-Manukau. And while the percentage of people using a computer at work was significantly smaller in Counties-Manukau than the national percentage, this was not the case for most of those other regions.

Waitakere City's educational statistics were not significantly different from the country as a whole, nor was the percentage of its people using a computer at work or at home, but its percentage of people with English as a first language was significantly less than the national percentage. In this case the language factor appears to be largely responsible for the relatively small percentage of people in this region with higher prose literacy, but this factor had less effect on numeracy.

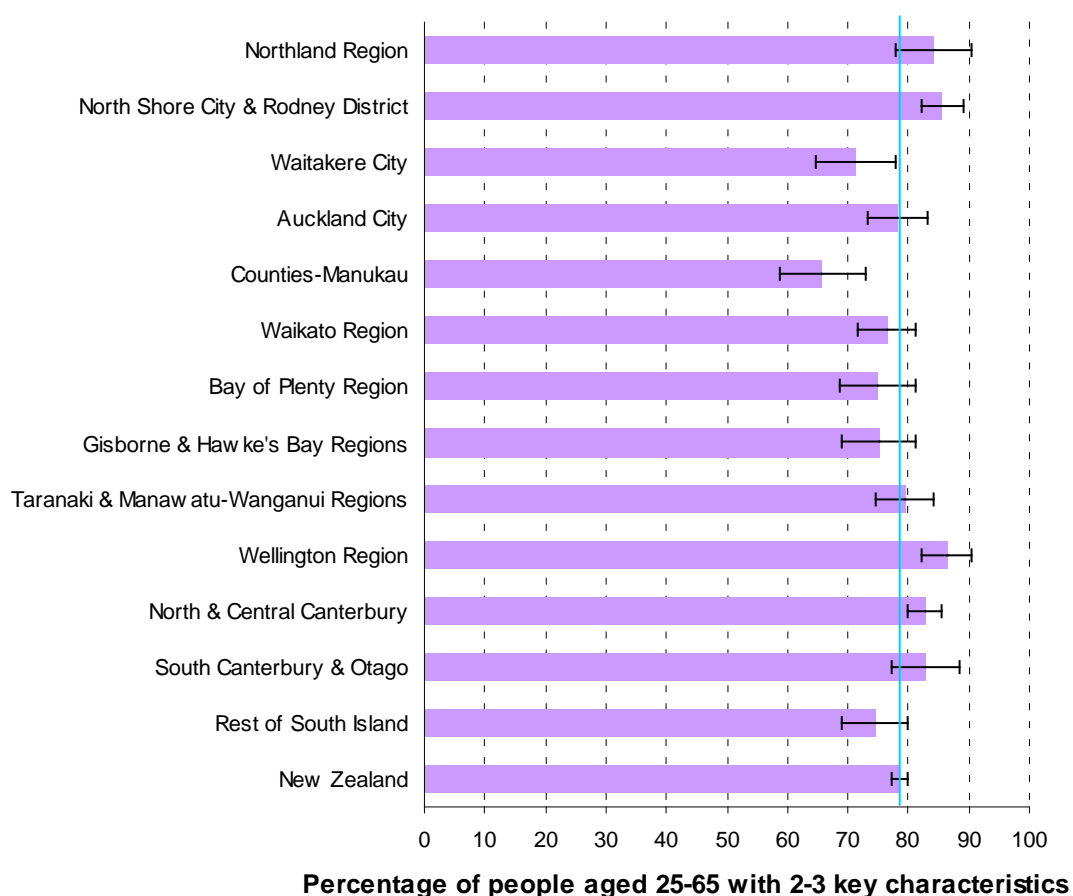
One way to take account of the combined effect of the key factors is to consider three characteristics favouring higher prose literacy and numeracy, namely having upper secondary or tertiary education, using a computer at work, and having English as a first language, and to count the number of these characteristics for each individual. This produces a **key factor scale**

¹⁰ 'Upper secondary' in this report refers to either of two categories of completed education: Year 12-13 or Level 1-3 certificate. These categories are not subdivided further in the survey data.

from zero (none of the three characteristics) to 3 (all the characteristics). The relationships of this scale to prose literacy and numeracy rates are covered in Lane (2010).

Figure 13 shows the percentages of people at the upper end of this scale (with 2 or 3 of the key characteristics) across the regions. In this comparison, most regions were not significantly different from New Zealand as a whole. The exceptions were North Shore City and Rodney District and the Wellington Region, which had percentages significantly greater than the national percentage, and Counties-Manukau, with a percentage significantly less than the national percentage. The regional pattern for this measure thus corresponds to the pattern for numeracy and almost matches the pattern for prose literacy (Waitakere City had the next smallest percentage after Counties-Manukau but this was not significantly less than the national percentage).

Figure 13
Percentage of people aged 25-65 with at least two key characteristics favouring higher literacy or numeracy, by region



Source: New Zealand results of the Adult Literacy and Life Skills Survey. Ministry of Education calculations.

Note: For an explanation of the categories see Chapter 6. The bars around estimates represent the margins of error (at the 95% confidence level). The solid vertical line marks the estimated national percentage.

Table 3 provides a summary of the regional distribution of higher prose literacy and numeracy in comparison with three key regional variables: the percentage of people with upper secondary or tertiary education (Year 12+), the percentage using a computer at work, and the percentage with English as a first language. The percentages are represented in terms of whether they are significantly greater than the percentage for New Zealand as a whole, not significantly different, or significantly less than the national percentage. The regional percentages of people with 2 or

3 key characteristics favouring higher prose literacy or numeracy are also included for comparison.

Table 3

Key factors, prose literacy and numeracy compared with national percentage, by region

Region	% Year 12+	% work computer	% L1 English	% with 2-3 key characteristics	% higher prose literacy	% higher numeracy
Northland			+			
North Shore-Rodney	+	+		+	+	+
Waitakere City			-		-	
Auckland City	+		-			
Counties-Manukau	-	-	-	-	-	-
Waikato	-		+			
Bay of Plenty	-		+			
Gisborne & Hawke's Bay						
Taranaki & Manawatu-Wanganui	-		+			
Wellington	+	+		+	+	+
North & Central Canterbury			+			
South Canterbury & Otago			+			
Rest of South Island	-	-	+			

Note on symbols: a blank cell indicates that the percentage was not significantly different from the national percentage; + indicates a percentage significantly greater than the national percentage; - indicates a percentage significantly less than the national percentage

The extreme cases of North Shore-Rodney, Counties-Manukau and Wellington show up clearly here, with percentages significantly different from the national percentage in both prose literacy and numeracy, and the percentages for at least two of the three factors also being significantly different from the national percentage. These are also three of the four regions in which the percentage of people using a computer at work was significantly different from the national percentage. In other words, of the three key variables, computer use at work was the one which most closely matched prose literacy and numeracy in terms of regional pattern.¹¹

A number of regions had a percentage of people with upper secondary or tertiary education which was significantly less than the national percentage, but this low education characteristic was counterbalanced by the language factor, that is, these regions had a percentage of people with English as a first language which was greater than the national percentage, and the percentages of people with higher prose literacy and numeracy were not distinguishable from the national percentage. These regions were: Waikato, Bay of Plenty, Taranaki and Manawatu-Wanganui, and the Rest of South Island.

Auckland City had a counterbalance between education and language in the opposite direction, that is, a percentage of people with upper secondary or tertiary education which was significantly greater than the national percentage, but a percentage of people with English as a first language which was significantly less than the national percentage, and again the percentages of people with higher prose literacy and numeracy were on a par with the national percentages.

Waitakere City on the other hand appears to have lacked a counterbalancing factor for its significantly small percentage of native English speakers, which impacted more on prose literacy than numeracy. This is in line with the statistical models used in Lane (2010), in which

¹¹ Note that the pattern for home computer use is similar, except that the percentage for Counties-Manukau was not significantly different from the national percentage, while that for Waikato was significantly different, so the parallel is not so good with home computer use.

the effect of first language not being English was considerably greater on prose literacy than on numeracy.

Three regions had education and computer use variables with percentages comparable with the national percentage, and a percentage of people with English as a first language which was significantly greater than the national percentage, namely Northland, North and Central Canterbury, and South Canterbury and Otago.¹² Here the percentages of people with higher prose literacy and higher numeracy were not significantly different from the national percentage. The language effect was probably not as strong in these regions as in Waitakere City, because in these regions the percentage with English as a first language did not depart from the national percentage nearly as much as it did in Waitakere City.

The remaining region is Gisborne and Hawke's Bay, with prose literacy and numeracy percentages not distinguishable from the national percentages, and similarly the percentages for the three variables of education, computer use and language also not significantly different from the national percentage.

Looking at occupation, industry and income in relation to the regional distribution of prose literacy and numeracy, we can see that the Wellington Region stood out as having a significantly greater percentage (than the national percentage) of people who were managers, professionals or technicians, of people working in finance, business or community services, and of people with an income of \$40,000 or more, and these observations point toward Wellington having a significantly greater percentage with higher prose literacy and numeracy. North Shore-Rodney had a significantly greater percentage, and Counties-Manukau had a significantly smaller percentage, of people who were managers, professionals or technicians, and of people working in finance, business and community services. But for both these regions, the percentage of people with incomes of \$40,000 or more was not significantly different from the national percentage.

In Lane (2010) I suggest that use of a computer at work identifies better than occupation or industry those jobs which require or foster literacy and numeracy skills. Such jobs can be thought of as involving more knowledge- or information-intensive work, and they can be found in a range of occupations and industries. It appears that work computer use is also a variable which identifies regions, in terms of the literacy and numeracy skills of their residents, better than occupation or industry.

In terms of industry, the percentage of people working in finance, business and community services was significantly greater in Auckland City than the national percentage, while it was significantly less in Waikato and Rest of South Island. In terms of occupation the same regions had significantly greater or smaller percentages of people who were managers, professionals or technicians, and Northland also had a significantly smaller percentage. In Northland and Rest of South Island the percentages with incomes of \$40,000 or more were also significantly less than the national percentage. Yet these regions all had percentages of people with higher prose literacy and higher numeracy which were comparable with the national percentage rather than distinct from it. In all of these regions except Rest of South Island, the percentage of people using a computer at work was also comparable with the national percentage.

These comparisons among variables are set out in Table 4, where it can be seen that the pattern of regional variation in prose literacy and numeracy most closely matches that for work computer use. In fact, the only discrepancy for numeracy is Rest of South Island, and the only

¹² Note that if degree completion is used as the educational criterion, Northland and South Canterbury and Otago would count as relatively low-education regions.

discrepancy for prose literacy is in Waitakere City: in both cases the language factor appears to have a particularly strong effect.

Table 4

Employment-related factors, prose literacy and numeracy compared with national percentage, by region

Region	Occupation: % managers, professionals or technicians	Industry: % finance, business & community services	Income: % receiving \$40,000 or more	% work computer users	% higher prose literacy	% higher numeracy
Northland	-		-			
North Shore-Rodney	+	+		+	+	+
Waitakere City					-	
Auckland City	+	+				
Counties-Manukau	-	-		-	-	-
Waikato	-	-				
Bay of Plenty						
Gisborne & Hawke's Bay						
Taranaki & Manawatu- Wanganui						
Wellington	+	+	+	+	+	+
North & Central Canterbury						
South Canterbury & Otago						
Rest of South Island	-	-	-	-		

Note on symbols: a blank cell indicates that the percentage was not significantly different from the national percentage; + indicates a percentage significantly greater than the national percentage; - indicates a percentage significantly less than the national percentage

The pattern for numeracy agrees with that for occupation and industry for most regions, but not for Auckland City, Waikato and Rest of South Island. For Northland, there is disagreement between the occupational factor and numeracy (and prose literacy). The pattern for numeracy also agrees with that for income for most regions, with the exceptions of Northland, North Shore-Rodney, Counties-Manukau, and Rest of South Island. Hence although there is broad agreement between the pattern for numeracy and those for occupation, industry and income, there are a number of regions where there is a mismatch between numeracy and at least one of these variables.

On the other hand there is only one mismatch between numeracy and work computer use, for Rest of South Island. One of the things that work computer use does is to tap into a wider range of occupations than managerial, professional and technical (for instance, the majority of clerical and sales and service workers used computers at work) and a wider range of industries than finance, business and community services. Within occupations and industries it tends to identify jobs which require or encourage extensive and intensive literacy and numeracy activities. It also identifies a considerable number of people with low incomes as potentially having higher literacy or numeracy.

3 LITERACY AND NUMERACY BY BROAD REGIONAL GROUPING

This chapter is aimed at presenting a broad picture of differences in literacy and numeracy based on aggregating New Zealand regions into just two groupings, following previous research on regional differences in educational qualifications. It outlines the differences between the two groupings in prose literacy and numeracy, and relates these to comparisons of the variables covered in Lane (2010) and in the previous chapter, namely completed education, upskilling, computer use at work and at home, occupation, industry, income and first language.

Aggregating regions into two broad groupings allows analysis of additional factors which could not be explored at the more detailed regional level because of the relatively small numbers of survey respondents in the regional units. These additional factors are birthplace, age and gender.

3.1 Defining two broad regional groupings

Following Pool et al. (2005a) on regional differences in qualifications, New Zealand can be divided into two broad regional groupings: on the one hand, the Auckland, Wellington, Canterbury and Otago Regions ('metropolitan' regions), and on the other, the rest of New Zealand. In Pool et al.'s analysis, Auckland, Wellington, Canterbury and Otago were the four regions with the smallest proportions of people without educational qualification, and they were also the four regions with the greatest proportions of people with tertiary qualifications. Table 5 shows how these groupings divide the estimated populations.

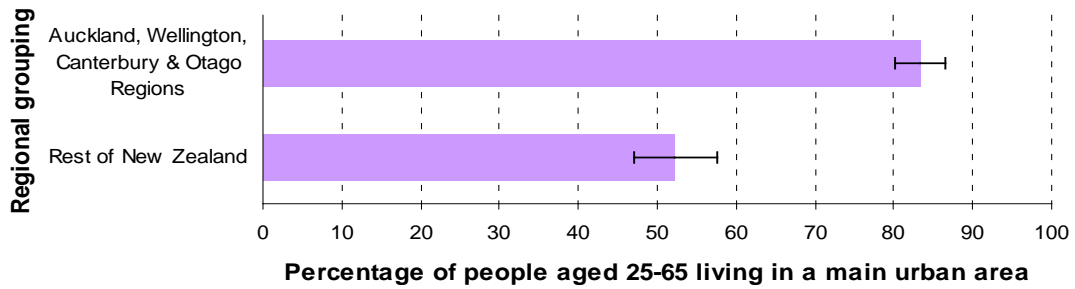
Table 5
Broad regional groupings

Broad regional grouping	Estimated population aged 25-65 in each grouping	Estimated population aged 25-65 as percentage of total
Auckland, Wellington, Canterbury & Otago Regions	1,344,000	63
Rest of New Zealand	779,000	37
TOTAL	2,122,000	100

Urbanisation in the broad regional groupings

The two broad regional groupings differ in many ways which will be outlined in the following sections, but one of the key differences is in the degree of urbanisation, as shown by the fact that a considerably greater percentage of people in Auckland, Wellington, Canterbury and Otago than in the rest of New Zealand lived in a main urban area (Figure 14).

Figure 14
Percentage of people living in a main urban area, by broad regional grouping



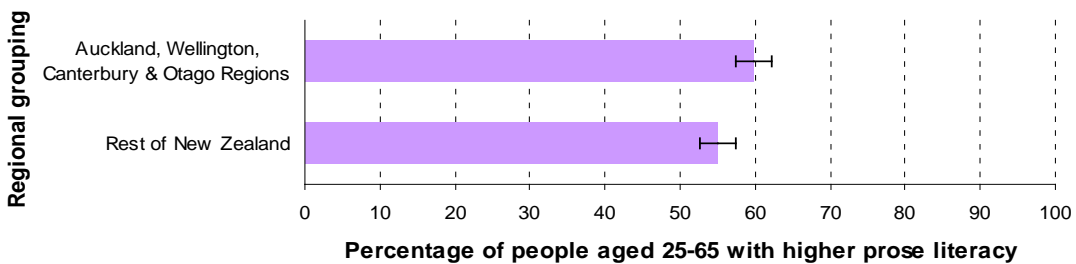
Source: New Zealand results of the Adult Literacy and Life Skills Survey. Ministry of Education calculations.

Note: A 'main urban area' has a population of 30,000 or more. For an explanation of other categories see Chapter 6. The bars around estimates represent the margins of error (at the 95% confidence level).

3.2 Prose literacy and numeracy

Figures 15 and 16 show comparisons of the broad regional groupings in terms of prose literacy and numeracy. The grouping of the Auckland, Wellington, Canterbury and Otago Regions had a significantly greater percentage of people aged 25-65 with higher prose literacy and with higher numeracy than the rest of New Zealand.

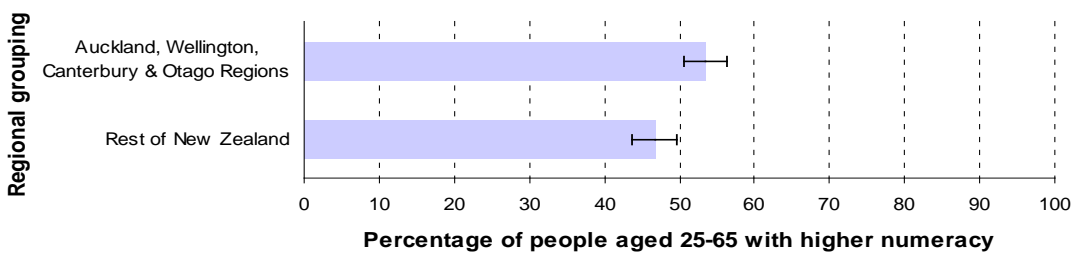
Figure 15
Percentage of people with higher prose literacy (Levels 3-5) by broad regional grouping



Source: New Zealand results of the Adult Literacy and Life Skills Survey. Ministry of Education calculations.

Note: For an explanation of the categories see Chapter 6. The bars around estimates represent the margins of error (at the 95% confidence level).

Figure 16
Percentage of people with higher numeracy (Levels 3-5) by broad regional grouping



Source: New Zealand results of the Adult Literacy and Life Skills Survey. Ministry of Education calculations.

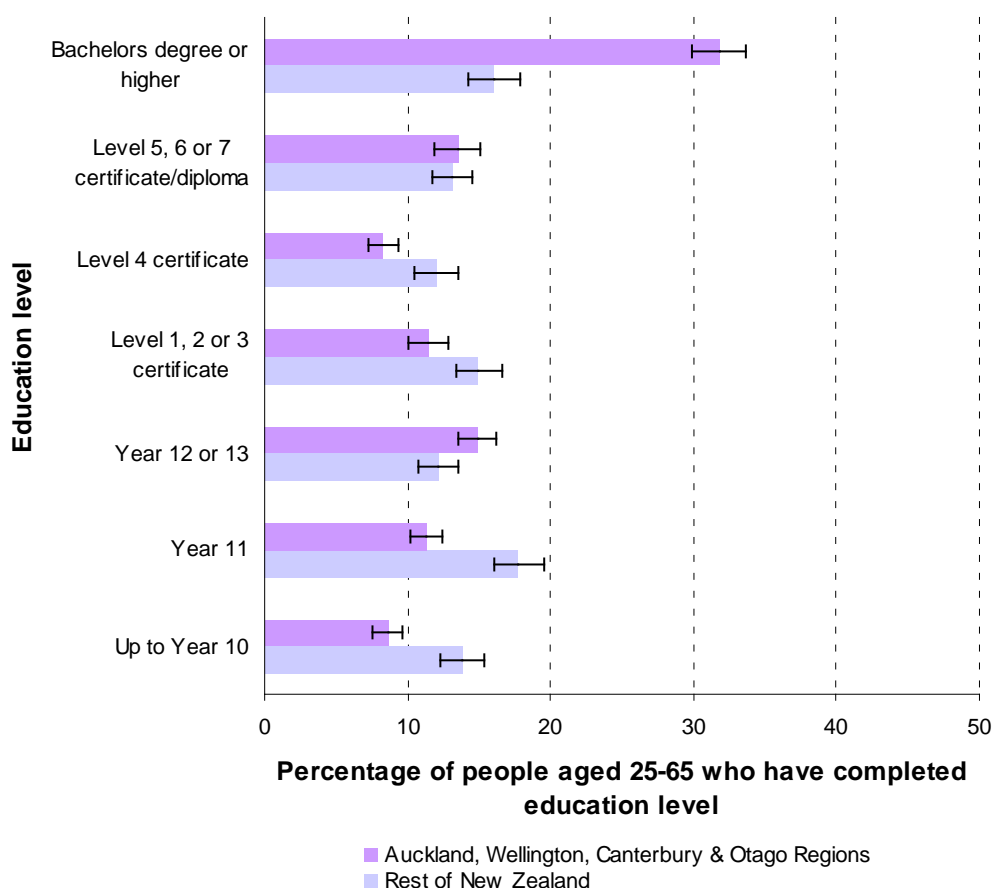
Note: For an explanation of the categories see Chapter 6. The bars around estimates represent the margins of error (at the 95% confidence level).

3.3 Education

Completed education

If we compare the two broad regional groupings of the Auckland, Wellington, Canterbury and Otago Regions, and the rest of New Zealand, there are clearcut differences (as is to be expected since educational criteria have been used to define the groupings), which are illustrated in Figure 17. The only percentage which was comparable in both groupings was that of people with Level 5, 6 or 7 certificates or diplomas. Auckland, Wellington, Canterbury and Otago had a markedly greater percentage of people with bachelors or postgraduate degrees (32 per cent, compared with 16 per cent for the rest of New Zealand), and a significantly greater percentage whose highest completed level was Year 12 or 13 (15 per cent compared with 12 per cent). Auckland, Wellington, Canterbury and Otago had significantly smaller percentages of people whose highest completed level was Year 10 or less (9 per cent, compared with 14 per cent in the rest of New Zealand), Year 11 (11 per cent compared with 18 per cent), Level 1 to 3 certificates (12 per cent compared with 15 per cent) and Level 4 certificates (8 per cent compared with 12 per cent).

