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Assessing the utility of 1996 Census data on indigenous Australians

B. Hunter

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Summary

The large non-biological, or non-childbirth-related, increases in the indigenous population cast doubt on how much confidence can be placed in 1996 Census data on Indigenous Australians. The credibility of analysis of 1996 Census data on indigenous Australians hinges on who the people are who have changed their indigenous identification between the last two censuses. This paper uses three techniques to indirectly examine this question.

Change in indigenous identification in last two censuses

The Post-Enumeration Survey (PES) conducted in non-remote areas after each census provides an important insight into the sort of people who are likely to change indigenous identification.

- The size of the 'marginal' indigenous population, defined as those who changed identification in the three week period between the census and the PES, fell substantially between 1991 and 1996. Indigenous people appear to be more confident about identifying themselves as indigenous in the 1996 Census.
- The percentage of population who identify as indigenous in either the census or the PES was identical in 1991 and 1996. The number of people who identify as indigenous is more stable than the prima facie evidence indicates.
- After accounting for the fact that the PES is not conducted in remote areas the potential indigenous population, defined as those who identify as indigenous in either the PES or the census, increases from 314,800 to 383,600 between 1991 and 1996. The 1991 number corresponds quite closely to Gray's estimate of the base indigenous population (313,500) that must have existed in that year, given the 1996 census results and latest data on fertility and mortality. Therefore is no need to resort to explanations which rely on bogus identification to explain the large increases in the indigenous population.
- The age profiles for both the 'marginal' and more consistent indigenous identifiers are concordant with the higher adult mortality that is characteristic of indigenous populations.

Cohort analysis of indigenous and non-indigenous populations, 1986–96

The second method uses cohort analysis of people born in a particular year to examine changes in education among people who identify as indigenous.

- There is no significant change in the proportion of early school leavers for indigenous identifiers for the last three censuses. That is, there is no evidence of changes in indigenous characteristics resulting from an influx of relatively well educated individuals.

- There was a small increase in proportion of the indigenous population with post-secondary qualifications between 1991 and 1996. However, this may be a result of education policy and active labour market programs in this period as much as a change in the composition of the indigenous population.

The geography of increased indigenous identification

The third method looks at changes in identification rates across both urban and rural areas to explore whether there are any obvious spatial concentrations of increased indigenous identification.

- Increased identification occurred in similar areas to those areas traditionally identified as indigenous (low socioeconomic status and high unemployment rates areas).

An excessive focus on whether this newly identified population are indigenous is undesirable. The continuing high level of disadvantage among the indigenous population means that self-identification signifies that one is, more than likely, disadvantaged. While it is difficult to say with absolute certainty that census statistics only reflect the economic status of the indigenous population, they are sufficiently credible, in the opinion of this author, to be taken at face value.

Acknowledgments

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Introduction

The large non-biological increases in the indigenous population cast doubt on how much confidence can be placed in 1996 Census data on Indigenous Australians (Barnes 1997). If the people who currently identify as indigenous but did not do so in past censuses are radically different from those who have continuously identified, then we must question the validity of census-based comparisons of changes in the socioeconomic status of indigenous Australians.

Analysis of the last two censuses indicate that about 50 per cent of the increase in the indigenous population is due to natural causes (Gray 1997a, 1997b). The other half may either be due to increased coverage of the indigenous population or an increased propensity to identify as indigenous on the census form. If increased coverage is the major factor behind the residual growth in the indigenous population, then census-based statistics will provide an accurate picture of the change in characteristics of indigenous people. In these circumstances we only need to construct a consistent series of estimates of the indigenous population which accounts for the variable coverage of the respective censuses to make legitimate intercensal comparisons. However, if changes in identification are important, questions must be asked about how changes in the composition of the indigenous population are affecting our analysis.

The issues involved can be illustrated by way of example. If the labour market characteristics of all the newly identified indigenous population are close to the non-indigenous population, then correcting for the different population levels in the respective censuses will distort the picture of those who identified as indigenous in previous censuses. Apparent substantial improvements in the employment status of indigenous Australians between 1991 and 1996 may be grossly over-stated if the newly identified indigenous population are relatively well-endowed (Altman 1997). It is conceivable that employment among those who continuously identified as indigenous actually fell or only improved marginally.

The Australian Bureau of Statistics (ABS) Standard for indigenous status is founded on the 'Commonwealth Working Definition' which states:

> An Aboriginal or Torres Strait Islander is a person of Aboriginal or Torres Strait Islander descent who identifies as an Aboriginal or Torres Strait Islander and is accepted as such by the community in which he or she lives.

Historically, censuses have only collected information on the descent component of this definition but some respondents will interpret the question to mean both descent and identification (Barnes 1997). Since the same question on indigenous status has been asked since 1981, the changes in the census measure of indigenous status is not a result of variations in the question asked.[1]

The utility of census statistics on indigenous Australians thus revolves around the question: who are the people who now identify as indigenous but did not in previous censuses? This paper addresses this issue using several techniques on data from the last three censuses. First, the Post-Enumeration

Survey (PES) data from the 1996 census are used to identify the characteristics of those who are likely to change identification between surveys/censuses.

Second, cohort analysis of people in certain age groups attempts to indirectly identify the extent to which compositional changes in those identifying as indigenous affect the overall changes in indigenous statistics. That is, holding sex and age constant, how do the characteristics of each cohort change between 1986 and 1991. Changes in the age/sex profile of educational attainment which are slow to change over time and thus provide indirect evidence of any compositional effect from these non-biological alterations in the quality of the data.

Finally, the locational dimension to intercensal changes can be analysed by examining whether the areas in which indigenous identification increased were, historically, where indigenous people have lived. If the geography of indigenous identification did not change in the last intercensal period, then the people who now identify as indigenous are similar, at least in terms of their spatial characteristics, to the people who identified before 1991. Taken together these three techniques should provide sufficient evidence for users of census data to feel confident that the 1996 indigenous data is useful.

