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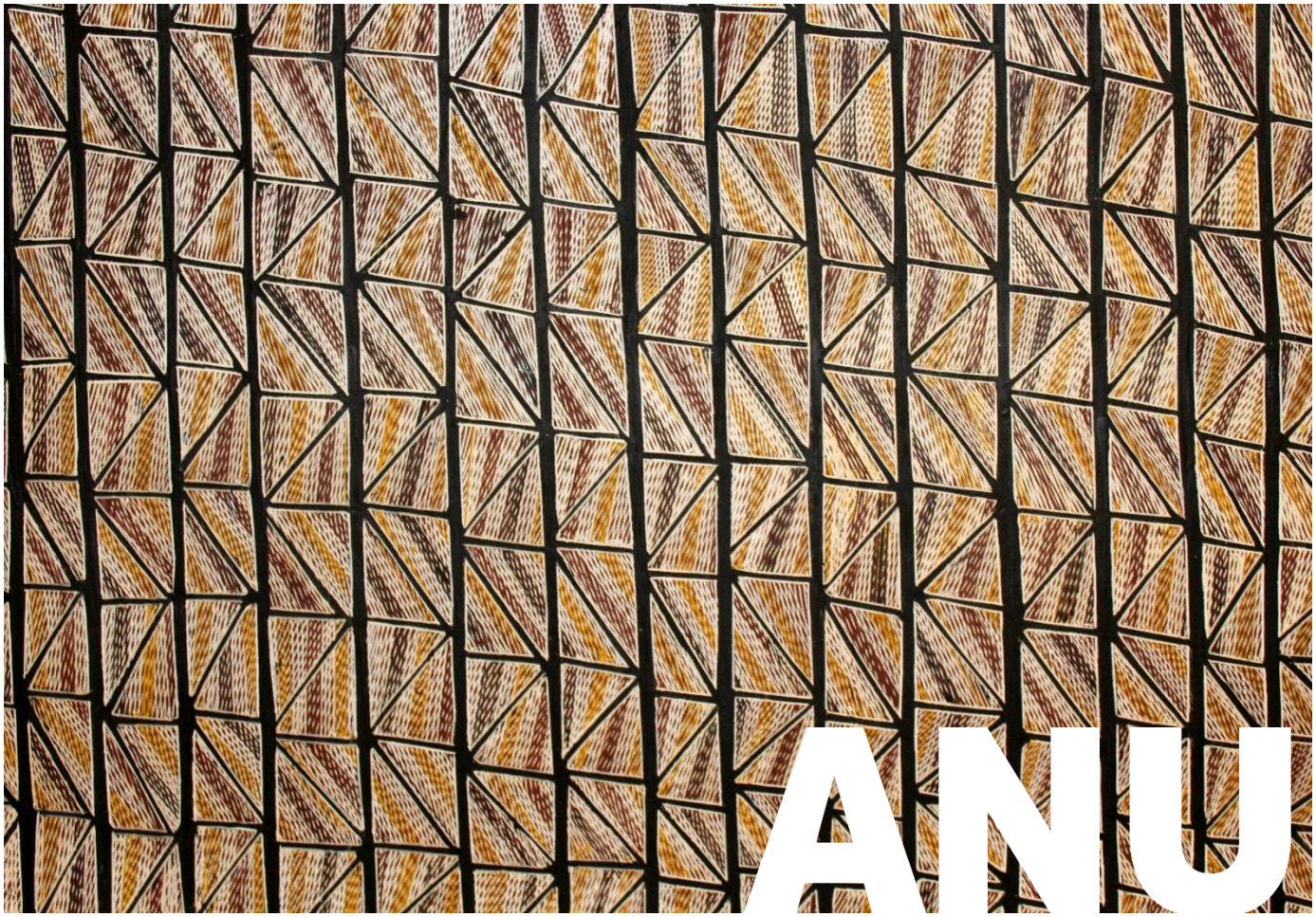

TRENDS IN PARTNERING AND FERTILITY AMONG THE INDIGENOUS POPULATION

D VENN AND H CRAWFORD

2016 CENSUS PAPERS

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2016 CENSUS PAPER NO. 13

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Trends in partnering and fertility among the Indigenous population

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2016 Census Paper No. 13

DOI 10.25911/5c2dd6df46ffe
ISBN 978-1-925286-35-9

An electronic publication downloaded from <caepr.cass.anu.edu.au>.