Figure 17
Completed education (detailed categories) by broad regional grouping for people aged 25-65

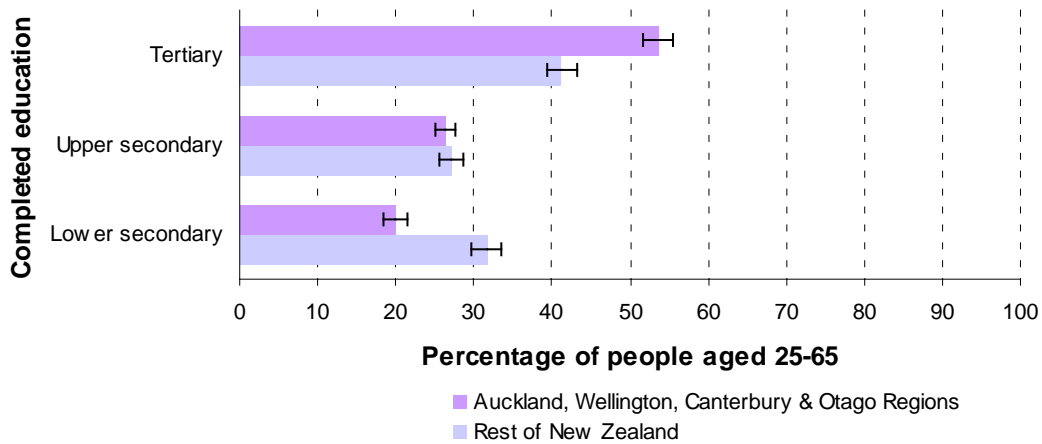


Source: New Zealand results of the Adult Literacy and Life Skills Survey. Ministry of Education calculations.

Note: For an explanation of the categories see Chapter 6. The bars around estimates represent the margins of error (at the 95% confidence level).

Figure 18 shows a comparison between the broad regional groupings in terms of aggregated categories of completed education, namely lower secondary (Year 11 or less), upper secondary (Year 12-13 or Level 1-3 certificate) or tertiary (Level 4 and above). Here it is clear that overall, the grouping of Auckland, Wellington, Canterbury and Otago had a significantly greater percentage of people aged 25-65 who had completed a tertiary education, and a significantly smaller percentage who had completed only lower secondary, while the percentage who had completed upper secondary was similar in the two broad groupings.

Figure 18
Completed education (aggregated categories) by broad regional grouping, for people aged 25-65



Source: New Zealand results of the Adult Literacy and Life Skills Survey. Ministry of Education calculations.

Note: For an explanation of the categories see Chapter 6. The bars around estimates represent the margins of error (at the 95% confidence level).

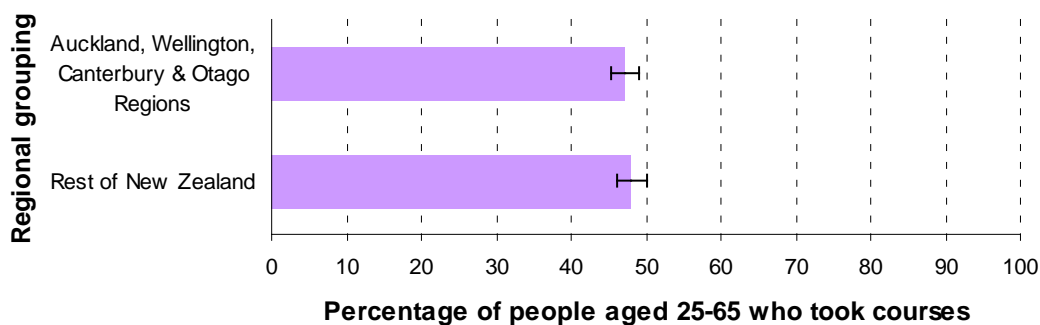
In the Auckland, Wellington, Canterbury and Otago Regions, people whose highest level of completed education was lower secondary accounted for 34 per cent of those with low prose literacy (Levels 1-2) and 33 per cent of those with low numeracy. In the rest of New Zealand, they accounted for 49 per cent of those with low prose literacy and 46 per cent of those with low numeracy.

In the Auckland, Wellington, Canterbury and Otago Regions, people whose highest level of completed education was tertiary accounted for 64 per cent of those with higher prose literacy (Levels 1-2) and 67 per cent of those with higher numeracy. In the rest of New Zealand, they accounted for 55 per cent of those with higher prose literacy and 58 per cent of those with higher numeracy.

Formal and non-formal upskilling

Higher prose literacy and numeracy are associated with taking formal or non-formal courses in the past year. In general, people with higher levels of completed education were more likely to have taken such courses (Lane 2010), but even though people in Auckland, Wellington, Canterbury and Otago tended to have higher levels of education, there was no significant difference between the two broad regional groupings in the percentage of people who had taken courses, as shown in Figure 19.

Figure 19
Percentage of people aged 25-65 who took formal or non-formal courses in the past year, by broad regional grouping



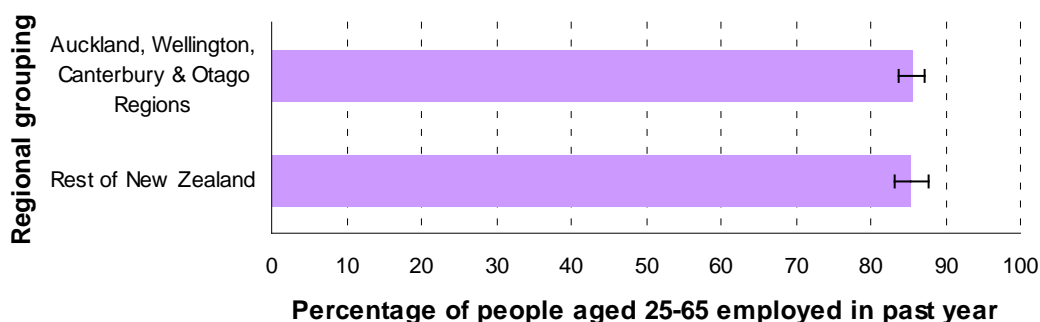
Source: New Zealand results of the Adult Literacy and Life Skills Survey. Ministry of Education calculations.

Note: For an explanation of the categories see Chapter 6. The bars around estimates represent the margins of error (at the 95% confidence level).

3.4 Employment

There was no significant difference in the percentage of people employed in the past year between the grouping of the Auckland, Wellington, Canterbury and Otago Regions and the rest of New Zealand, as shown in Figure 20.¹³

Figure 20
Percentage of people employed in the past year, by broad regional grouping



Source: New Zealand results of the Adult Literacy and Life Skills Survey. Ministry of Education calculations.

Note: For an explanation of the categories see Chapter 6. The bars around estimates represent the margins of error (at the 95% confidence level).

¹³ This uniformity may have been a temporary phenomenon. At the time the survey was carried out, in 2006 and the beginning of 2007, labour force participation was particularly high and unemployment particularly low, with the result that the percentage of people in employment would have been maximised. Pool et al. (2006) show that the rates of labour force participation and unemployment in different regions diverged during the recessionary period of the 1990s.

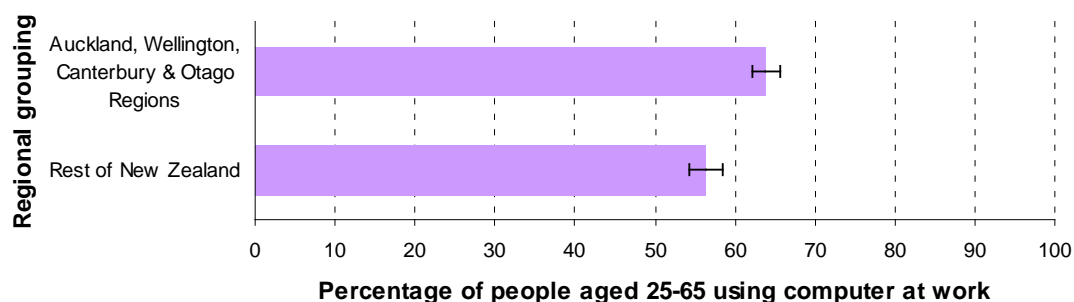
3.5 Computer use

Computer use at work

Given the detailed regional results covered in chapter 2, it is perhaps not surprising that the comparison by broad regional grouping in Figure 21 shows a significantly greater percentage (64 per cent) of people using a computer at work in the Auckland, Wellington, Canterbury and Otago Regions than in the rest of New Zealand (56 per cent), even though Counties-Manukau, with its significantly small percentage of work computer users, is part of the Auckland Region.

Figure 21

Percentage of people aged 25-65 who had used a computer at work in the past year, by broad regional grouping



Source: New Zealand results of the Adult Literacy and Life Skills Survey. Ministry of Education calculations.

Note: For an explanation of the categories see Chapter 6. The bars around estimates represent the margins of error (at the 95% confidence level).

In the Auckland, Wellington, Canterbury and Otago Regions, people who did not use a computer at work (either because they were not employed or because they were employed but did not use a computer at work) accounted for 57 per cent of those with low prose literacy (Levels 1-2) and 55 per cent of those with low numeracy. In the rest of New Zealand, they accounted for 62 per cent of those with low prose literacy and 61 per cent of those with low numeracy.

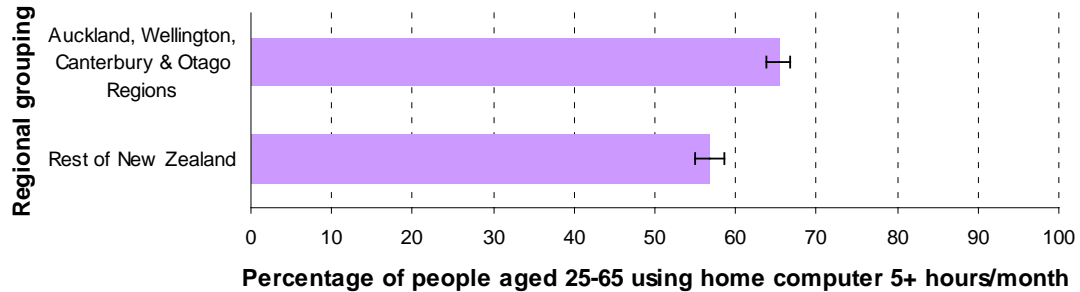
In the Auckland, Wellington, Canterbury and Otago Regions, people who used a computer at work accounted for 78 per cent of those with higher prose literacy (Levels 1-2) and 80 per cent of those with higher numeracy. In the rest of New Zealand, they accounted for 72 per cent of those with higher prose literacy and 76 per cent of those with higher numeracy.

Home computer use

The Auckland, Wellington, Canterbury and Otago Regions had overall a higher rate (65 per cent) of home computer use for 5 or more hours per month¹⁴ than the rest of New Zealand (57 per cent), and this difference was statistically significant, as shown in Figure 22.

Figure 22

Percentage of people aged 25-65 who used a home computer for 5 or more hours per month, by broad regional grouping



Source: New Zealand results of the Adult Literacy and Life Skills Survey. Ministry of Education calculations.

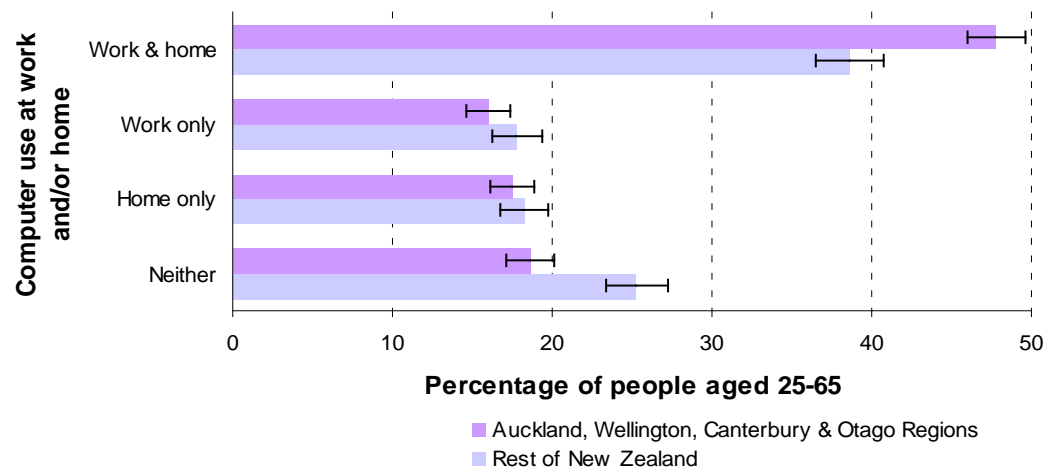
Note: For an explanation of the categories see Chapter 6. The bars around estimates represent the margins of error (at the 95% confidence level).

Computer use at work and home combined

When the broad regional groupings were compared in terms of computer use at work and (for 5 or more hours per month) at home, Auckland, Wellington, Canterbury and Otago Regions had a significantly higher percentage (48 per cent) of people who used a computer both at work and at home compared with the rest of New Zealand (39 per cent), and a significantly lower percentage (19 per cent compared with 25 per cent) who did not use a computer in either location as shown in Figure 23.

Figure 23

Locations of computer use by broad regional grouping, for people aged 25-65



Source: New Zealand results of the Adult Literacy and Life Skills Survey. Ministry of Education calculations.

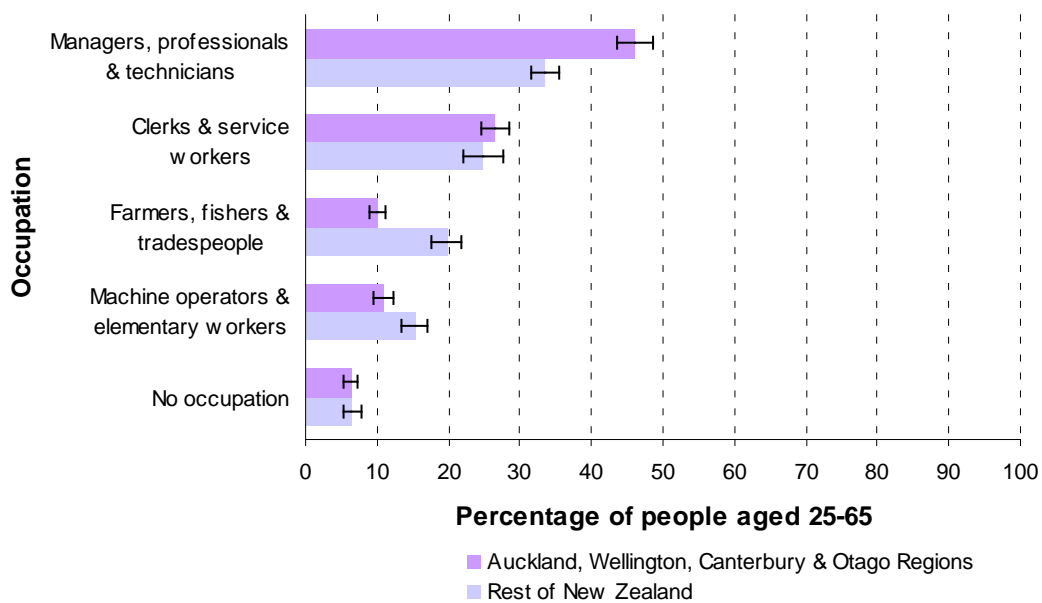
Note: For an explanation of the categories see Chapter 6. The bars around estimates represent the margins of error (at the 95% confidence level).

¹⁴ Five hours per month is taken as a minimum to ensure that respondents actually used a home computer if they had access to one. Those who used a home computer less than 5 hours per month could not be distinguished in the survey responses from those who did not use their home computers at all.

3.6 Occupation

Figure 24 compares the broad regional groupings in terms of membership of four broad occupational groups and of people with no assigned occupation¹⁵. While the percentages of clerks and service workers, and of people with no occupation, were not significantly different, there was a significantly greater percentage of managers, professionals and technicians in the Auckland, Wellington, Canterbury and Otago Regions (46 per cent) than in the rest of New Zealand (34 per cent). Conversely, there was a significantly greater percentage of farmers, fishers and tradespeople in the rest of New Zealand (20 per cent) than in Auckland, Wellington, Canterbury and Otago (10 per cent), and also a significantly greater percentage of machine operators and elementary workers in the rest of New Zealand (15 per cent) than in Auckland, Wellington, Canterbury and Otago (11 per cent).

Figure 24
Percentage of people aged 25-65 in different occupational categories, by broad regional grouping



Source: New Zealand results of the Adult Literacy and Life Skills Survey. Ministry of Education calculations.

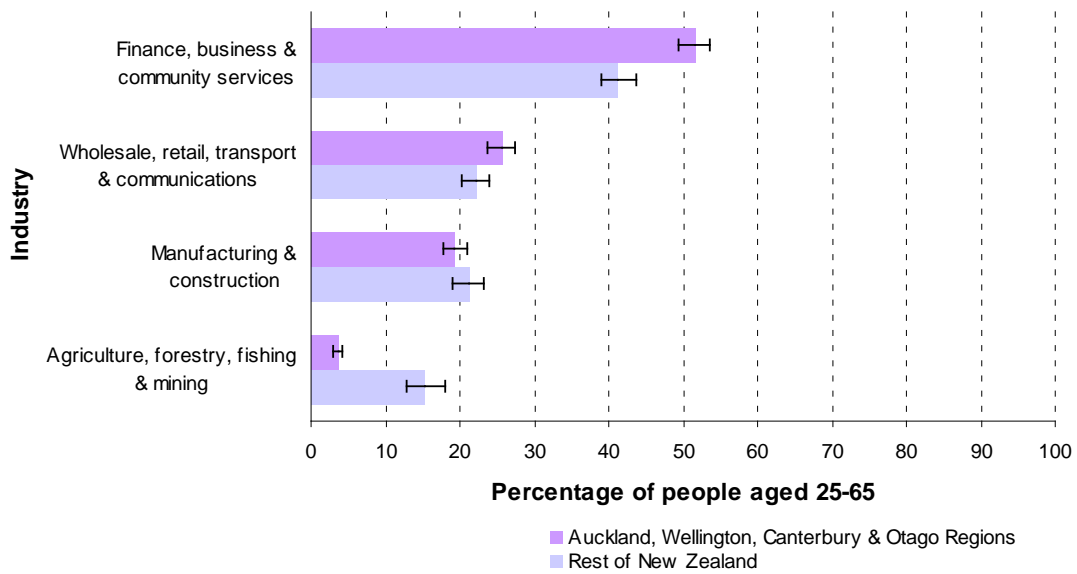
Note: For an explanation of the categories see Chapter 6. The bars around estimates represent the margins of error (at the 95% confidence level).

¹⁵ See chapter 6 for an explanation of how people were assigned to occupational categories.

3.7 Industry

Figure 25 shows the percentage of people aged 25-65 in each industry group¹⁶ by broad regional grouping. While the percentages were not significantly different for ‘Wholesale, retail, transport and communications’ and for ‘Manufacturing and construction’, the percentage of people in ‘Finance, business and community services’ was significantly higher in the grouping of the Auckland, Wellington, Canterbury and Otago Regions (52 per cent) than in the rest of New Zealand (41 per cent). On the other hand, the percentage of people involved in ‘Agriculture, forestry, fishing and mining’ was significantly higher in the rest of New Zealand (15 per cent) than in Auckland, Wellington, Canterbury and Otago (4 per cent).

Figure 25
Percentage of people aged 25-65 in different industry categories, by broad regional grouping



Source: New Zealand results of the Adult Literacy and Life Skills Survey. Ministry of Education calculations.

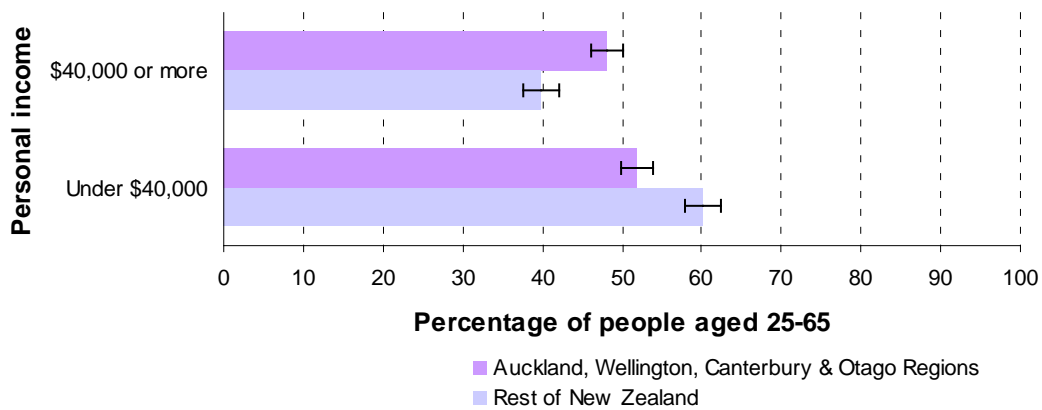
Note: For an explanation of the categories see Chapter 6. The bars around estimates represent the margins of error (at the 95% confidence level).

¹⁶ See chapter 6 for an explanation of how people were assigned to industry categories.

3.8 Income

Figure 26 gives an indication of differences in income between the two broad regional groupings. The percentage of people aged 25-65 with an annual gross personal income of \$40,000 or more was significantly higher in the Auckland, Wellington, Canterbury and Otago Regions (48 per cent) than in the rest of New Zealand (40 per cent)¹⁷.

Figure 26
Percentage of people aged 25-65 with gross annual personal income above and below \$40,000, by broad regional grouping



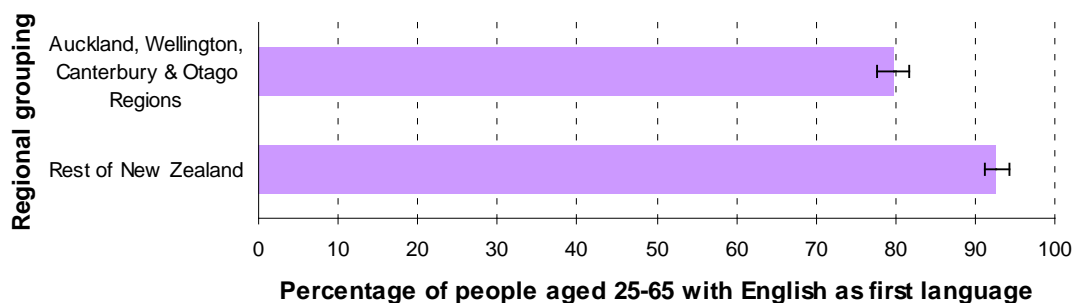
Source: New Zealand results of the Adult Literacy and Life Skills Survey. Ministry of Education calculations.

Note: For an explanation of the categories see Chapter 6. The bars around estimates represent the margins of error (at the 95% confidence level).

3.9 First language

The percentage of people aged 25-65 whose first language was English was significantly less in Auckland, Wellington, Canterbury and Otago Regions (80 per cent), than in the rest of New Zealand (93 per cent), as shown in Figure 27.

