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INDIGENOUS WELLBEING IN  
AUSTRALIA: EVIDENCE FROM HILDA  
M. MANNING, C.L. AMBREY AND C.M. FLEMING

Centre for  
Aboriginal Economic  
Policy Research  
ANU College of  
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CAEPR WORKING PAPER NO. 101/2015

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April 2015



# Indigenous wellbeing in Australia: Evidence from HILDA

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*Working Paper No. 101/2015*  
ISSN 1442-3871

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ISBN 978-1-925286-00-7

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An electronic publication downloaded from [caepi.anu.edu.au](http://caepi.anu.edu.au).

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## Abstract

This study explores the subjective wellbeing of Indigenous Australians. We focus on mean levels of self-reported life satisfaction, inequality in life satisfaction within the Indigenous and non-Indigenous Australian populations, and the prevalence and severity of dissatisfaction with one's life. Evidence on differences in the determinants of life satisfaction between Indigenous and non-Indigenous Australians is provided. Results indicate that Indigenous life satisfaction peaked in 2003 and has since declined. We also find that inequality in life satisfaction is greater for Indigenous than non-Indigenous Australians. Despite a downward trend in the level of dissatisfaction for non-Indigenous Australians, dissatisfaction among Indigenous Australians has remained relatively unchanged.

**Keywords:** Dissatisfaction; Household, Income and Labour Dynamics in Australia (HILDA) survey; Indigenous Australians; Inequality; Life satisfaction; Subjective wellbeing

## Acknowledgments

This paper uses unit record data from the Household, Income and Labour Dynamics in Australia (HILDA) survey. The HILDA Project was initiated and is funded by the Australian Government Department of Social Services (DSS) and is managed by the Melbourne Institute of Applied Economic and Social Research (Melbourne Institute). The findings and views reported in this paper, however, are those of the authors and should not be attributed to either DSS or the Melbourne Institute.

## Acronyms

ABS	Australian Bureau of Statistics
ANU	The Australian National University
BUC	blow up and cluster
CAEPR	Centre for Aboriginal Economic Policy Research
HILDA	Household, Income and Labour Dynamics in Australia

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## Introduction

Indigenous populations in countries such as Australia, Canada, New Zealand and the United States are severely disadvantaged according to a range of socioeconomic indicators (Kimmel 1997, Kuhn & Sweetman 2002, Maani 2004). For example, Indigenous Australians aged 15–64 years in 2012–13 were less likely than non-Indigenous Australians to participate in the labour force (55.9% compared with 76.4%), approximately three times more likely to be unemployed (17.2% compared with 5.5%), almost half as likely to have completed Year 12 or higher (35.9% compared with 67.3%) and almost twice as likely to report fair or poor health (23.1% compared with 11.8%) (ABS 2014). To place these figures in a global context, in 2011, Australia ranked second out of 187 countries on the United Nations Human Development Index, with an index value of 0.928. The index value for Indigenous Australians, however, was 0.745,<sup>1</sup> similar to the scores for Serbia (0.744), Jordan (0.744), Sri Lanka (0.740), Brazil (0.740) and Iran (0.733) (UNDP 2014).

In 2008, the Council of Australian Governments committed to addressing the disadvantage faced by Indigenous Australians. The goals of the ‘Closing the Gap’ framework (COAG 2014) are to:

- close the gap in life expectancy between Indigenous and non-Indigenous Australians within a generation
- halve the gap in the mortality rate for Indigenous children under 5 years of age by 2018
- ensure that all Indigenous 4-year-olds in remote communities have access to quality early childhood programs within five years
- halve the gap in reading, writing and numeracy achievements for children by 2018
- halve the gap for Indigenous students in Year 12 (or equivalent) attainment rates by 2020
- halve the gap in employment outcomes by 2018.

A recent report on the performance of Indigenous reform (COAG Reform Council 2014) claims success in some targets (reducing child deaths, improving literacy and numeracy, and Year 12 attainment), while noting that outcomes in other areas (life expectancy and early childhood education) have fallen short and, in some cases (employment outcomes), deteriorated.

In a further attempt to address Indigenous disadvantage, the *Aboriginal and Torres Strait Islander Peoples Recognition Act 2013* provides for an administrative

review that will consider the readiness of the Australian public to support a referendum to amend the Constitution so that it recognises Aboriginal and Torres Strait Islander peoples. It is envisaged that this amendment will ‘... create provisions for the elimination of race discrimination, the “advancement” of Aborigines and Torres Strait Islanders and the protection of their language and culture’ (Parliament of Australia 2014). The precise form and timing of the constitutional amendment are set to be debated in the Australian Parliament.

Most recently, on 1 July 2014, the Australian Government established a new Indigenous Advancement Strategy (Australian Government 2014), replacing more than 150 individual programs and activities with five flexible, overarching programs:

- Jobs, Land and Economy
- Children and Schooling
- Safety and Wellbeing
- Culture and Capability
- Remote Australia Strategies.

Evaluation and monitoring of these policies is mostly based on objective criteria. For example, ‘progress’ is measured against criteria such as life expectancy, rates of literacy and levels of unemployment. Wellbeing, however, is necessarily a subjective concept. Although there is an increasing body of literature on using subjective wellbeing (i.e. wellbeing indicators based on personal opinions, interpretations, points of view, emotions and judgment) for economic and social policy (see Kahneman & Sugden 2005, Layard 2006, Dolan & White 2007), subjectivity has been largely absent from the Indigenous policy domain. This is problematic because many things that matter to Indigenous people—such as family stability, community life, cultural identity and connectedness with country—cannot be measured objectively.

Furthermore, there is an increasing recognition that subjective measures (such as those provided by self-reports of life satisfaction or happiness) have an important role to play in policy development and evaluation. For example, the Commission on the Measurement of Economic Performance and Social Progress (Stiglitz et al. 2009) reports that both objective and subjective indicators of progress are important, placing them on an equal footing. The commission states:

Research has shown that it is possible to collect meaningful and reliable data on subjective as well as objective wellbeing. Subjective wellbeing encompasses different aspects (cognitive evaluations

of one's life, happiness, satisfaction, positive emotions, such as joy and pride, and negative emotions such as pain and worry): each of them should be measured separately to derive a more comprehensive appreciation of people's lives ...

(Stiglitz et al. 2009:16)

The commission also notes that it is critical that inequalities in wellbeing be examined in a comprehensive manner, across people, groups and generations. Whereas inequalities in monetary dimensions of wellbeing are relatively easily identified (e.g. through the calculation of Gini indices or Lorenz curves), identifying inequalities in nonmonetary dimensions is more difficult. Examining deviations in self-reported happiness or life satisfaction is one way to capture inequality in wellbeing or access to opportunities (Kalmijn & Veenhoven 2005, Veenhoven 2005, Ambrey & Fleming 2014a).

Consistent with the recommendations outlined above, the purpose of this study is to explore the subjective wellbeing of Indigenous Australians. In particular, the study focuses on self-reported life satisfaction of Indigenous Australians, investigating:

- mean levels of life satisfaction
- inequality in life satisfaction
- prevalence and severity of dissatisfaction with one's life.

We also offer preliminary evidence on differences in the determinants of life satisfaction between Indigenous and non-Indigenous Australians. Our aim is to make a significant contribution to the understanding of Indigenous wellbeing, with the overall goal of assisting in the development of stronger and more effective Indigenous policy.

The paper proceeds as follows:

- 'Subjective wellbeing and Indigenous Australians' provides a critical review of the literature on the subjectively measured wellbeing of Indigenous Australians.
- 'Data' discusses the data used in the study.
- 'Empirical analysis' provides an overview of the analysis.
- 'Discussion' summarises the findings and concludes the paper.

## Subjective wellbeing and Indigenous Australians

Although much is known about the relative performance of Indigenous and non-Indigenous Australians against objective criteria, far less is known about their relative performance on subjective grounds. Further, the evidence that is available is often inconclusive or counterintuitive. For example, in stark contrast to the objective measures of wellbeing reported in the previous section ('Introduction'), several studies find that, on average, Indigenous Australians report higher levels of life satisfaction than non-Indigenous Australians (*ceteris paribus*). In most cases, however, the primary focus of these studies is not Indigenous wellbeing *per se*; rather, whether or not an individual is Indigenous is merely used as a control variable. This result was first highlighted by Shields and Wooden, who note:

One unexpected finding is the coefficient on the indigenous identifier. Other things held constant, Aboriginal and Torres Strait Islander men score higher on the life satisfaction scale than non-indigenous men. Moreover, the size of the effect is relatively large. Among indigenous women, the size of the differential is smaller, and statistically insignificant. (2003:11)

Similar results were reported by Shields et al. (2009), and Ambrey and Fleming (2011, 2012, 2014a, 2014b). Even among adolescents defined as 'at-risk' of not completing their schooling, Indigenous students score higher on subjective wellbeing than non-Indigenous students (Tomy et al. 2014).

