

**The Adult Literacy
and Life Skills (ALL) Survey:
Numeracy Skills and Education
in New Zealand & Australia**

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Acknowledgements

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For background information, please refer to the publication *The Adult Literacy and Life Skills (ALL) Survey: An Introduction* (available from www.educationcounts.govt.nz/goto/all).

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Summary

This report provides an initial investigation into the relationships between education level, numeracy, participation in upskilling and self-assessed numeracy through the adult populations of New Zealand and Australia.

Key Findings

New Zealand and Australia had similar distributions of numeracy skill. However, for each reported education level, Australian adults performed better – on average – than their New Zealand counterparts. These apparently contradictory statements can be reconciled by the fact that Australia had relatively more adults with lower secondary or less education – the group that, in both countries, had the lowest numeracy skills.

New Zealand and Australia had broadly similar distributions of participation in up-skilling. In both countries, proportions of participation in up-skilling activities are highest amongst those with a tertiary level education and lowest amongst those with a lower secondary level education or less. That is, those adults who were best equipped to engage with the knowledge economy and society were those who were most likely to try to improve this level of engagement by up-skilling.

After controlling for non-participation in up-skilling activities, and in both countries, those with upper secondary education level or less were most likely to participate in self-directed up-skilling activities. In New Zealand, those with tertiary education were most likely to participate in self-directed up-skilling activities whereas their Australian counterparts were most likely to participate in non-formal up-skilling activities.

In both New Zealand and in Australia, just under 40% of adults assessed themselves as having higher numeracy skills when, in fact, they were measured as having low numeracy skills. For both countries this percentage was lower for those with higher education levels.

What information did the ALL survey capture?

The ALL survey measured proficiency among 16-65 year-olds¹ in four “domains”. One of these of these is part of the focus of the present document:

“Numeracy” is the ability to understand and process mathematical and numerical information.

The ALL survey also collected information on the background of respondents. This includes factors such as the respondent’s gender, ethnicity, age-group, labour-force status and employment status.

One part of the background education collected in the ALL survey is respondents’ education level². In this document – to allow robust statistics to be reported – these will be grouped as follows:

Lower secondary or less: the respondent completed at most Year 10 (or the equivalent).³

Upper secondary: the respondent completed more than Year 10 (or the equivalent) but no more than Year 13 (or the equivalent).⁴

Tertiary: the respondent participated in a tertiary education programme.

¹ Note that 15-year-olds and 66-75-year-olds were also sampled in the Australian ALL survey but were not included in the analyses in the present document.

² In the ALL survey, educational level is coded using the International Standard Classification of Education (ISCED).

³ New Zealanders with lower secondary or less education most likely left school before having an opportunity to sit School Certificate or NCEA level 1.

⁴ People with higher secondary education will have stayed at school long enough to sit school qualifications.

Numeracy levels in New Zealand and Australia

In Figure 1 below, the distribution of numeracy levels in New Zealand are compared with those in Australia. In Figure 2, the distribution of numeracy levels by education level in New Zealand are compared with those in Australia.

Based on their performance in the ALL survey's numeracy test, respondents were assigned one of five "cognitive levels". The following list provides descriptions of typical tasks associated with each cognitive level.

Level 1: Tasks require the ability to perform simple one-step calculations.