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Suggested citation:
Venn D and H Crawford (2018), Trends in partnering and fertility among the Indigenous population, 2016 Census Paper no. 13, Centre for Aboriginal Economic Policy Research, Australian National University, Canberra.

Abstract

This paper uses data from the Census of Population and Housing to examine trends in Indigenous partnering and fertility between 2006 and 2016. The proportion of Indigenous adults who are partnered (either married or living in a de facto relationship) fell during the period examined. There were particularly large declines in partnering among Indigenous people in their 20s, those with less than Year 12 education and the population living in remote areas. These decreases were large enough to negate increases in partnering rates resulting from increasing educational attainment. Fertility—measured by the average number of children born to Indigenous women—has also declined over the same period. There was a sharp fall in teenage motherhood, due to a combination of fewer young women leaving school before finishing Year 12 and a substantial reduction in the proportion of early school leavers having children. Over time, an increasing proportion of Indigenous women are postponing childbirth from their teens into their 20s and 30s. Similar percentages of women in their 40s and 50s have borne a child compared with their counterparts 10 years earlier. However, the falling average number of children suggests that postponing the birth of their first child leads to women having fewer children over their lifetimes. This pattern is particularly evident for highly-educated women. Increasing average educational attainment accounts for a large share of the decline in the average number of children born to Indigenous women in their 20s, 30s and 40s.

Keywords: fertility, partnering, family formation, Indigenous population, education

Acknowledgments

Funding for this paper was received from the Australian Government Department of the Prime Minister and Cabinet (PM&C). The authors thank Joanna Abhayaratna and other staff from PM&C, as well as Edith Gray and Francis Markham for comments received on an earlier draft of this paper. The findings and views reported in this paper are those of the authors and should not be attributed to PM&C.

Acronyms

ABS	Australian Bureau of Statistics
ANU	Australian National University
CAEPR	Centre for Aboriginal Economic Policy Research
PM&C	Department of the Prime Minister and Cabinet

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Introduction

Previous research has found that the partnering and fertility patterns of Indigenous Australians differ from those of non-Indigenous Australians. Analysis of the 2011 Census found that Indigenous men and women were less likely than their non-Indigenous peers to be living in a registered or de facto marriage across all age groups except for 15-24 year olds. Indigenous people who were partnered were less likely to be in a registered marriage than non-Indigenous people (Biddle & Yap 2010; Yap & Biddle 2012). Over half of Indigenous adults who were partnered had a non-Indigenous partner, with Indigenous women slightly more likely than Indigenous men to have a non-Indigenous partner (Biddle 2013).

On average, Indigenous women are more likely to have children and have more children than non-Indigenous women (Biddle & Yap 2010; de Vaus 2002; Kinfu & Taylor 2002; Yap & Biddle 2012). One of the key drivers of this pattern is the low age at first birth, with comparably high rates of teenage fertility (Johnstone & Evans 2012). Similar to those of the total Australian population, fertility rates of Indigenous women have been declining since the 1970s (e.g., Johnstone 2011), with age at first birth increasing and evidence of first births being delayed from the teens to 20s or older (Johnstone 2010; Kinfu & Taylor 2002, 2005). There are few data available on the fertility of Indigenous men.[1] Biddle and Yap (2010) report that Indigenous men are more likely to provide unpaid childcare in their teens, 20s and early 30s than non-Indigenous men, but less likely from their late 30s onwards. Similar to Indigenous women, this is indicative of low age at first birth.

There is clear evidence that partnering and fertility decisions and outcomes are closely related to educational attainment. Australian men and women with higher levels of education are more likely to marry or live in a de facto relationship than those with lower levels of education (Heard 2011). For men, higher education levels are associated with greater partnership stability. For women, the evidence of links between education and partnering is more mixed (de Vaus et al. 2017; Hewitt et al. 2005). Australian women with higher levels of education are more likely to remain childless, have children at older ages and have fewer children in total than those with lower levels of education (de Vaus 2002; McDonald 1998). Similar associations have been identified in the few studies to examine the links between education and Indigenous fertility and partnering (Biddle & Yap 2010; Johnstone 2010).