In the most comprehensive assessment of the subjective wellbeing of Indigenous Australians undertaken to date, Biddle (2014) confirmed that Indigenous Australians report higher levels of life satisfaction than non-Indigenous Australians. In an attempt to explain this result, Biddle suggested that Indigenous Australians may have a different baseline against which they evaluate their own life. It is also likely that some dimensions of life are uniquely experienced by Indigenous Australians; these potentially play an important role in Indigenous life satisfaction. Somewhat surprisingly, Biddle (2014) found that Indigenous Australians are significantly more likely to report both above-average and below-average satisfaction with their lives. The full spectrum of subjective self-reports may therefore require attention. Such an approach would be in line with the growing recognition that positive and negative wellbeing are more than opposite ends of the same phenomenon, and that factors that increase satisfaction may not necessarily



decrease dissatisfaction (Boes & Winkelmann 2010). The approach taken in this paper goes some way to addressing this issue.

### *Indigenous-specific determinants of wellbeing*

Much of the existing literature on the measurement of subjective wellbeing focuses on the determinants of wellbeing, independent of whether or not a person is Indigenous. In an Australian context, see, for example, Ambrey and Fleming (2014a). Considerable scope exists to discover more about the Indigenous-specific determinants of wellbeing. The notion that the determinants of subjective wellbeing may differ systemically as a result of cultural differences (Uchida et al. 2004) is yet to be statistically tested. Exploring likely heterogeneity in the determinants of wellbeing between Indigenous and non-Indigenous Australians will advance our knowledge in this area.

Early evidence, much of which does not permit easy comparison between Indigenous and non-Indigenous populations, suggests a number of Indigenous-specific determinants of subjectively measured wellbeing. For example, a number of studies (e.g. Browne-Yung et al. 2013) suggest that cultural identity has a unique impact. Furthermore, while assimilation may potentially improve objectively measured labour market or educational outcomes (Kuhn & Sweetman 2002, Bradley et al. 2007), it may concomitantly reduce wellbeing if it requires sacrificing elements of one's culture (Dockery 2010). For example, Dockery finds that, for Indigenous Australians, stronger cultural attachment is associated with a greater level of self-assessed health, a lower likelihood of engaging in risky alcohol consumption, an increased probability of being employed, and a greater number of years of post-primary education. Conversely, weaker cultural attachment is associated with an increased probability of having been arrested in the past five years and a reduced chance of being employed. This suggests that the level of self-reported wellbeing of Indigenous Australians may be determined by Indigenous cultural attachment, functioning through factors such as self-esteem, self-efficacy and a positive sense of self-identity (Dockery 2010).

Cultural identity among Indigenous Australians also supports, and is supported by, social capital, with both positive and negative implications for health and wellbeing. Browne-Yung et al. (2013) suggest that a shared cultural identity strengthens social networks and mediates the health impact of socioeconomic disadvantage. Further, shared values, social networks and volunteering in Aboriginal health organisations

facilitate greater access to medical and dental care, and to activities that address drug and alcohol dependency. In contrast, a lack of reciprocation or virtuous behaviour adversely affects wellbeing—an outcome that is compounded by existing economic disadvantage. These findings are corroborated by Brough et al. (2004), Dietsch et al. (2011) and Waterworth et al. (2014).

The evidence above suggests that wellbeing may differ between Indigenous and non-Indigenous Australians for a number of reasons, some of which may be attributed to cultural identity and its interplay with many other facets of life.

### **Data**

The measure of self-reported life satisfaction, and the socioeconomic and demographic characteristics of respondents were obtained from waves 1 (2001) to 12 (2012) of the Household, Income and Labour Dynamics in Australia (HILDA) survey. HILDA survey data were used because, despite significant progress in the measurement and collection of data on the wellbeing of Indigenous Australians,<sup>2</sup> there remains a genuine lack of longitudinal data for this population. The use of panel datasets such as HILDA allows examination of determinants of wellbeing in a quasi-experimental setting (e.g. Metcalfe et al. 2011), and permits researchers to control for time-invariant individual-specific confounders such as stable personality traits (Bertrand & Mullainathan 2001, Ferrer-i-Carbonell & Frijters 2004). In this respect, the HILDA survey is particularly useful for this study. It is the only source of data that accommodates our research design, in that it is Australia's largest household-based panel study, and (unlike the National Aboriginal and Torres Strait Islander Social Survey) incorporates both Indigenous and non-Indigenous populations.

First conducted in 2001, the HILDA survey is, by international standards, a relatively new national probability sample, owing much to household panel studies conducted elsewhere in the world, particularly the German Socio-Economic Panel and the British Household Panel Survey. The reference population for the first wave of the survey was all members of private dwellings in Australia aged 15 years or over (Watson & Wooden 2002). As discussed in detail below, HILDA's representation of Indigenous Australians compares favourably with Australian Bureau of Statistics (ABS) census data. Watson and Wooden (2012) provide a brief history of the HILDA survey's progress to date.

Table 1 illustrates representation of Indigenous Australians by the HILDA survey compared with the ABS census. A chi-square test shows that, in 2001 (wave 1), Indigenous Australians were statistically significantly underrepresented; in 2006, (wave 6), there was no statistically significant difference between the two datasets; and, in 2011 (wave 11), Indigenous Australians were statistically significantly overrepresented. This overrepresentation may reflect the refreshment or ‘top-up’ sample that was collected in 2011. This top-up consists of selection of a random sample of people living in nonremote parts of Australia. The aim was to reduce biases that may arise from nonrandom attrition—in particular, nonrandom attrition of immigrants (Watson & Wooden 2010). However, there remains an issue of whether the HILDA sample of Indigenous Australians is representative of the Indigenous population as a whole (Biddle 2014).

The life satisfaction variable is obtained from individuals’ responses to the question: ‘All things considered, how satisfied are you with your life?’ The life satisfaction variable is an ordinal variable, the individual choosing a number between 0 (totally dissatisfied with life) and 10 (totally satisfied with life). With regard to the legitimacy of such a measure, many authors (e.g. Diener & Suh 1999, Frey & Stutzer 2002, Lucas & Donnellan 2012, Diener et al. 2013), including those of the school of hedonic psychology (Kahneman & Krueger 2006), have provided evidence on the validity of single-item measures of life satisfaction as a retrospective subjective measure of experience—that is, as a measure of *experienced utility* (Kahneman & Thaler 2006).

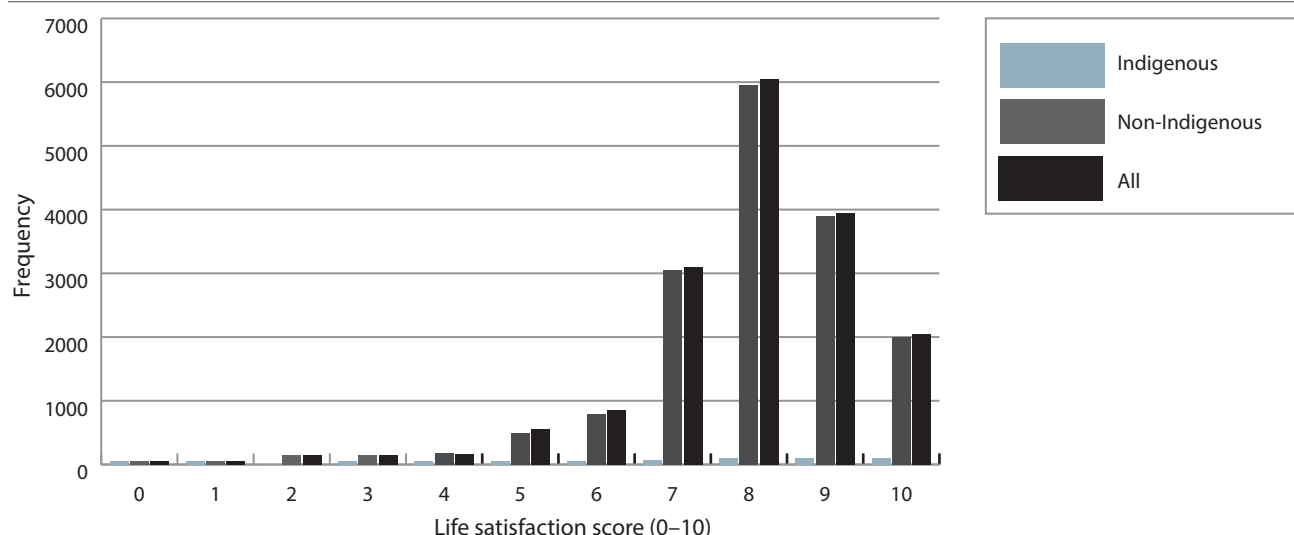
Presenting data from wave 12, Fig. 1 shows the distribution of responses, and Fig. 2 shows the proportion of Indigenous and non-Indigenous respondents that fall in different categories.