Figure 27
Percentage of people aged 25-65 with English as a first language, by broad regional grouping



Source: New Zealand results of the Adult Literacy and Life Skills Survey. Ministry of Education calculations.

Note: For an explanation of the categories see Chapter 6. The bars around estimates represent the margins of error (at the 95% confidence level).

¹⁷ These percentages are estimates based on the ALL data. The corresponding percentages based on the 2006 Census are 48 per cent for Auckland, Wellington, Canterbury and Otago and 41 per cent for the rest of New Zealand.

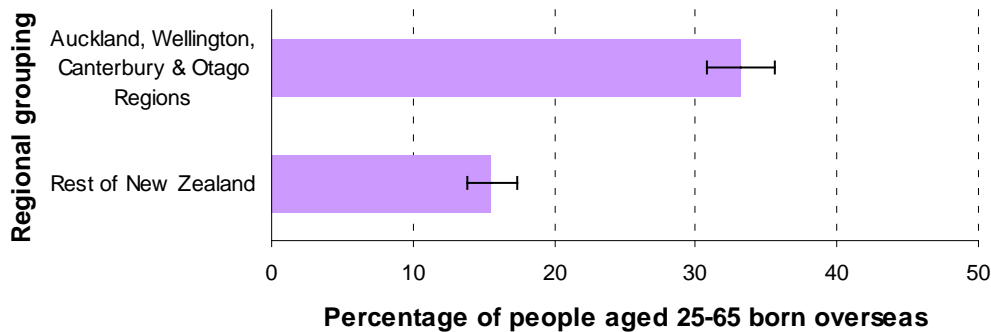
In the Auckland, Wellington, Canterbury and Otago Regions, people whose first language was not English accounted for 37 per cent of those with low prose literacy (Levels 1-2) and 31 per cent of those with low numeracy. In the rest of New Zealand, they accounted for 11 per cent of those with low prose literacy and 9 per cent of those with low numeracy.

3.10 Birthplace

At the detailed regional level it is not possible to obtain reliable estimates from the ALL survey data of the percentage of people born overseas in most regions (hence birthplace was not covered in chapter 2). However, in terms of broad regional groupings, it is clear that a much greater percentage of people aged 25-65 were born overseas in the grouping of the Auckland, Wellington, Canterbury and Otago Regions (33 per cent) than in the rest of New Zealand (16 per cent), as shown in Figure 28.

Figure 28

Percentage of people aged 25-65 who were not born in New Zealand, by broad regional grouping



Source: New Zealand results of the Adult Literacy and Life Skills Survey. Ministry of Education calculations.

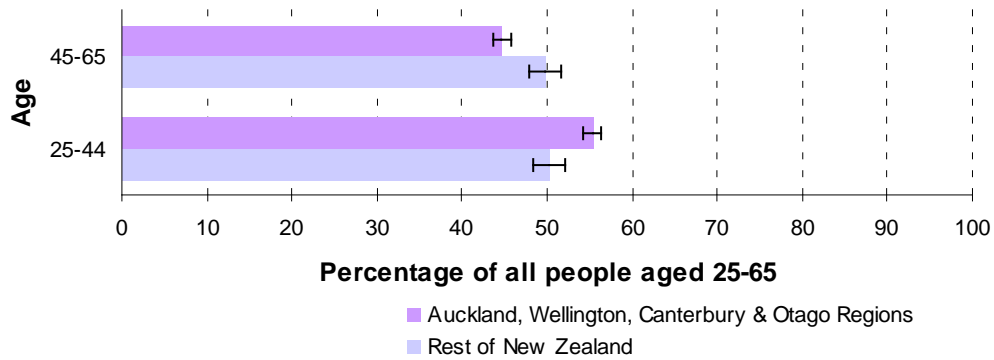
Note: For an explanation of the categories see Chapter 6. The bars around estimates represent the margins of error (at the 95% confidence level).

3.11 Age

Aggregating the regions into two broad groupings allows more detailed analysis of demographic differences within regions, in this and the following sections.

The grouping of Auckland, Wellington, Canterbury and Otago had a younger age profile than the rest of New Zealand, as shown in Figure 29. This arises from a combination of younger people moving into major urban areas for tertiary study and work, the fact that immigrants to New Zealand tend to be younger and to settle mainly in Auckland, Christchurch or Wellington, and a tendency of some older people to move out of major urban areas into rural and smaller urban areas (Statistics New Zealand, n.d.).

Figure 29
Percentage of people in different age groups, by broad regional grouping

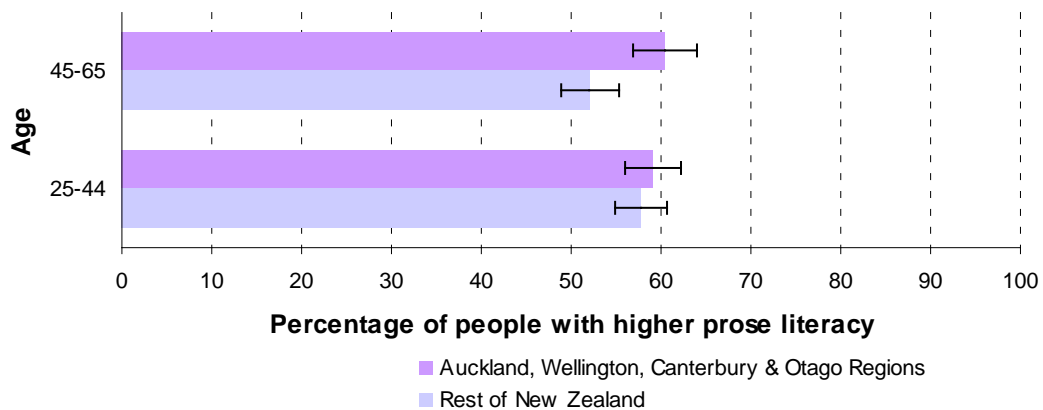


Source: New Zealand results of the Adult Literacy and Life Skills Survey. Ministry of Education calculations.

Note: For an explanation of the categories see Chapter 6. The bars around estimates represent the margins of error (at the 95% confidence level).

Older people in the rest of New Zealand were less likely to have higher prose literacy or numeracy than younger people in either regional grouping, or than older people in Auckland, Wellington, Canterbury and Otago, as shown in Figures 30 and 31.

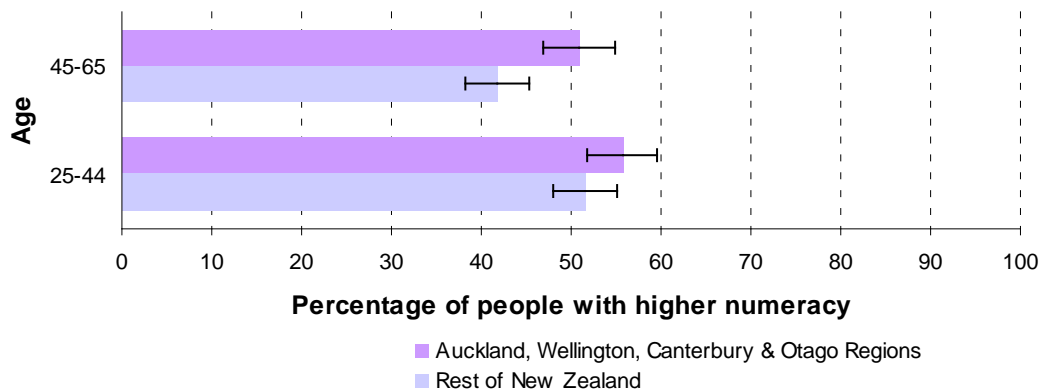
Figure 30
Percentage of people aged 25-65 with higher prose literacy (Levels 3-5), by age and broad regional grouping



Source: New Zealand results of the Adult Literacy and Life Skills Survey. Ministry of Education calculations.

Note: For an explanation of the categories see Chapter 6. The bars around estimates represent the margins of error (at the 95% confidence level).

Figure 31
Percentage of people aged 25-65 with higher numeracy (Levels 3-5), by age and broad regional grouping



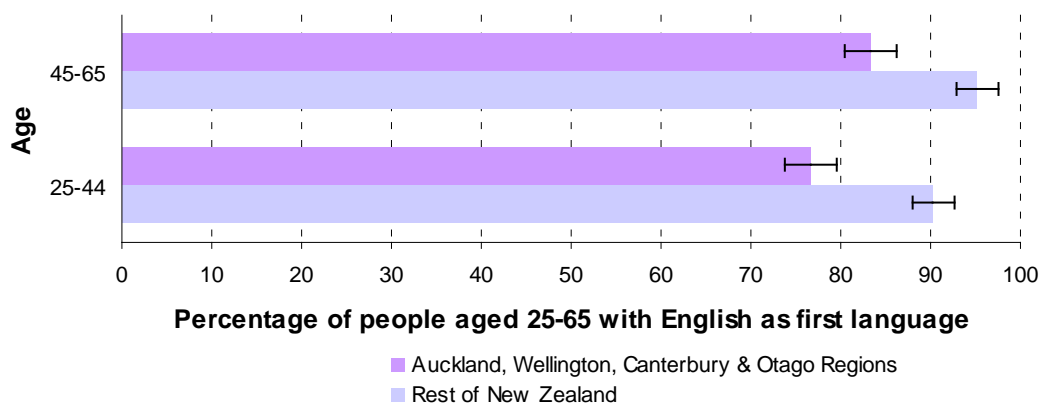
Source: New Zealand results of the Adult Literacy and Life Skills Survey. Ministry of Education calculations.

Note: For an explanation of the categories see Chapter 6. The bars around estimates represent the margins of error (at the 95% confidence level).

This probably reflects lower education in the rest of New Zealand in the older age group (especially for women) and lower work computer use by older women, plus a specific age disadvantage for numeracy (see section 3.13). The difference was significant even though older people in the rest of New Zealand were the group most likely to be native speakers of English, as shown in Figure 32. The percentage with English as a first language was significantly greater in this group than in any other.

The percentage of people with English as a first language was also significantly greater in the rest of New Zealand than in Auckland, Wellington, Canterbury and Otago within each age group. Within each broad regional grouping, people in the older age group were significantly more likely to have English as a first language than people in the younger age group.

Figure 32
Percentage of people with English as a first language, by age and broad regional grouping



Source: New Zealand results of the Adult Literacy and Life Skills Survey. Ministry of Education calculations.

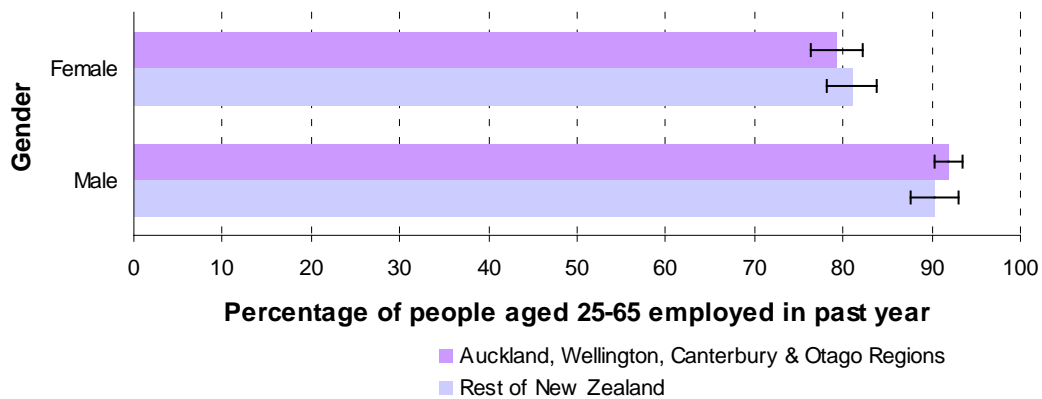
Note: For an explanation of the categories see Chapter 6. The bars around estimates represent the margins of error (at the 95% confidence level).

3.12 Gender

There were different gender patterns for prose literacy and numeracy in the younger and older age groups: these are dealt with in the next section. This section covers some gender differences in which age has less effect.

Men were more likely to be employed than women in both regional groupings, as shown in Figure 33.

Figure 33
Percentage of people employed in the past year, by gender and broad regional grouping

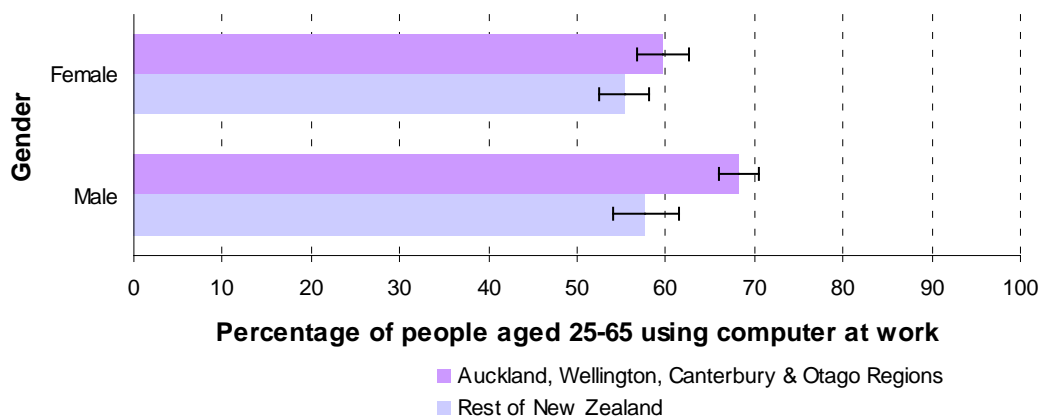


Source: New Zealand results of the Adult Literacy and Life Skills Survey. Ministry of Education calculations.

Note: For an explanation of the categories see Chapter 6. The bars around estimates represent the margins of error (at the 95% confidence level).

This partly accounts for men in Auckland, Wellington, Canterbury and Otago being more likely to be employed and use a computer at work than women in either grouping, as shown in Figure 34. They were also significantly more likely to have used a computer at work than men in the rest of New Zealand. Clearly a smaller percentage of employed men in the rest of New Zealand used a computer at work.

Figure 34
Percentage of people using a computer at work, by gender and broad regional grouping



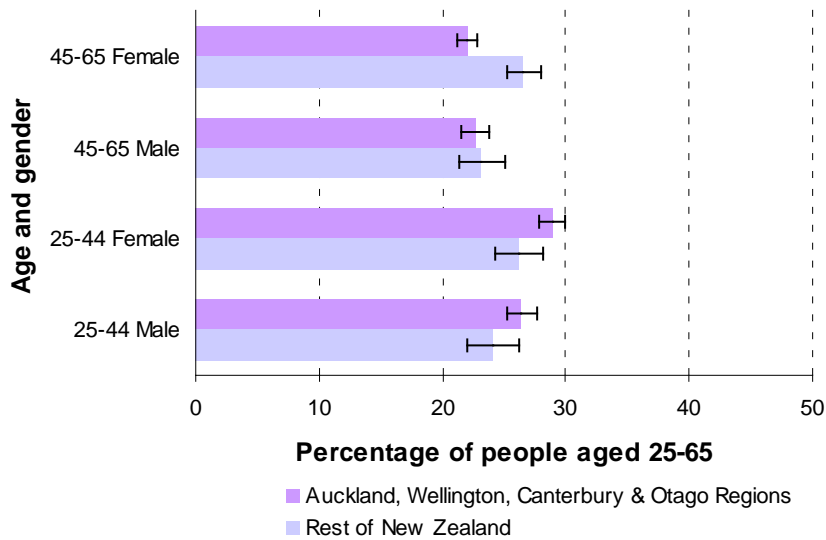
Source: New Zealand results of the Adult Literacy and Life Skills Survey. Ministry of Education calculations.

Note: For an explanation of the categories see Chapter 6. The bars around estimates represent the margins of error (at the 95% confidence level).

3.13 Age and gender

This section is based on dividing the population aged 25-65 into four groups on the basis of age (25-44 and 45-65 age bands) and gender. The percentage of people in each age/gender group was comparable except that the percentage of older women was significantly greater in the rest of New Zealand than in Auckland, Wellington, Canterbury and Otago, as shown in Figure 35.

Figure 35
Percentage of people in each age/gender group by broad regional grouping



Source: New Zealand results of the Adult Literacy and Life Skills Survey. Ministry of Education calculations.

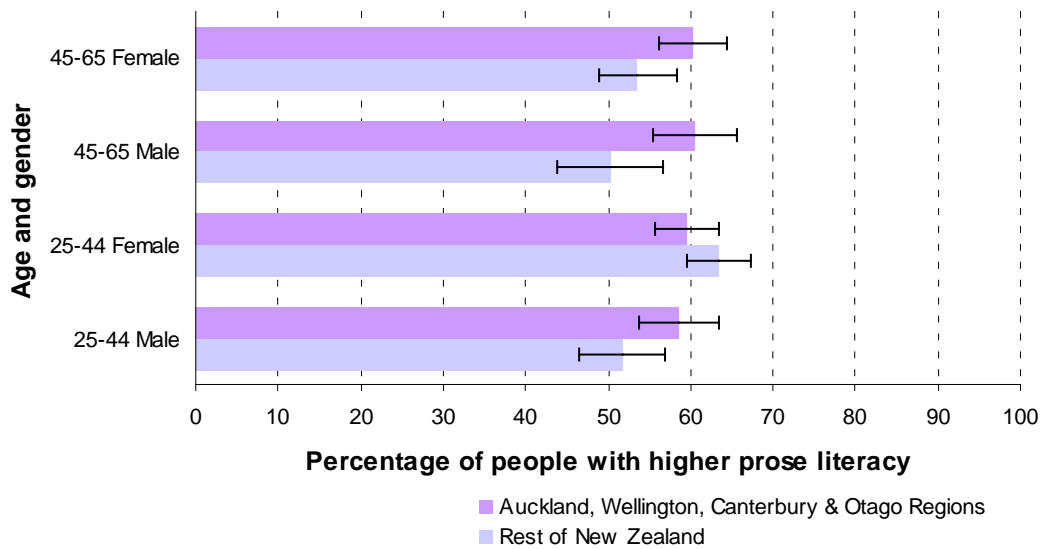
Note: For an explanation of the categories see Chapter 6. The bars around estimates represent the margins of error (at the 95% confidence level).

Prose literacy and numeracy

The age/gender differences between the broad regional groupings for prose literacy were not significant, as can be seen in Figure 36, but older women in the rest of New Zealand were significantly less likely than older women in Auckland, Wellington, Canterbury and Otago to have higher numeracy, as shown in Figure 37.

However, within the rest of New Zealand, younger women were significantly more likely to have higher prose literacy than the other three age/gender groups.

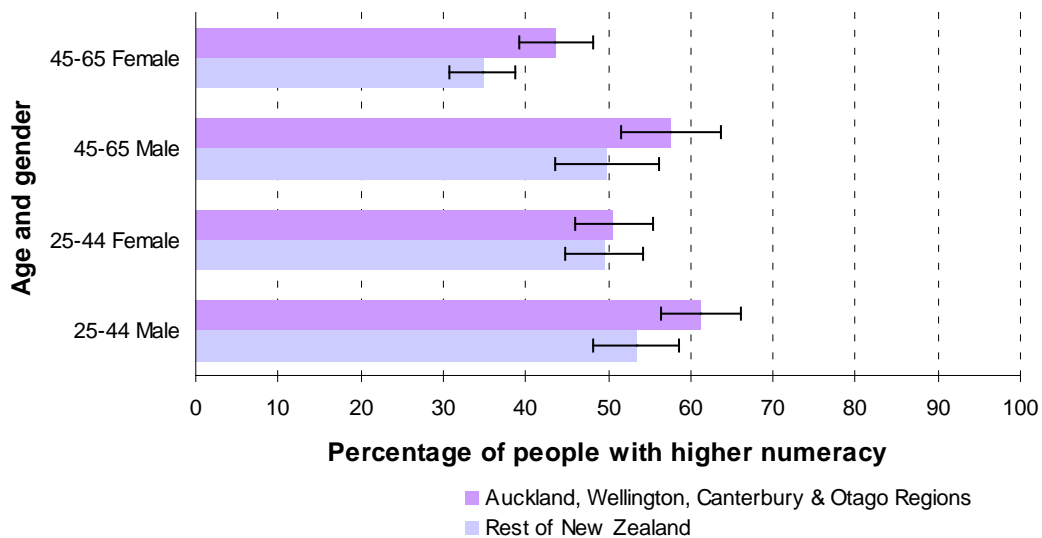
Figure 36
Percentage of people with higher prose literacy (Levels 3-5) in each age/gender group, by broad regional grouping



Source: New Zealand results of the Adult Literacy and Life Skills Survey. Ministry of Education calculations.

Note: For an explanation of the categories see Chapter 6. The bars around estimates represent the margins of error (at the 95% confidence level).

Figure 37
Percentage of people with higher numeracy (Levels 3-5) in each age/gender group, by broad regional grouping



Source: New Zealand results of the Adult Literacy and Life Skills Survey. Ministry of Education calculations.

Note: For an explanation of the categories see Chapter 6. The bars around estimates represent the margins of error (at the 95% confidence level).

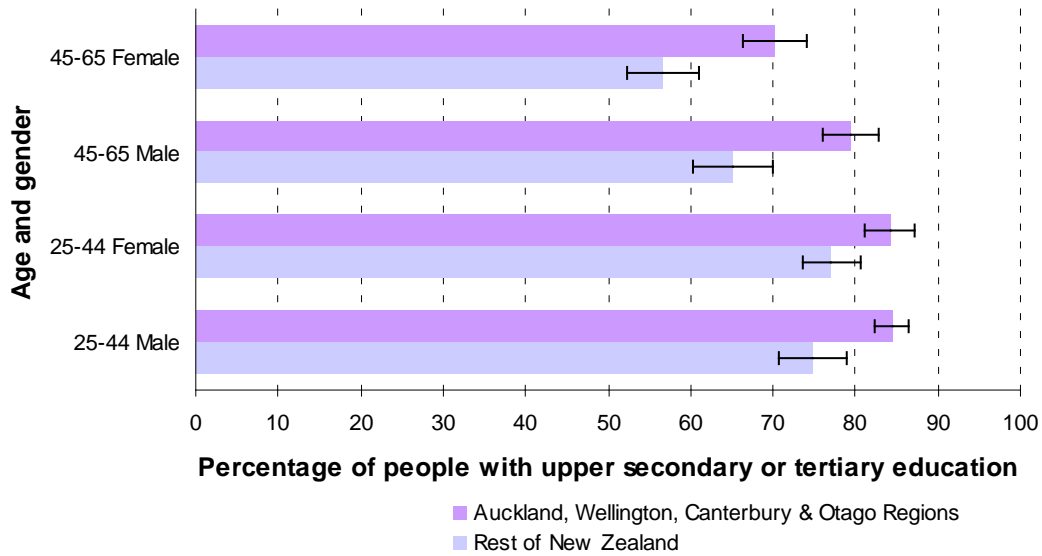
Comparing the two broad regional groupings, there is a combined effect here: a greater percentage of older women in the rest of New Zealand, and these older women were less likely to have higher numeracy than their counterparts in Auckland, Wellington, Canterbury and Otago.

