



LONGITUDINAL SURVEYS OF AUSTRALIAN YOUTH BRIEFING PAPER 22

Early post-school outcomes of Indigenous youth: the role of literacy and numeracy

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OVERVIEW

Despite significant improvements in the areas of education and employment, the gaps between Indigenous and non-Indigenous youth remain. Across some indicators—for example, university participation—the gap has actually widened. This is mainly because improvements for non-Indigenous young people have matched or surpassed the gains made by Indigenous young people.

Governments at both federal and state levels are striving to improve Indigenous people's educational attainment and employment participation. The consistently lower scores in reading and maths assessments achieved by Indigenous youth have meant that improving their performance in literacy and numeracy has become one of the key target areas on the national agenda to assist in closing the gap between Indigenous and non-Indigenous Australians.

Using data from the Longitudinal Surveys of Australian Youth (LSAY), this briefing paper explores the impact of literacy and numeracy levels on the educational gap between Indigenous and non-Indigenous youth. The paper focuses on the early post-school outcomes of Indigenous and non-Indigenous young people between 1999 and 2007.

HIGHLIGHTS

- Significant gains have been made in Year 12 completion for Indigenous youth, with the gap between them and non-Indigenous youth narrowing by more than half, from a -27 percentage point difference in 1999 to -12 percentage points in 2007.
- The proportion of Indigenous 19-year-olds participating or completing vocational education and training (VET) study also increased over the same period.
- Higher literacy and numeracy levels are associated with higher Year 12 completion and university post-school study for Indigenous and non-Indigenous young people. However, these rates are lower for Indigenous youth; hence, the gap remains.
- High-achieving Indigenous youth are not participating in university study at the rate of their non-Indigenous counterparts, despite a large proportion of these young people aspiring to university study. Instead, a large proportion of them are undertaking VET.
- Slightly larger proportions (four percentage points) of Indigenous 19-year-olds are in full-time employment, among them many higher achievers. They are working mainly in trades, sales work, clerical and administration, and personal care. Around 4% are employed as professionals.
- Raising literacy and numeracy levels contributes significantly to improving Indigenous outcomes, particularly in increasing Year 12 completion rates. But a multiple-level approach is required to reduce the educational gap between Indigenous and non-Indigenous young people, since Indigenous youth face a combination of disadvantages, such as poor access to post-school education as well as low literacy and numeracy levels, all of which subsequently affect their educational outcomes.

Closing the gap in outcomes between Indigenous and non-Indigenous people is a key goal nationally. To do this, governments at both federal and state levels are striving to improve Indigenous people's educational attainment and employment participation (Macklin 2009; Productivity Commission 2009).

Over time, outcomes for Indigenous young Australians have improved, with falls in unemployment and increases in the number obtaining certificate II level qualifications or above. However, recent reports on the progress of Indigenous outcomes (Productivity Commission 2009; Dusseldorp Skills Forum 2009) show that these improvements have occurred against an improvement in outcomes for all young people; so the gap remains. Across some indicators—for example, university participation—the gap has actually widened.

There are multiple factors that contribute to Indigenous disadvantage. These are highly interconnected, and action across a range of areas may be required to improve a single indicator of success (Productivity Commission 2009). The Productivity Commission noted that achieving some targets can have multiple effects and lead to improvements across a range of indicators. For example, literacy and numeracy levels are important factors that contribute to Year 12 completion and participation in post-school education and training for all young people (Marks et al. 2000; Rothman, Frigo & Ainley 2005). These factors in turn influence employment outcomes and individual health (Productivity Commission 2009). Due to the consistently lower scores in reading and maths assessments achieved by Indigenous youth, improving their performance in literacy and numeracy has become one of the key target areas on the national agenda for helping to close the gap between Indigenous and non-Indigenous Australians.

Using data from the Longitudinal Surveys of Australian Youth we can segment outcomes of Indigenous young people by background characteristics. This enables us to examine the contributing effects of literacy and numeracy levels on Indigenous outcomes and the extent to which raising these levels helps to reduce the gap.