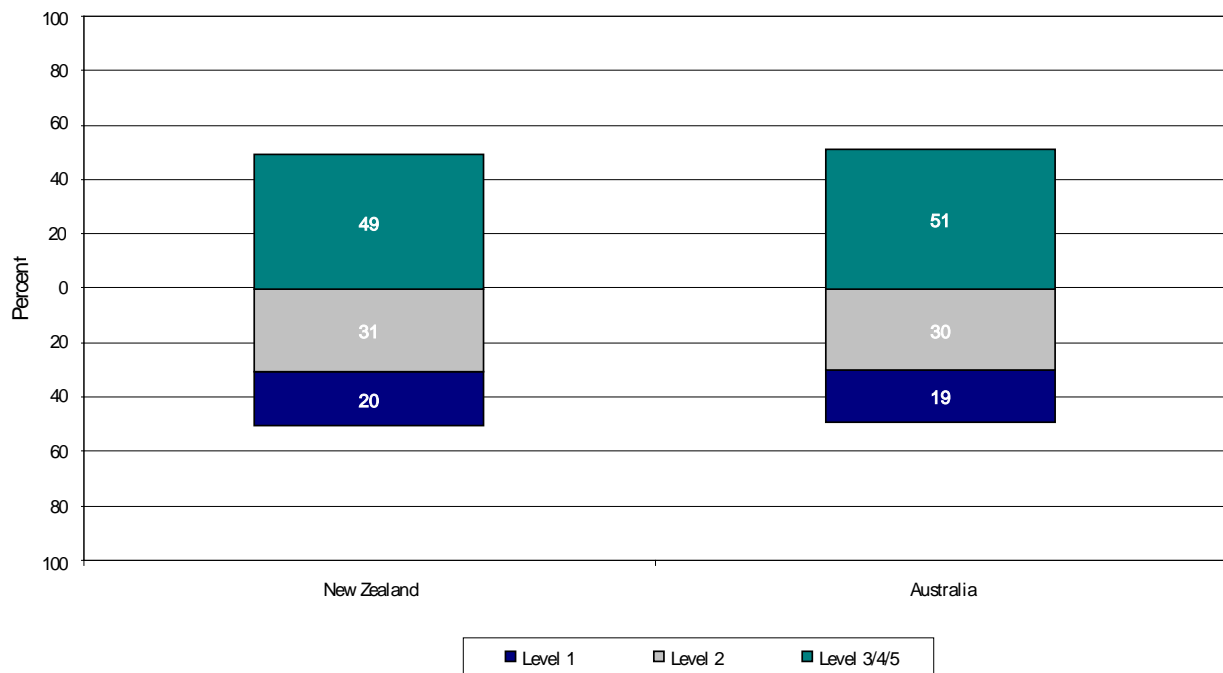
Level 2: Tasks demand the capacity to execute one- or two-step calculations and estimations.

Level 3: Typical tasks involve the facility to manipulate mathematical symbols, perhaps in several stages.

Level 4: A task might demand the completion of multiple-step calculations requiring some reasoning.

Level 5: Tasks incorporate the capability to understand and use abstract mathematical ideas with justification.

Figure 1: Numeracy Levels in New Zealand and Australia



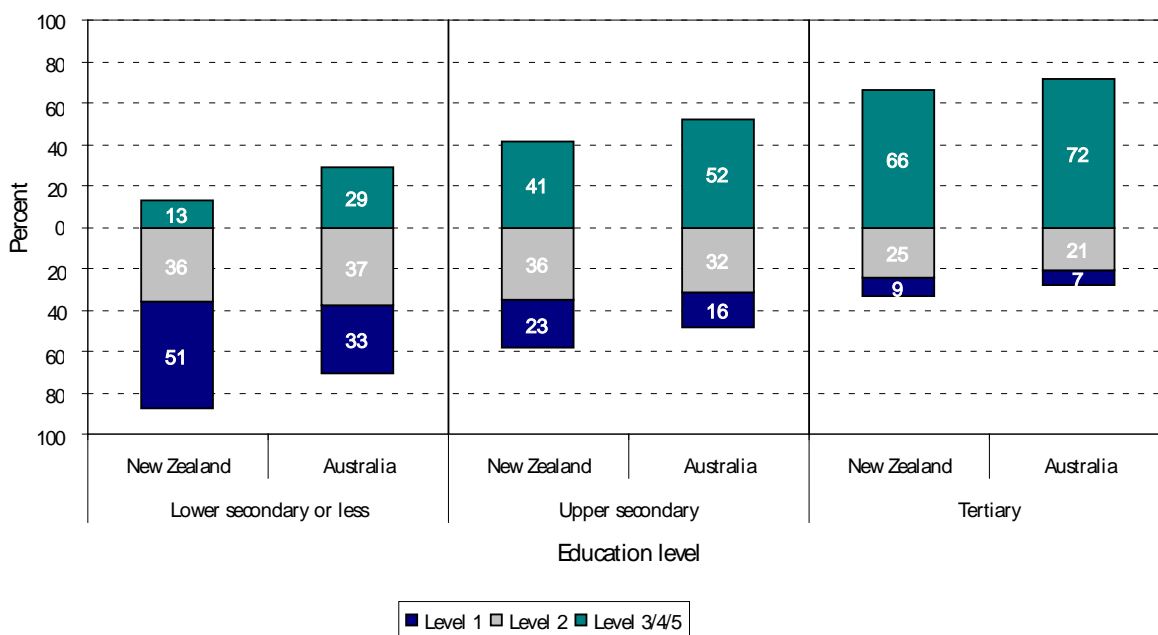
Note:

1. Levels 3, 4 and 5 were grouped to ensure statistically robust statistics.

Figure 1 shows the percentages of the adult populations of New Zealand and Australia at Level 1, Level 2 and Level 3, 4, or 5. Level 3 is considered to be the minimum for full participation in the knowledge society and economy; hence the columns for New Zealand and Australia in Figure 1 are both “anchored” at the Level 2/3 threshold.

New Zealand and Australia have very similar overall distributions of numeracy levels: in both countries around half of the adult population have numeracy skills below the minimum considered necessary for full participation in the knowledge society and economy.

Figure 2: Numeracy Levels by education level in New Zealand and Australia



Note:

- Levels 3, 4 and 5 were grouped to ensure statistically robust statistics.

Figure 2 shows, for each education level, the percentages of the adult populations of New Zealand and Australia in that education level at Level 1, Level 2 and Level 3, 4, or 5.

For both countries, the percentage of those with levels 3, 4 or 5 numeracy skills was higher for higher education levels. For example, 13% of New Zealanders with lower secondary or less education had levels 3, 4 or 5 numeracy skills. This compares with 41% for those with upper secondary education and 66% for those with a tertiary education.

In each of the three reported education levels Australia performed better than New Zealand – particularly in the lower secondary or less education level.

Figure 2 presents an apparent contradiction with Figure 1: Australia performed better than New Zealand at every education level but almost the same overall. To reconcile these figures note that approximately 34% of Australian adults had lower secondary or less education (compared with 10% of New Zealand adults), approximately 33% of Australian adults had upper secondary education (compared with 46% of New Zealand adults), and approximately 34% of Australian adults had tertiary education (compared with 44% of New Zealand adults). So although those with lower secondary or less education levels in Australia performed better than their New Zealand counterparts, there were relatively more of them, hence the overall numeracy distributions of Figure 1 are similar.

Participation in up-skilling in New Zealand and Australia

In Figure 3 and Table 1 below, the distribution of participation in up-skilling in New Zealand is compared with that in Australia. In Figures 5 and 6, the distribution of participation in up-skilling by education level in New Zealand is compared with that in Australia.

In the graphs and analysis of ALL data provided in this section, the following definitions are used.

Up-skilling refers to training and educational activities undertaken in the twelve months prior to participation in the ALL survey.

- *Formal full-time* up-skilling refers to full-time participation in any course that is part of a programme of study towards a certificate, degree or diploma (for example, participation in a plumbing apprenticeship).
- *Formal part-time* up-skilling refers to part-time participation in any course that is part of a programme of study towards a certificate, degree or diploma (for example, part-time participation in a Bachelor of Arts degree).
- *Non-formal* up-skilling refers to participation in any course that is not part of a programme of study toward a certificate, degree or diploma (for example, participation in a photography course at night-school).
- *Self-directed* up-skilling refers to frequent participation in up-skilling activities such as guided tours, trade fairs, learning from instructional media, etc.

Respondents who reported undertaking up-skilling both formally (either part-time or full-time) and in any other way were recorded as undertaking up-skilling formally. Respondents who reported undertaking up-skilling non-formally and in a self-directed manner were reported as undertaking up-skilling non-formally.