Change in indigenous identification in last two censuses

The PES conducted after each census provides an important insight into the sort of people who are likely to change indigenous identification. The PES involves an interview conducted three weeks after census night and provides information about the quality of data collected on a range of demographic factors (age, sex, marital status and whether a person was born overseas) and indigenous status. The question about indigenous origins permits a direct comparison of the PES response with that given in the census.

One use of the PES is to gain some insight into the level of census undercounts in the areas in which the survey is conducted. Because the PES is not conducted in remote areas it is not possible to directly analyse the changes in identification of remote residents. However, given that only 0.5 per cent of the population enumerated on the remote area interview forms in 1991 were non-indigenous (Evans, Kahles and Bate 1993: 25), changes in identification are unlikely to be an important factor in such areas.

Census undercount rates decreased between 1986 and 1991, falling from 6.0 to 3.6 per cent for the indigenous population and from 1.9 to 1.7 per cent for the non-indigenous population (Evans, Kahles and Bate 1993: 6). While this constitutes prima-facie evidence that more of the indigenous population was covered by the 1991 Census than in previous collections, there was little room for improvement between 1991 and 1996. At best, on the basis of the 1991 estimates, increasing the coverage of the indigenous people to that experienced by other Australians would only increase the indigenous population by 1.9 per cent.

Differences in methodology between the PES and the census mean that people may be more likely to self identify as indigenous in anonymity rather than when an interviewer asks the same question some weeks later. Many indigenous people have an entrenched distrust of public institutions (Hunter 1997) and the ABS interviewer may be viewed with some suspicion. Notwithstanding the intrinsic difficulty in second guessing why people changed identification between the census and the corresponding PES, this analysis will attempt to tease out what type of people are likely to change identification. For the rest of this section, 'marginal' indigenous population refers to those PES respondents who changed identification between the survey and the respective censuses (and vice versa). The term 'consistent' indigenous population will be used to refer to those respondents who do not change indigenous identification. For the purposes of this section, the non-indigenous population comprises those people who identify as such in both the PES and the census.

Table 1. PES and census responses to the indigenous origins question, 1991 and 1996

	Non-indigenous	Indigenous	Total
	1991 Census response		
1991 PES response			
Non-indigenous	63,888	192	64,080
	(98.05)	(0.29)	(98.35)
Indigenous	174	904	1,078
	(0.27)	(1.39)	(1.65)
Total	64,062	1,096	65,158
	(98.32)	(1.68)	(100.00)
	1996 Census response		
1996 PES response			
Non-indigenous	79,298	237	79,535
	(98.05)	(0.29)	(98.35)
Indigenous	91	1,245	1,336
	(0.11)	(1.54)	(1.65)
Total	79,391	1,482	80,873
	(98.17)	(1.83)	(100.00)

Notes: The PES surveyed 65,158 and 82,210 persons in 1991 and 1996 censuses, respectively. The not stated categories are eliminated from the 1996 cross-tabs in order to make the tables comparable between censuses. The per cent of PES respondents in each category are listed in brackets.

Source: 1991 data from Evans, Kahles and Bate (1993: 12) and 1996 equivalents from Barnes (1997).

The matrix shown as Table 1 indicates that a substantial portion of the PES survey population changed identification between the census and the subsequent survey. About 20 per cent of the census indigenous population in non-remote areas changed identification in both 1991 and 1996. One interesting feature of Table 1 is that the proportion of PES respondents who indicated they were indigenous in the survey but did not identify in the census fell between 1991 and 1996. The marginal indigenous population fell substantially at a time of large

increases in the indigenous population. That is, indigenous people appear to be more consistent about officially identifying themselves as indigenous.

One particularly interesting feature of Table 1 is that the percentage of people who identify as non-indigenous in both the PES and the census is identical in both 1991 and 1996 (98 per cent). Inverting this, the number of people who identify as indigenous in some way were identical in both of these years. Thus, the number of people who identify as indigenous appears to be more stable than the prima facie evidence indicates.

Table 2 emphasises this point by calculating the population corresponding to each category of response to the indigenous questions in the last two censuses and the respective PES. Since the PES is not conducted in remote areas where there are concentrations of indigenous people, it is necessary to estimate the population in Collection Districts (CDs) receiving the remote area form and deduct these numbers from the census populations. In the absence of any better information, indigenous identification in these non-PES areas is taken as given. The corresponding populations are calculated by allocating people in PES areas to each category according to the proportions implicit in Table 1.[2] While this is, in some respects, merely a re-presentation of the information in the previous Table, it is useful in illustrating several important points.

Table 2. Estimated indigenous population in each category of response to the indigenous question: 1991 and 1996 Censuses and the PES

	Non-indigenous	Indigenous	Total
		1991 Census response	
1991 PES response			
Non-indigenous	16,535,600	37,600	16,573,200
Indigenous	45,000	232,200	277,200
Total	16,580,600	269,800	16,850,300
		1996 Census response	
1996 PES response			
Non-indigenous	17,369,200	48,100	17,417,300
Indigenous	19,900	315,600	335,500
Total	17,389,100	363,700	17,752,800

Note: The PES is not conducted in remote areas (defined as being where there was less than 0.57 dwellings per square kilometre) or in discrete Aboriginal communities. The population in these remote areas was calculated using the CDs numbers of areas which did not use the Special Indigenous Form (SIF), also known as the 'remote area form'. The population for each census category of indigenous identification were allocated to a cell on the basis of the proportion of each census sub-group (eg. indigenous people) who claimed they were indigenous or non-indigenous in the PES. This approach was adopted to account for the differential rates of indigenous identification in PES and non-PES areas. For simplicity's sake, and in the absence of any better information, the rate of indigenous identification in non-PES areas for the census was taken as given. Totals may not add up due to rounding errors.