**TABLE 1: Indigenous representation in HILDA data and ABS census data**

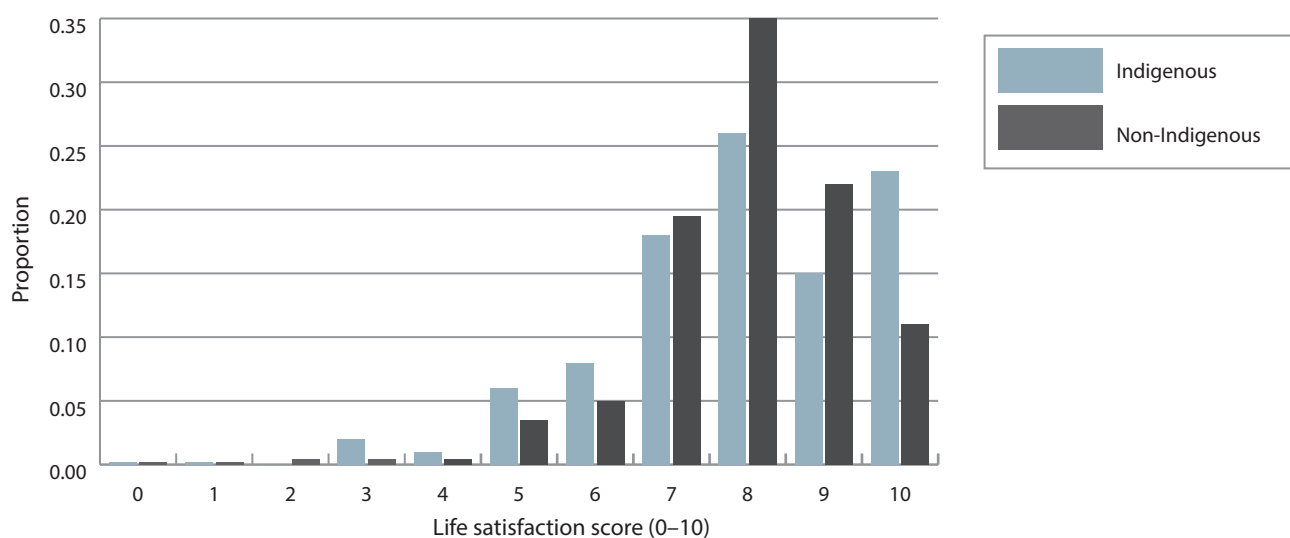
Year	HILDA data (%)	ABS census data (%)
2001	1.85***	2.20
2006	2.20	2.30
2011	2.80**	2.50

\*\*  $P < 0.05$   
 \*\*\*  $P < 0.01$

**FIG. 1: Frequency distribution of life satisfaction scores (2012)**



Source: Derived from HILDA survey

**FIG. 2: Proportion of Indigenous and non-Indigenous people reporting life satisfaction scores (2012)**

Source: Derived from HILDA survey

Fig. 1 shows that the distribution of the responses is negatively skewed, with more than half of the respondents reporting an 8 or higher. A life satisfaction score of 8 is both the median and the mode. The mean life satisfaction score is 7.89. Fig. 2 indicates that Indigenous Australians are more likely to report a score of 10 (totally satisfied with their life) than non-Indigenous Australians; are less likely to report scores of 7, 8 or 9; and are more likely to report a score of 6 or below.

Table 2 provides definitions and descriptive statistics for all variables, and indicates where statistically significant differences (at the 5% level) are found between Indigenous and non-Indigenous Australians. The table shows that mean life satisfaction is higher for Indigenous

than non-Indigenous Australians (7.98 compared with 7.91). The Indigenous sample is significantly younger and has a lower proportion of males. Indigenous members of the sample are less likely to be legally married (21.1% compared with 49.6%) and more likely to be in a de facto relationship (21.5% compared with 12.7%). Somewhat surprisingly, the Indigenous sample is less likely to report having a long-term health condition that limits their ability to work (17.5% compared with 19.0%). The data also reveal that Indigenous Australians have lower levels of educational attainment, are more likely to be unemployed or nonparticipants in the labour force, and have lower disposable incomes. Finally, Indigenous Australians are more likely to live in outer regional and remote areas.

**TABLE 2: Variables by Indigenous and non-Indigenous status**

Variable name	Definition	Indigenous		Non-Indigenous		Significantly different at the 5% level (Y/N)
		Mean (standard deviation)	%	Mean (standard deviation)	%	
Dependent variable						
Life satisfaction	Individual's self-reported life satisfaction, where 0 is totally dissatisfied and 10 is totally satisfied	7.98 (1.78)		7.91 (1.49)		Y Y
Independent variables						
Age (15–19)	Individual is between 15 and 19 years of age		16.7		7.6	Y
Age (20–29)	Individual is between 20 and 29 years of age		29.1		17.1	Y
Age (40–49)	Individual is between 40 and 49 years of age		17.7		19.3	Y
Age (50–59)	Individual is between 50 and 59 years of age		15.7		9.4	Y
Age (≥60)	Individual is 60 years of age or greater		8.7		22.5	Y
Male	Individual is male		41.5		47.5	Y
Poor English	Individual speaks English either not well or not at all		0.01		1.3	Y
Married	Individual is legally married		21.1		49.6	Y
De facto	Individual is in a de facto relationship		21.5		12.7	Y
Separated	Individual is separated		3.3		2.8	N
Divorced	Individual is divorced		6.3		6.0	N
Widow/widower	Individual is a widow		2.9		5.2	Y
Lone parent	Individual is a lone parent		2.0		1.7	N
Number of children	Number of individual's own resident children in individual's household at least 50% of the time, and their own children who usually live in a nonprivate dwelling but spend the rest of the time mainly with the individual	0.89 (1.09)		0.71 (1.32)		Y Y
Severe health condition	Individual has a long-term health condition—that is, a condition that has lasted, or is likely to last, for more than six months—and cannot work		1.2		0.9	Y
Moderate health condition	Individual has a long-term health condition—that is, a condition that has lasted, or is likely to last, for more than six months—limiting the amount or type of work that they can do		17.5		19.0	Y

TABLE 2 *continued*

Variable name	Definition	Indigenous		Non-Indigenous		Significantly different at the 5% level (Y/N)
		Mean (standard deviation)	%	Mean (standard deviation)	%	
Mild health condition	Individual has a long-term health condition—that is, a condition that has lasted, or is likely to last, for more than six months—that does not limit the type or amount of work the individual can do		8.6		8.0	N
Bachelor degree or higher	Individual's highest level of education is a bachelor degree or higher		7.3		20.1	Y
Certificate or diploma	Individual's highest level of education is a certificate or diploma		23.3		27.9	Y
Year 12	Individual's highest level of education is Year 12		14.7		15.3	N
Employed part-time	Individual is employed and works less than 35 hours per week		17.4		20.7	Y
Unemployed	Individual is not employed but is looking for work		12.6		3.4	Y
Nonparticipant	Individual is a nonparticipant in the labour force, including retirees, those performing home duties, nonworking students, and individuals less than 15 years old at the end of the last financial year		40.5		32.5	Y
Disposable income	Equivalised disposable household income	\$28 096.42 (\$18 314.20)		\$38 612.12 (\$30 783.39)		Y Y
Others present	Someone other than the individual was present during the interview		37.0		37.5	N
Years interviewed	Number of years the individual has been interviewed in the survey	5.43 (3.52)		5.65 (3.50)		Y N
Inner regional	Individual resides in inner regional Australia		28.2		24.4	Y
Outer regional	Individual resides in outer regional Australia		22.5		11.3	Y
Remote areas	Individual resides in a remote, very remote or migratory region of Australia		7.6		1.9	Y
Individual-time observations		158 442		3689		–