Existing theoretical and empirical research suggests several reasons why partnering decisions are likely to be affected by education. For men, education increases earnings capacity, and has long been associated with better marriage prospects and lower probability of relationship breakdown (see Becker (1981) for a theoretical explanation and Hewitt et al. (2005) for Australian empirical evidence). For women, the effects of education on marriage and partnering are more ambiguous. The influential work of Becker (1981) suggests that women with higher levels of education have less to gain from marriage and the specialised gender roles that come with it. However, as gender roles change and marriages become more equal, it is likely that the economic security provided by education plays a similar role for women as for men in relation to marriage. This view is supported by recent empirical evidence that demonstrates that more educated women delay marriage but, ultimately, have higher marriage rates than women with lower levels of education (e.g., Heard 2011; Isen & Stevenson 2010). Education may also play a role in providing economic stability to partnerships through greater labour market success and higher incomes, reducing the likelihood of relationship breakdowns (Bracher et al. 1993; Hewitt et al. 2005).

There are various hypotheses for the association between education and fertility, with the causal relationship potentially operating in both directions. Higher levels of educational participation and attainment may lead to women being less likely to have children or to have fewer children than those with lower levels of education for

[1] Census data on number of children born used in this paper are only available for women.

several reasons. First, participation in education can directly affect lifetime fertility; women who spend longer in education have been found to postpone partnering and childbearing. As a result, they have fewer children over their lifetime (Cygan-Rehm & Maeder 2013; Silles 2011). Second, women with higher education levels—and greater earning capacity—have a greater opportunity cost of spending time out of the workforce while having and raising children and so might be expected to have fewer children (Becker 1981).[2] Third, lower levels of educational attainment may be the result of structural disadvantage. This disadvantage may also reduce knowledge of, or access to, means to prevent unwanted pregnancies (Musick et al. 2009).

Conversely, fertility may affect educational participation and attainment. In particular, teenage motherhood could disrupt a woman's education, leading them to leave school prematurely or affect their opportunities to participate in post-school education. Young women with aspirations to have children may also invest less in education, as they envisage lower economic returns to education over their life (Martin-Garcia 2008).

One of the most notable socioeconomic developments for Indigenous Australians during the past decade has been rapidly increasing educational attainment. The proportion of Indigenous adults who have completed a post-school qualification increased by between 11 and 18 percentage points between 2006 and 2016, while the number of Indigenous teenagers who leave school before finishing Year 12 has dropped dramatically in both remote and non-remote areas (Crawford & Venn 2018; Venn & Crawford 2018). Based on previous empirical evidence and theoretical predictions, it might be expected that increasing educational attainment among the Indigenous population would be associated with lower fertility and higher partnering rates. This would be consistent with a long term trend of declining female fertility among the Indigenous population (Altman et al. 2005; Kinfu & Taylor 2005). However, the implications of increased educational attainment for Indigenous partnering and fertility decisions does not appear to have been directly addressed in the academic literature.

This paper examines recent trends in partnering and fertility for Indigenous Australians.[3] The focus is on how fertility and partnering rates have changed for the Indigenous population over time. The research examines variations between Indigenous people living in remote and non-remote parts of Australia, and by education level. The extent to which rapidly increasing educational attainment among the Indigenous population has contributed to changing patterns of partnering and fertility is determined. The paper concludes by discussing the implications of these findings for policy and suggests areas for further research.