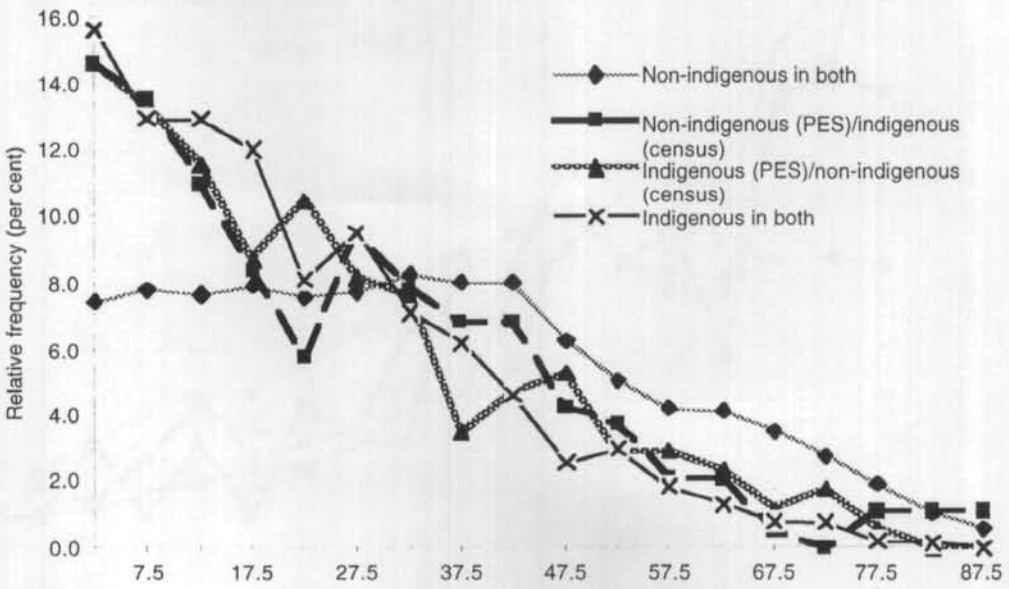
Source: See Table 1. Indigenous identification in censuses from ABS (1993) and ABS (1997).

Two things emerge from Tables 1 and 2. First, while similar numbers of people changed identification from indigenous to non-indigenous and vice versa in

1991, substantially fewer changed identification from non-indigenous in the 1996 census to indigenous in the PES. One implication may be that there is limited potential for further non-biological increases in indigenous identification as measured by future censuses. That is, if the potential indigenous population is assumed to be those who identify themselves as indigenous in either the census or PES, then future increases in census identification may be in the order of the 20,000 or so who identified as indigenous in the 1996 PES but not in the 1996 census.

The second point to emerge is that the potential indigenous population, defined as those people who identified as indigenous in either survey or the census, was more stable than the intercensal change in population indicates. The potential indigenous population increased from 314,800 to 383,600 between 1991 and 1996. This relative stability is based on the fact that the non-indigenous population in the 1996 Census were less likely to change their identification than in the previous census. More importantly, the 1991 number corresponds quite closely to Gray's (1997b) estimate of the base indigenous population (313,500) that must have existed in that year given the 1996 census results and latest data on fertility and mortality. If the people who identified themselves as indigenous in 1991 in either the census or PES are considered to be the 1991 base population, then the large increase in the Aboriginal and Torres Strait Islander population is credible. There is no need to resort to explanations which rely on bogus identification of non-indigenous as indigenous respondents.

Figure 1. Age profiles for the 1991 Census



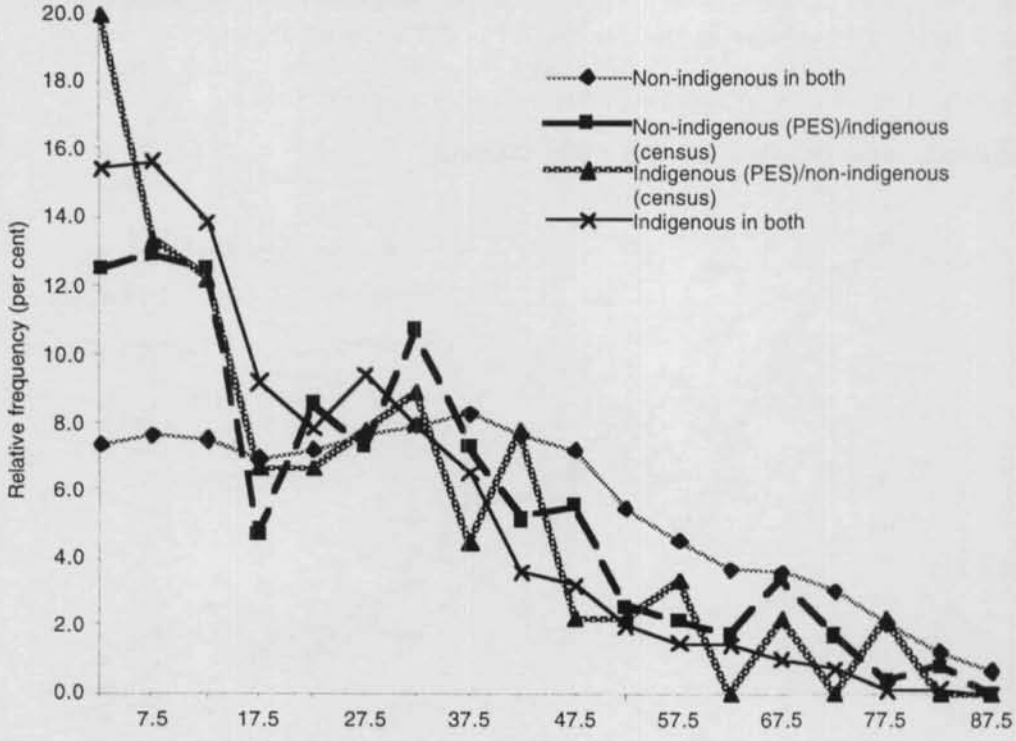
Note: Some census responses were been imputed during census processing. For the purposes of this analysis all imputed ages are classified as not stated. All not stated responses are excluded from the calculations.

Source: Unpublished data from the 1991 PES.