Figure 3: Participation in up-skilling in New Zealand and Australia (percentages of adult populations)

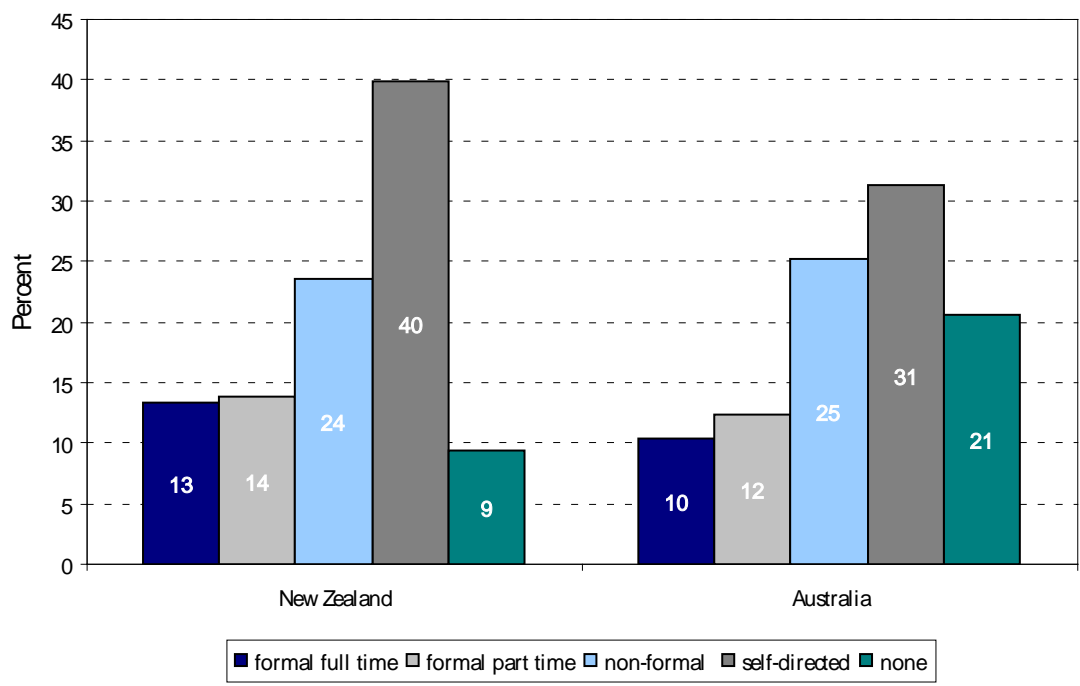


Figure 3 shows the percentage of the adult populations of New Zealand and Australia in each of the up-skilling categories described above.

The distributions of participation in New Zealand and Australia exhibit some similarities. The biggest difference is that New Zealand had a higher proportion of adults who reported as participating in self-directed study, and a lower proportion who reported as doing no education or training activity at all.

Adjusting for the proportions⁵ of those who report as participating in no up-skilling shows distributions which look even more alike. These are given in Table 1.

Table 1: Participation in up-skilling in New Zealand and Australia (percentages of adult populations who participate in some form of up-skilling)

Type of up-skilling	Country	
	New Zealand	Australia
Formal full-time	15	13
Formal part-time	15	16
Non-formal	26	32
Self-directed	44	39

Table 1 shows that after adjusting for non-participation in up-skilling activities, New Zealand still had a higher proportion reporting as participating in self-directed up-skilling activities, but that Australia had a higher proportion reporting as participating in non-formal up-skilling activities.

⁵ That is, the denominator in each of these percentages is made up of only those adults who did some up-skilling (as opposed to all adults).