Completed education

The percentage of people with upper secondary or tertiary education was significantly greater in Auckland, Wellington, Canterbury and Otago than in the rest of New Zealand for all four age/gender groups, as shown in Figure 38. Within the rest of New Zealand, a significantly greater percentage of younger people than of older people had upper secondary or tertiary education. Within the grouping of Auckland, Wellington, Canterbury and Otago, greater percentages of younger people and of older men had upper secondary or tertiary education than of older women.

Figure 38

Percentage of people with upper secondary or tertiary education, by age, gender and broad regional grouping



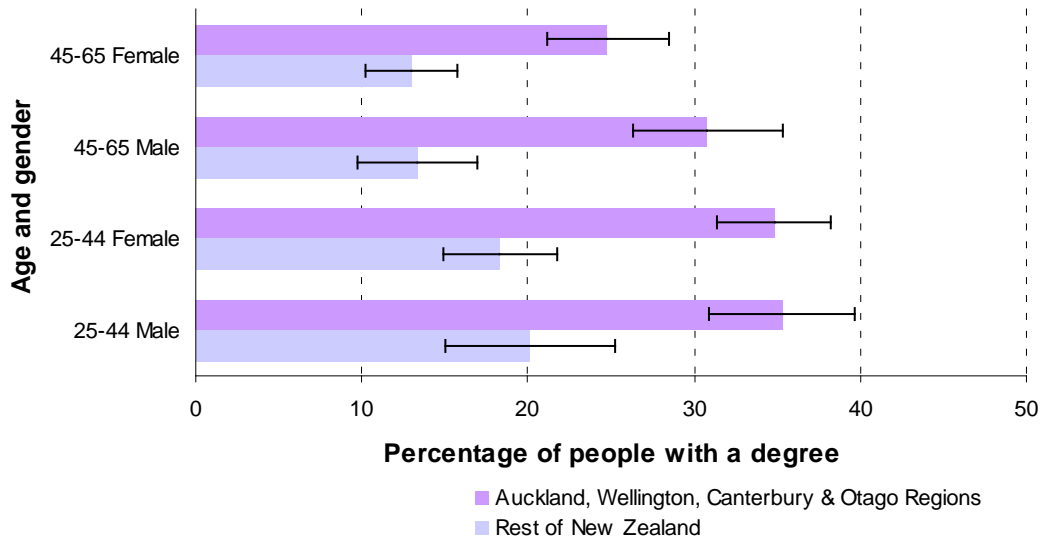
Source: New Zealand results of the Adult Literacy and Life Skills Survey. Ministry of Education calculations.

Note: For an explanation of the categories see Chapter 6. The bars around estimates represent the margins of error (at the 95% confidence level).

Figure 39 shows the percentage of people with a degree in each age/gender group for the two broad regional groupings. For each age/gender group, the percentage in Auckland, Wellington, Canterbury and Otago was significantly greater than in the rest of New Zealand and this difference was very large. Within the rest of New Zealand there was no significant difference between age groups, while within Auckland, Wellington, Canterbury and Otago the percentage for older women was significantly less than both the younger women and the younger men.

Figure 39

Percentage of people who have completed a bachelors or postgraduate degree, by age, gender and broad regional grouping



Source: New Zealand results of the Adult Literacy and Life Skills Survey. Ministry of Education calculations.

Note: For an explanation of the categories see Chapter 6. The bars around estimates represent the margins of error (at the 95% confidence level).

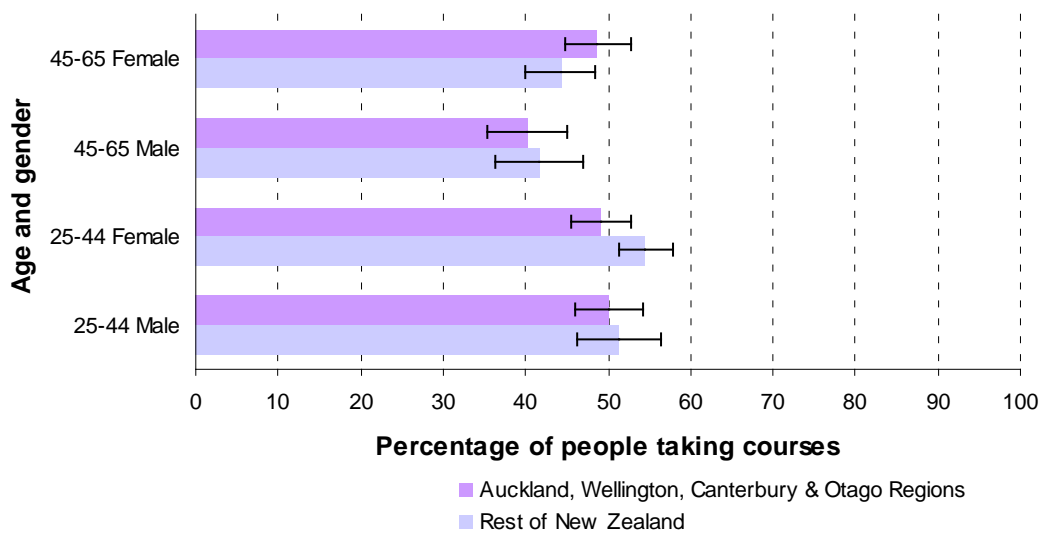
Formal and non-formal upskilling

Figure 40 shows the percentages of people in each age/gender group in the two regional groupings who took formal or non-formal courses in the past year. Within each age/gender group there were no significant differences between the regional groupings. The estimated percentages taking courses in the younger groups were greater than in the older groups, though in terms of significance we can just say that the percentages for all the younger groups were greater than that for older men in Auckland, Wellington, Canterbury and Otago, and that the percentage for younger women in the rest of New Zealand was significantly greater than for the older groups apart from the older women in Auckland, Wellington, Canterbury and Otago.

The general age and gender patterns (see Scott and Lane, 2010 for further discussion) were mainly due to age differences in formal upskilling (younger people being more likely to take formal courses than older people), and gender differences in non-formal upskilling (women being more likely to take non-formal courses than men).

Figure 40

Percentage of people who took formal or non-formal courses in past year, by age, gender and regional grouping



Source: New Zealand results of the Adult Literacy and Life Skills Survey. Ministry of Education calculations.

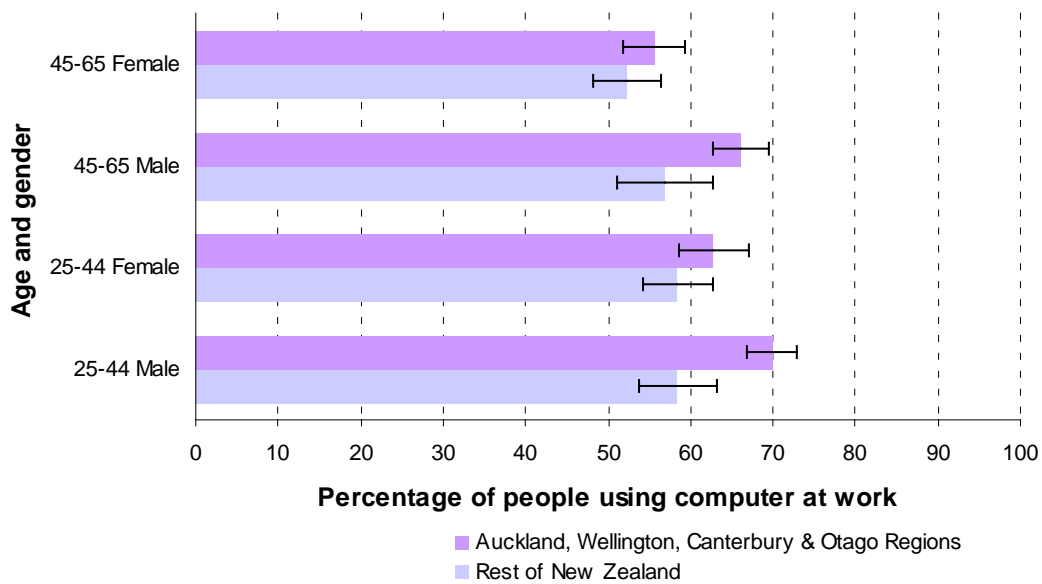
Note: For an explanation of the categories see Chapter 6. The bars around estimates represent the margins of error (at the 95% confidence level).

Computer use

Figure 41 shows the percentages of people employed and using a computer at work in each age/gender group in the two regional groupings. There were no significant differences between regional groupings among women, but among both the younger and the older men there was a significantly greater percentage of work computer users in Auckland, Wellington, Canterbury and Otago than in the rest of New Zealand. The percentages of work computer users were also greater among the younger and older men in Auckland, Wellington, Canterbury and Otago than among all age/gender groups in the rest of New Zealand and among older women in Auckland, Wellington, Canterbury and Otago.

Figure 41

Percentage of people employed and using a computer at work in the past year, by age, gender and regional grouping

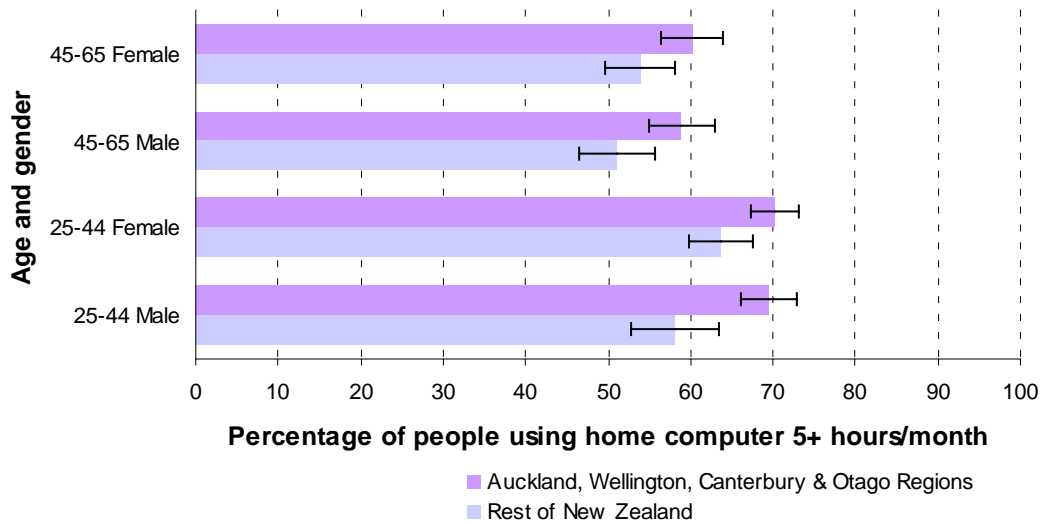


Source: New Zealand results of the Adult Literacy and Life Skills Survey. Ministry of Education calculations.

Note: For an explanation of the categories see Chapter 6. The bars around estimates represent the margins of error (at the 95% confidence level).

Figure 42 shows the percentages of people using a home computer for 5 or more hours per month in each age/gender group in the two regional groupings. The estimated percentages are greater in Auckland, Wellington, Canterbury and Otago than in the rest of New Zealand for all age/gender groups but the differences are only significant for the younger groups (both male and female).

Figure 42
Percentage of people using a home computer for 5 hours or more per month, by age, gender and regional grouping



Source: New Zealand results of the Adult Literacy and Life Skills Survey. Ministry of Education calculations.

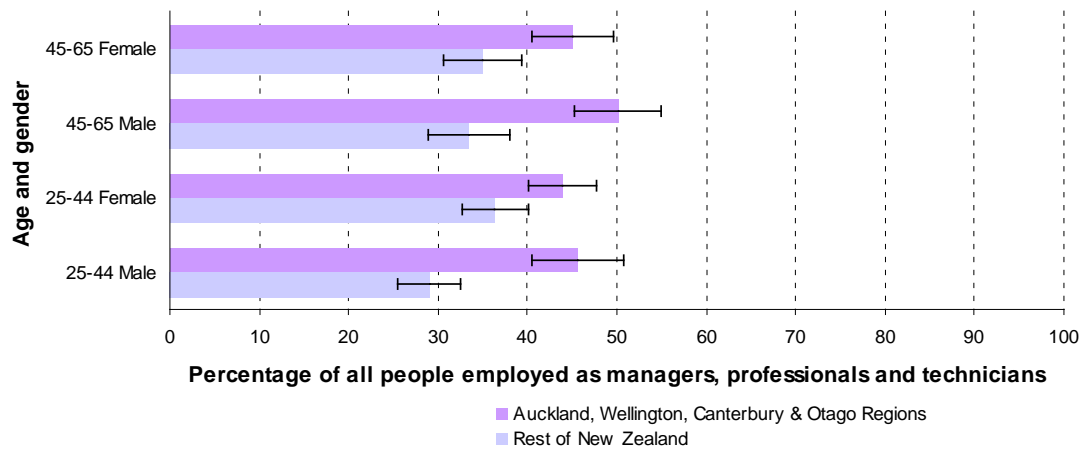
Note: For an explanation of the categories see Chapter 6. The bars around estimates represent the margins of error (at the 95% confidence level).

Occupation

People in Auckland, Wellington, Canterbury and Otago were more likely to be managers, professionals or technicians in all four age/gender groups, as shown in Figure 43. Within each broad regional grouping there was no significant difference between age/gender groups except that younger men were significantly less likely than younger women to be managers, professionals or technicians in the rest of New Zealand.

Figure 43

Percentage of people who were managers, professionals or technicians, by age, gender and broad regional grouping



Source: New Zealand results of the Adult Literacy and Life Skills Survey. Ministry of Education calculations.

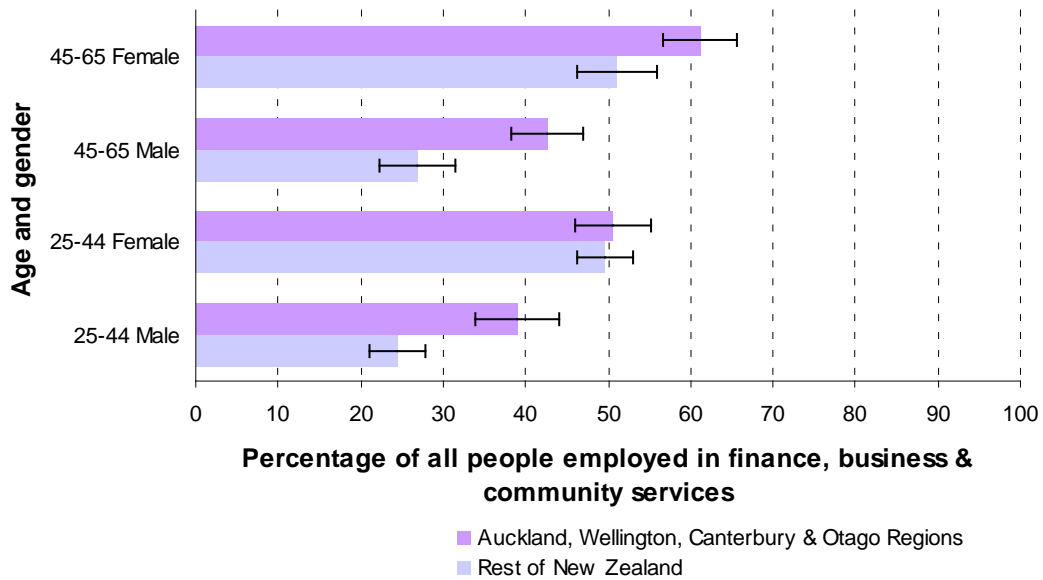
Note: For an explanation of the categories see Chapter 6. The bars around estimates represent the margins of error (at the 95% confidence level).

Industry

Figure 44 shows that older men and women and younger men in Auckland, Wellington, Canterbury and Otago were more likely to have worked in finance, business and community services than in the rest of New Zealand, while for younger women the likelihood was about the same in the two regional groupings.

Figure 44

Percentage of people in finance, business and community services, by age, gender and broad regional grouping



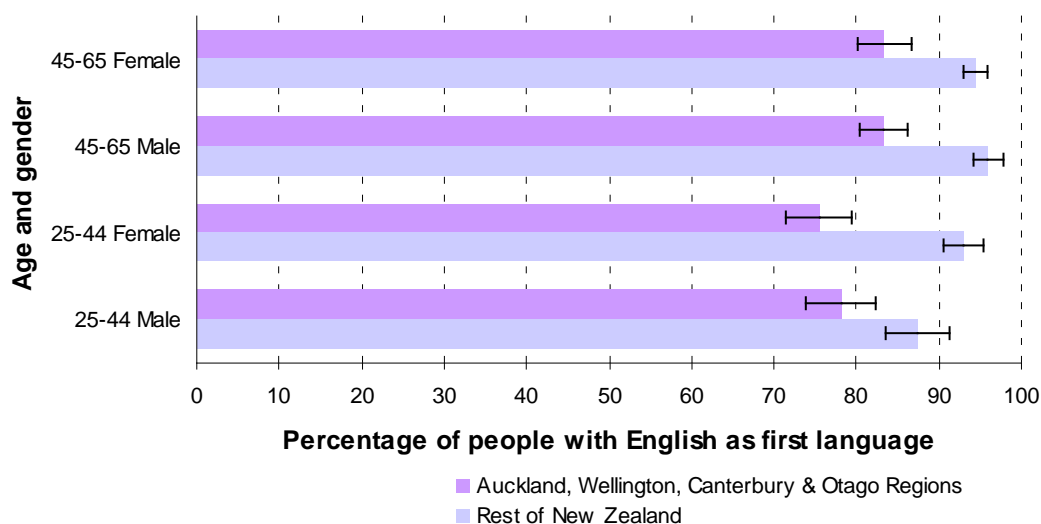
Source: New Zealand results of the Adult Literacy and Life Skills Survey. Ministry of Education calculations.

Note: For an explanation of the categories see Chapter 6. The bars around estimates represent the margins of error (at the 95% confidence level).

Language

People in the rest of New Zealand were more likely to be native English speakers across all four age/gender groups than people in Auckland, Wellington, Canterbury and Otago, as shown in Figure 45. Within each broad regional grouping there were differences in the percentage of people who had English as a first language by age and gender: in Auckland, Wellington, Canterbury and Otago, the percentage was significantly less for younger women than for older men or women, while in the rest of New Zealand, the percentage was significantly less for younger men than for older men or women.

Figure 45
Percentage of people with English as a first language, by age, gender and broad regional grouping



Source: New Zealand results of the Adult Literacy and Life Skills Survey. Ministry of Education calculations.

Note: For an explanation of the categories see Chapter 6. The bars around estimates represent the margins of error (at the 95% confidence level).

3.14 Summary

The grouping of the Auckland, Wellington, Canterbury and Otago Regions (the ‘metropolitan’ grouping) had a significantly greater percentage of people aged 25-65 with higher prose literacy and with higher numeracy than the rest of New Zealand.

The metropolitan regions had a significantly greater percentage of people aged 25-65 with upper secondary or tertiary education than the rest of New Zealand, and had a markedly greater percentage of people with degrees.

There was no significant difference in percentage employed between metropolitan regions on the one hand and the rest of New Zealand on the other.

However, a significantly greater percentage (64 per cent) of people aged 25-65 had used a computer at work in the metropolitan grouping than in the rest of New Zealand (56 per cent). The percentage of people who used a computer at home for 5 or more hours per month was significantly greater in the metropolitan grouping (65 per cent) than in the rest of New Zealand (57 per cent).

There was a significantly greater percentage of managers, professionals and technicians in the metropolitan grouping (46 per cent) than in the rest of New Zealand (34 per cent). The percentage of farmers, fishers and tradespeople was significantly smaller in the metropolitan

grouping (10 per cent) than in the rest of New Zealand (20 per cent), and similarly the percentage of machine operators and elementary workers was significantly smaller in the metropolitan grouping (11 per cent) than in the rest of New Zealand (15 per cent). A significantly greater percentage of people were involved in finance, business and community services in the metropolitan grouping (52 per cent) than in the rest of New Zealand (41 per cent). The percentage of people aged 25-65 with annual gross personal income over \$40,000 was significantly greater in the metropolitan grouping (48 per cent) than in the rest of New Zealand (40 per cent).

The percentage of people aged 25-65 with English as a first language was significantly smaller in the metropolitan grouping (80 per cent) than in the rest of New Zealand (93 per cent). The geographical distribution of people whose first language was not English mainly reflected the settlement patterns of migrants, with concentrations in main urban areas and particularly in greater Auckland. This language factor effectively narrows the gap in prose literacy and numeracy between the two broad regional groupings from what could be expected on the basis of the education, computer use, and employment-related factors.

Thus for each characteristic (other than having English as a first language) favouring higher prose literacy and numeracy, the percentage of people with that characteristic was greater in the metropolitan grouping than in the rest of New Zealand; and the education, computer use and employment-related variables help to account for the significant differences between the two broad regional groupings in prose literacy and numeracy.

Aggregating regions into the broad regional groupings made it possible to subdivide regional groupings by demographic characteristics, something which was not feasible with the more detailed regional breakdown.

The percentage of people aged 25-44 was significantly greater, and the percentage aged 45-65 significantly less, in the metropolitan grouping compared with the rest of New Zealand. The differences in literacy and numeracy between the two broad regional groupings were concentrated in the older age group: there were no significant differences between the regional groupings among the younger age group, but among the older age group the percentages of people with higher prose literacy and higher numeracy were significantly greater in the metropolitan grouping than in the rest of New Zealand.

When the regional groupings are compared by age (25-44 or 45-65) and gender, there was a significantly greater percentage of older women in the rest of New Zealand than in the metropolitan grouping. No significant differences were apparent in prose literacy within age/gender groups, but among the older women, the percentage with higher numeracy was greater in the metropolitan grouping than in the rest of New Zealand.

The following differences held across all four age/gender groups:

- a greater percentage of people with upper secondary or tertiary education in the metropolitan grouping
- a greater percentage of people with degrees in the metropolitan grouping
- a greater percentage of people who were managers, professionals or technicians in the metropolitan grouping; and
- a greater percentage of people with English as a first language in the rest of New Zealand.

There were no significant differences in formal and non-formal upskilling between regional groupings within the four age/gender groups.