This briefing paper begins by looking at whether the early post-school outcomes of Indigenous young people have improved in the last decade and compares two LSAY cohorts: those first interviewed in 1995 and those first interviewed in 2003. The focus of the paper then turns to the analysis of gaps in literacy and numeracy levels between Indigenous and non-Indigenous youth in 2007.

The LSAY data contain representative samples of Indigenous young people (2.1% in the Y95 cohort and 1.9% in the Y03 cohort) but the numbers in each wave are relatively small.¹ This limits how the results can be generalised to the Indigenous population as a whole when the analysis disaggregates the sample by background characteristics.

¹ Attrition also affects the sample of Indigenous young people in LSAY, with a noticeable drop in the third year of the survey (wave 3) when most young people were leaving school.

THE GAP BETWEEN INDIGENOUS AND NON-INDIGENOUS YOUNG PEOPLE IN LSAY

Table 1 compares the education and employment outcomes of two cohorts of Indigenous and non-Indigenous youth in 1999 and 2007, approximately 19 years², typically one year after completing Year 12. Over this period, significant gains have been made in Year 12 completion for Indigenous youth, with the

proportion increasing from 49% in 1999 to over 70% in 2007. The gap between Indigenous and non-Indigenous youth completing Year 12 also reduced by more than half, from a -27 percentage point difference to -12 percentage points in 2007, despite an increase for non-Indigenous young people.

Table 1 Summary of education and employment outcomes by Indigenous status, approximately 19 years old, 1999 and 2007, Y95 and Y03 cohorts (%)

	1999			2007		
	Indigenous	Non-Indigenous	Gap ^(a)	Indigenous	Non-Indigenous	Gap ^(a)
Number of respondents	172	8095	-	260	6398	-
	(%)	(%)	(%)	(%)	(%)	(%)
Completed Year 12	49	76	-27	71	83	-12
Employed – total	64	74	-10	81	86	-5
Employed full-time	36	32	+4	46	42	+4
In full-time employment or full-time education	62	80	-18	66	79	-13
Undertaking or completed a bachelor degree or higher	17	31	-14	16	39	-23
Undertaking or completed a VET qualification ^(b)	26	28	-2	40	34	+6

Notes: (a) The gap is calculated as a percentage-point difference.

(b) Includes apprenticeships and traineeships and certificate I to advanced diploma.

The overall proportion of 19-year-olds participating or completing VET qualifications has increased significantly since 1999, particularly for Indigenous youth. However, the same improvements are not seen in the uptake of university study for Indigenous young people. LSAY shows that between 1999 and 2007 the gap between Indigenous and non-Indigenous people participating in university study increased, a finding consistent with national reporting (Dusseldorp Skills Forum 2009).

The proportion of Indigenous young people in employment increased for 19-year-olds in 2007, compared with those in 1999. This trend is also evident for non-Indigenous youth and may relate to improved labour market conditions at this time. The employment gap between Indigenous and non-Indigenous young people has narrowed slightly between 1999 and 2007. Slightly larger proportions of Indigenous youth are in full-time employment than non-Indigenous young people, more of whom are in full-time study.

² LSAY participants in the Y95 cohort were, on average, 18.5 years old in 1999. LSAY participants in the Y03 cohort were, on average, 19.7 years old in 2007.

LITERACY AND NUMERACY LEVELS WITHIN THE INDIGENOUS POPULATION

LSAY research has consistently found that test scores in maths and reading are significantly lower for Indigenous young people than for non-Indigenous young people, even after taking into account background factors such as socioeconomic status and locality (Rothman, Frigo & Ainley 2005; Australian Council for Educational Research 2009).

The performance of Indigenous Year 3, 5 and 7 students against the national benchmarks for reading, writing and numeracy have not changed markedly between 1999 and 2007. As they progress through school beyond Year 7, the proportion of Indigenous students achieving the national benchmarks in reading and numeracy decreases (Australian Council for Educational Research 2009; OECD 2009).

The reading and maths achievement quartiles measured in the Programme of International Student Assessment (PISA) provide a measure of literacy and numeracy levels at age 15 years. Students who participated in PISA in 2003 became the LSAY 2003 cohort, providing us with the opportunity to assess the impact of literacy and numeracy on their early post-school outcomes in 2007³.