Figure 4: Participation in up-skilling by education level in New Zealand (percentages of adult population)

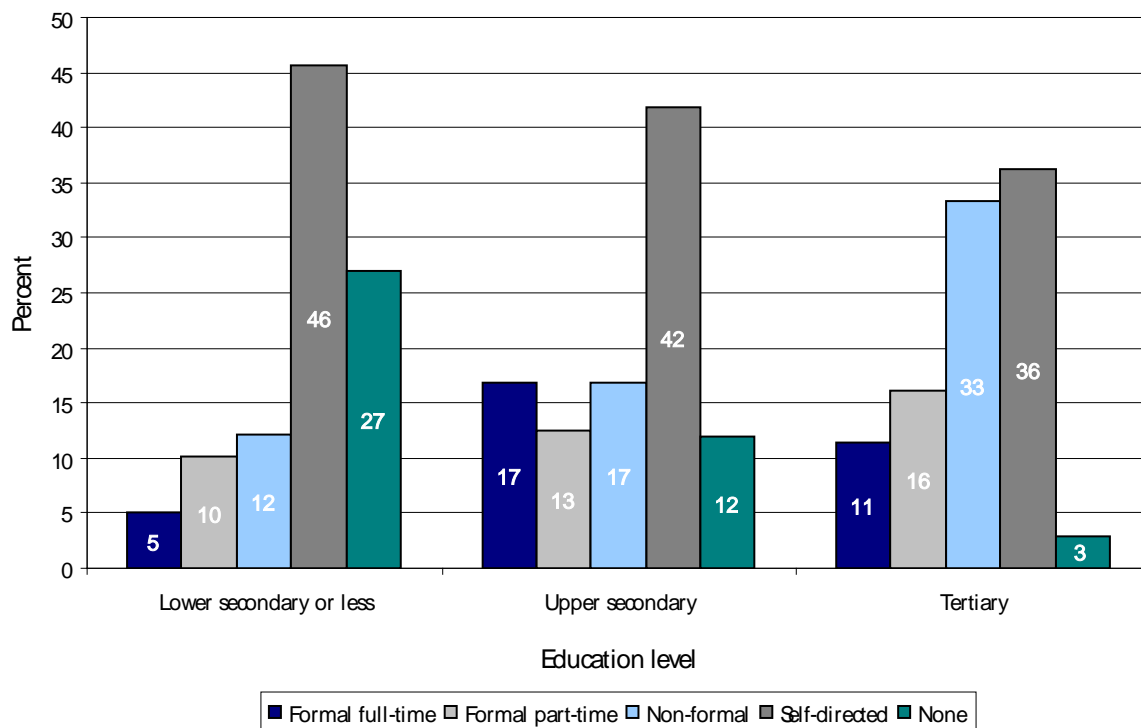


Figure 4 shows the percentage of the adult New Zealand population with a given education level in each of the up-skilling categories described above.

Figure 4 depicts very different patterns of participation in up-skilling for people with different education levels. The clearest differences are:

- Very small proportions of people with tertiary education reported as doing no study at all compared with much higher proportions for people with secondary education or less.
- Large proportions of people with tertiary education reported as doing non-formal study compared with those who have achieved only secondary education.
- There were high proportions of self-directed study at all levels.
- The highest proportion who reported as doing formal full time study were those that already had upper secondary education, many of whom will have been young.
- A significant proportion of people who already had a tertiary qualification were doing formal study – aiming to get yet further qualifications.

Figure 5: Participation in up-skilling by education level in Australia (percentages of adult population)