There were greater percentages of work computer use for both younger and older men in Auckland, Wellington, Canterbury and Otago than for any age/gender group in the rest of New Zealand.

Younger men and younger women in Auckland, Wellington, Canterbury and Otago were more likely to use a home computer for 5 or more hours per month than their counterparts in the rest of New Zealand, and were also more likely to do so than the older age/gender groups in either regional grouping.

The percentage of younger women in finance, business and community services was not significantly different between the two regional groupings, but for the other age/gender combinations the percentage was significantly greater in the metropolitan grouping than in the rest of New Zealand.

A combination of factors appears to give rise to the fact that the literacy and numeracy differences between the regional groupings were concentrated in the older age group. One is that the difference between regional groupings in percentage with upper secondary or tertiary education was considerably greater for the older than for the younger age group. A further contributing factor was the greater percentage of older people, especially older women, living in the rest of New Zealand, combined with the general tendency for older people and for women to have lower numeracy. This tendency to lower numeracy was particularly pronounced for older women in the rest of New Zealand.

4 LITERACY AND NUMERACY BY URBAN/RURAL PROFILE

The detailed regional analysis in Chapter 2 found a number of regions which were significantly above the national norm (North Shore City and Rodney District, Wellington Region) or below the national norm (Waitakere City, Counties-Manukau) in prose literacy and/or numeracy. These were all highly urbanised regions. Other less urbanised regions could not be clearly distinguished from the national norm. It is possible that there were differences in literacy and numeracy between urban and rural areas within these other regions, but that these differences may have been obscured by combining urban and rural areas together in these regional units.

The analysis by broad regional grouping in Chapter 3 found clear differences between the highly urbanised grouping of Auckland, Wellington, Canterbury and Otago and the less urbanised grouping of the rest of New Zealand. This raises the question of whether differences between these regional groupings reflect underlying urban-rural differences.

This chapter addresses the hypothesis that there were significant urban-rural differences in prose literacy and numeracy, and explores variation in prose literacy and numeracy along the urban-rural dimension, using a geographical classification called the urban/rural profile. Variation in prose literacy and numeracy is considered in relation to completed education, upskilling, employment, computer use at work and at home, occupation, industry, income, first language, birthplace, age and gender.

4.1 Urban/Rural Profile

The urban/rural profile is a classification of urban and rural areas developed by Statistics New Zealand (2004; see section 1.5). It is based on a comparison of the home and work addresses of employed people, and an analysis of the extent to which people work locally or commute between areas. Starting with the standard Statistics New Zealand definition of ‘main urban area’ as one with a population of 30,000 or more, a ‘satellite urban area’ is an urban area with a population less than 30,000, in which 20 per cent or more of the employed people work in a main urban area. An ‘independent urban area’ is an urban area with a population less than 30,000 in which less than 20 per cent of the employed people work in a main urban area. A list of urban areas and their classification is provided in Appendix A.

The classification of rural areas is somewhat more complex, being based on the percentage of people commuting into urban areas to work and also the sizes of those urban areas. In ‘rural areas with high urban influence’ a relatively large proportion of employed people work in main urban areas. In ‘highly rural/remote areas’ very few people work in urban areas of any size (or there are simply very few employed people). ‘Rural areas with moderate urban influence’ and ‘rural areas with low urban influence’ fall between these extremes.

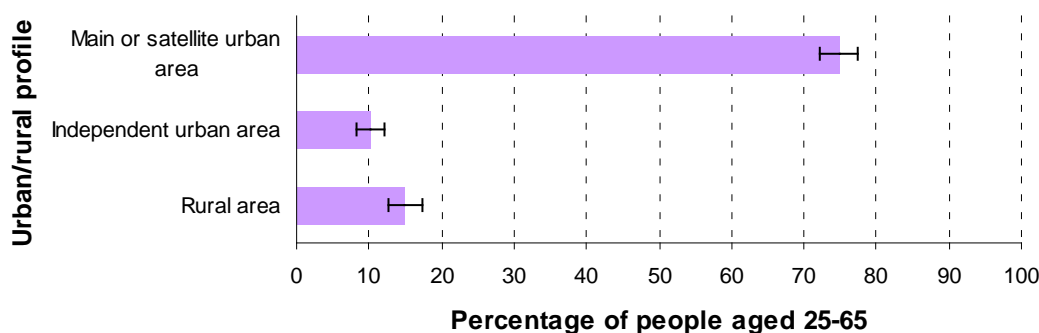
The majority of people in New Zealand live in main urban areas, while the proportions in highly rural/remote areas, rural areas with high urban influence, and satellite urban areas are relatively small. For these smaller categories it is not possible to provide robust estimates of prose literacy and numeracy levels, and hence it is necessary to aggregate categories. In this chapter then, rural areas are aggregated into a single category, and satellite urban areas are aggregated with main urban areas because of their close connections. This leaves three aggregated categories which can be compared reliably: main or satellite urban areas, independent urban areas, and rural areas. Table 6 sets out the population estimates for these three categories.

Table 6
Urban/rural profile categories

Urban/rural profile category	Estimated population aged 25-65 in each category	Estimated population aged 25-65 as percentage of total
Main or satellite urban area	1,588,000	75
Independent urban area	217,000	10
Rural area	318,000	15
TOTAL	2,122,000	100

Figure 46 shows the percentages of people aged 25-65 living in these aggregated categories of urban/rural profile: 75 per cent in main or satellite urban areas, 10 per cent in independent urban areas, and 15 per cent in rural areas.

Figure 46
Percentage of people aged 25-65 living in different categories of urban and rural area

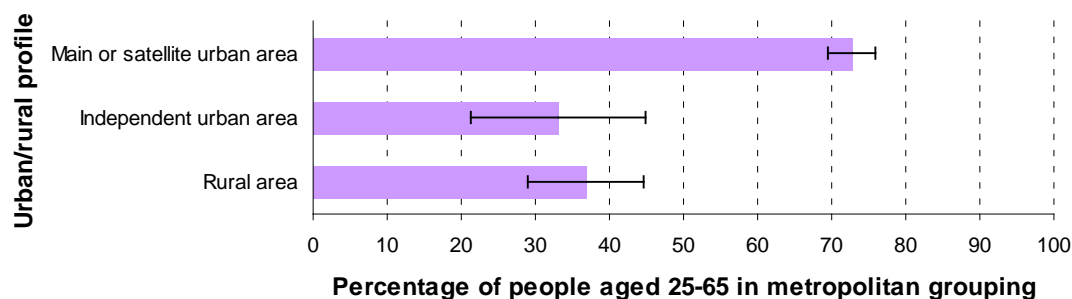


Source: New Zealand results of the Adult Literacy and Life Skills Survey. Ministry of Education calculations.

Note: For an explanation of the categories see Chapter 6. The bars around estimates represent the margins of error (at the 95% confidence level).

There is a relationship between urban/rural profile and the broad regional groupings used in the last chapter, as shown in Figure 47. Most (73 per cent) of the people in main or satellite urban areas were to be found in the grouping of the Auckland, Wellington, Canterbury and Otago Regions, while most people in independent urban areas (67 per cent) and rural areas (63 per cent) were in the rest of New Zealand.

Figure 47
Percentage of people aged 25-65 living in Auckland, Wellington, Canterbury & Otago Regions, by urban/rural profile



Source: New Zealand results of the Adult Literacy and Life Skills Survey. Ministry of Education calculations.

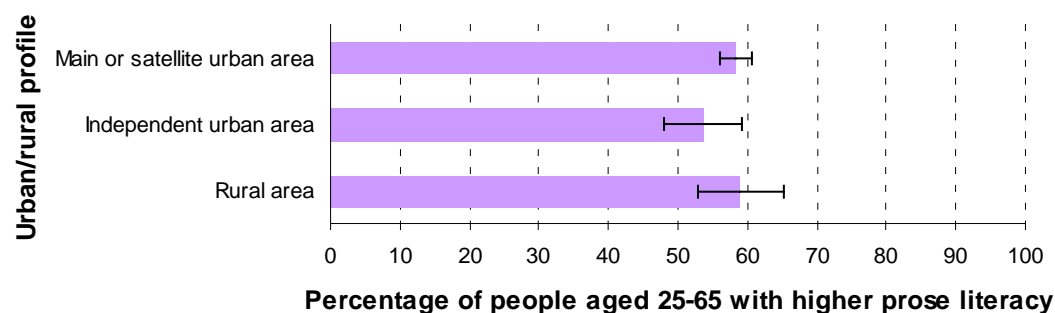
Note: For an explanation of the categories see Chapter 6. The bars around estimates represent the margins of error (at the 95% confidence level).

4.2 Prose literacy and numeracy

Prose literacy by urban/rural profile

Figure 48 shows the percentage of people aged 25-65 with higher prose literacy according to the aggregated categories of urban/rural profile, and it is clear that there was no significant difference between the three categories.

Figure 48
Percentage of people aged 25-65 with higher prose literacy by urban/rural profile



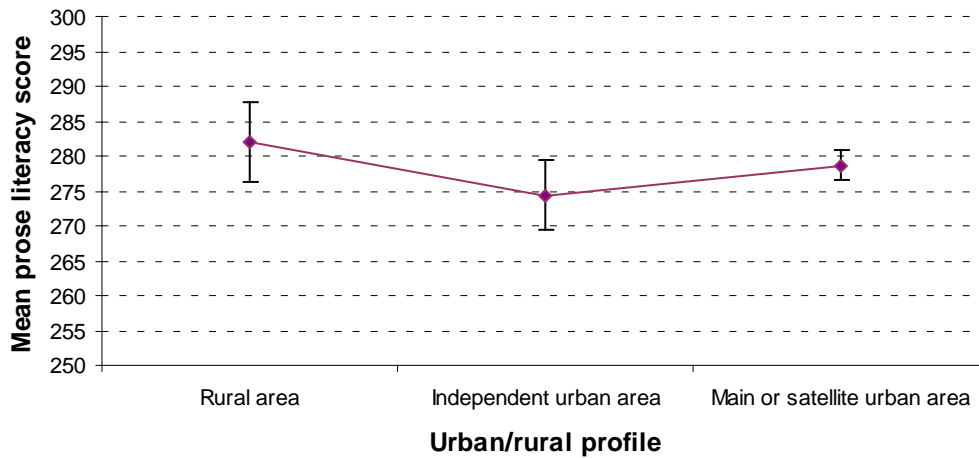
Source: New Zealand results of the Adult Literacy and Life Skills Survey. Ministry of Education calculations.

Note: For an explanation of the categories see Chapter 6. The bars around estimates represent the margins of error (at the 95% confidence level).

Figure 49 uses a different measure, namely the mean prose literacy scores in the three categories of the urban/rural profile. This should be more sensitive than the percentage measure to differences between the categories¹⁸, but again no significant difference was evident.

¹⁸ The smaller the number of respondents that contribute to a statistic, the greater the standard error, in general. The standard error on the mean prose literacy for any category depends on the total number of respondents in the category. The standard error on the percentage with higher prose literacy also depends on the number of respondents with higher prose literacy, which is generally less than the total number of respondents in the category. Hence percentages generally have proportionately greater errors than means.

Figure 49
Mean prose literacy score by urban/rural profile



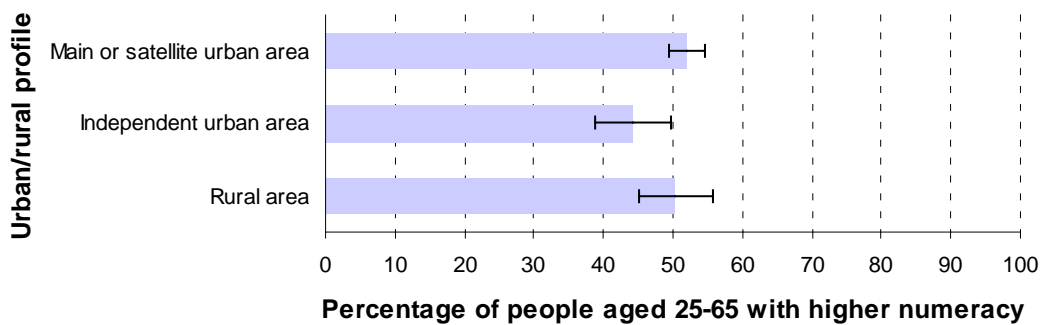
Source: New Zealand results of the Adult Literacy and Life Skills Survey. Ministry of Education calculations.

Note: For an explanation of the categories see Chapter 6. The bars around estimates represent the margins of error (at the 95% confidence level).

Numeracy by urban/rural profile

Figure 50 shows the percentage of people aged 25-65 with higher numeracy in the three urban/rural profile categories. As with prose literacy, there were no statistically significant differences between the three categories, although the difference between main or satellite urban areas on the one hand, and independent urban areas on the other, did approach significance.

Figure 50
Percentage of people aged 25-65 with higher numeracy

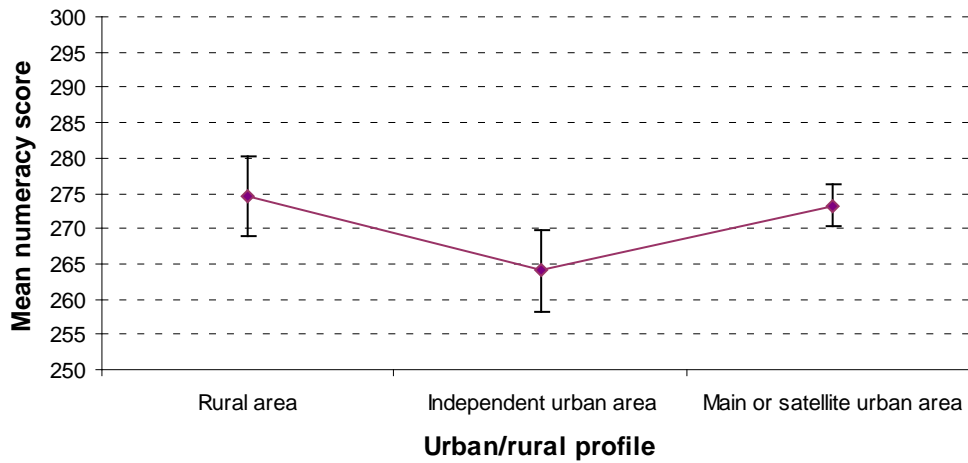


Source: New Zealand results of the Adult Literacy and Life Skills Survey. Ministry of Education calculations.

Note: For an explanation of the categories see Chapter 6. The bars around estimates represent the margins of error (at the 95% confidence level).

Figure 51 makes the same comparison using the more sensitive measure of mean numeracy score, and shows that main or satellite urban areas had a significantly higher mean score than independent urban areas. The mean numeracy score for rural areas was similar to that for main or satellite urban areas, but could not be shown to be significantly different from that for independent urban areas.

Figure 51
Mean numeracy score by urban/rural profile



Source: New Zealand results of the Adult Literacy and Life Skills Survey. Ministry of Education calculations.

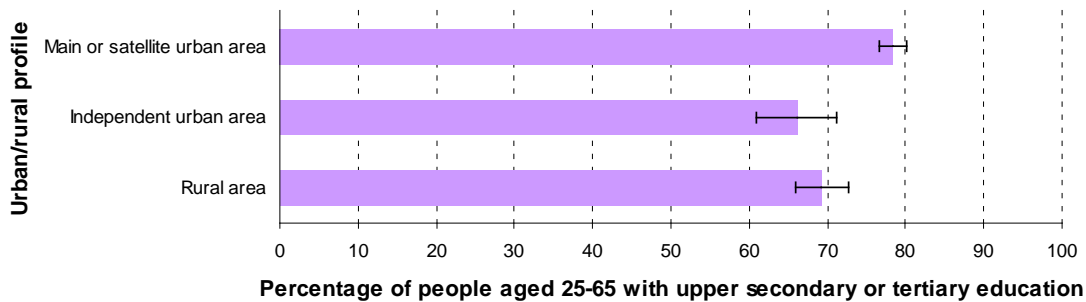
Note: For an explanation of the categories see Chapter 6. The bars around estimates represent the margins of error (at the 95% confidence level).

4.3 Education

Completed education

Figure 52 shows the percentage of people aged 25-65 who had completed upper secondary¹⁹ or tertiary study by urban/rural profile. The percentage was significantly greater in main or satellite urban areas (78 per cent) than in either independent urban areas (66 per cent) or rural areas (69 per cent).

Figure 52
Percentage of people aged 25-65 who had completed upper secondary or tertiary education, by urban/rural profile



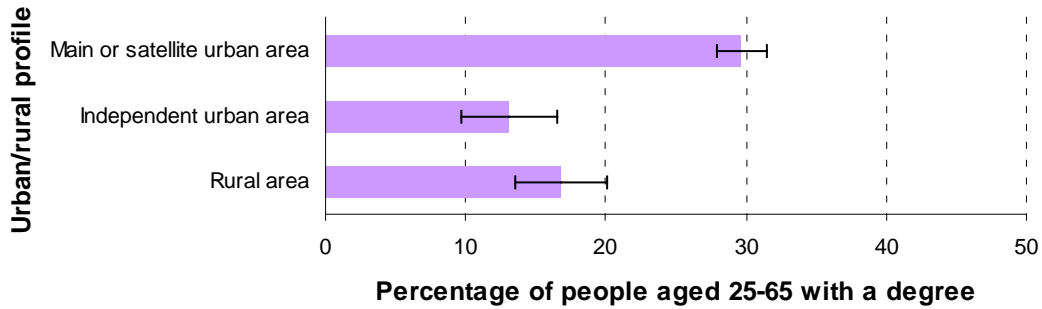
Source: New Zealand results of the Adult Literacy and Life Skills Survey. Ministry of Education calculations.

Note: For an explanation of the categories see Chapter 6. The bars around estimates represent the margins of error (at the 95% confidence level).

¹⁹ 'Upper secondary' in this report refers to either of two categories of completed education: Year 12-13 or Level 1-3 certificate. These categories are not subdivided further in the survey data.

There was a similar but more dramatic distinction in terms of the percentage of people with degrees, as shown in Figure 53. In main or satellite urban areas, 30 per cent of people aged 25-65 had a degree, compared with 13 per cent in independent urban areas and 17 per cent in rural areas (note that the margins of error are such that the estimates for independent urban areas and rural areas are not significantly different).

Figure 53
Percentage of people aged 25-65 who had completed degrees, by urban/rural profile



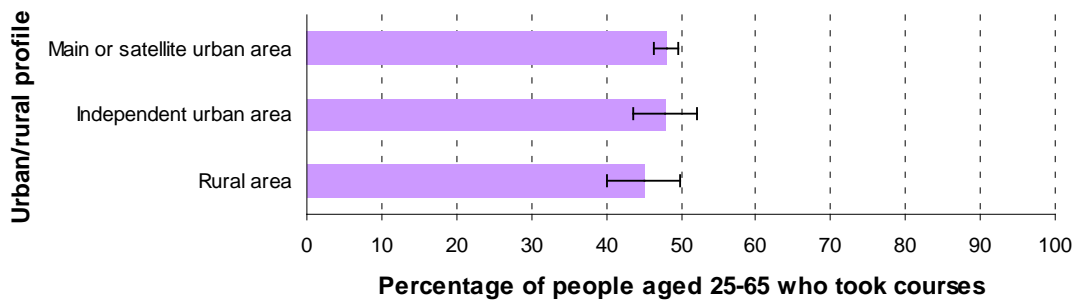
Source: New Zealand results of the Adult Literacy and Life Skills Survey. Ministry of Education calculations.

Note: For an explanation of the categories see Chapter 6. The bars around estimates represent the margins of error (at the 95% confidence level).

Formal and non-formal upskilling

Figure 54 shows that there was no significant difference between the urban/rural profile categories in the percentage of people who took formal or non-formal courses in the past year.

Figure 54
Percentage of people aged 25-65 who took formal or non-formal courses in the past year, by urban/rural profile



Source: New Zealand results of the Adult Literacy and Life Skills Survey. Ministry of Education calculations.

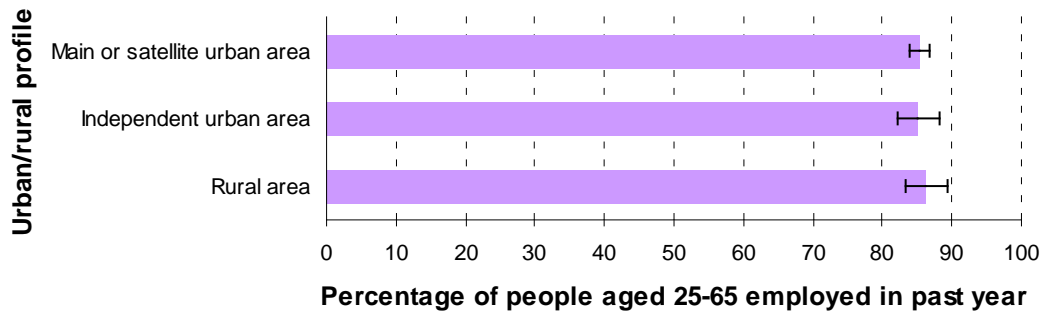
Note: For an explanation of the categories see Chapter 6. The bars around estimates represent the margins of error (at the 95% confidence level).

4.4 Employment

There was no significant difference in the percentage of people employed in the past year according to urban/rural profile, as shown in Figure 55.²⁰

Figure 55

Percentage of people aged 25-65 who had been employed in the past year, by urban/rural profile



Source: New Zealand results of the Adult Literacy and Life Skills Survey. Ministry of Education calculations.

Note: For an explanation of the categories see Chapter 6. The bars around estimates represent the margins of error (at the 95% confidence level).

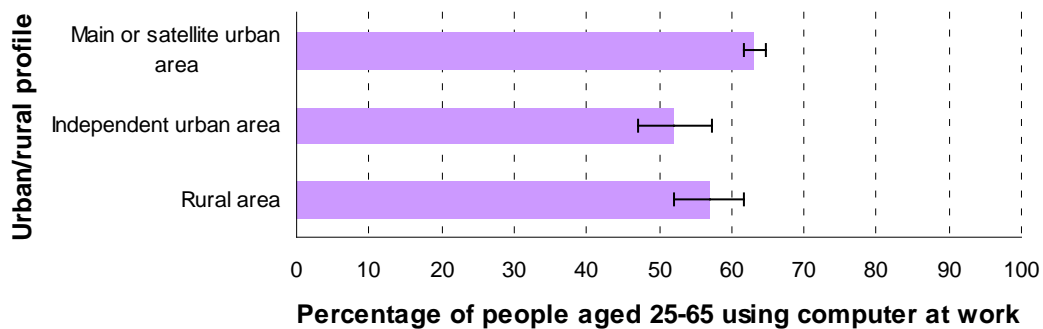
4.5 Computer use

Computer use at work

Figure 56 shows the distribution of work computer users by urban/rural profile. The estimated percentage of people aged 25-65 using a computer at work was higher in main or satellite urban areas (63 per cent) than in independent urban areas (52 per cent) or rural areas (57 per cent), but the only clear statistically significant difference was that between the two kinds of urban area.