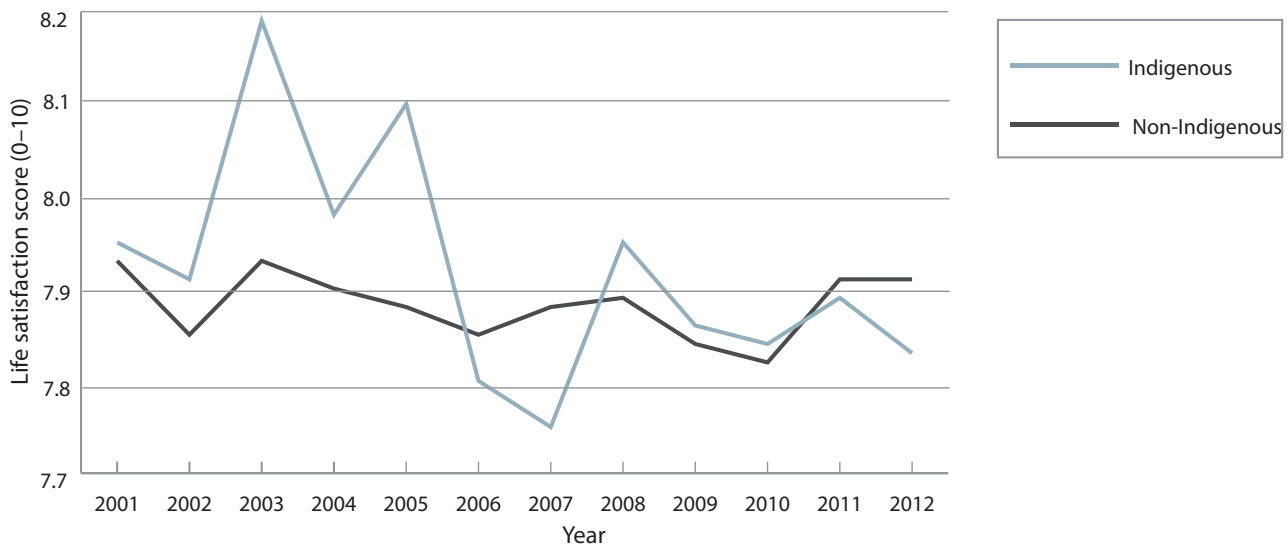
Note: Omitted cases are: age (30–39); female; speaks English well or very well; never married and not defacto; not a widow or widower; not a lone parent; does not have a long-term health condition; Year 11 or below; employed working 35 hours or more per week; no others present during the interview or don't know—telephone interview; major city.

### Empirical analysis

Fig. 3 illustrates mean life satisfaction scores for Indigenous and non-Indigenous Australians over the period 2001–12. At first glance, it appears that the life satisfaction of Indigenous Australians has declined. Before testing to see whether the changes in life satisfaction over time are statistically significant, however, we adjusted for panel conditioning effects—that is,

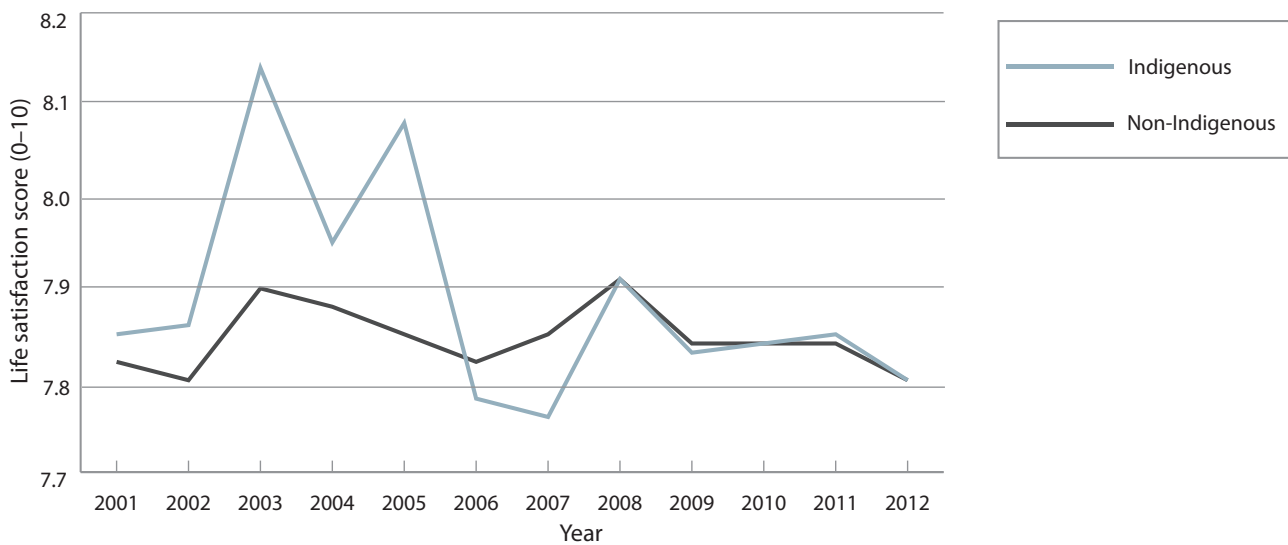
where respondents learn to use the middle points of the 0–10 scale, rather than the extremes (Headey et al. 2013). These effects are removed using the inverse of the number of years a respondent has been interviewed. In line with existing evidence on the nature of panel conditioning bias in the HILDA data, Fig. 4 confirms that the differences are small enough to be disregarded (Wooden & Li 2014).

**FIG. 3: Life satisfaction (2001–12)**



Source: Derived from HILDA survey

**FIG. 4: Life satisfaction adjusted for panel conditioning effects (2001–12)**



Source: Derived from HILDA survey

Adjusted Wald tests, which take into account the complex survey design of the HILDA dataset, indicate that there was no statistically significant change in the life satisfaction of Indigenous Australians over the period 2001–12. However, for non-Indigenous Australians, life satisfaction increased by 0.7%. For both groups, life satisfaction peaked in 2003. From 2003 to 2012, the life satisfaction of both groups has declined, but this decline is only statistically significant for Indigenous Australians (a 4% decline).

### Trends in life satisfaction

To examine the nature of any general change in life satisfaction, we estimated a fixed effects model for individual  $i$  at time  $t$ , as follows:

$$LS_{i,t} = \sum_{j=1}^k \alpha_j x_{j,t} + \eta \text{IndigenousTrend}_t + \text{pnonIndigenousTrend}_t + \iota_i + \varepsilon_{i,t} \quad (1)$$

where  $LS_{i,t}$  is the self-reported life satisfaction of individual  $i$  at time  $t$ ;  $x_{i,t}$  is a vector of socioeconomic and demographic characteristics, including income, marital status, employment status, health, education and number of children;  $\text{IndigenousTrend}_t$  is an Indigenous-specific time trend ( $\text{Indigenous}_i \times (\text{Year}_t - 2000)/100$ );  $\text{nonIndigenousTrend}_t$  is a non-Indigenous-specific time trend ( $\text{nonIndigenous}_i \times (\text{Year}_t - 2000)/100$ );  $\iota_i$  is the individual-specific fixed effect; and  $\varepsilon_{i,t}$  is the error term. Equation 1 is estimated using the ‘blow up and cluster’ (BUC) estimator, which takes into account the ordinal nature of the dependent variable while concomitantly controlling, to some extent, for unobserved individual-specific fixed effects such as stable personality traits, cohort effects, and time-invariant measurement error and self-selection bias (Baetschmann et al. 2014). Specifically, the BUC estimator replaces every observation in the sample with  $K - 1$  copies of itself (where  $K$  is the number of ordered outcomes in the dependent variable) and dichotomises each of the  $K - 1$  copies of the individual at a different cut-off point. The estimates are obtained by conditional maximum likelihood estimation using the entire sample. The standard errors are adjusted for clustering as observations are dependent by construction. Riedl and Geishecker (2014) used Monte Carlo simulations to compare linear and nonlinear ordered response estimators in terms of consistency and efficiency. They concluded that, if the absolute size of the parameters matter (as it does for calculation of willingness-to-pay), the BUC estimator is the best choice because it delivers the least biased and most efficient parameter estimates, irrespective of sample size and number, and distribution of ordinal response categories. This result is supported by Dickerson et al. (2014) in their assessment of alternative estimators for the fixed effects

ordered logit model in the context of estimating the relationship between wellbeing and commuting.

Table 3 presents the estimates for the trend terms. The results indicate that, all other things being equal, both coefficient estimates are negative, and they are not statistically significantly different from one another. The result is only statistically significant for non-Indigenous Australians. This suggests that, for non-Indigenous Australians, taking into account changes in socioeconomic status and health, as well as changes in the demographic distribution of the population, life satisfaction has declined over the sample period.

**TABLE 3: Trends in Indigenous and non-Indigenous life satisfaction**

Variable	Calculation
Indigenous trend	-1.8598 (1.7184)
Non-Indigenous trend	-1.9150*** (0.4047)
<i>Summary statistics</i>	
Observations	398 602
Individuals	18 944
Pseudo R <sup>2</sup>	0.0177

\*\*\*  $P < 0.01$

Note: Standard errors are in parentheses. Results include independent variables in Table 2 and time (or year) fixed effects.