Table 2 demonstrates the differences in reading and maths assessment distributions within the two groups of young people. Compared with non-Indigenous youth, Indigenous young people are over-represented in the lower half of both maths and reading achievement quartiles, with around half in the lowest achievement quartile.

Table 2 Summary of achievement in reading and maths by Indigenous status, 2007, Y03 cohort (%)

	Indigenous (N = 260) (%)	Non-Indigenous (N = 6398) (%)	Gap ^(a) (%)
Reading comprehension			
Lowest quartile	46	23	+23
Second quartile	22	22	-2
Third quartile	17	27	-10
Highest quartile	15	27	-12
Mathematics achievement			
Lowest quartile	51	22	+29
Second quartile	22	25	-3
Third quartile	17	26	-9
Highest quartile	10	28	-18

Note: (a) The gap is a percentage-point difference, not a percentage difference.

Looking at the achievement quartiles by locality and gender adds context (tables 3 and 4). Tables 3 and 4 show that the majority of all young people attend schools in metropolitan areas, regardless of Indigenous status or achievement levels in reading and maths. But a larger proportion of non-Indigenous youth attend schools in metropolitan areas, providing them with more opportunities for employment and access to post-school education than their Indigenous counterparts.

An interesting point observed from tables 3 and 4 is the gender difference evident in literacy and numeracy levels. Females tend to perform better in reading, while males perform better in maths assessment, irrespective of Indigenous status.

³ Achievement quartiles are derived from wave 1 for all students.

Table 3 Reading achievement quartiles by locality of school attended and Indigenous status, 2007, Y03 cohort (%)

	Reading achievement quartile			
	Lowest	Second	Third	Highest
Number of respondents	108	59	49	44
Indigenous	(%)	(%)	(%)	(%)
Metropolitan	65	65	60	62
Non-metropolitan	35	35	40	38
Male	50	54	36	34
Female	50	46	64	66
Non-Indigenous	(%)	(%)	(%)	(%)
Metropolitan	70	73	71	76
Non-metropolitan	30	27	29	24
Male	65	54	49	43
Female	35	46	51	57

Table 4 Maths achievement quartiles by locality of school attended and Indigenous status, 2007, Y03 cohort (%)

	Maths achievement quartile			
	Lowest	Second	Third	Highest
Number of respondents	118	62	49	31
Indigenous	(%)	(%)	(%)	(%)
Metropolitan	63	61	66	70
Non-metropolitan	37	39	34	30
Male	44	50	39	60
Female	56	50	61	40
Non-Indigenous	(%)	(%)	(%)	(%)
Metropolitan	74	69	72	76
Non-metropolitan	26	31	28	24
Male	49	48	52	58
Female	51	52	48	42

EXTENT OF THE GAP BETWEEN INDIGENOUS AND NON-INDIGENOUS YOUNG PEOPLE

The analysis now turns to how much literacy and numeracy levels contribute to the educational gap between Indigenous and non-Indigenous young people. This is done by breaking down the gap in school, post-school study and employment outcomes into two individual components.

The first component is referred to as the 'literacy/numeracy effect' in tables 5–8 and calculates how much the difference in distributions of the group achievement quartiles contributes to the gap. We know that larger proportions of Indigenous young people score in the lower quartiles of reading and maths achievement. The question we are interested in is how much does this affect the differences between the overall education and employment outcomes of Indigenous and non-Indigenous youth.

The second component is referred to as 'other contributing factors', and calculates how much of the gap is attributable to differences between the Indigenous and non-Indigenous groups that are not related to 'literacy and numeracy effects'. Contributing factors could include locality, health, parental income, occupation, and educational attainment. Appendix A provides further information on the calculations contained in tables 5–8.

Table 5 shows that Year 12 completion improves with higher levels of literacy and numeracy for both Indigenous and non-Indigenous young people. However, significant gaps remain across the lowest and third achievement quartiles, indicating that Indigenous people confront other disadvantages that affect completion of Year 12, over and above poor literacy and numeracy skills.