Figure 56

Percentage of people aged 25-65 who had used a computer at work in the past year, by urban/rural profile



Source: New Zealand results of the Adult Literacy and Life Skills Survey. Ministry of Education calculations.

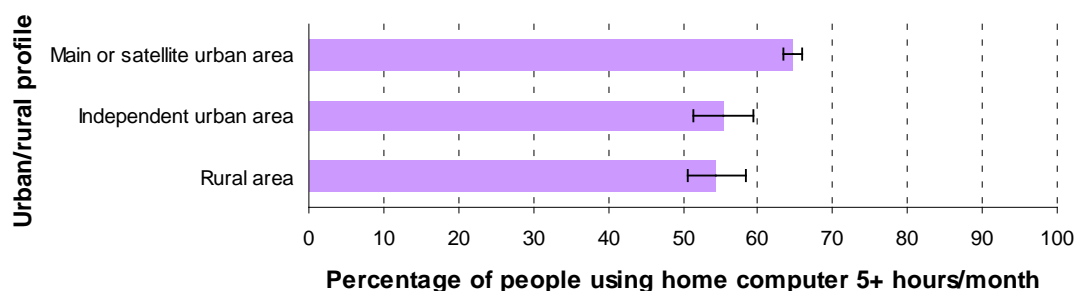
Note: For an explanation of the categories see Chapter 6. The bars around estimates represent the margins of error (at the 95% confidence level).

²⁰ This uniformity may have been a temporary phenomenon. At the time the survey was carried out, in 2006 and the beginning of 2007, labour force participation was particularly high and unemployment particularly low, with the result that the percentage of people in employment would have been maximised. Pool et al. (2006) show that the rates of labour force participation and unemployment in different regions diverged during the recessionary period of the 1990s.

Home computer use

Figure 57 compares urban/rural profile areas, showing that main and satellite urban areas had a higher estimated percentage (65 per cent) of people using a home computer for 5 or more hours per month²¹ than independent urban areas (55 per cent) or rural areas (55 per cent), and this difference was statistically significant.

Figure 57
Percentage of people aged 25-65 who used a computer at home for 5 or more hours per month, by urban/rural profile



Source: New Zealand results of the Adult Literacy and Life Skills Survey. Ministry of Education calculations.

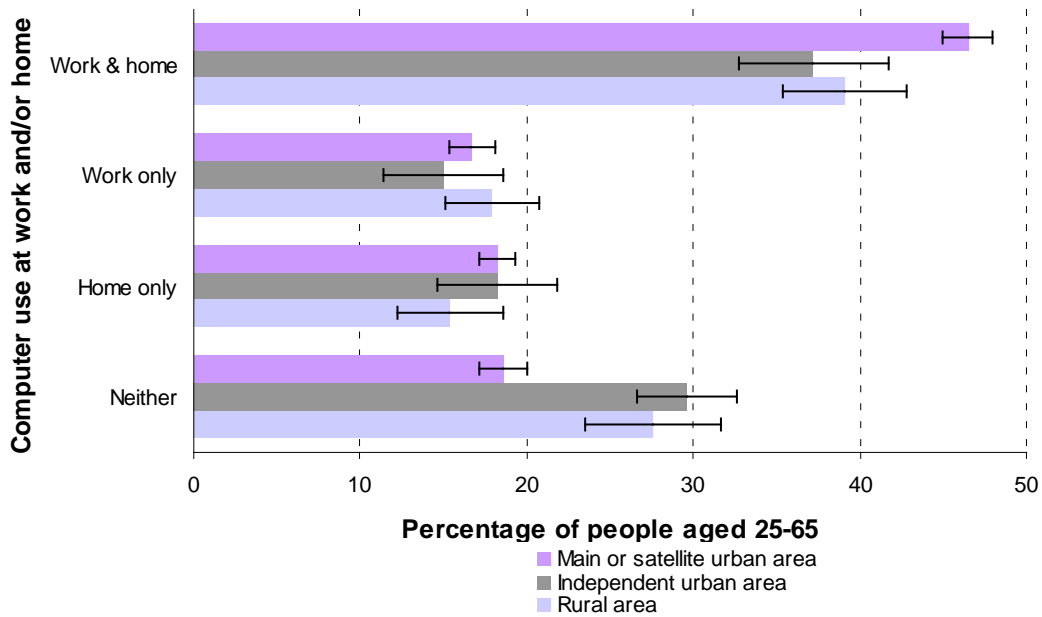
Note: For an explanation of the categories see Chapter 6. The bars around estimates represent the margins of error (at the 95% confidence level).

Work and home computer use combined

Figure 58 shows how work and home computer use varied by urban/rural profile. People in main and satellite urban areas were significantly more likely to have used computers in both locations (47 per cent) than people in independent urban areas (37 per cent) or rural areas (39 per cent). There was no significant difference between the urban/rural profile categories in terms of the percentage of people who used a computer only at work or only at home. Finally, people in main or satellite urban areas were significantly less likely to have used computers in neither location (19 per cent) than people in independent urban areas (30 per cent) or rural areas (28 per cent).

²¹ Five hours per month is taken as a minimum to ensure that respondents actually used a home computer if they had access to one. Those who used a home computer less than 5 hours per month could not be distinguished in the survey responses from those who did not use their home computers at all.

Figure 58
Locations of computer use by urban/rural profile for people aged 25-65



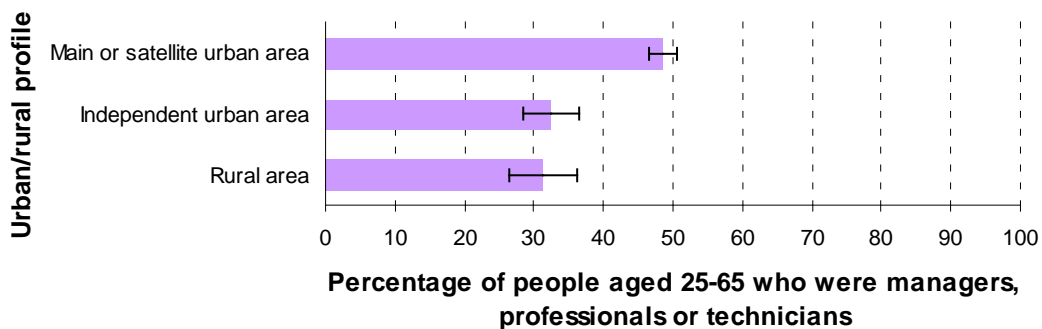
Source: New Zealand results of the Adult Literacy and Life Skills Survey. Ministry of Education calculations.

Note: For an explanation of the categories see Chapter 6. The bars around estimates represent the margins of error (at the 95% confidence level).

4.6 Occupation

Figure 59 shows the percentages of people who were managers, professionals or technicians by urban/rural profile. There was no significant difference between independent urban areas and rural areas, but the percentage of managers, professionals and technicians in main or satellite urban areas (49 per cent) was significantly higher than in both independent urban areas (33 per cent) and rural areas (31 per cent).

Figure 59
Percentage of people aged 25-65 who were managers, professionals or technicians, by urban/rural profile



Source: New Zealand results of the Adult Literacy and Life Skills Survey. Ministry of Education calculations.

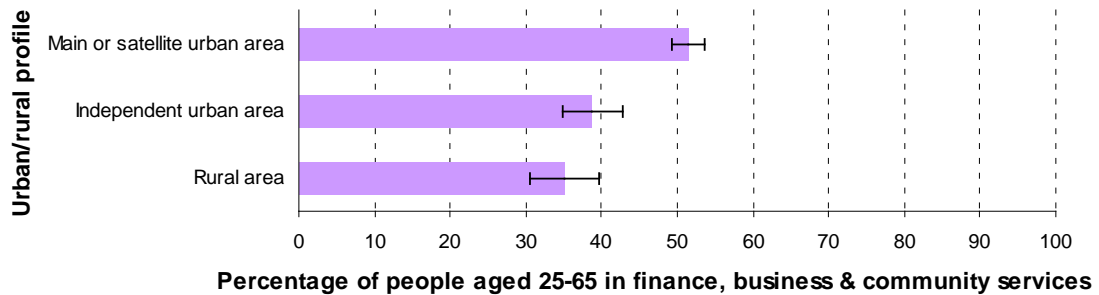
Note: For an explanation of the categories see Chapter 6. The bars around estimates represent the margins of error (at the 95% confidence level).

4.7 Industry

The percentage of people in ‘Finance, business and community services’ is broken down in Figure 60 by urban/rural profile. There was a significantly higher percentage in main or satellite urban areas (52 per cent) than in either independent urban areas (39 per cent) or rural areas (35 per cent), but no significant difference between independent urban areas and rural areas.

Figure 60

Percentage of people aged 25-65 in finance, business and community services, by urban/rural profile



Source: New Zealand results of the Adult Literacy and Life Skills Survey. Ministry of Education calculations.

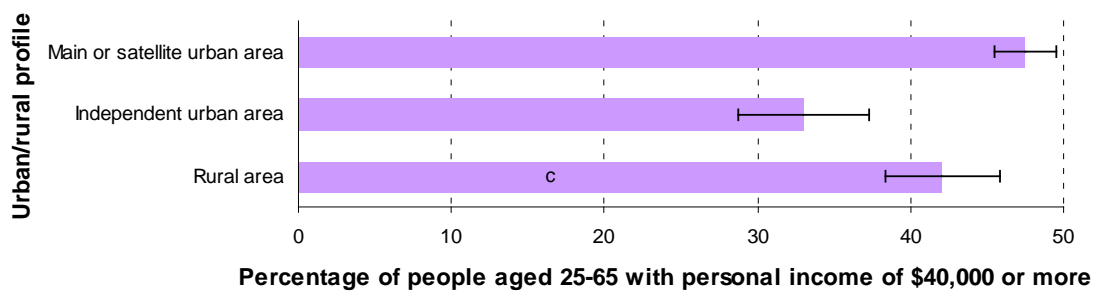
Note: For an explanation of the categories see Chapter 6. The bars around estimates represent the margins of error (at the 95% confidence level).

4.8 Income

Figure 61 shows the percentage of people aged 25-65 with personal income of \$40,000 or more by urban/rural profile. While the difference in percentages between main or satellite urban areas and rural areas was not quite statistically significant, the percentage for independent urban areas (33 per cent) was significantly lower than that for main or satellite urban areas (48 per cent) and that for rural areas (42 per cent).

Figure 61

Percentage of people aged 25-65 with gross annual personal income of \$40,000 or more, by urban/rural profile



Source: New Zealand results of the Adult Literacy and Life Skills Survey. Ministry of Education calculations.

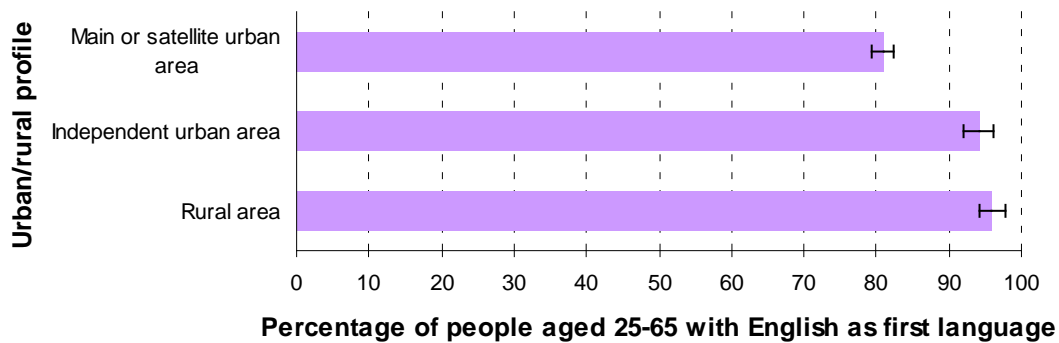
Note: For an explanation of the categories see Chapter 6. The bars around estimates represent the margins of error (at the 95% confidence level).

4.9 First language

The percentage of people with English as a first language was significantly smaller in main or satellite urban areas (81 per cent) than in independent urban areas (94 per cent) or rural areas (96 per cent), as shown in Figure 62.

Figure 62

Percentage of people aged 25-65 with English as a first language, by urban/rural profile



Source: New Zealand results of the Adult Literacy and Life Skills Survey. Ministry of Education calculations.

Note: For an explanation of the categories see Chapter 6. The bars around estimates represent the margins of error (at the 95% confidence level).

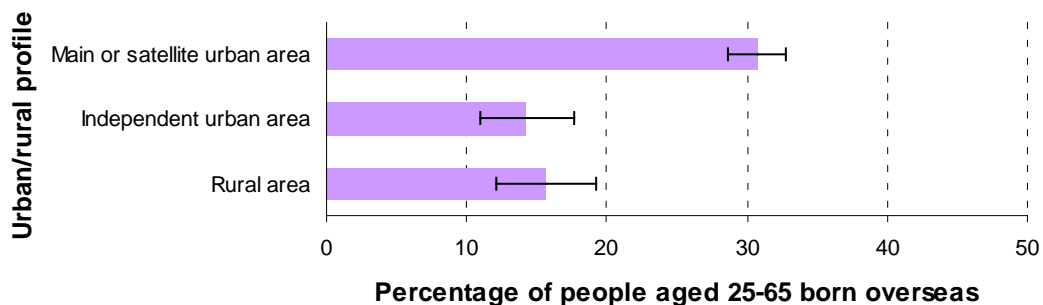
These regional differences largely reflect the tendency of immigrants, especially those from non-English speaking countries, to be concentrated in main urban areas and in specific regions, particularly the Auckland, Canterbury and Wellington Regions.

4.10 Birthplace

Similarly, a much greater percentage had been born overseas among people in main or satellite urban areas (31 per cent) than in independent urban areas (14 per cent) or rural areas (16 per cent), as shown in Figure 63.

Figure 63

Percentage of people aged 25-65 who were not born in New Zealand, by urban/rural profile



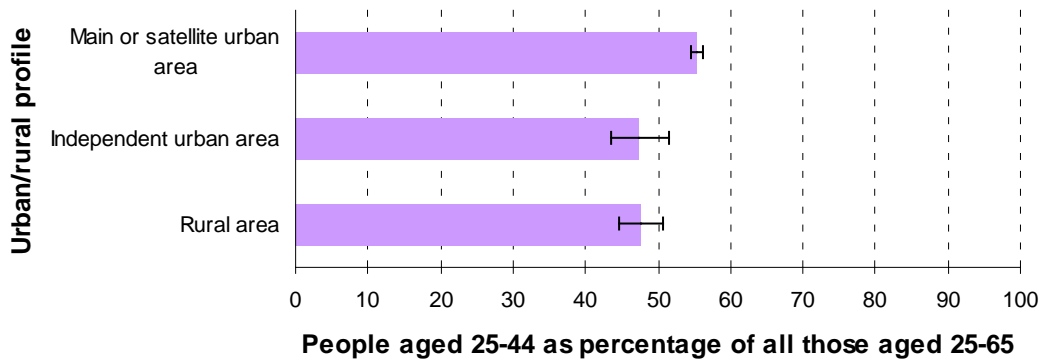
Source: New Zealand results of the Adult Literacy and Life Skills Survey. Ministry of Education calculations.

Note: For an explanation of the categories see Chapter 6. The bars around estimates represent the margins of error (at the 95% confidence level).

4.11 Age

Main and satellite urban areas had a younger age profile than the other urban/rural profile categories, as indicated in Figure 64. This shows that the percentage of younger people (aged 25-44) among all people aged 25-65 was significantly greater in main or satellite urban areas (estimated at 55 per cent) than in independent urban areas or rural areas (both 48 per cent).

Figure 64
Younger age group (aged 25-44) as a percentage of all people aged 25-65, by urban/rural profile



Source: New Zealand results of the Adult Literacy and Life Skills Survey. Ministry of Education calculations.

Note: For an explanation of the categories see Chapter 6. The bars around estimates represent the margins of error (at the 95% confidence level).

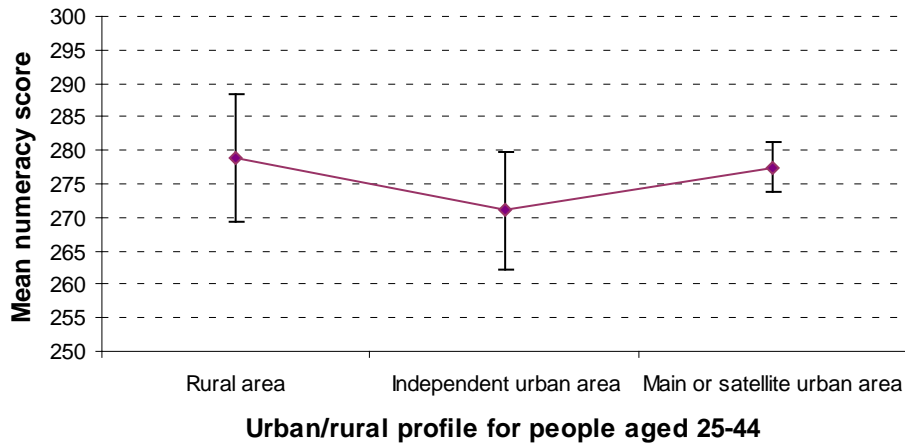
One of the main findings of the comparison by broad regional grouping was that statistically significant differences in prose literacy and numeracy were confined to the older age group (i.e. people aged 45 to 65; see section 3.11). Given the relationship between the broad regional groupings and the urban/rural profile (see section 4.1), this finding raises the question of whether the observed differences in numeracy by urban/rural profile were also concentrated in the older age group.

Figures 65 and 66 show comparisons of mean numeracy scores by urban/rural profile for the two age groups. A first point to note is that the lowest mean for the younger age group, which was the mean for independent urban areas, was 271, which was the same as the highest mean for the older age group, which was the mean for rural areas. More importantly, while there were no significant differences between the means for the younger group, for the older group the mean for independent urban areas was significantly less than that for rural areas, while the difference between the means for the main or satellite urban areas and for the independent urban areas was almost significant.

In other words, as in the analysis by broad regional groupings, the overall differences between regions (in this case, only in numeracy) were concentrated in the older age group.

Figure 65

Mean numeracy score for the younger age group (people aged 25-44) by urban/rural profile

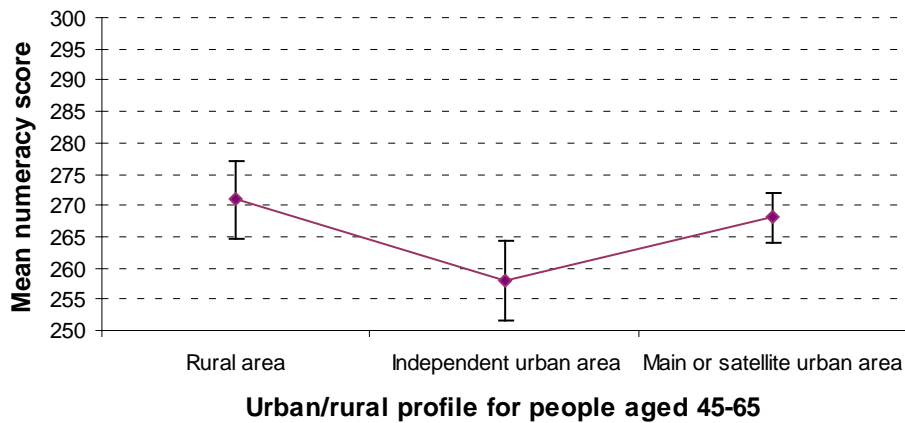


Source: New Zealand results of the Adult Literacy and Life Skills Survey. Ministry of Education calculations.

Note: For an explanation of the categories see Chapter 6. The bars around estimates represent the margins of error (at the 95% confidence level).

Figure 66

Mean numeracy score for older age group (people aged 45-65) by urban/rural profile



Source: New Zealand results of the Adult Literacy and Life Skills Survey. Ministry of Education calculations.

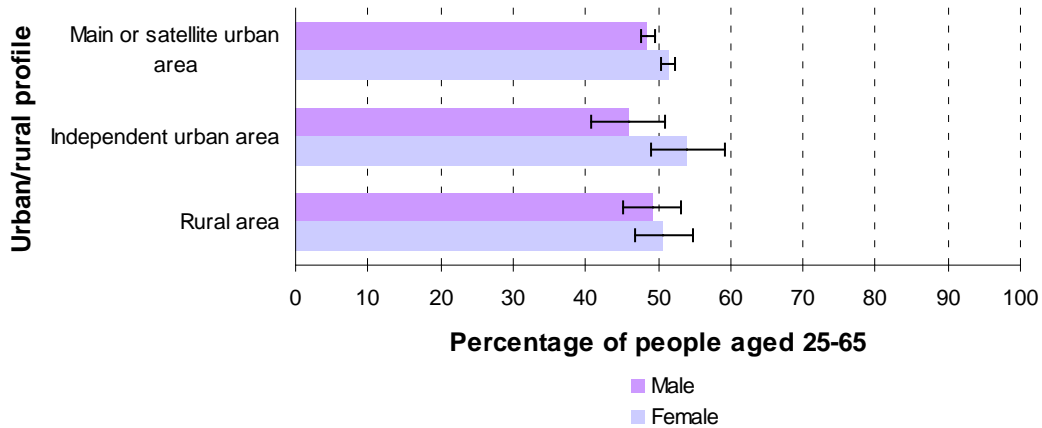
Note: For an explanation of the categories see Chapter 6. The bars around estimates represent the margins of error (at the 95% confidence level).

4.12 Gender

There were no significant differences between the urban/rural profile categories in the percentages of men, or of the percentages of women, as shown in Figure 67.