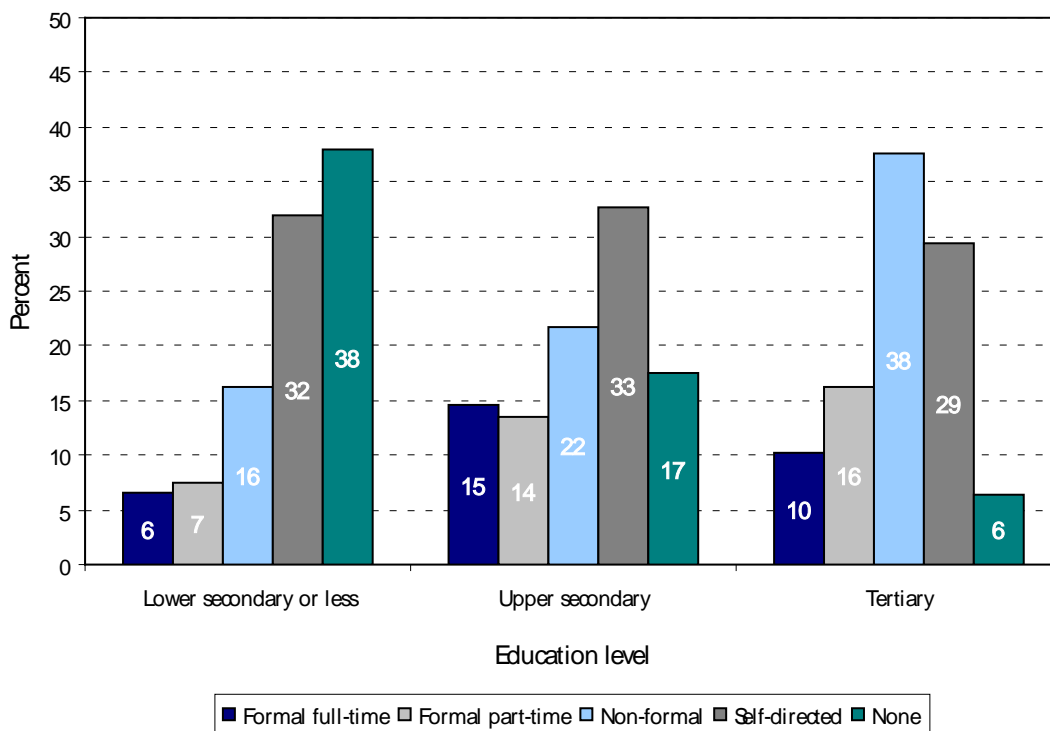


Figure 5 shows the percentage of the adult Australian population with a given education level in each of the up-skilling categories described above.

Figure 5 depicts patterns of participation in up-skilling for Australia that are broadly similar to those of New Zealand. The main inter-country differences are:

- Lower educated Australians reported as being less active in up-skilling than their New Zealand peers. A higher proportion of Australians with lower secondary education or less reported as doing no up-skilling at all – 38 percent in Australia and 27 percent in New Zealand.
- In Australia, self-directed study was quite even across education levels compared with NZ where there was a higher proportion for those with low education levels than those with higher.

In both countries those with little education had low rates of formal and non-formal study, and had high rates of non-participation in any form of up-skilling. However, sizable proportions of all education levels participated in self-directed study.

In both countries, people who already had tertiary level education undertook yet further training and study at a much higher rate than those with lower levels of education. In both New Zealand and Australia, skill maintenance and development was sought and obtained most intensively by those already with the highest education levels and skills.

Again, adjusting for the proportions who report as participating in no up-skilling provides another perspective on this data. This is given in Table 2.

Table 2: Participation in up-skilling by education level in New Zealand and Australia (percentages of adult populations who participate in some form of up-skilling)

Type of up-skilling	Country and education level					
	New Zealand			Australia		
	Lower secondary or less	Upper secondary	Tertiary	Lower secondary or less	Upper secondary	Tertiary
Formal full-time	7	19	12	10	18	11
Formal part-time	14	14	17	12	16	17
Non-formal	17	19	34	26	26	40
Self-directed	63	48	37	51	40	31

Table 2 shows that the effect of controlling for non-participation in up-skilling activities is most obvious for those with at most a lower secondary education level. This is because this group has the largest proportion of non-participation in up-skilling activities. Note in particular the changes in the percentages participating in non-formal up-skilling for this group after controlling for non-participation in up-skilling activities.

Despite these small changes after controlling for non-participation in up-skilling activities, Table 2 confirms that the patterns of participation in Australia are broadly similar to those in New Zealand.