Overall, the Year 12 completion rate for Indigenous young people is 12 percentage points lower than for non-Indigenous young people. Not surprisingly, over half of the gap is because Indigenous young people have lower Year 12 completion rates for a given level of literacy, confirming that other factors are important contributors to raising Year 12 completion.

But close to half (that is, five percentage points out of the 12 percentage points) can be attributed to the poorer literacy scores of Indigenous young people (literacy effect). The story is similar when maths achievement is controlled for (numeracy effect). This indicates that improving levels of literacy and numeracy will go some way to improving Year 12 completion rates for Indigenous youth.

Overall, slightly more Indigenous young people at the average age of 19.7 years are in full-time employment compared with non-Indigenous youth (table 6). What is noticeable is the lower rate of Indigenous youth in full-time employment in the bottom literacy and numeracy quartiles and that those Indigenous people in the top quartiles have higher employment rates than their non-Indigenous counterparts at this age. Indigenous young people at the average age of 19.7 years work mainly in trades (19%) and sales (15%), and as labourers (13%). Around 4% are employed as professionals. Refer to table B1 in appendix B for the full table of occupations.

Table 5 Completing Year 12, at age 19.7 years, 2007, Y03 cohort (%)

Reading achievement quartile					
Quartile	Indigenous	Non-Indigenous	Gap	Literacy effect	Other contributing factors
	(%)	(%)	(%)	(%)	(%)
Lowest	55	64	-8	-	-
Second	83	82	+1	-	-
Third	80	90	-10	-	-
Highest	95	95	0	-	-
Total	71	83	-12	-5	-7

Maths achievement quartile					
Quartile	Indigenous	Non-Indigenous	Gap	Numeracy effect	Other contributing factors
	(%)	(%)	(%)	(%)	(%)
Lowest	58	66	-8	-	-
Second	74	80	-6	-	-
Third	97	88	9	-	-
Highest	93	95	-2	-	-
Total	71	83	-12	-4	-8

Table 6 Employed full-time, at age 19.7 years, 2007, Y03 cohort (%)

Reading achievement quartile					
Quartile	Indigenous	Non-Indigenous	Gap	Literacy effect	Other contributing factors
	(%)	(%)	(%)	(%)	(%)
Lowest	46	59	-13	-	-
Second	52	49	3	-	-
Third	42	36	6	-	-
Highest	44	27	17	-	-
Total	46	42	4	-2	6

Maths achievement quartile					
Quartile	Indigenous	Non-Indigenous	Gap	Numeracy effect	Other contributing factors
	(%)	(%)	(%)	(%)	(%)
Lowest	48	53	-5	-	-
Second	36	49	-13	-	-
Third	55	41	14	-	-
Highest	42	28	14	-	-
Total	46	42	4	-2	6

The higher employment rates in the upper quartiles are associated with lower numbers going onto university study. Table 7 shows that the small proportion of Indigenous youth going to university (23 percentage points lower than for non-Indigenous

youth) can be partly attributed to their poor literacy and numeracy scores within every literacy and numeracy quartile. Other factors contribute equally to the lower university participation for Indigenous youth.

Table 7 Undertaking or completed a bachelor degree or higher, at age 19.7 years, 2007, Y03 cohort (%)

Reading achievement quartile					
Quartile	Indigenous	Non-Indigenous	Gap	Literacy effect	Other contributing factors
	(%)	(%)	(%)	(%)	(%)
Lowest	6	11	-5	-	-
Second	13	27	-14	-	-
Third	28	49	-21	-	-
Highest	39	65	-26	-	-
Total	16	39	-23	-13	-10

Maths achievement quartile					
Quartile	Indigenous	Non-Indigenous	Gap	Numeracy effect	Other contributing factors
	(%)	(%)	(%)	(%)	(%)
Lowest	4	14	-10	-	-
Second	18	26	-8	-	-
Third	34	44	-10	-	-
Highest	47	66	-19	-	-
Total	16	39	-23	-10	-13

Overall, there is no real difference in the proportion of Indigenous and non-Indigenous youth undertaking VET study at certificate III level or above (table 8). Higher participation in VET by Indigenous youth in the highest quartiles balances their lower participation in the other quartiles. The larger uptake of VET study compared with university study by high-achieving Indigenous

youth can be explained in part by access to higher education institutions. VET study is more accessible than university study in non-metropolitan areas, where over a third of high-achieving Indigenous youth reside (compared with a quarter of their non-Indigenous counterparts, see tables 3 and 4).