Figure 67

Percentage of people aged 25-65 who were male or female, by urban/rural profile



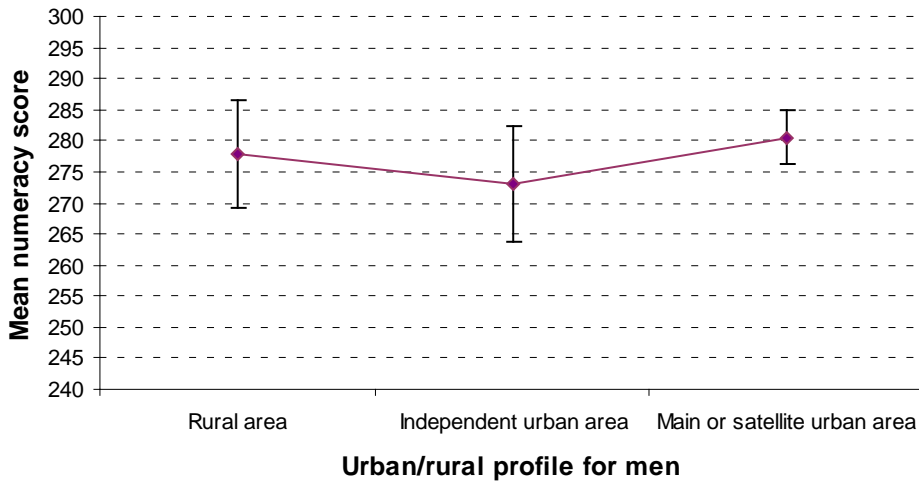
Source: New Zealand results of the Adult Literacy and Life Skills Survey. Ministry of Education calculations.

Note: For an explanation of the categories see Chapter 6. The bars around estimates represent the margins of error (at the 95% confidence level).

Figures 68 and 69 show comparisons of mean numeracy scores by urban/rural profile and gender. A first point to note is that the lowest mean for the men, which was the mean for independent urban areas, was 273, which was just above the highest mean for women (272), which was the mean for rural areas. More importantly, while there were no significant differences between the means for men, for women the mean for independent urban areas was significantly less than that for rural areas, while the difference between the means for the main or satellite urban areas and for the independent urban areas was almost significant.

In other words, the overall differences between regions in numeracy were more evident among women than among men.

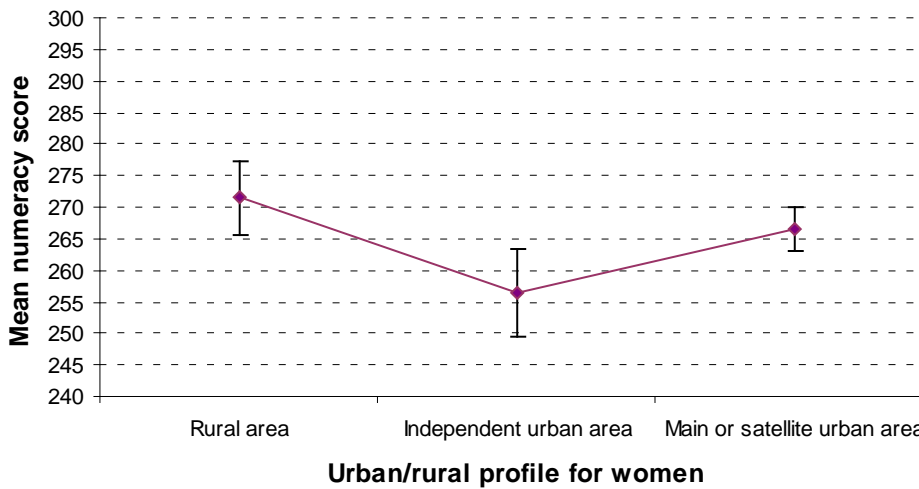
Figure 68
 Mean numeracy score for men, by urban/rural profile



Source: New Zealand results of the Adult Literacy and Life Skills Survey. Ministry of Education calculations.

Note: For an explanation of the categories see Chapter 6. The bars around estimates represent the margins of error (at the 95% confidence level).

Figure 69
 Mean numeracy score for women, by urban/rural profile



Source: New Zealand results of the Adult Literacy and Life Skills Survey. Ministry of Education calculations.

Note: For an explanation of the categories see Chapter 6. The bars around estimates represent the margins of error (at the 95% confidence level).

4.13 Summary and discussion

There were no significant differences by urban/rural profile in prose literacy, but there was a significantly greater mean numeracy score for main or satellite urban areas than for independent urban areas. The mean numeracy score for rural areas was similar to that for main or satellite urban areas but not significantly different from that for either urban category.

The percentage of people who had completed an upper secondary or tertiary education was significantly greater in main or satellite urban areas than in independent urban areas or rural areas, and the percentage with degree was markedly greater in main or satellite urban areas.

There was no significant difference in percentage of people aged 25-65 employed according to urban/rural profile, that is, between main and satellite urban areas, independent urban areas, and rural areas.

The percentage who were employed and used a computer at work was significantly greater in main or satellite urban areas (63 per cent) than in independent urban areas (52 per cent), with rural areas in between (57 per cent). There was a significantly greater percentage who used a home computer for 5 or more hours per month in main and satellite urban areas (65 per cent) than in independent urban areas (55 per cent) and rural areas (55 per cent). Considering computer use at work and home together, the percentage of people using a computer in both locations was significantly greater in main or satellite urban areas (47 per cent) than in independent urban areas (37 per cent) and rural areas (39 per cent).

A significantly greater percentage of people aged 25-65 were managers, professionals or technicians in the main or satellite urban areas (49 per cent) than in the independent urban areas (33 per cent) and the rural areas (31 per cent). The percentage of people involved in finance, business and community services was significantly greater in main or satellite urban areas (52 per cent) than in independent urban areas (39 per cent) or in rural areas (35 per cent). A significantly greater percentage of people had annual gross personal income over \$40,000 in main or satellite urban areas (48 per cent) and rural areas (42 per cent) than in independent urban areas (33 per cent).

Education, computer use and employment-related factors thus favour greater percentages of people with higher prose literacy and numeracy in main and satellite urban areas, and greater percentages of people with low prose literacy and numeracy in independent urban areas. On the other hand, the pattern for rural areas is variable, in that they are sometimes comparable with main or satellite urban areas (e.g. income) and sometimes with independent urban areas (e.g. completed education, home computer use, occupation, industry, first language) and sometimes not distinguishable from either urban category (e.g. upskilling, work computer use). The education, computer use and employment-related factors help to account for the significant difference in numeracy between the two urban categories, but do not align so clearly with the relatively high prose literacy and numeracy in rural areas.

Comparing the two categories of urban area, independent urban areas had a smaller percentage of people with upper secondary or tertiary education, a smaller percentage of people using a computer at work (or at home), but a greater percentage of people with English as a first language. These factors lead to a small disadvantage for independent urban areas, but the language factor reduces the differences more for prose literacy than for numeracy.

Comparing rural areas with main or satellite urban areas, rural areas had a smaller percentage of people with upper secondary or tertiary education, a comparable percentage of people using a computer at work (but a smaller percentage at home), and a greater percentage of people with English as a first language. These factors balance out to the extent that the percentages of

people with higher prose literacy and numeracy in main or satellite urban areas and in rural areas were not significantly different.

These comparisons are summarised in Table 7. Main or satellite urban areas are used as the benchmark for comparison because they account for the majority of the population, and this category has the smallest errors on estimates, making comparisons more clearcut.

Table 7
Key factors and mean prose literacy and numeracy by urban/rural profile

Urban/rural profile (compared to main/satellite urban area)	% Year 12+	% work computer	% L1 English	Mean prose literacy	Mean numeracy
Independent urban area	-	-	+		-
Rural area	-		+		

Note on symbols: a blank cell indicates that the percentage was not significantly different from the main/satellite urban area percentage; + indicates a percentage significantly greater than the main/satellite urban area percentage; - indicates a percentage significantly less than the main/satellite urban area percentage

As in the detailed regional comparison in chapter 2, among all the factors considered (including education, computer use, occupation, industry, income, first and home language), the variable which most closely parallels the pattern for numeracy is work computer use, while the pattern for prose literacy is similar but is more strongly affected by the language variable.

It is thus possible to answer the question raised in the introduction to this chapter as to whether there were urban-rural differences in literacy or numeracy. There were significant differences in numeracy related to the urban/rural profile, but these were not differences between urban areas on the one hand and rural areas on the other, but rather between types of urban area: main or satellite urban areas and independent urban areas.

The aggregated category of rural areas had a mean numeracy score which was closer to main or satellite urban areas than to independent urban areas, and within the older (45-65) age group, and among women, the mean numeracy score was significantly higher in rural areas than in independent urban areas.

There are considerable socioeconomic differences between the different types of rural area in the urban/rural profile (Statistics New Zealand, 2004), which indicates that there could be significant differences between them in literacy and/or numeracy. Any such differences are obscured by aggregating the different types of rural area in one category. However, the fact that there were differences in numeracy according to the urban/rural profile indicates that this classification of areas provides a useful approach to studying geographical variation in skills.

The differences between broad regional groupings discussed in Chapter 3 were concentrated in the older (45-65) age group. Similarly, the differences in numeracy by urban/rural profile were concentrated in the same older age group. These differences were also more evident among women than among men.

5 CONCLUSION

This report is based on the Adult Literacy and Life Skills (ALL) Survey 2006, and analyses regional variation in English prose literacy and numeracy among people aged 25-65, using three different geographical classifications:

- a detailed breakdown into 13 regional units
- two broad regional groupings (the Auckland, Wellington, Canterbury and Otago Regions compared with the rest of New Zealand)
- urban/rural profile as defined by Statistics New Zealand

Prose literacy and numeracy

In the detailed regional analysis, two regions were identified as having significantly greater percentages of people aged 25-65 with higher English prose literacy and higher numeracy (Levels 3-5) than for the country as a whole, namely North Shore-Rodney (North Shore City and Rodney District) and Wellington Region. Counties-Manukau was the only region which had significantly smaller percentages of people than the country as a whole with higher prose literacy and higher numeracy.²² The percentage of people in Waitakere City with higher prose literacy was significantly smaller than the national percentage, but the percentage of people with higher numeracy was not significantly different from the national percentage.

In the analysis by broad regional grouping, the ‘metropolitan’ grouping of the Auckland, Wellington, Canterbury and Otago Regions had a significantly greater percentage of people aged 25-65 with higher prose literacy and with higher numeracy than the rest of New Zealand.

In the analysis by urban/rural profile, no significant differences were detected in the percentages of people with higher prose literacy or higher numeracy, nor in mean prose literacy score. However, there was a significantly greater mean numeracy score in main or satellite urban areas on the one hand, compared with independent urban areas (which can be described approximately as towns beyond commuting range of a main urban area) on the other. The mean numeracy score in rural areas was not clearly distinct from either category of urban area, although it was closer to the mean for main and satellite urban areas than to the mean for independent urban areas.

Factors associated with prose literacy and numeracy

Higher prose literacy and higher numeracy in the ALL survey were associated with a number of different variables (Lane 2010), namely:

- higher levels of completed education (i.e. upper secondary or tertiary)
- recent formal or non-formal upskilling
- being employed
- using a computer at work in the past year
- using a home computer 5 or more hours per month
- having a managerial, professional or technical occupation
- having worked in finance, business or community services (including education and health)
- having a higher income (i.e. \$40,000 or more)
- having English as a first language
- having English as the main language of the home

²² This is equivalent to saying that Counties-Manukau had a significantly greater percentage of people with low prose literacy and low numeracy (Levels 1-2).

- having been born in New Zealand
- having an ethnic identification of New Zealand European
- being younger (25-45)

In addition, there were associations with gender. When other factors were controlled for, being female was associated with higher prose literacy, and being male with higher numeracy.

There were strong relationships between many of these variables, such as between education, computer use and occupation; between occupation, industry and income; and between first language, home language, birthplace and ethnic identification. These variables were explored in Lane (2010) in order to identify a small set of key factors which could account for a large part of the variation between people in prose literacy and numeracy.

Statistical models based on completed education, computer use at work and at home, and first and main home language can account for over 40 per cent of the variation in prose literacy and in numeracy. Including further variables (occupation, ethnic identification, gender, age and a measure of socioeconomic deprivation) in the models improves the explained variation by a modest amount. On the other hand, it is possible to reduce the models to ones based on three variables (completed education, work computer use and first language) and still explain over 30 per cent of the variation.

These three variables can be expressed as having (or not having) the following key characteristics:

- completed upper secondary or tertiary education
- employed and used a computer at work in the past year
- English as a first language

Regional variation in terms of key characteristics

In the detailed regional analysis, the percentage of people aged 25-65 with higher prose literacy (and similarly with higher numeracy) in each region was compared with the benchmark of the percentage for the country as a whole. In the comparison of the broad regional groupings, the percentages with higher prose literacy and numeracy in the 'metropolitan' grouping were compared with the benchmark of the percentage for the rest of New Zealand. In both cases it was noted whether the difference between the percentage for each region was significantly different statistically from the benchmark or not.

In the analysis by urban/rural profile, the measure which varied between profile categories was numeracy, and mean numeracy scores for independent urban areas and rural areas were compared with the benchmark of the mean numeracy score for main or satellite urban areas, and it was noted whether the differences in means were significant or not.

The benchmark percentages or means can be (somewhat loosely) interpreted as norms or averages. We can then say that a regional category was 'average' for prose literacy or numeracy or some other variable if the regional percentage or mean for that variable was not significantly different from the benchmark. Similarly we can say the a region was 'above average' or 'below average' if the regional percentage or mean was significantly greater or less than the benchmark.

In all three approaches, the percentages of people with each of the three key characteristics in each regional category were compared with the benchmark percentage for that characteristic. If the percentages for at least two of the characteristics were above average, then the percentage of

people with higher numeracy was also above average. This is the case for North Shore-Rodney and for the Wellington Region in the detailed regional analysis: both had significantly greater percentages of people with upper secondary or tertiary education and of people using a computer at work than the country as a whole, and both had a significantly greater percentage of people with higher numeracy (and also higher prose literacy) than the country as a whole.

This was also the case for the metropolitan grouping of Auckland, Wellington, Canterbury and Otago Regions compared with the rest of New Zealand. The metropolitan grouping had significantly greater percentages of people with upper secondary or tertiary education and of people using a computer at work than the rest of New Zealand, and even though it also had a significantly smaller percentage of people with English as a first language, it still had a significantly greater percentage of people with higher numeracy (and also higher prose literacy).

In a similar fashion, if the percentages for at least two of the key characteristics were below average, then the percentage of people with higher numeracy was also likely to be below average. This was the case for Counties-Manukau in the detailed regional analysis, where the percentages for all three key characteristics were significantly less than the national percentages, as was the percentage of people with higher numeracy (and also higher prose literacy).

It was also the case for independent urban areas in the urban/rural profile analysis, where the percentage of people with upper secondary or tertiary education and the percentage using a computer at work were significantly less than in main or satellite urban areas, and the mean numeracy score in independent urban areas was significantly lower than that for main or satellite urban areas (although no significant difference in numeracy was apparent in terms of the *percentage* with higher numeracy).

The exception to this generalisation was the region consisting of the South Island apart from Canterbury and Otago, where the percentage of people with upper secondary or tertiary education and the percentage using a computer at work were significantly less than the national percentage, but the percentages with higher prose literacy and with higher numeracy were not significantly different from the national percentage. The very large percentage of people with English as a first language in this region was an important factor in this result.

Numeracy was average in all regions apart from the cases just mentioned (where the percentages of people with at least two of the key characteristics were above or below average). Thus, in the detailed regional analysis, the regions other than North Shore-Rodney, Counties-Manukau and Wellington had percentages of people with higher numeracy which were not significantly different from the national percentage. And in the urban/rural profile analysis, the mean numeracy score in the rural areas was not significantly different from that in main or satellite urban areas.

Prose literacy follows the same pattern as numeracy with two exceptions: in the detailed regional analysis, Waitakere City had a significantly small percentage for only one key characteristic, namely having English as a first language, but also had a percentage of people with higher prose literacy which was significantly less than the national percentage. In the urban/rural profile analysis, independent urban areas had significantly smaller percentages of people with upper secondary or tertiary education and of people using a computer at work, but were not significantly different in prose literacy from main or satellite urban areas.

These exceptions reflect the greater effect of the first language variable on prose literacy than on numeracy. In the case of Waitakere City, this one factor is sufficient to lead to a significantly small percentage of people with higher prose literacy. In the case of independent urban areas, their advantage in having a significantly greater percentage of people with English as a first

language than main or satellite urban areas effectively cancels out the disadvantages in completed education and work computer use.

Of the three key characteristics, the one which most closely parallels prose literacy and numeracy (in terms of the significance of differences from a benchmark) is computer use at work. In fact the parallel for numeracy is almost exact, that is, where work computer use is significantly different from the benchmark, so also is numeracy (and in the same direction); with the one exception of the South Island apart from Canterbury and Otago. For prose literacy, the same exceptions apply as mentioned in the previous paragraph.

Use of a computer at work is in fact a composite variable: it incorporates labour force status (employed or not) as well as computer use (or not) among those who are employed, and the alternatives to using a computer at work are either not being employed, or being employed but not using a computer at work. For those who are employed, work computer use appears to be a strong sign of jobs which require and/or encourage involvement in a wide range of literacy and numeracy activities, and this involvement is correlated with higher prose literacy and numeracy (Lane 2010). Work computer use was only moderately correlated with education: people with tertiary education were more likely than others to use a computer at work but 40 per cent of work computer users had no tertiary education.

One of the things which is striking about the detailed regional analysis is the number of regions which were 'average' in the sense that the percentages of people with higher prose literacy and numeracy were not significantly different from the national percentage. These were regions where the percentage of people using a computer at work was also average. However, in many of these regions, the percentages for the education and language factors were not average, but rather, appeared to pull in different directions.

Thus there were four such regions with a significantly small percentage of people with upper secondary or tertiary education but a significantly large percentage of people with English as a first language, namely Waikato, Bay of Plenty, Taranaki and Manawatu-Wanganui and Rest of South Island (i.e. South Island outside Canterbury and Otago).²³ There was one region (Auckland City) with a significantly large percentage of people with upper secondary or tertiary education but a significantly small percentage of people with English as a first language.

There were three 'average' regions (Northland, North and Central Canterbury, and South Canterbury and Otago) which were average in terms of education but the percentage of people with English as a first language was significantly higher than the national percentage. However, this language advantage does not appear to have been strong enough for these regions to stand out in terms of prose literacy or numeracy. The remaining 'average' region (Gisborne and Hawke's Bay) was average for all three characteristics.

Regional variation in terms of other characteristics

Variation in literacy and numeracy in New Zealand according to income, occupation and industry has previously been documented by Satherley, Lawes and Sok (2008b). In terms of these variables, the geographical areas with significantly greater percentages of people aged 25-65 with higher prose literacy or numeracy (namely North Shore-Rodney, Wellington Region, the grouping of Auckland, Wellington, Canterbury and Otago Regions, and main or satellite urban areas) can all be identified as areas with greater percentages of people with higher incomes, greater percentages of people in managerial, professional or technical occupations, and greater percentages of people working in the industrial grouping of finance, business and

²³ Rural areas also fit this pattern, in comparison with main or satellite urban areas.

community services, including education and health (which corresponds to the grouping which Pool et al. 2005b refer to as 'more skilled tertiary' industry).

However, the converse does not appear to be the case, in the sense that geographical areas with significantly smaller percentages of people with higher incomes, or of people in managerial, professional or technical occupations, or of people in finance, business and community services, did not necessarily have a significantly smaller percentage of people with higher prose literacy or numeracy. The only region where this seemed to apply was Counties-Manukau, which has already been pinpointed on account of its significantly small percentage of people with upper secondary or tertiary education, of people using a computer at work, and of people with English as a first language.

In the detailed regional analysis there were three regions in which two of these three factors (income, occupation or industry) were significantly 'below average', namely Northland, Waikato and Rest of South Island, but these regions were average in terms of prose literacy and numeracy. In the urban/rural profile analysis, rural areas had a significantly smaller percentage of people who were managers, professionals or technicians, and a significantly smaller percentage of people in finance, business or community services, than main or satellite urban areas, but rural areas were not significantly different in terms of prose literacy and numeracy. These were all geographical areas (except for Rest of South Island) in which work computer use was average, and this points to these geographical areas having people with higher literacy and numeracy spread across a wide range of occupations and industries rather than being concentrated in particular occupational or industry clusters.

Demographic differences

Of the three approaches to regional analysis, only the broad regional groupings and the urban/rural profile categories were sufficiently large to allow further subdivision by age and gender in order to study the interaction of age and gender with region.

The percentage of people aged 25-44 was significantly greater, and the percentage aged 45-65 significantly less, in the metropolitan grouping compared with the rest of New Zealand. The differences in literacy and numeracy between the two broad regional groupings were concentrated in the older age group: there were no significant differences between the regional groupings among the younger age group, but among the older age group the percentages of people with higher prose literacy and higher numeracy were significantly greater in the metropolitan grouping than in the rest of New Zealand.

A combination of factors appears to give rise to the fact that the literacy and numeracy differences between the regional groupings are concentrated in the older age group. One is that the difference between regional groupings in percentage with upper secondary or tertiary education is considerably greater for the older than for the younger age group. A further contributing factor is the greater percentage of older people, especially older women, living in the rest of New Zealand, combined with the general tendency for older people and for women to have lower numeracy. This tendency to lower numeracy was particularly pronounced for older women in the rest of New Zealand.

Similarly, the differences in numeracy by urban/rural profile were concentrated in the same older age group (45-65), where the mean numeracy score was significantly higher in rural areas than in independent urban areas. These differences were also more evident among women than among men, and women in rural areas had a significantly higher mean numeracy score than women in independent urban areas.

Limitations of the analysis

Because the analysis is based on survey and not census data, it is not possible to produce results for small geographical areas. It is likely that there are localised pockets of high and low literacy and numeracy, but that these are balanced out within the regions used in this study, giving rise to a large number of regions with ‘average’ literacy and numeracy.

This observation applies in particular to the category ‘rural areas’ which includes areas on the outskirts of major urban centres through to areas remote from any urban settlement. There could be significant variations in literacy and numeracy within this category but it has not been possible to subdivide this category given the relatively small number of respondents residing in rural areas.

Some implications and cautions

Educational qualifications have often been used as approximate indicators of literacy and numeracy. Previous analyses of the ALL survey data (Earle 2009; Smyth and Lane 2009) have highlighted a number of situations in which educational qualifications do not give a good guide to literacy or numeracy skills.

This study provides a basis for similar caution at the regional level. In this set of analyses there were a number of geographical areas in which the percentage of people with higher levels of education deviated significantly from average, but the percentages of people with higher prose literacy and numeracy were average. A large part of the reason for this is that the effect of education was moderated by the countervailing effect of first language. A better guide to regional literacy and numeracy was the percentage of people using a computer at work. This may be because this characteristic relates most closely to respondents’ recent circumstances, while first language and education are more distant parts of the respondents’ backgrounds in general.