Numeracy and self-assessed numeracy in New Zealand and Australia

In Tables 3 and 4 below, the relationship between measured numeracy and self-assessed numeracy in New Zealand is compared with that in Australia. In Figure 6, the distribution of education level for those with low measured numeracy and high self-assessed numeracy in New Zealand is compared with that in Australia. In Figure 7, the percentage of those with low measured numeracy and high self-assessed numeracy in each education level in New Zealand is compared with that in Australia.

In this document the following definitions of self-assessed numeracy skill are used:

Higher self-assessed numeracy skill refers to those respondents who either strongly agreed or agreed with the statement “I am good with numbers and calculations”.

Low self-assessed numeracy skill refers to those respondents who either strongly disagreed or disagreed with the statement “I am good with numbers and calculations”.

Also, levels 1 or 2 numeracy skill are referred to as *low* and levels 3, 4 or 5 are referred to as *higher*.

Table 3: Numeracy and self-assessed numeracy in New Zealand

		Self-assessed numeracy		
		Higher	Low	Total
Measured numeracy	Higher	44%	5%	49%
	Low	37%	14%	51%
	Total	81%	19%	100%

Table 3 shows that around 14% of New Zealand’s adult population assessed themselves as having low numeracy skill and were measured as having low numeracy skill. In contrast, around 37% assessed themselves as having higher numeracy skill but were measured as having low numeracy skill. These two percentages add to show that around 51% of New Zealand’s adult population were measured as having low numeracy skill.

Furthermore, Table 3 shows that:

- There is a strong mismatch between measured numeracy and New Zealand adults' self-assessment of their numeracy skills. Note that this may not mean that a lot of people are wrong about what they can do, but rather it may mean their skills are relatively well-matched to their numerical activity⁶.
- A particularly large proportion of New Zealand adults (around 37%) 'overrate' their numeracy skills.

Table 4: Numeracy and self-assessed numeracy in Australia

		Self-assessed numeracy		
		Higher	Low	Total
Measured numeracy	Higher	48%	3%	51%
	Low	38%	11%	49%
	Total	86%	14%	100%

Table 4 shows similar information to Table 3. There are patterns for Australia similar to those for New Zealand and again there is a strong mismatch between measured and self-assessed numeracy.

Figure 6: Education level for those with low measured numeracy and high self-assessed numeracy in New Zealand and Australia