### Standard deviations in life satisfaction

The standard deviation in life satisfaction for Indigenous and non-Indigenous Australians over the period 2001–12, illustrated in Fig. 5, is calculated for each year as follows:

$$\sigma = \sqrt{\frac{\sum_{i=1}^N (l_{s_i} - \bar{l}_s)^2}{N - 1}} \quad (2)$$

where  $\sigma$  is the standard deviation;  $l_{s_i}$  is an individual’s self-reported life satisfaction;  $\bar{l}_s$  is the average level of life satisfaction; and  $N$  is the sample size. It is important to note that:

- for the *within* Indigenous standard deviation,  $l_{s_i}$  is an Indigenous Australian’s self-reported life satisfaction, while  $\bar{l}_s$  is the average level of life satisfaction of Indigenous Australians
- for the *within* non-Indigenous standard deviation,  $l_{s_i}$  is a non-Indigenous Australian’s self-reported life satisfaction, while  $\bar{l}_s$  is the average level of life satisfaction of non-Indigenous Australians
- for the *between* Indigenous and non-Indigenous standard deviation,  $l_{s_i}$  is an Indigenous Australian’s self-reported life satisfaction, while  $\bar{l}_s$  is the average level of life satisfaction of non-Indigenous Australians.

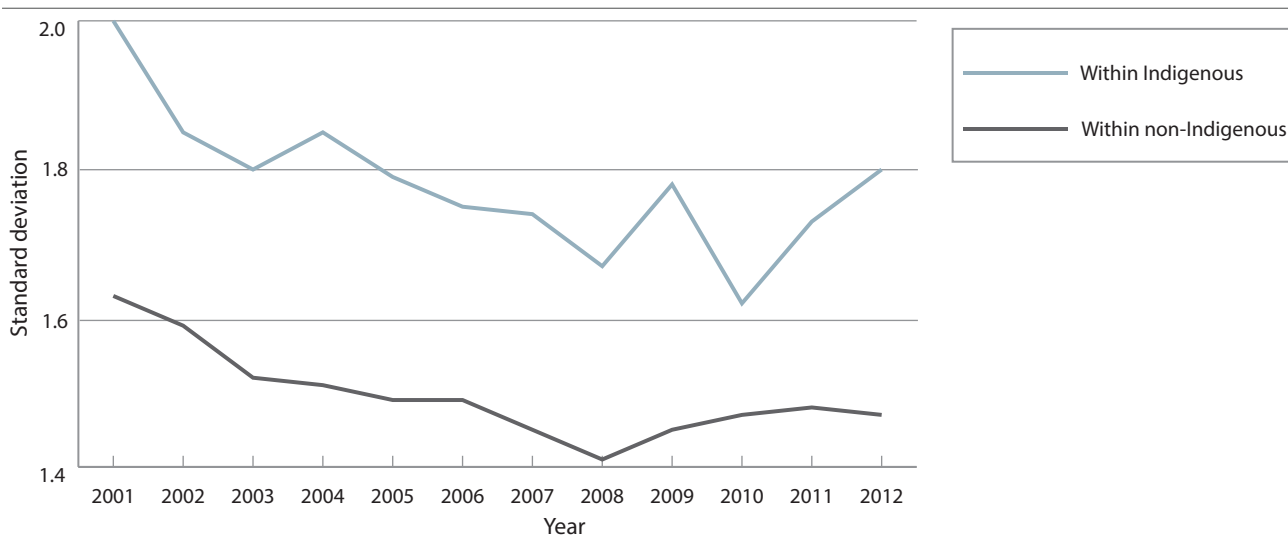
Examining standard deviations in self-reported happiness or life satisfaction is one means of measuring inequality in wellbeing or access to opportunities (including inequality in nonmonetary dimensions of wellbeing such as health and education). These inequalities are not captured by more traditional means of measuring inequality, such as the Gini index or Lorenz curves (Kalmijn & Veenhoven 2005, Veenhoven 2005, Ambrey & Fleming 2014a).

Fig. 5 shows that the standard deviation in life satisfaction is noticeably higher for Indigenous Australians than for non-Indigenous Australians (a statistically significant result). This result highlights a higher degree of inequality in life satisfaction among Indigenous Australians. For

both groups, however, there has been a general decline in the standard deviation of life satisfaction over the period (i.e. the distribution of life satisfaction self-reports has become more equal). A greater decline is seen for non-Indigenous Australians than for Indigenous Australians in absolute (0.22 compared with 0.20, respectively) and relative (13% compared with 10%, respectively) terms.

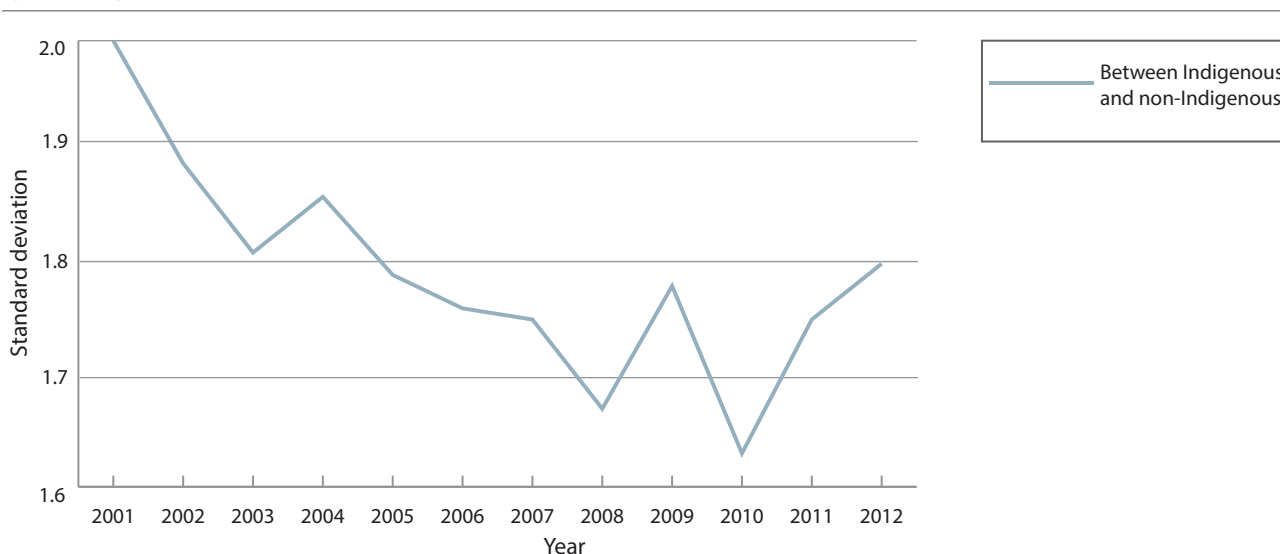
As shown in Fig. 6, the *between* Indigenous and non-Indigenous standard deviations differ little from the *within* Indigenous standard deviations. This result reflects and reinforces the earlier finding that, on average, Indigenous Australians report very similar levels of life satisfaction to non-Indigenous Australians.

**FIG. 5: Standard deviation in life satisfaction within Indigenous and non-Indigenous populations (2001–12)**



Source: Derived from HILDA survey

**FIG. 6: Standard deviation in life satisfaction between Indigenous and non-Indigenous populations (2001–12)**



Source: Derived from HILDA survey



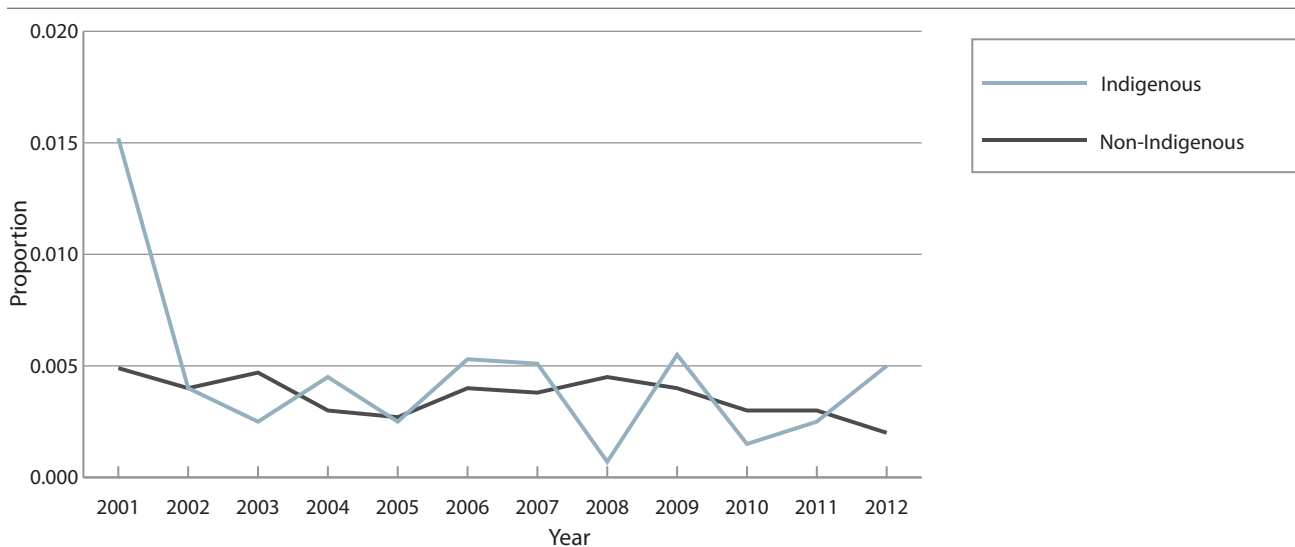
**Prevalence and severity of dissatisfaction**