Notwithstanding this result, the 'marginal' indigenous people, who are more likely to change their identification, should be examined to see how they affect our interpretation of intercensal changes. Age and birthplace are two characteristics of the marginal indigenous population which should facilitate our analysis of whether they are more like the 'consistent' indigenous or non-indigenous populations.

The unique age profiles of indigenous Australians are clearly identifiable in Figures 1 and 2 for both the marginal indigenous population and those who seem more certain of their indigenous heritage. The age profiles for both the 'marginal' and more consistent indigenous identifiers are concordant with the higher adult mortality that is characteristic of indigenous populations (Gray 1997b). The age pyramids for the PES respondents who identified as indigenous in either the survey or the census are heavily weighted to younger age groups with few people living over 60. This result is emphasised by the fact that the PES excludes the remote area indigenous population who have very high fertility and adult mortality rates.

Figure 2. Age profiles from the 1996 Census



Note: Some census responses were been imputed during census processing. For the purposes of this analysis all imputed ages are classified as not stated. All not stated responses are excluded from the calculations.

Source: Unpublished data from the 1996 PES.

The fact that there is very little change in the age profile between 1991 and 1996 for either the marginal or more 'consistent' indigenous population means that one can feel confident that the composition of the indigenous population has not changed substantially. The age profile of the marginal indigenous population is still much closer to that of the 'consistent' indigenous population than it is to the non-indigenous profile. This result is consistent with Gray (1997a: 14–6) who found, using aggregate data, that the 'new' Aborigines had approximately the same age distribution as the 'old' Aborigines.

Similarly, the proportion of the population claiming to be born overseas among the 'marginal' indigenous population is closer to the indigenous than the non-indigenous population. Indeed, none of the PES respondents who identified themselves as indigenous in the 1991 Census were born overseas. Even those who identified as non-indigenous in the census but indigenous in the PES were six times less likely to be born overseas than the non-indigenous population.

Table 3. Proportion born overseas in the 1991 and 1996 Censuses

	Non-indigenous	Indigenous	Total
	1991 Census response		
1991 PES response			
Non-indigenous	22.4	0.0	22.8
Indigenous	3.5	0.0	0.6
Total	22.3	0.0	22.5
	1996 Census response		
1996 PES response			
Non-indigenous	22.6	2.2	22.3
Indigenous	11.1	0.4	1.2
Total	22.5	0.7	22.0

Source: Unpublished data from the 1991 PES.

The probability that an indigenous person claimed to be born overseas increased between 1991 and 1996 for both the consistent and marginal indigenous populations. Changes in census coding procedures meant that the major explanation for the change is that those who indicated they, or both of their parents, were born overseas were not counted as indigenous in the 1991 but were in 1996 (Taylor 1997: 10). Butterfield (1998) estimates that 6,111 or 7.0 per cent of the increase in the indigenous count in the last intercensal period can be accounted for by this change in coding procedures.

It is not possible to easily dismiss the increased proportion of overseas born among the marginal indigenous population. For example, people who identify as indigenous in the PES but not in the 1996 Census are only half as likely to be born overseas as the non-indigenous population. One possible explanation of these changes is that the type of people who formally identified as indigenous in the PES but not in the 1991 Census are now more likely to identify as indigenous in the census because of the changes in coding procedure.[3] Given that these

people were more likely to be born overseas in 1991 than the rest of the potential indigenous population, this scenario is consistent with the increases in the proportion born overseas in the other indigenous categories. The 'indigenous' people remaining in this category will be much more likely to be born overseas than other indigenous people.[4] If this interpretation is correct, then the potential increases in census identification in future censuses, disregarding 'bogus' increases in indigenous identification and people newly discovering their 'indigenous' roots, may be drawn from a population that bears more resemblance, at least in terms of their birthplace, to the non-indigenous population than they do to the consistent indigenous population.

In summary, the analysis of PES and census data reveals that the apparent increase in indigenous identification may not be as large as it appears at first glance. Much of the non-biological increase in census indigenous identification can be accounted for by people who claimed some indigenous heritage in 1991. However, Table 3 provides indirect evidence that some of the people who now tick the census question are less like the previously identified indigenous population. However, while there may be minor changes in the composition of the indigenous population, non-genuine increase in indigenous identification in recent censuses does not appear to be an important explanation of population increases.

Cohort analysis of selected characteristics

One way of assessing the effect of changing identification between the last few censuses is to trace the changes in the characteristics of cohorts of individuals between 1986 and 1996. A cohort is defined as having a fixed membership of individuals which can be easily identified in successive censuses (for example, males and females who were born in a particular year). Verbeek and Nijman (1992) show that synthetic cohorts of people in various age categories can be treated as individual observations when the size of each cohort is quite large, effectively 100 or 200 in practice.[5] The construction of cohorts with members that are distinct from one another and internally homogenous will enhance precision of the analysis.[6]

If the composition of the cohort changes over time in a way that changes the overall characteristics of the cohort, then this will manifest itself as apparent change in the characteristics of the cohort. Therefore, cohort analysis provides a relatively sensitive tool for examining the extent to which changes in the composition of the indigenous population may be affecting the data.

The analysis is confined to characteristics which are slow to change over time and are not sensitive to the stage of the lifecycle. The variables used are whether an individual left school before age 15 and whether they have a post-school qualification. One reason for confining our focus is to facilitate the intertemporal comparison of the cohort characteristics in order to identify the effect of changes in composition of the cohort. Our attention should be focused on cohorts who were 25 to 64 years old in 1986, because the large lifecycle changes

that occur before 25 and high death rates among the over 65 age group introduce excessive randomness into our estimates of the characteristics of the respective cohorts.[7]

Table 4. Cohort analysis of the proportion of the population who left school before age 15, 1986–96