Table 8 Undertaking or completed a certificate III level VET qualification or higher, at age 19.7 years, 2007, Y03 cohort (%)

Quartile	Reading achievement quartile				
	Indigenous	Non-Indigenous	Gap	Literacy effect	Other contributing factors
	(%)	(%)	(%)	(%)	(%)
Lowest	33	43	-10	-	-
Second	34	36	-2	-	-
Third	26	26	0	-	-
Highest	21	15	6	-	-
Total	30	29	1	-4	5

Quartile	Maths achievement quartile				
	Indigenous	Non-Indigenous	Gap	Numeracy effect	Other contributing factors
	(%)	(%)	(%)	(%)	(%)
Lowest	36	39	-3	-	-
Second	27	37	-10	-	-
Third	20	30	-10	-	-
Highest	26	15	11	-	-
Total	30	29	1	-4	5

POST-SCHOOL PLANS AND INTENTIONS

A similar proportion of Indigenous young people aspire to post-school study at VET or university as their non-Indigenous counterparts (74% and 78% respectively, table 9). Unfortunately, less than half of

Indigenous young people pursue these post-school study plans compared with over two-thirds of non-Indigenous youth (table 1).

Table 9 Post-school plans by Indigenous status, at average age 15 years, 2003, LSAY Y03 cohort (%)

	Indigenous	Non-Indigenous	All
Post-school plans	(%)	(%)	(%)
University	34	55	56
VET*	40	24	23
Work	13	9	9
Other	3	5	5
Don't know	10	8	7
Total	100	100	100

Note: Due to attrition and low response to this question, post-school plans at age 15 years (wave 1) are used.

* VET includes apprenticeships and traineeships.

And these aspirations vary by academic ability. Table 10 shows that lower-achieving students are more likely to have aspirations for post-school VET study, while higher-achieving students are more likely to have aspirations to

go to university. However, unlike their non-Indigenous counterparts, fewer Indigenous high achievers actually go on to realise their post-school university plans, and instead go onto post-school VET study.

Table 10 Post-school plans by Indigenous status, at average age 15 years, 2003, LSAY Y03 cohort (%)

	Reading achievement quartile					
	Indigenous (%)			Non-Indigenous (%)		
	University	VET	Work	University	VET	Work
Lowest	20	49	16	32	43	13
Second	39	35	10	48	28	9
Third	50	37	9	63	16	7
Highest	75	12	10	78	6	5
Total	34	40	13	55	24	9

	Maths achievement quartile					
	Indigenous (%)			Non-Indigenous (%)		
	University	VET	Work	University	VET	Work
Lowest	25	46	15	34	41	13
Second	37	40	13	48	28	10
Third	55	25	7	61	19	7
Highest	67	20	6	77	6	5
Total	34	40	13	55	24	9

Note: Due to attrition and low response to this question, post-school plans in wave 1 are used. Table 10 excludes don't know and other responses.

CONCLUSIONS

This briefing paper considered the extent to which literacy and numeracy levels contribute to the gap between the educational and employment outcomes of Indigenous and non-Indigenous young people.

High levels of literacy and numeracy are associated with higher completion of Year 12 and university post-school study for both Indigenous and non-Indigenous young people. However, these rates are lower for Indigenous youth.

The negligible gap in post-school VET study (certificate III or higher) between Indigenous and non-Indigenous youth can be attributed to the higher proportion of Indigenous youth in the top literacy and numeracy quartiles participating in this pathway. This balances the low proportions in the other quartiles.

By contrast, high-achieving Indigenous youth are not participating in university study at the rate of their non-Indigenous counterparts, despite a large proportion of these young people aspiring to study at university. Instead, a large proportion of higher-achieving Indigenous youth are undertaking VET study. This may be because in non-metropolitan areas there is better access to VET than university study.