Consistent with the notion that positive and negative wellbeing are more than opposite ends of the same phenomenon (Boes & Winkelmann 2010), we explored the severity and prevalence of dissatisfaction. This area of investigation owes something to the conventional interpretation of Rawls’s *Theory of justice* (1971), where improvements in societal welfare can only be obtained from improvements in the position of the least well-off member. It also has some of the appeal of Kahneman and Krueger’s (2006) U-index (a measure of the proportion of time an individual spends in an unpleasant state), as well as the idea that policy makers may be more comfortable

with attempting to minimise a specific measure of ill-being, rather than maximise the more nebulous concept of happiness.

The prevalence of dissatisfaction is measured by the proportion of the sample deemed to be ‘totally dissatisfied’ (life satisfaction score equals 0) with their lives. Fig. 7 shows a statistically significant (although slight) downward trend in the prevalence of dissatisfaction for non-Indigenous Australians and no discernible trend for Indigenous Australians.

**FIG. 7: Proportion totally dissatisfied with life (2001–12)**



Source: Derived from HILDA survey

To measure the severity of dissatisfaction, we adopted a method used in the portfolio management literature to measure downside risk (Sortino 2010). In portfolio management, this method measures the risk of achieving a rate of return below some exogenously pre-specified target rate. In adapting this method, we substituted the pre-specified target rate of return with a target level of life satisfaction; the more intense a person's dissatisfaction, the greater the deviation from this target. A Rawlsian-inspired social welfare function would suggest that the larger the downside deviation from this target level, the lower societal welfare must be, as there is a greater risk of a randomly drawn individual being dissatisfied with their life. We used this approach to examine negative deviations for life satisfaction *within* Indigenous and non-Indigenous Australians. In addition, we examined negative deviations *between* Indigenous and non-Indigenous Australians in a similar manner to that described above (under 'Standard deviations in life satisfaction'). In both cases, the measure of downside risk or negative deviation for life satisfaction is calculated using equation 3:

$$\sigma_{NEGDEV} = \sqrt{\frac{\sum_{i=1}^N \tau_i (l_{i,a} - l_{i,h})^2}{N-1}} \quad (3)$$

where  $l_{i,a}$  is an individual's self-reported life satisfaction;  $l_{i,h}$  is the target life satisfaction score;  $\tau_i$  is 1 for all  $l_{i,a} < l_{i,h}$  and 0 otherwise; and  $N$  is the sample size.

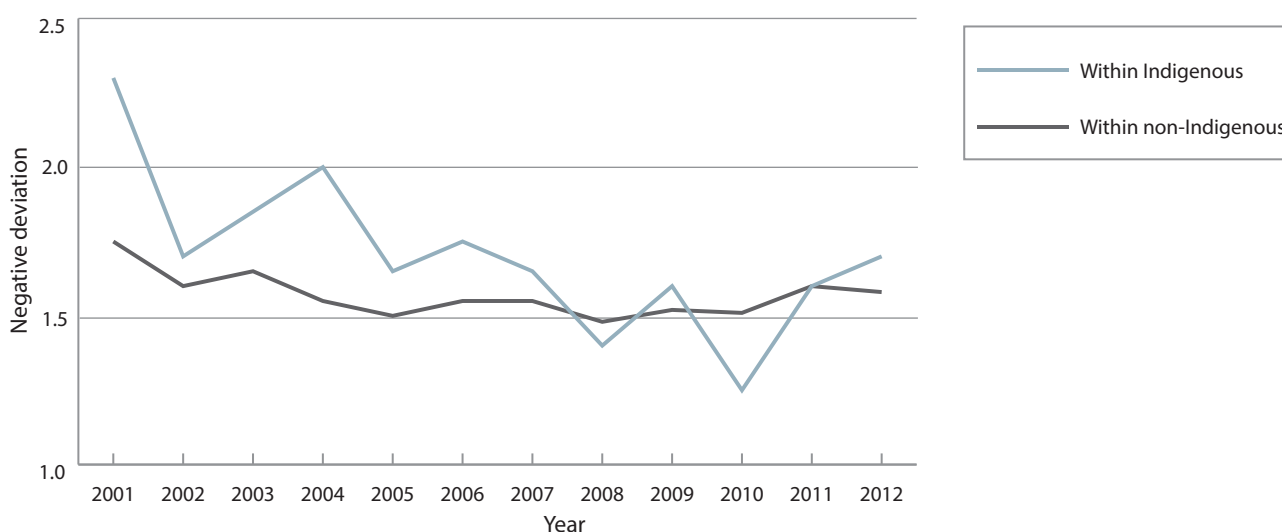
As with equation 2, it is important to note that:

- for the *within* Indigenous standard deviation,  $l_{i,a}$  is an Indigenous Australian's self-reported life satisfaction, while  $l_{i,h}$  takes a score of 6
- for the *within* non-Indigenous standard deviation,  $l_{i,a}$  is a non-Indigenous Australian's self-reported life satisfaction, while  $l_{i,h}$  takes a score of 6
- for the *between* Indigenous and non-Indigenous standard deviation,  $l_{i,a}$  is an Indigenous Australian's self-reported life satisfaction, while  $l_{i,h}$  is the average level of life satisfaction of non-Indigenous Australians.

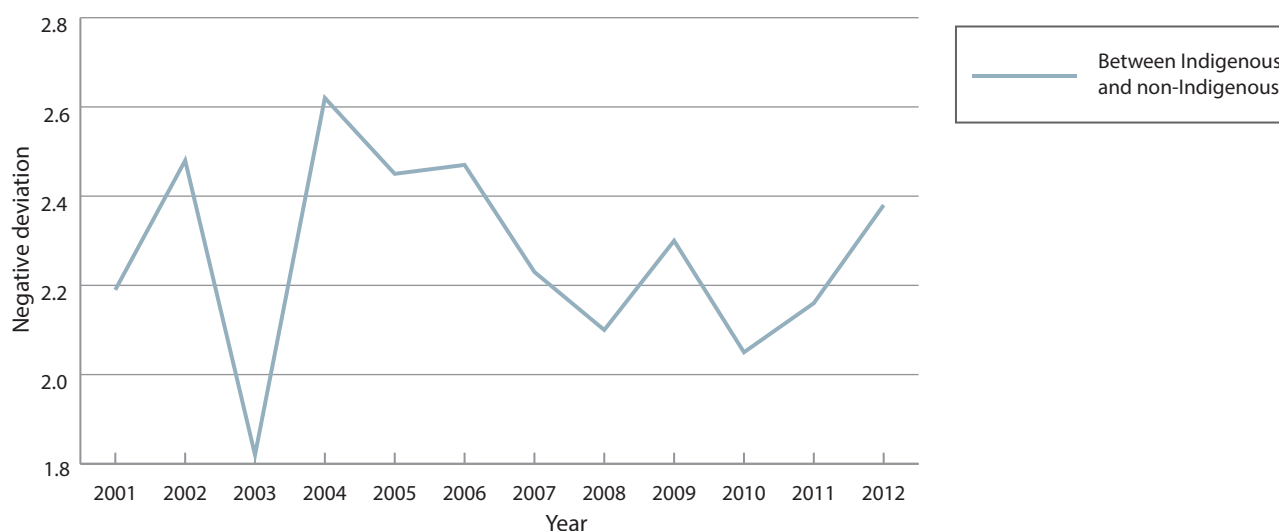
Fig. 8 shows negative deviation *within* Indigenous and non-Indigenous Australians populations. The risk of reporting a life satisfaction score of less than 6 tends to be marginally higher for Indigenous Australians, although the difference between the two groups is only statistically significant in 2001, 2004 and 2006. Over the period 2001–12, there has been a statistically significant decline in negative deviations for Indigenous and non-Indigenous Australians. Specifically, for Indigenous Australians, the risk of reporting a life satisfaction score of less than 6 has declined by 0.63 or 27%. For non-Indigenous Australians, the risk has declined by 0.62 or 35%.