	Indigenous			Non-indigenous		
Age in 1986	1986	1991	1996	1986	1991	1996
Males						
15 to 19	12.8	13.1	13.3	2.0	2.8	3.8
20 to 24	15.0	14.9	15.0	3.6	4.1	5.0
25 to 29	17.6	17.6	18.7	5.1	5.2	6.0
30 to 34	25.6	23.9	26.1	6.4	6.5	7.4
35 to 39	41.1	38.6	39.5	12.8	12.4	13.2
40 to 44	50.6	48.6	49.9	20.6	19.4	20.4
45 to 49	55.5	54.9	53.5	28.1	26.8	27.7
50 to 54	62.0	60.2	58.8	34.7	33.2	34.2
55 to 59	69.1	68.8	66.2	45.2	42.7	42.8
60 to 64	74.3	76.0	72.3	55.0	51.3	51.2
65 and over	79.3	77.9	74.9	58.4	53.5	52.6
Females						
15 to 19	10.8	10.0	9.8	1.8	2.3	3.2
20 to 24	11.4	11.4	11.2	3.1	3.3	4.0
25 to 29	14.4	14.1	14.3	4.8	4.7	5.3
30 to 34	21.0	20.1	20.5	6.5	6.2	6.9
35 to 39	34.9	33.6	33.2	13.6	12.5	13.0
40 to 44	44.2	42.3	42.7	21.4	19.7	20.4
45 to 49	50.0	47.2	47.9	28.0	26.2	26.9
50 to 54	55.6	55.4	53.4	34.6	32.7	33.6
55 to 59	62.8	63.7	60.3	42.9	40.4	40.8
60 to 64	71.9	69.1	69.8	52.2	48.4	48.8
65 and over	77.8	76.3	72.4	56.6	52.7	52.9

Notes: The 'not stated' category is omitted from the denominator when calculating the proportion. The category, 'did not go to school' is incorporated in having 'left school before age 15'. The question on which this variable was based changed between 1991 and 1996 in a way that reduced the number of people who indicated that they left school after 19. The 1996 questionnaire directly prompts the respondent to give the age they left primary or secondary school rather than leave the definition of what constitutes a school to respondents. The focus of this Table on early school leavers is an attempt to minimise the distortion from the 1996 Census.

Source: Unpublished cross-tabs of 1986, 1991 and 1996 census data.

Table 4 shows that the proportion of each indigenous cohort which leaves school by the relatively young age of 15 is fairly constant for all age groups. For example, the proportion of indigenous males who were aged between 20 and 24 at the 1986 Census and had left school before age 15 was 15.0 per cent in both 1986 and 1996. This observation is equally valid for non-indigenous and indigenous cohorts. The consistency of these measures of early school leavers across the last three censuses can be contrasted to the large differences between

indigenous and non-indigenous cohorts. The smallest differences between the indigenous and non-indigenous population are observed in the younger age groups with the difference rising to about 20 to 30 percentage points for many cohorts aged over 40 in 1986. That is, while consistent government policies have successfully reduced the overall number of early school leavers, there are persistent differences among Australians. These ongoing racial differences in incidence of early school leavers among all cohorts makes it even more remarkable that there is little evidence of compositional change arising from the non-biological increases in the indigenous count.

Table 5. Cohort analysis of the proportion of the population with no post-secondary qualification, 1986–96

	Indigenous			Non-indigenous		
Age in 1986	1986	1991	1996	1986	1991	1996
Males						
15 to 19	97.6	88.8	81.3	95.3	68.8	50.4
20 to 24	87.8	83.5	79.1	63.9	52.8	47.7
25 to 29	85.6	82.7	78.7	52.2	48.9	45.6
30 to 34	85.8	83.6	80.3	49.8	48.0	46.1
35 to 39	88.1	86.3	82.2	50.5	49.9	49.0
40 to 44	90.0	88.5	86.3	52.7	53.3	52.8
45 to 49	92.5	91.3	88.4	54.6	56.1	55.8
50 to 54	94.3	92.4	91.8	59.7	61.9	61.8
55 to 59	94.1	94.2	92.0	62.5	65.4	65.2
60 to 64	96.1	94.1	93.2	64.5	67.6	66.9
65 and over	96.5	96.8	95.7	71.2	75.6	73.8
Females						
15 to 19	97.1	92.3	86.8	94.5	73.6	59.5
20 to 24	90.9	90.9	86.8	72.7	66.5	62.6
25 to 29	90.4	89.7	85.8	65.1	64.8	62.2
30 to 34	91.2	89.5	85.7	65.6	65.5	63.6
35 to 39	92.3	90.6	87.8	69.4	70.1	68.6
40 to 44	94.4	93.6	91.0	72.6	74.1	73.4
45 to 49	95.3	94.9	93.2	77.0	79.2	79.0
50 to 54	96.1	96.1	94.7	80.8	83.4	83.5
55 to 59	97.0	98.5	97.0	82.3	85.8	86.0
60 to 64	98.6	98.6	97.7	85.1	88.9	89.2
65 and over	98.9	99.0	98.4	88.1	91.5	91.5

Notes: The 'not stated' category is omitted from the denominator when calculating the proportion.
Source: Unpublished cross-tabs of 1986, 1991 and 1996 census data.

Changes in the post-school qualifications of the cohorts are described in Table 5. The pattern of changes in the distribution of qualifications among cohorts is quite complex. While there has been a general increase in the numbers of qualifications among Australians, there is a consistent and persistent gap in educational attainment between indigenous and non-indigenous cohorts. The low

rate of acquiring qualifications among younger indigenous cohorts is evident with only 16.3 per cent of those indigenous people who were 15 to 19 years old in 1986 getting some post-school qualification by the time they reached their late 20s. The analogous non-indigenous cohorts fared much better with 44.9 per cent gaining some form of qualification in the ten years from 1986 to 1996.

While a large differential in the qualifications was evident among all cohorts, the differential became smaller in older age groups. One reason for this is the small increases in the proportion of the non-indigenous population without qualifications in such cohorts. This may represent a recognition by such groups that old qualifications may not be useful or recognised in the current labour market. The contrasting rise in the qualification level among older indigenous cohorts may need some explanation. The rise in the number of active labour market programs under the now defunct *Working Nation*, many of which attempted to secure some qualifications for participants, and the substantial number of indigenous participants in such programs may partially explain this somewhat anomalous observation (Taylor and Hunter 1996).[8] While the short-term nature of many programs offered may not have directly led to qualifications recognised by the ABS, they may have led to longer term courses which resulted in certificate, diploma or degree-based qualifications.[9]

Even if the recent changes in indigenous identification have affected the composition of qualification in the population, the effect appears to have been small. The 'newly identified' indigenous population have similarly poor educational endowments to those who identified in previous censuses.