Although computer use at work was a good guide to higher prose literacy and numeracy (at least in 2006 when the survey was done), it does not follow that increasing the use of computers would in itself improve the literacy or numeracy rate of a region. Computer use at work appears to be a clue to the kind of work undertaken, that is, the computer is a tool for literacy and numeracy and that is why it is an indicator of jobs which regularly involve a wide range of literacy and numeracy activities. One would need a certain level of literacy and/or numeracy to begin such a job, and working in such a position would provide continuing practice and probably enhancement of literacy and/or numeracy.

There would be much more involved in increasing the proportion of jobs which have this character than changing the technology to be used (although this would be a part of it). The fact that education and language were key factors in the variation in literacy and numeracy indicates that provision of education in general, and specifically English for speakers of other languages, has a significant role to play.

In each of the three approaches to regional comparison, there was at least one geographical area or category which was significantly below average in prose literacy or numeracy. While these were areas of high educational need this needs to be kept in perspective.

In the detailed regional analysis, there were two such regions, namely Counties-Manukau and Waitakere City. In Counties-Manukau 55 per cent of people aged 25-65 had low English prose literacy and 63 per cent had low numeracy. Counties-Manukau had 10 per cent of New Zealand’s population aged 25-65 but accounted for 13 per cent of those with low prose literacy and also 13 per cent of those with low numeracy. In Waitakere City 53 per cent of people aged 25-65 had low English prose literacy and 58 per cent had low numeracy. Waitakere City had 5 per cent of New Zealand’s population aged 25-65 but accounted for 7 per cent of those with low

prose literacy and also 6 per cent of those with low numeracy. However, this means that 80 per cent of people with low prose literacy and 81 per cent of those with low numeracy were spread among the remaining regions, which were average or above average in terms of prose literacy and numeracy.

In the comparison of broad regional groupings, the corresponding area was the rest of New Zealand, i.e. that part of New Zealand outside the Auckland, Wellington, Canterbury and Otago Regions. In the rest of New Zealand, 45 per cent of people aged 25-65 had low prose literacy and 53 per cent had low numeracy. The rest of New Zealand had 37 per cent of New Zealand's population aged 25-65 but accounted for 39 per cent of those with low prose literacy and 40 per cent of those with low numeracy. This means that 61 per cent of those with low prose literacy and 60 per cent of those with low numeracy could be found in the grouping of the Auckland, Wellington, Canterbury and Otago Regions.

In the urban/rural profile analysis, independent urban areas had significantly lower mean numeracy than main or satellite urban areas. In percentage terms, 56 per cent of people aged 25-65 in independent urban areas had low numeracy, which was not significantly different from the percentages for main or satellite urban areas or for rural areas. Independent urban areas had 10 per cent of New Zealand's population aged 25-65 but 12 per cent of those with low numeracy. This means that 88 per cent of those with low numeracy were to be found in main and satellite urban areas and rural areas.

Independent urban areas are listed individually in Appendix A, but the above results apply only to the total set of independent urban areas. They do not necessarily mean that any particular independent urban area had lower mean numeracy than any main or satellite urban area, since it is possible that people with low numeracy may be over-represented in some independent urban areas but not in others. The survey data does not support analysis at that level of detail.

6 DATA AND DEFINITIONS

Sampling and weighting for the Adult Literacy and Life Skills Survey 2006

The survey was based on a probability (proportional to size) sample of 896 meshblocks (from the 2001 Statistics New Zealand meshblock classification) in the North and South Islands and Waiheke Island. Within each meshblock a sample of permanent private dwellings was sought, consisting of an initial sample and then a screened sample designed to over-sample Māori and Pasifika. One person usually resident in each sampled dwelling and aged between 16 and 65 was sought. The achieved response rate was 64 per cent.

Each respondent was interviewed face-to-face, the interviewer completed the background questionnaire and the respondent completed a number of test booklets designed to assess prose and document literacy, numeracy and problem solving. A pilot survey was undertaken between July and September 2005 and the main survey took place from May 2006 to March 2007. The pilot data was included in the final data set, which consists of records from 7,131 respondents, of whom 6,048 were aged between 25 and 65. Four of these respondents were unclassified in terms of completed education and were not included in the analyses, leaving a total of 6,044 respondents in the data set analysed.

Because most Māori and Pasifika live in the North Island, one consequence of the sample design is that North Island residents were over-represented in the data set relative to South Island residents.

The sample data was validated against Statistics New Zealand census and household survey data and Ministry of Education statistics.

Each respondent was assigned a weight which was a product of a probability weight, a non-response weight and a benchmark adjustment. The benchmark adjustment was based on 2006 Census data for gender, ethnicity and age.

To calculate replicate weights, the 896 meshblocks were divided into 30 groups (each of 29 or 30 meshblocks with a wide geographical spread) and weights recalculated based on deleting one group in turn and readjusting to the benchmarks. Standard errors and 95 per cent confidence intervals have been derived from a jackknife variance estimation procedure using these 30 replicate weights.

Differences between proportions and means were considered significant if the 95 per cent confidence intervals did not overlap. This procedure is known to be considerably more conservative than hypothesis testing with $\alpha = 0.05$, and in fact when the standard errors of two estimates are approximately equal (as they generally are in this report), this procedure approximates a test with $\alpha = 0.01$ (Schenker and Gentleman, 2001). This conservatism is considered appropriate here given the overall large sample size, and the large number of comparisons of estimates in this report.

Scores in the Adult Literacy and Life Skills Survey

Satherley and Lawes (2007) give an account of the scoring approach in the ALL survey:

To each individual, and for each of the domains, a score from zero to 500 is assigned. Zero indicates extremely low proficiency, and 500 extremely high. In addition, based on this score, one of five 'cognitive levels' is assigned. These cognitive levels are used in national and international comparison, essentially as a benchmark. The following list provides descriptions of typical tasks associated with each cognitive level.

Level 1 (Scores 0–225):

Tasks at this level require the ability to read simple documents, accomplish literal information-matching with no distractions, and perform simple one-step calculations.

Level 2 (Scores 226–275):

This level includes tasks that demand the capacity to search a document and filter out some simple distracting information, achieve low-level inferences, and execute one- or two-step calculations and estimations.

Level 3 (Scores 276–325):

Typical tasks at level 3 involve more complex information-filtering, sometimes requiring inferences and the facility to manipulate mathematical symbols, perhaps in several stages.

Level 4 (Scores 326–375):

A level 4 task might demand the integration of information from a long passage, the use of more complex inferences and the completion of multiple-step calculations requiring some reasoning.

Level 5 (Scores 376–500):

Level 5 tasks incorporate the capability to make high-level inferences or syntheses, use specialised knowledge, filter out multiple distractors, and to understand and use abstract mathematical ideas with justification.

OECD and Statistics Canada (2000) provide the following characterisation of Level 3:

Level 3 is considered a suitable minimum for coping with the demands of everyday life and work in a complex, advanced society. It denotes roughly the skill level required for successful secondary school completion and college entry.

Geographical classifications

Regions

The 13 regions used in chapter 2 of this report are based on the 16 Statistics New Zealand Regions, as set out in Table 8. Some of the standard regions were aggregated, while the Auckland Region was subdivided, and the Canterbury Region was subdivided and part was aggregated with the Otago Region.

The four report regions corresponding to the standard Auckland Region are based on the 2006 territorial local authorities Rodney District, North Shore City, Waitakere City, Auckland City, and (comprising Counties-Manukau) Manukau City, Papakura District and Franklin District. Part of Franklin District is in the standard Waikato Region: this part has been included in Counties-Manukau (as it is for instance in the Counties-Manukau District Health Board). Consequently the Waikato region used in this report leaves out the Franklin District.

North and Central Canterbury contains the following territorial local authorities: Kaikoura District, Hurunui District, Waimakariri District, Christchurch City (incorporating the former Banks Peninsula District), Selwyn District and Ashburton District. South Canterbury and Otago contains the following territorial local authorities: Timaru District, Mackenzie District, Waimate District, Waitaki District, Central Otago District, Queenstown-Lakes District and Dunedin City.

Table 8

Detailed regional classification

Region as used in this report	SNZ Region	Number of survey respondents aged 25-65	Estimated population aged 25-65
Northland Region	Northland	231	77,000
North Shore City & Rodney District	Auckland	401	178,000
Waitakere City	Auckland	317	108,000
Auckland City	Auckland	611	232,000
Counties-Manukau	Auckland Waikato	637	214,000
Waikato Region	Waikato	572	177,000
Bay of Plenty Region	Bay of Plenty	410	134,000
Gisborne & Hawke's Bay Regions	Gisborne Hawke's Bay	337	97,000
Taranaki & Manawatu-Wanganui Regions	Taranaki Manawatu-Wanganui	459	162,000
Wellington Region	Wellington	619	253,000
North & Central Canterbury	Canterbury	720	241,000
South Canterbury & Otago	Canterbury Otago	344	125,000
Rest of South Island	Nelson Tasman Marlborough West Coast Southland	386	124,000
TOTAL		6,044	2,122,000

Broad regional groupings

The 'metropolitan' broad grouping consists of the four Statistics New Zealand Regions: Auckland, Wellington, Canterbury and Otago. Of the regions used in this report, this grouping contains North Shore City and Rodney District, Waitakere City, Auckland City, Counties-Manukau (apart from that part of Franklin District in the Waikato Region), the Wellington Region, North and Central Canterbury and South Canterbury and Otago.

Table 9
Broad regional classification

Broad regional grouping	Number of survey respondents aged 25-65	Estimated population aged 25-65 in each grouping
Auckland, Wellington, Canterbury & Otago Regions	3,623	1,344,000
Rest of New Zealand	2,421	779,000
TOTAL	6,044	2,122,000

Urban/rural profile

Statistics New Zealand provides concordance tables matching meshblock numbers with urban/rural profile categories based on the 2001 and the 2006 censuses. These were downloaded from the Statistics New Zealand website and merged with the ALL data set.

Respondents were assigned the 2006 urban/rural profile category where it could be matched with the 2001 meshblock number used in the survey design. This could not be done for 620 respondents in the analysis data set because of changes in Statistics New Zealand's meshblock classification between 2001 and 2006. For all these respondents, a value for urban/rural profile category was imputed by assigning the 2001 urban/rural profile category.

Table 10 shows how the urban/rural profile categories were aggregated, and the numbers of respondents and estimated populations in the three aggregated categories of urban/rural profile.

Table 10
Aggregated urban/rural profile

Urban/rural profile aggregated category	Urban/rural profile category	Number of survey respondents aged 25-65	Estimated population aged 25-65 in each category
Main or satellite urban area	Main urban area	4,513	1,588,000
	Satellite urban area		
Independent urban area	Independent urban area	656	217,000
Rural area	Rural area with high urban influence.	875	318,000
	Rural area with moderate urban influence.		
	Rural area with low urban influence.		
	Highly rural/remote area.		
TOTAL		6,044	2,122,000

Completed education

Highest level of completed education was derived from responses to questions A4B and A4C of the ALL background questionnaire which asked respectively “What is the highest level of primary or secondary school that you have ever completed?” and “What is the highest level of formal education or training that you have ever completed?” The New Zealand coded responses were used and grouped in two different ways, as shown in Tables 11 and 12.

Table 11

Detailed classification of highest level of education completed

Detailed Grouping	Responses (from A4B & A4C)	Frequency	Weighted Frequency
Up to Year 10	Up to Standard 3/Year 5 Standard 4/Year 6 Form 1, 2 or 3/Year 7, 8 or 9 Form 4/Year 10	723	224,000
Year 11	Form 5/Year 11	923	290,000
Year 12 or 13	Form 6 or 7/Year 12 or 13	825	295,000
Level 1, 2 or 3 certificate	Level 1, 2 or 3 certificate	792	271,000
Level 4 certificate	Level 4 certificate	564	205,000
Level 5, 6 and 7 certificate/diploma	Level 5, 6 and 7 certificate or diploma	825	284,000
Bachelors degree or higher	Bachelors degree Professional degree Bachelors degree with honours or postgraduate diploma Masters degree Doctorate	1,392	553,000
TOTAL		6,044	2,122,000

Table 12

Broad classification of highest level of education completed

Broad Grouping	Responses (from A4C)	Frequency	Weighted Frequency
Lower secondary	Up to Form 5/Year 11	1,646	514,000
Upper secondary	Form 6 or 7/Year 12 or 13 Level 1, 2 or 3 certificate	1,617	566,000
Tertiary	Level 4 certificate Level 5, 6 and 7 certificate or diploma Bachelors degree Professional degree Bachelors degree with honours or postgraduate diploma Masters degree Doctorate	2,781	1,042,000
TOTAL		6,044	2,122,000

Upskilling

The number of people who had taken formal courses (which count towards a qualification) or non-formal courses (which do not) was determined from responses to questions F2 and F16 in the ALL background questionnaire. F2 asked “During the last 12 months ... did you take any courses as part of a programme of study toward a certificate, diploma or degree?” F16 asked “During the last 12 months, did you participate in any courses that were not part of a programme of study?” The distribution of responses is shown in Table 13.

Table 13

Formal and non-formal upskilling in the past year

	Frequency	Weighted Frequency
Formal or non-formal courses taken	2,875	1,009,000
No courses taken	3,169	1,113,000
TOTAL	6,044	2,122,000

Employment

Employment in the past year was based on responses to question D2 in the ALL background questionnaire, which asked “Did you work at a job or business at any time in the last 12 months ... (regardless of the number of hours per week)?” The distribution of responses is set out in Table 14.

Table 14

People aged 25-65 employed or not employed in the past year

Employment status in past year	Frequency	Weighted Frequency
Employed	5,026	1,814,000
Not employed	1,018	309,000
TOTAL	6,044	2,122,000

Computer use at work

The work computer use variable was based on question H7 in the ALL background questionnaire. This question was only asked of people who had answered yes to D2 (see Employment above) and yes to question H2, “Have you ever used a computer?”. H7 asked “In the last 12 months, did you use a computer in your job? (If you have more than one job, tell us about the one at which you work the most hours)”. Table 15 cross-classifies the responses to H7 and to D2 on employment in the past year.

Table 15

Work computer use or non-use in past year

Work computer use in past year	Frequency	Weighted Frequency
Employed and used computer	3,472	1,298,000
Employed but did not use computer	1,554	516,000
Not employed	1,018	309,000
TOTAL	6,044	2,122,000

Computer use at home

The variable used in analysis was whether the respondent used a home computer for 5 or more hours per month, or otherwise. This variable is based on question H13 in the ALL background questionnaire, which was only asked of people who had answered yes to H2, “Have you ever used a computer?” and yes to H11, “Do you have personal access to a computer in your home (including a laptop you bring home from your work)?”. H13 asked “In a typical month, how many hours did you use a computer at home?” The lowest use category was less than 5 hours, which includes the possibility of not using the computer at all. In order to have a variable which reflects actual computer use, responses indicating at least 5 hours of use per month were aggregated in a single variable, as opposed to using a home computer less than 5 hours per month, or not having access to a computer at home, or never having used a computer, as set out in Table 16.

Table 16

Home computer access and use

	Frequency	Weighted Frequency
Used home computer 5+ hours/month	3,585	1,320,000
Used home computer less than 5 hours/month	1,144	428,000
Had used a computer, but no home computer access	795	222,000
Never used a computer	520	153,000
TOTAL	6,044	2,122,000

Occupation and industry

The ALL background questionnaire contains a series of questions (D17 to D43) about the most recent job that the respondent had worked at within the last five years. Occupation and industry categories were assigned on the basis of this job. People who had not been employed in the previous five years were not assigned an occupation or industry.

Occupation

Occupation is coded to the International Standard Classification of Occupation (ISCOR) in the ALL data set. This has been concorded to the New Zealand Standard Classification of Occupation 1999 (NZSCO99). Occupations at level one of this classification have been aggregated for this analysis, following Pool et al. (2005c), as shown in Table 17.

A small number of people with military occupations were included in the survey but these are excluded from the occupational analysis. Because the survey was limited to permanent private dwellings, a large number of military personnel living in military institutional dwellings were not eligible to be surveyed, and so the survey could not fairly represent this occupational category.

Table 17

Classification of occupations

Group	NZSCO99	Frequency	Weighted Frequency
Managers, professionals and technicians	Administrators and managers Professionals Technicians and associate professionals	2,339	880,000
Clerks and service workers	Clerks Service and sales workers	1,611	552,000
Farmers, fishers and tradespeople	Agricultural workers Trades workers	787	287,000
Machine operators and elementary workers	Plant and machinery operators and assemblers Labourers	831	266,000
Other (excluded from analysis)	Military	5	2,000
No occupation assigned		471	136,000
TOTAL		6,044	2,122,000

Industry

Industry is coded in the ALL data set using the International Standard Industry Classification (ISIC). For this analysis, the ISIC has been concorded to the Australia and New Zealand Standard Industry Classification 2006 (ANZSIC06), and industries in the top level of classification have been grouped together, following Pool et al. (2005c), as shown in Table 18.

Table 18

Classification of industries

Group	ANZSIC06	Frequency	Weighted Frequency
Agriculture, forestry, fishing and mining	A Agriculture, forestry and fishing B Mining	446	157,000
Manufacturing and construction	C Manufacturing E Construction	1,145	396,000
Wholesale and retail trade, transport and communications	F Wholesale trade G Retail trade H Accommodation and food services I Transport, postal and warehousing J Information media and telecommunications	1,321	483,000
Finance, business and community services	D Electricity, gas, water and waste services K Finance and insurance services L Rental, hiring and real estate services M Professional, scientific and technical services N Administrative and support services O Public administration and safety P Education and training Q Health care and social assistance R Art and recreation services S Other services	2,655	947,000
No industry assigned		477	139,000
TOTAL		6,044	2,122,000

Income

Personal income is based on responses to ALL questions K6 to K9. K6 asks “What is your best estimate of your personal income” in the previous year “from all sources ... before taxes and deductions?”. Respondents who were unable or unwilling to provide an estimate were asked in the subsequent questions to choose among a series of income ranges. One of the range boundaries was \$40,000, and this was selected as a dividing value between low and high personal income. The distribution of responses is shown in Table 19.

Table 19

Distribution of responses to income questions

Gross annual personal income (from K6 to K9)	Frequency	Weighted Frequency
Under \$40,000	3,431	1,112,000
\$40,000 or more	2,340	916,000
Not specified	273	94,000
TOTAL	6,044	2,122,000

First language

Information on first language(s) was derived from responses to ALL questions B1A and B1B which asked “What is the language that you first learned at home in childhood and still understand?” Respondents could nominate two languages if they were learned at precisely the same time. Respondents who provided English as a response to one of these questions were categorised as having English as a first language, and all others as not having English as a first language. Numbers are shown in Table 20.

Table 20

Classification by first language

First language (from B1A and B1B)	Frequency	Weighted Frequency
English is a first language	5,069	1,793,000
English is not a first language	975	329,000
TOTAL	6,044	2,122,000

Birthplace

Birthplace was derived from responses to ALL question A1, which asked “Were you born in New Zealand?” Details of the responses are given in Table 21. No further information relating to birthplace (such as country of birth) is available from the survey data.

Table 21

Distribution of birthplaces

Responses (from A1)	Frequency	Weighted Frequency
Born in New Zealand	4493	1,555,000
Born overseas	1551	568,000
TOTAL	6,044	2,122,000

Age and gender

Respondents were asked their date of birth and whether they were male or female. In each age group there were considerably more female than male respondents, and a correction for this gender imbalance was incorporated in the weighting through the benchmark adjustments.

Table 22

Age and gender distribution

Age	Gender	Frequency	Weighted Frequency
25-34	Male	618	248,000
	Female	876	271,000
35-44	Male	767	294,000
	Female	1,089	321,000
45-54	Male	642	267,000
	Female	775	278,000
55-65	Male	541	218,000
	Female	736	225,000
TOTAL		6,044	2,122,000

APPENDIX A CLASSIFICATION OF URBAN AREAS

Urban areas by region

Based on Statistics New Zealand (2004)

Table 23

Urban areas, classified in terms of urban/rural profile, by Statistics New Zealand region

Region	Main urban areas	Satellite urban areas	Independent urban areas
Northland	Whangarei		Kaitiaki Taipa Bay-Mangonui Kerikeri Kaikohe Paihia Russell Moerewa Kawakawa Dargaville
Auckland	Northern Auckland Western Auckland Central Auckland Southern Auckland	Helensville Waiheke Island Pukekohe Waiuku	Wellsford Warkworth Snells Beach
Waikato	Hamilton Cambridge Te Awamutu	Pukekohe Waiuku Huntly Raglan	Coromandel Whitianga Tairua Thames Whangamata Waihi Paeroa Te Aroha Morrinsville Matamata Putaruru Tokoroa Otorohanga Te Kuiti Mangakino Taupo Turangi
Bay of Plenty	Tauranga Rotorua	Te Puke	Waihi Beach Katikati Whakatane Edgecumbe Opotiki Kawerau Murupara
Gisborne	Gisborne		
Hawke's Bay	Napier Hastings		Wairoa Waipawa Waipukurau
Taranaki	New Plymouth	Waitara Inglewood	Stratford Eltham Opunake Manaia Hawera Patea

Manawatu-Wanganui	Wanganui Palmerston North	Bulls Feilding	Taumarunui Raetihi Ohakune Waiouru Taihape Marton Dannevirke Woodville Pahiatua Foxton Shannon Levin
Wellington	Kapiti Porirua Upper Hutt Lower Hutt Wellington	Otaki Featherston	Masterton Carterton Greytown Martinborough
Nelson and Tasman Regions	Nelson	Brightwater Wakefield	Takaka Motueka
Marlborough			Picton Blenheim
West Coast			Westport Reefton Greymouth Hokitika
Canterbury	Christchurch	Oxford Rangiora Woodend Darfield Rolleston Lincoln Leeston	Kaikoura Hanmer Springs Ashburton Geraldine Twizel Pleasant Point Temuka Timaru Waimate
Otago	Dunedin		Wanaka Arrowtown Queenstown Cromwell Oamaru Alexandra Milton Balclutha
Southland	Invercargill	Riverton	Te Anau Gore Winton Bluff

Notes:

Regions referred to here are the standard Statistics New Zealand regions rather than those used in the detailed regional analysis.

Urban areas do not necessarily coincide with territorial local authorities. For example, the Northern Auckland Urban Zone includes parts of North Shore City and of Rodney District.

The regional boundary splits Pukekohe and Waiuku between the Auckland and Waikato regions.

Spellings of place names are those which were official in 2006 (e.g. Wanganui, Manawatu-Wanganui).

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