As shown in Fig. 9, the negative deviation *between* Indigenous and non-Indigenous Australians appears to have increased modestly over the period 2001–12 (although this increase is not statistically significant).

**FIG. 8: Negative deviation within Indigenous and non-Indigenous populations (2001–12)**



Source: Derived from HILDA survey

**FIG. 9: Negative deviation between Indigenous and non-Indigenous populations (2001–12)**

Source: Derived from HILDA survey

### *Determinants of life satisfaction*

To investigate differences in the determinants of life satisfaction between Indigenous and non-Indigenous Australians, the Indigenous identifier was interacted with all socioeconomic and demographic characteristics, and then estimated via maximum likelihood estimation in an ordered probit model. A Chow test of the interaction terms and the Indigenous identifier was strongly statistically significant ( $P$  value of 0.0000). This indicates that the determinants of life satisfaction are not the same and, therefore, it is not appropriate to pool the two groups. Hence, we estimated two separate models. This allows the parameter estimates to vary uniquely for Indigenous and non-Indigenous Australians. The Breusch–Pagan Lagrangian multiplier test for random effects was then applied to determine whether a random effects model is appropriate or a simple pooled ordinary least squares model can be used. Results revealed a strong rejection ( $P$  value of 0.0000) of the null hypothesis for both groups, suggesting that random effects models should be used.

However, the use of a random effects model relies on the assumption that the individual-specific fixed effects are not correlated with the regressors in the model; if this assumption is invalid, the model will produce inconsistent estimates. The results reveal strong evidence against this assumption; a test of over-identifying restrictions (asymptotically equivalent to the usual Hausman fixed versus random effects test) yields a  $P$  value of 0.0000 (Schaffer & Stillman 2010). Consequently, for both Indigenous and non-Indigenous Australians, separate fixed effects life satisfaction models, as shown in equation 4, were estimated using the BUC estimator:

$$LS_{i,t} = \sum_{j=1}^k \alpha_j x_{j,i,t} + \sum_{t=1}^T d_t \tau_t + \iota_i + \epsilon_{i,t} \quad (4)$$

The variables are as previously defined in equation 1.  $\tau_t$  is a vector of time (year) dummy variables. Results are reported in Table 4.

**TABLE 4: BUC estimates for Indigenous and non-Indigenous Australians**

Variable	Indigenous	Non-Indigenous
Age (15–19)	0.2862 (0.3490)	0.2602*** (0.0662)
Age (20–29)	–0.1043 (0.2228)	–0.0296 (0.0444)
Age (40–49)	–0.1340 (0.2586)	0.0210 (0.0410)
Age (50–59)	0.0659 (0.4186)	0.0970 (0.0616)
Age (≥60)	0.7201 (0.5902)	0.4119*** (0.0830)
Poor English	1.6913*** (0.4152)	–0.2555** (0.1015)
Married	0.1633 (0.2575)	0.4884*** (0.0552)
De facto	0.5705*** (0.1797)	0.5153*** (0.0423)
Separated	–0.3161 (0.4974)	–0.5581*** (0.0771)
Divorced	0.6035 (0.5005)	–0.0810 (0.0768)
Widow	–1.4997* (0.8610)	–0.1972* (0.1043)
Lone parent	–0.0547 (0.2800)	–0.0730 (0.0683)
Number of children	–0.0003 (0.0758)	–0.0869*** (0.0168)
Severe health condition	–1.3915*** (0.4002)	–0.7527*** (0.0696)
Moderate health condition	–0.7197*** (0.1546)	–0.5851*** (0.0273)
Mild health condition	–0.1482 (0.1762)	–0.1505*** (0.0255)
Bachelor degree or higher	–0.7939 (0.5538)	–0.2596*** (0.0902)
Certificate or diploma	0.3673 (0.3153)	–0.2346*** (0.0659)
Year 12	–0.5476* (0.3105)	–0.3189*** (0.0535)
Employed part-time	0.0237 (0.1780)	0.1114*** (0.0256)
Unemployed	–0.3722* (0.1954)	–0.3062*** (0.0434)
Nonparticipant	0.0348 (0.1801)	0.0123 (0.0332)
Disposable income (natural log)	–0.0379 (0.0590)	0.0599*** (0.0103)
Others present 1/years interviewed	–0.6934* (0.3778)	0.2856*** (0.0741)
Inner regional	–0.0461 (0.2456)	0.1420*** (0.0470)
Outer regional	–0.4085 (0.2844)	0.0823 (0.0674)
Remote areas	0.0826 (0.3257)	–0.0315 (0.1120)
<i>Summary statistics</i>		
Observations	10 335	388 267
Individuals	479	18 465
Pseudo R <sup>2</sup>	0.0386	0.0185

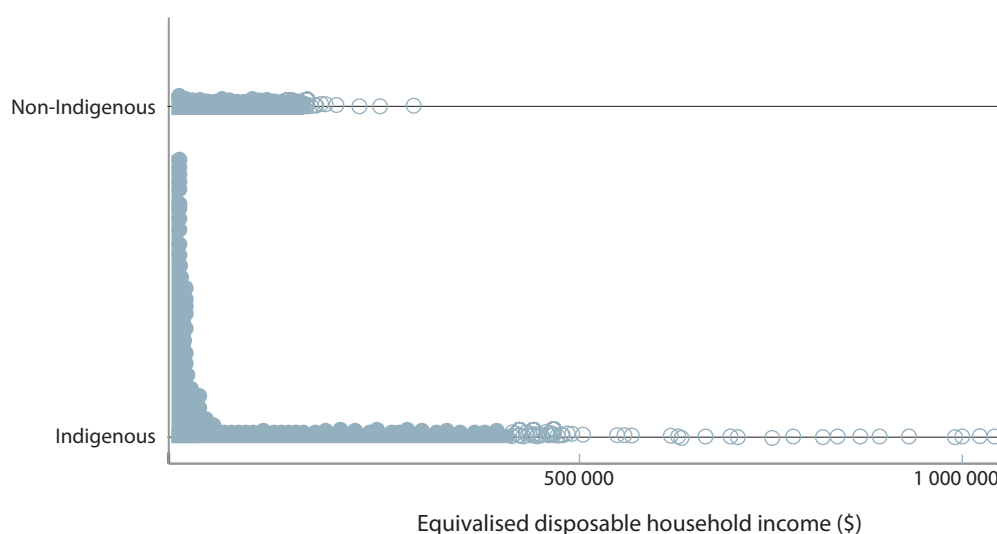
\*  $P < 0.10$ \*\*  $P < 0.05$ \*\*\*  $P < 0.01$ 

Note: Standard errors are in parentheses. Results include controls for time (year) fixed effects.

Comparing estimates for Indigenous and non-Indigenous Australians in Table 4, life satisfaction has the usual U-shape in relation to age for non-Indigenous Australians; however, no such effect is found for the Indigenous sample. Surprisingly, for Indigenous Australians, poor English is associated with higher levels of life satisfaction, while the reverse is true for non-Indigenous Australians. With regard to marital status, for both groups it appears that being in a de facto relationship is positively associated with life satisfaction, and being a widow or widower is negatively associated with life satisfaction. The negative coefficient for being a widow is more than seven times greater for Indigenous Australians than for non-Indigenous Australians. For non-Indigenous Australians, being married is associated with higher levels of life satisfaction, while being separated is associated with lower levels of life satisfaction; no statistically significant relationships are observed for Indigenous Australians.

Being a lone parent has no statistically significant association with life satisfaction for either group. The number of children in the household is not statistically significant for Indigenous Australians, whereas, for non-Indigenous Australians, it is statistically significant and negative. For both groups, poor health is associated with lower levels of life satisfaction. However, for Indigenous Australians, the coefficient for having a severe health condition is almost twice that estimated for the non-Indigenous population. Higher levels of education are associated with lower levels of life satisfaction for both groups. Being employed part-time is positive for non-Indigenous Australians only. Being unemployed is associated with lower levels of life satisfaction for both groups, independent of any change in income.

Fig. 10 (consistent with the descriptive statistics in Table 2) shows that, in contrast to non-Indigenous Australians, there is little variation in income among Indigenous Australians. Surprisingly, for Indigenous Australians, the natural log of equivalised disposable household income is negatively associated with life satisfaction (although this is not statistically significant). This issue is explored in more detail by Biddle (forthcoming). In contrast, the same measure is positively linked to life satisfaction for non-Indigenous Australians. Noting that the lack of variance in Indigenous income over time may have implications for the accuracy of the fixed effects estimator, we re-estimated equation 4 using a pooled ordered probit model for the Indigenous sample. Results from this re-estimation confirm the negative coefficient for income. Further, an attempt to find a more appropriate functional form using a Box–Cox transformation was unsuccessful—the maximum likelihood estimator failed to converge.