Table 6. Analysis of variance (ANOVA) of whether cohorts over age 25 in 1986 have significantly different levels of educational attainment in adjacent censuses, 1986–96

	No post-school qualification		Left school before age 14 years	
	1986–91	1991–96	1986–91	1991–96
Males				
Indigenous	2.88	4.77*	0.04	0.01
Non-indigenous	0.19	0.31	0.13	0.03
Females				
Indigenous	0.32	6.00*	0.07	0.02
Non-indigenous	0.13	0.91	0.23	0.03

Notes: See Edwards (1993) for details of ANOVA methodology. An asterisk (*) denotes that the cohort characteristics are significantly different in the respective censuses at the 5 per cent level. The F-statistic reported in this Table are distributed F(1,80). The still at school category is negligible for all cohorts over age 25 in 1986.

Source: Unpublished cross-tabs of census data.

Table 6 reports the ANOVA analysis of whether the proportion of indigenous and non-indigenous cohorts over the age of 25 with various levels of educational

attainment changed significantly between intercensal periods. The only instances of educational characteristics changing significantly were in indigenous cohorts in the last intercensal period. This may be consistent with the hypothesis that there was compositional change in the characteristics of the indigenous population between 1991 and 1996. However, as Table 5 illustrates, such compositional change, if it exists, is relatively small in nature.

The complete lack of statistically significant changes in the cohort analysis of early school leavers means that it is probably possible to reject the hypothesis that non-biological increases in the count caused compositional changes in the indigenous population. The fact that a person can gain a qualification at any age, but is unlikely to leave primary and secondary school after age 25, adds weight to the judgement to give precedence to the results for early school leavers.

Cohort analysis is only an approximate test of the effect of potential changes arising from changes in composition of the indigenous population.[10] It may merely mean that policy has effectively increased indigenous educational attainment relative to other Australians. The closure of the gap in qualification rate between indigenous and other Australians, albeit rather small in size, is probably a good news story which is a tribute to the accomplishment of successive governments' education policies and active labour market programs. However, the persistent and large differential in educational qualifications between the indigenous and non-indigenous population means that the newly identified indigenous population do not differ substantially from those who identified previously.

Location and the recent increases in indigenous identification

Gray (1997a) shows that the increased identification occurred almost uniformly across all age groups for both males and females. This analysis focuses on whether there was any systematic patterns in changes in identification across areas between 1991 and 1996.

Taylor (1997) shows that the increased identification in major Australian cities occurred largely in low socioeconomic status neighbourhoods where indigenous people were already concentrated. This section provides further detail about the basis of his analysis and extends it to cover 'other urban' and rural areas.

If sections of the non-indigenous community experienced prolonged disadvantage, it is possible that an increase in 'bogus' indigenous identification may occur as a protest against the perception of the uncaring response of recent government to their plights and their (mis)perception that more benefits are received by indigenous Australians. Two measures of prolonged locational disadvantage are used to examine systematic regional changes in the increases in identification: one ranking based on the relative socioeconomic status of major urban areas and a ranking based on levels of unemployment rates. The first

ranking can be justified on the grounds of the large changes in inequality in Australian cities which has been largely focused on low socioeconomic status areas (Hunter and Gregory 1996). The second ranking is also adopted because it is easily calculated for both urban and rural areas and provides a direct measure of the economic stress of an area.

Table 7. Intercensal change in the percentage of the population who identify as indigenous by socioeconomic status, 1991–96

	Deciles of CDs ranked by socioeconomic status in 1991									
	1	2	3	4	5	6	7	8	9	10
Sydney	0.8	0.5	0.4	0.3	0.3	0.3	0.2	0.1	0.1	0.1
Melbourne	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.0
Brisbane	1.4	0.9	0.8	0.8	0.6	0.4	0.4	0.3	0.2	0.2
Perth	1.3	0.9	0.6	0.6	0.5	0.3	0.2	0.2	0.1	0.1
Adelaide	0.6	0.4	0.4	0.4	0.4	0.1	0.1	0.1	0.1	0.0
Hobart	1.7	2.0	1.4	0.9	1.0	0.9	0.6	0.3	0.6	0.3
Canberra	1.3	0.5	0.7	0.4	0.3	0.5	0.5	0.2	0.1	0.1

Notes: Derivation of socioeconomic status detailed in Appendix A. CDs are aggregated to their 1991 boundaries and are eliminated if there is more than a 10 per cent change in the number of dwellings between 1991 and 1996. The deciles are recalculated for each city and therefore represent the relative status of an area.

Source: ABS (1993) and the 1991 and 1996 Censuses.

Table 7 confirms the results presented in Taylor (1997). The increase in identification has occurred in proportion to the historical concentration of indigenous residents in areas of low socioeconomic status (Hunter 1996). In general, indigenous identification also increased by more in capital cities which had a high proportion of indigenous people in previous censuses. For example, large increases in identification occurred in Brisbane and Perth compared to either Sydney or Melbourne. The possible exceptions to this observation are Hobart and Canberra which historically have relatively small indigenous populations (ABS 1993). In the case of Canberra one reason for going against the trend would be the increased employment of indigenous people in the Australian Public Sector (for example, the Aboriginal and Torres Strait Islander Commission).

The general increase in indigenous identification across all types of areas, both rural and urban, is confirmed by Table 8. While increased identification is slightly higher in the areas with the highest unemployment rate, the differences are not large. For example, the increase in the percentage of the population who identify as indigenous was less than 1 per cent in all deciles. The increases closely corresponded to the original distribution of the indigenous population in 1991.