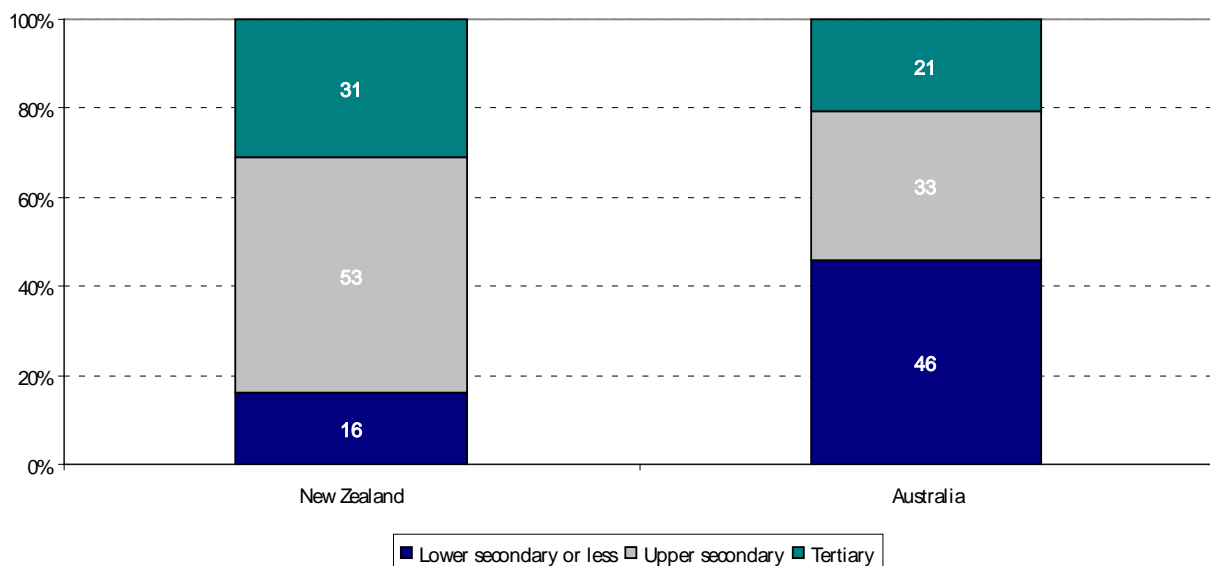


Figure 6 shows the percentage, in each education level, of adults in New Zealand and Australia who have low measured numeracy and high self-assessed numeracy.

The graph shows quite different proportions. This is, in large part, due to the fact that ALL measures New Zealand having a smaller proportion of people with secondary education or less (approximately 10% with lower secondary or less, 46% with upper secondary and 44% with tertiary education level) than Australia (approximately 34% with lower secondary or less, 33% with upper secondary and 34% with tertiary education level).

⁶ For example, a person might assess their own numerical ability as high if they could successfully complete all numerical tasks that they encountered – even if these tasks were not difficult when compared with the tasks others might face.

However, in both countries the low measured, high self-assessed group has significant proportions across all education levels. New Zealand's highest proportion is those with upper secondary while Australia has the highest proportion with lower secondary or less.

Figure 7: Low measured numeracy and high self-assessed numeracy and education level in New Zealand and Australia

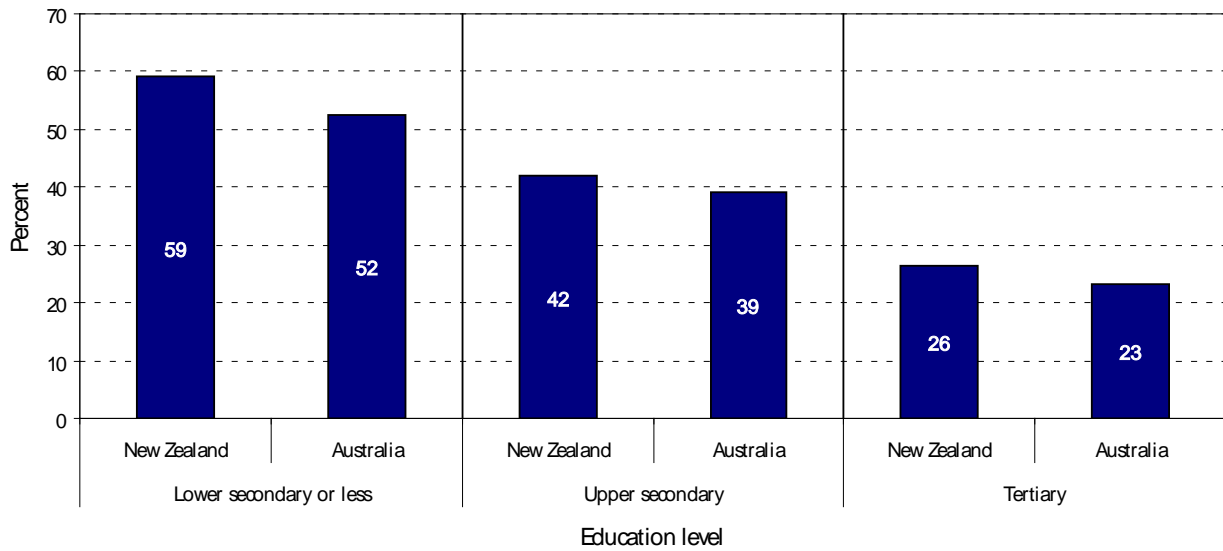


Figure 7 shows, for New Zealand and Australia, the percentage in each education level that belongs to the low measured but high self-assessed numeracy group.

The patterns for New Zealand and Australia are very similar. Those with lower secondary education have a much higher proportion belonging to this group than those with higher education levels. Of note, 59% of adult New Zealanders and 52% of the adult Australians with lower secondary education have low measured numeracy skills but self-assess as having high numeracy skills.