**FIG. 10: Dot plot of equivalised disposable household income**

Source: Derived from HILDA survey

The presence of others during the interview is associated with higher levels of life satisfaction for non-Indigenous Australians only, suggesting some degree of social desirability bias for this group. The estimated coefficients for the inverse of years interviewed (a control for panel conditioning effects) take different signs for the Indigenous and non-Indigenous samples. Noting that, in a fixed effects model, we can only explore the influence of location on life satisfaction if people move between different regions over time, we find that living in an inner regional area is associated with higher levels of life satisfaction than living in a major city for non-Indigenous Australians.

Broadly speaking, the results for non-Indigenous Australians are consistent with existing evidence and a priori expectations. However, the results for Indigenous Australians differ in many respects, thus offering opportunities for further research.

## Discussion

This paper explores Indigenous wellbeing in Australia using data from the HILDA survey. In particular, the study focuses on self-reported life satisfaction of Indigenous Australians, investigating:

- mean levels of life satisfaction
- inequality in life satisfaction
- the prevalence and severity of dissatisfaction with one's life.

The study also offers some preliminary evidence on the determinants of life satisfaction.

### *Levels of life satisfaction*

Our results suggest that life satisfaction for Indigenous Australians is higher than that of non-Indigenous Australians, although it is declining. More specifically, it is evident that life satisfaction for both Indigenous and non-Indigenous Australians peaked in 2003, and Indigenous life satisfaction declined sharply between 2003 and 2012. This decline is despite significant investment by all levels of Australian government in addressing Indigenous disadvantage<sup>3</sup> and suggests that existing policies are having little effect.

Focusing on the distribution of life satisfaction scores, Indigenous Australians are more likely to report being totally satisfied with their life (i.e. report a score of 10); are less likely to report scores of 7, 8 or 9; and are more likely to report a score of 6 or below. This suggests that there may be a polarised experience in the life satisfaction of Indigenous Australians. This polarisation is, in part, reflected in higher levels of inequality in life satisfaction, discussed below.

### *Inequality in life satisfaction*

It is clear that inequality in life satisfaction is higher for Indigenous Australians. We speculate that this may be attributed to greater heterogeneity in personal characteristics and circumstances. For example, there are varying degrees of discrimination towards the Indigenous population; discrimination is often more

keenly experienced by those with darker skin tones (Browne-Yung et al. 2013).

### *Prevalence and severity of dissatisfaction*

Both Indigenous and non-Indigenous Australians report similar levels of dissatisfaction with their lives (i.e. a life satisfaction score of 0). Over the period 2001–12, however, there has been a statistically significant downward trend in the level of dissatisfaction for non-Indigenous Australians, whereas dissatisfaction among Indigenous Australians has remained relatively unchanged. The finding that both groups report similar levels of dissatisfaction is somewhat surprising, given that ABS data (2012) show that, in 2001–10, the overall rate of suicide for Indigenous Australians was twice that of non-Indigenous Australians, with rate ratios of 2.0 for males and 1.9 for females. Similarly, a recent survey (Martin et al. 2010) found that the estimated proportion of the Indigenous population that self-injure at some point in their lifetime is 17.2%, which is approximately 2.2 times that reported by the non-Indigenous population.

### *Determinants of life satisfaction*

Results for the determinants of life satisfaction reveal some interesting differences between Indigenous and non-Indigenous Australians. For example, speaking English either not well or not at all is associated with higher life satisfaction for Indigenous Australians, whereas the reverse is true for non-Indigenous Australians. The curious result for Indigenous Australians may reflect the fact that those reporting lower English-speaking ability are more closely connected with their culture and community. This close connection acts as a protective factor against psychological distress (Kelly et al. 2009) and, therefore, is plausibly positively associated with life satisfaction.

We also find that being a widow is seven times more detrimental to life satisfaction for Indigenous than non-Indigenous Australians. Candidate explanations for this result include the following:

- Indigenous women have more children than non-Indigenous women (Australian Indigenous HealthInfoNet 2013), and thus widowhood imposes a larger burden in terms of child-rearing responsibilities.
- Job opportunities are limited by socioeconomic status. Indigenous people whose partner has died are therefore less likely to be able to find employment to support themselves and their family.

- Indigenous men die approximately 11.5 years younger than non-Indigenous men (ABS 2011) and, therefore, do not accumulate as much superannuation or other financial assets for their beneficiaries.

For Indigenous Australians, the negative effect of a severe (long-term) health condition that prevents them from working is almost double that for non-Indigenous Australians. A plausible explanation for this result is inequality in access to health care between the two groups. It may be that non-Indigenous Australians are more easily able to access health care and thus receive treatment to relieve the symptoms of their health conditions. This result, however, deserves further research.

Perhaps the most intriguing result is that income is not positively associated with life satisfaction for Indigenous Australians (in fact, the coefficient estimate is negative, although not statistically significant). This is in stark contrast to overwhelming evidence in the life satisfaction literature of the positive (albeit diminishing) effects of income on life satisfaction (Frijters et al. 2004). As with the result for poor English-speaking ability and consistent with the arguments put forward by Dockery (2010), a possible explanation may be that activities that disconnect the individual from their community and culture (e.g. living in an urban centre, attracted by the prospect of gainful employment) have the potential to reduce life satisfaction—a reduction that is not adequately compensated for by higher income. Future research into the association between income and life satisfaction for Indigenous Australians may benefit from employing a more plausibly exogenous measure of income, such as a subset of windfall income (see Ambrey & Fleming 2014c). Alternatively, quantile regression methods could be used with a larger sample of Indigenous Australians to identify potential nonlinearity in the relationship between income and life satisfaction.

This evidence on heterogeneity in the determinants of life satisfaction for Indigenous and non-Indigenous Australians is preliminary, exposing only average differences. Determinants may differ further among Indigenous Australians by, for example, gender, age and other sociodemographic factors. This is an area worthy of future research as more data become available.

### *Final comments*

The history of policies concerning Indigenous Australians is awash with unintended outcomes. Despite considerable investment from all levels of government, many indicators show that outcomes for Indigenous Australians are not improving. There is still a considerable way to go to achieve the commitment of the Council of Australian Governments to 'close the gap' in Indigenous disadvantage. As noted by Dockery:

From the arrival of the 'First Fleet' in Australia in 1788 ... policy towards the Indigenous population has oscillated through a number of stages. It remains an issue of intense debate among Indigenous and non-Indigenous Australians alike. The one point of consensus is that our past efforts have been a failure. (2010:315)

The Australian Government recognises that Indigenous policy must work with Indigenous people in ways that take into account the full cultural, social, emotional and economic context of their lives; actively involve Indigenous communities in every stage of program development and delivery; and value Indigenous knowledge, and cultural beliefs and practices, which are important for promoting positive cultural identity, and social and emotional wellbeing for Indigenous Australians (Osborne et al. 2013).

Moreover, the United Nations Permanent Forum on Indigenous Issues declaration states:

... Indigenous peoples will define their own understandings and visions of wellbeing from which indicators will be identified, and include the full participation of Indigenous peoples in the development of these indicators. (2006:15)

Despite such declarations, in many countries (including Australia), policy development and application remain deeply rooted in improving Indigenous wellbeing as it is perceived by the dominant (Western) non-Indigenous culture. This position is most clearly articulated in the framework underpinning the Closing the Gap suite of policies, where Indigenous outcomes are benchmarked against outcomes achieved by the non-Indigenous population (COAG 2014). The use of a non-Indigenous perspective of wellbeing in the design and application of Indigenous policy is fundamentally flawed, as it does not account for Indigenous ways of life. What is needed is an appreciation of Indigenous wellbeing as perceived by the Indigenous population itself. With a clearer understanding of Indigenous wellbeing and its determinants, more

appropriate policy, and ultimately better outcomes, can be achieved for this population. The introduction of subjective measures into the policy discourse will go some way to achieving this goal.

It is hoped that the results presented in this study will provide policy makers with a barometer of the state of Indigenous wellbeing in Australia, highlight the importance of subjective measures of wellbeing, and illustrate the opportunity offered by such measures to enrich policy discussion and promote public debate.

## Notes

1. The value for Indigenous Australians was calculated using a similar method to that used by Yap and Biddle (2010). Data from 2011 are used to take advantage of information from the most recent Australian Census of Population and Housing.
2. For example, the National Aboriginal and Torres Strait Islander Social Survey, and the Australian Aboriginal and Torres Strait Islander Health Survey.
3. In 2012–13, government expenditure per head of population was estimated to be \$43 449 for Indigenous Australians and \$20 900 for non-Indigenous Australians (a ratio of 2.08 to 1) (Steering Committee for the Review of Government Service Provision 2014).

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