Table 8. Intercensal change in the percentage of the population who identify as indigenous by the local unemployment rate, 1991–96

	Decile of CDs ranked by the unemployment rate in 1991									
	1	2	3	4	5	6	7	8	9	10
Per cent who identify as indigenous										
1991	2.2	0.9	0.8	0.9	1.1	1.1	1.5	1.7	2.0	3.4
1996	2.6	1.2	1.1	1.2	1.6	1.6	2.0	2.4	2.6	4.3
Unemployment rate in 1991										
	3.0	6.0	7.0	9.0	10.0	11.0	13.0	16.0	19.0	28.0

Notes: CDs are aggregated to their 1991 boundaries and are eliminated if there is more than a 10 per cent change in the number of dwellings between 1991 and 1996. All 31,401 CDs from the 1991 census were used in these calculations.

Source: ABS (1993) and the 1991 and 1996 Censuses.

There is no evidence that social alienation among the non-indigenous unemployed has led to a bogus increase in identification. The observed increases occurred in proportion to the percentage of population that was indigenous in 1991. While such alienation may find expression in the populist politics of Ms Pauline Hanson MP, it has not manifested itself in a disproportionate change in indigenous identification in disadvantaged areas. The 1996 indigenous population live in the same areas in which they have historically resided: poor, low status neighbourhoods with relatively high unemployment rates.

Concluding remarks

The basic conclusion of the evidence provided in this paper is that, while there is some weak evidence of a change in the composition of the indigenous population arising from the non-biological increase in the population, it has not significantly affected the fundamental characteristics of the indigenous population relative to other Australians. Indigenous people continue to have relatively low levels of education and live in the most locationally disadvantaged areas.

While the evidence presented is somewhat indirect, taken together the three methods of analysis used in this paper mean that any notion that there has been a bogus increase in indigenous identification between 1991 and 1996 should be rejected. Not only does the 1996 indigenous population have much the same characteristics as in previous censuses, but it falls well within the population projection based on those who identified as indigenous in either the PES or the 1991 Census.

The potentially important implications of compositional changes in the indigenous population in future censuses means that it is desirable that the ABS ensure that sufficient data are available to directly analyse the impact of changes in identification. While it would be contrary to ABS practice to track individuals

who change their identification over time (for example, by keeping the census forms for at least five years), it may be possible to augment future PESs with a question which asks respondents how they answered the indigenous question in the previous census. The obvious drawback to such an approach is that respondents may be reluctant to admit that their response differed in previous censuses. Given that deliberate misrepresentations are not permitted under the *Census and Statistics Act 1905* there may be legal incentives to answer questions consistently over time.[11] However, such legal incentives are not important in practice, given all the prosecutions under the Act are for non-compliance rather than providing incorrect information.[12]

An alternative approach is to ensure that PES and census responses are effectively linked for future censuses. For example, it should be possible to extract the whole census record for PES respondents when the sample is being selected. A multivariate analysis of respondents who are likely to change identification between the survey and the census will enable the use of economic models to interpret the data rather than rely on the elementary bi-variate descriptions used in this paper. While it may still be possible to conduct this analysis for the 1996 Census, it would be an expensive afterthought. With some relatively minor preparations, future PESs should easily be able to plan for this data requirement.

The apparent lack of a 'compositional effect' in the last intercensal period does not mean that we should not be careful when making intercensal comparisons of indigenous statistics. The different indigenous population levels of the respective censuses mean that adjustments need to be made to the level of statistics before any comparisons can be made. For example, the number of indigenous people employed in 1991 needs to be adjusted to be consistent with an indigenous population that currently identifies as indigenous.

This need to adjust the level of the statistics is particularly apparent when census statistics are being compared with administrative and other data sources. The problem of denominator shift means that extra care needs to be taken when rendering the populations consistent between the disparate sources (Barnes 1997). The scope and relative coverage of the various sources of data need to be fully accounted for lest the comparisons be meaningless and the inference drawn invalid.

An excessive focus on whether these newly identified population are indigenous is undesirable. The continuing high level of disadvantage among the indigenous population means that self-identification signifies that one is, more than likely, disadvantaged. While it is difficult to say with absolute certainty that census statistics only reflect the economic status of the indigenous population, they are sufficiently credible, in the opinion of this author, to be taken at face value.

Appendix A. Characterising indigenous areas: the construction of a socioeconomic index for CDs in 1991

To examine where changes in indigenous identification have occurred, areas need to be characterised using specific criteria. This section describes the construction of a socioeconomic status index for 1991 to analyse changes in identification in the major capital cities. The unemployment rate used to examine local changes in identification in both rural and urban areas is defined as the proportion of the labour force who are unemployed.

The socioeconomic index used is closely related to the ABS's urban index of relative socioeconomic advantage (ABS 1990). This index was used since socioeconomic status will be determined differently in rural and urban areas. Socioeconomic status is not easily defined in rural areas where differences in the asset base of residents and access to resources may mean that income-based measures may misrepresent the socioeconomic status of areas.

Like other socioeconomic indexes, the ABS index provides a one dimensional measure, or summary, of income, education and occupational status (Linke 1988). The three characteristics are used to construct a stable and reliable index of relative position and general social standing. The basic structural composition of these socioeconomic indicators has remained 'essentially the same for more than forty years and still provides a standard measure of social stratification [in sociology]' (Linke 1988: 7–8).

The ABS index is constructed using principal components analysis on CD data. The CDs are the appropriate unit for the analysis because they are sufficiently small and homogenous in character to reflect the socioeconomic distribution of all the individuals in the area. However, it is possible for an area to contain two quite extreme groups of individuals, for example, highly segregated neighbourhoods in inner-city areas in the process of redevelopment. Given the small size of CDs, most are reasonably homogenous.