Another concern is that over 70% of Indigenous young people aspire to post-school study but less than half go on to pursue these post-school study plans. This compares with over two-thirds of non-Indigenous young people participating in post-school study.

The slightly larger proportion (four percentage points) of Indigenous youth at the average age of 19.7 years in full-time employment is mainly explained by the higher proportion of Indigenous youth in the top quartiles of literacy and numeracy who are working rather than studying. This partly reflects the fact that a much smaller proportion of Indigenous youth go to university.

Raising the levels of literacy and numeracy for Indigenous youth would help to improve some of their educational outcomes. However, many Indigenous young people face multiple disadvantages, such as poor access to post-school education and poor health, in addition to the low literacy and numeracy levels that subsequently affect their outcomes.

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APPENDIX A: MEASURING THE GAP

We have determined that there are differences between Indigenous and non-Indigenous groups for the outcomes of interest (such as Year 12 completion) by literacy and numeracy levels. The gap can be decomposed into two individual components. The first component explains the difference in distributions of the group (Indigenous or non-Indigenous) achievement quartiles. If there are large differences in these distributions, then we would expect this to contribute more to the gap. For example, if there are more Indigenous individuals in the lower quartile, and if this explains a large proportion of the gap, then policy can be directed at improving Indigenous numeracy and literacy. The second component explained is that of 'other' differences between the Indigenous and non-Indigenous groups. This component consists of differences that are not related to ability. The gap is decomposed or broken down separately for literacy and numeracy by the outcome variables of interest.

The methodology to break down the gap into its two components is:

$$\begin{aligned} \text{Gap} &= \frac{1}{n} \sum_{i=1}^4 \sum_{j=1}^n x_{ij} - \frac{1}{m} \sum_{i=1}^4 \sum_{j=1}^n y_{ij} \\ &= \frac{1}{n} \sum_{i=1}^4 \frac{n_i}{n_i} \sum_{j=1}^n x_{ij} - \frac{1}{m} \sum_{i=1}^4 \frac{m_i}{m_i} \sum_{j=1}^n y_{ij} \\ &= \sum_{i=1}^k \frac{n_i}{n} \bar{x}_i - \sum_{i=1}^k \frac{m_i}{m} \bar{y}_i \end{aligned}$$

Where $i = 1, \dots, 4$ represents the i th achievement quartile, $j = 1, \dots, n$, the j th individual in the particular group, x represents an Indigenous person, and y represents a non-Indigenous person, n_i and m_i represent the number of Indigenous and non-Indigenous individuals respectively.

If we replace $\frac{n_i}{n} = p_i$ and $\frac{m_i}{m} = q_i$ then we obtain:

$$\begin{aligned} &= \sum_{i=1}^4 (p_i \bar{x}_i - q_i \bar{y}_i) \\ &= \sum_{i=1}^4 [p_i (\bar{x}_i - \bar{y}_i) + \bar{y}_i (p_i - q_i)] \end{aligned}$$

Which decomposes the gap into the 'literacy/numeracy effect' and 'other contributing factors' respectively in tables 5–8.

APPENDIX B: ADDITIONAL TABLE

Table B1 ANZSCO 1-digit occupation of young people at average age 19.7 years by Indigenous status, 2007, LSAY Y03 cohort (%)

ANZSCO 1-digit occupation of respondent	Indigenous (%)	Non-Indigenous (%)
Number of respondents	260	6398
Managers	2*	3
Professionals	4*	5
Technicians and trades workers	19	16
Community and personal service workers	11	17
Clerical and administrative workers	11	11
Sales workers	15	20
Machinery operators and drivers	4*	3
Labourers	13	10
Unknown or not classifiable	2*	1
Not employed	19	14
Total	100	100

Note: * Estimate has a relative standard error greater than 25%.

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The Longitudinal Surveys of Australian Youth is a research study that follows young Australians as they move from school into further work and study. It provides valuable information to better understand young people's pathways from school and what influences their choices. The analytical and research work of the program is managed by NCVER.

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