The socioeconomic index uses factor scores from principal component analysis on 1991 CDs in major urban areas (Table A1).[13] The 1991 index is based on several variables: the proportion of very high income household (that is, income over $50,000 per annum in 1991 dollars); the number of households with more than three cars; the proportion of families who own or are purchasing their own home; the average number of bedrooms per house; the proportion of houses with more bedrooms; the percentage of the population with various post-secondary qualifications; and the proportion of the population in professional, administrative, clerical and sales occupations.[14]

The rank correlation between the calculated socioeconomic status indexes and the ABS (1990) measure for the 1986 Census is about 0.85.[15] The rank correlation between a similar measure constructed for major urban areas in the 1976 Census and the 1991 index is about 0.82. These correlations indicate that the socioeconomic status of an area is quite stable over time.

There are several other stable indicators which can be used to characterise an area. For instance, personal and household income have reasonably high rank correlations between the 1976 and 1991 Censuses (0.58 and 0.73 respectively). Neighbourhood unemployment rates are more volatile than the income variables with rank correlations of 0.38.[16] The socioeconomic index is one of the best uni-dimensional methods of characterising a neighbourhood because the rank correlations for socioeconomic status are higher than these other indicators.

Table A1. Descriptive statistics of variables used in the principal component analysis of CDs in the 1991 Census

	Mean	Standard deviation	Factor weights
Family income over $50,000	0.208	0.139	0.878
Three plus cars per household	0.107	0.068	0.529
Own/purchasing home	0.659	0.200	0.445
Number of bedrooms per person	2.811	0.469	0.491
Households with 4 or more bedrooms	0.185	0.155	0.700
Bachelor degree	0.095	0.074	0.727
Diploma	0.054	0.026	0.764
Other certificate	0.033	0.014	0.392
Trade certificate	0.097	0.036	-0.181
Professional occupation	0.143	0.084	0.700
Manager or administrators	0.096	0.055	0.762
Clerical occupation	0.165	0.042	0.107
Sales occupation	0.055	0.025	0.314

Notes: The number of CDs used was 17,891. The first principal component explained 34.3 per cent of the variance of the 13 variables. All variables are expressed as the proportion of the population except the number of bedrooms per house.

The use of socioeconomic status in preference to other uni-dimensional methods of characterising an area can be justified on the grounds that it is more stable over time. The use of unemployment rates as an alternative method of characterising areas is a sensitivity test of the results to ensure that social dislocation of recently unemployed is not driving a bogus increase in identification among disaffected non-indigenous Australians.

Notes

1. Although census coverage may be a factor (Taylor 1997).
2. That is, the response to the indigenous question in the census is taken to be correct. The estimated indigenous population in the non-PES areas is close to Butterfield's (1998) estimates of the number of people receiving the Special Indigenous Form (SIF), otherwise known as the remote area form, in the last two censuses. Butterfield estimates that 54,928 and 62,884 people used the SIF in 1991 and 1996, respectively.
3. Note that the PES samples a different set of people after each census.
4. This may not be as anomalous as it first appears. The large increase in the proportion born overseas may be a compositional effect of those marginal indigenous people who were less likely to be born overseas changing their census identification. The residual portion of this category are those who have some indigenous roots but are not that dissimilar to non-indigenous Australians. This story is entirely consistent with the *average* statistics reported in Table 3.
5. The analysis could be made more sophisticated by using an error-in-variable estimator for the formal statistical analysis (see Deaton 1985). However, the gains from adopting such a technical methodology are small since the cohorts sizes are much larger than that which make such an estimator worthwhile (Verbeek and Nijman 1992).
6. If the cohorts are of different sizes then this will require that each observation be weighted by the square root of the cohort size. Given the attrition problem with panel data, a repeated cross-section approach may not yield inferior results to genuine panel data. With respect to indigenous data the lack of any panel data means that there is no effective choice.
7. Evans, Kahles and Bate (1993: 11) finds that the non-response to the indigenous question was most pronounced among the over 70 year olds in the 1991 census.
8. The *Working Nation* initiatives launched by the Labor government in May 1994 introduced the Job Compact which gave people in receipt of unemployment allowances for more than 18 months the guarantee of a job or training opportunity. Early interventions, case management and the National Training Wage were also major features of *Working Nation* programs.
9. A more morbid explanation is that the better educated indigenous population were more likely to survive the period relative to the unqualified indigenous population. Educational qualifications might have less influence among the non-indigenous as the average public awareness of lifestyle issues in that population might be uniformly, relatively high compared to the indigenous population.
10. One alternative is to focus on changes in cohorts within major urban areas where the greatest increase in the indigenous population occurred. However, migration of individuals, particularly for those less than 30 years old, renders this approach problematic.

11. A similar problem might be said to exist for the PES itself. If people are reluctant to change the answer to the indigenous question in the survey, for either psychological or legal reasons, then the estimates in Table 1 and 2 form a lower bound on the 'marginal' indigenous population.

12. There were 48 prosecutions under Section 10 of the *Census and Statistics Act 1905* for non-compliance in the 1996 Census (Australian National Audit Office 1997: 21). There were no prosecutions for provision of incorrect information about the indigenous question. The likely reasons for non-prosecution of provision of incorrect information include: the census and PES forms are completed by one person in the household who may not know sensitive information about racial origin of all household residents; questions about indigenous identity are to some extent subjective and may vary over time as individual perceptions change or more information comes to hand. However, even if the threat to prosecute is not credible in reality, it may provide a psychological impediment to changing one's response to the indigenous question.

Appendix notes

13. The sample consisted of 13,675 and 17,997 major urban CDs in the 1976 and 1991 Censuses respectively.

14. The set of variables used in this analysis was similar, but not identical to, those used by the ABS on the 1986 Census. The differences between variables used largely results from changes in definition of variables across censuses. For example, the occupational classifications used in 1976 are based on Classification and Classified List of Occupations, whereas in 1986 and 1991 they are defined using Australian Standard Classification of Occupations.

15. The high rank correlation is even more surprising given that the ABS index is calculated for all urban areas whereas the indexes calculated for this paper are based on CDs from all major urban areas.

16. This is not surprising since migration decisions will tend to equalise unemployment rates across and within cities but will not necessarily equalise rents or socioeconomic status.

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