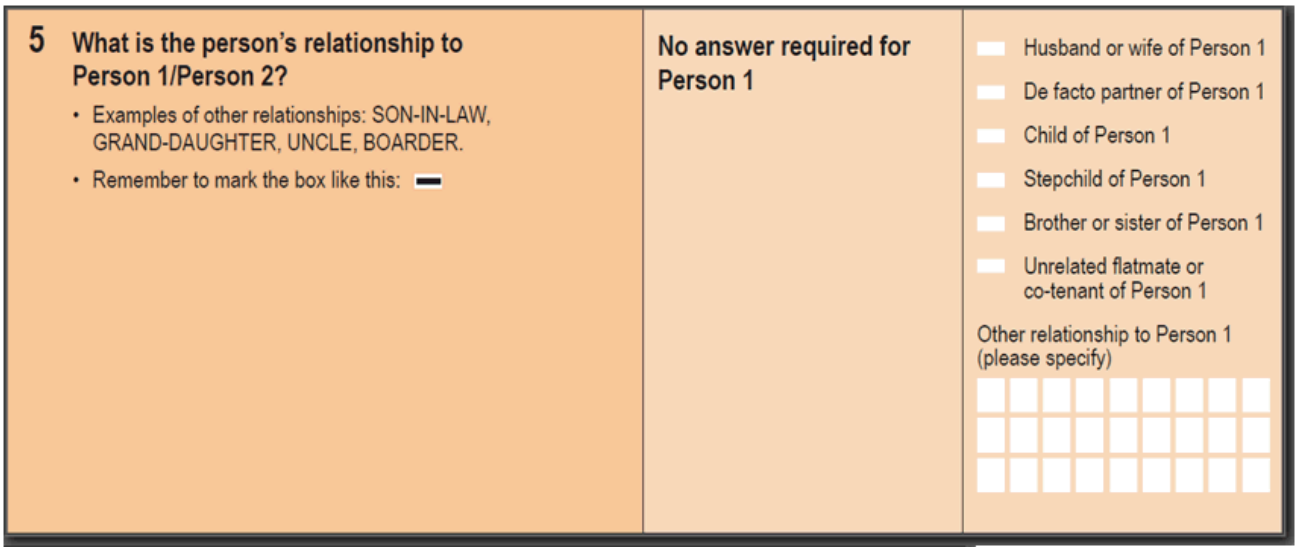
Data and methods

This paper uses data from the Australian Census of Population and Housing, which is conducted every five years by the Australian Bureau of Statistics (ABS). It examines trends in partnering and fertility for Indigenous Australians between 2006 and 2016. For the purposes of this paper, census data have several advantages over birth and marriage registration data published by the ABS in Births, Australia (catalogue no. 3301.0) and Marriages and Divorces, Australia (catalogue no. 3310.0). First, Indigenous status is not available in marriage registration data and is of inconsistent quality in birth registration data. In particular, the identification of births as of Aboriginal and/or Torres Strait Islander origin in New South Wales between 2006 and 2013 was inconsistent with the process used elsewhere. Second, there is evidence that Indigenous births are registered at a lower rate than non-Indigenous births. For example, the Queensland Ombudsman (2018) found that between 15% and 18% of births to Indigenous mothers in Queensland were unregistered, compared with 1.5% of births to non-Indigenous mothers. Third, in addition to information on fertility and partnering, the census includes data on a wider range of other personal and household characteristics than registration data, as well as allowing detailed breakdowns by geography. Most importantly for this paper, it is possible to examine how fertility and partnering

[2] Alternatively, women who earn more may be more able to afford to raise children and may be more likely to have higher earning partners who can support children.
[3] As the focus of this paper is on trends for the Indigenous population, comparisons between Indigenous and non-Indigenous Australians are not included. See Yap and Biddle (2012) for a comparison of Indigenous and non-Indigenous rates of partnering and fertility.

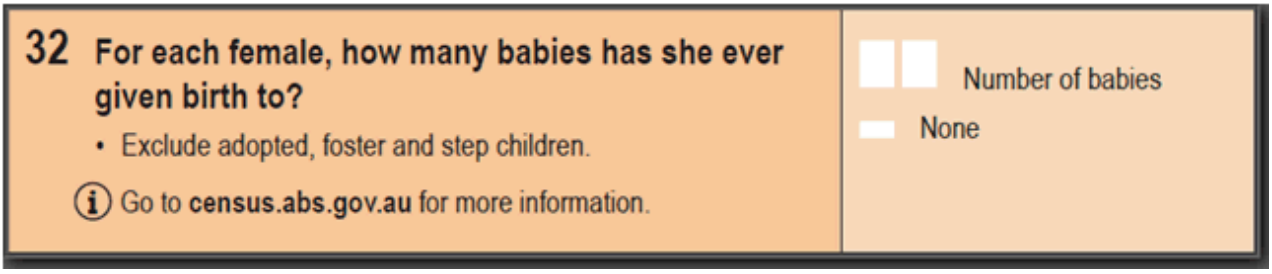
patterns vary by level of education and remoteness. Partnering is measured as the proportion of adults (aged 15 years or older) who are married or living in a de facto relationship with a person in the same usual residence. This includes opposite sex and same sex relationships. The data are based on the person's social marital status (rather than registered marital status), which is identified by the ABS using the responses to a range of census questions. In the first instance, partnered persons are identified using data on the Census Household Form, which provides information about each household member's relationship to the household reference person (see Figure 1). Similar information is collected about household members who were away from home on census night. When that information is not sufficient to identify social marital status, information such as name, place of usual residence or registered marital status may also be used. If, as a result of these processes, it is established that a person is in a couple relationship or social marriage, they are classified as 'married', otherwise they are classified as 'not married'. Therefore, this item is not subject to item non-response (Australian Bureau of Statistics 2018).

Figure 1 Household form question about relationship status, 2016 Census



The census collects information about fertility history for women, but not men. The household form includes a question about how many children each woman aged 15 years and over has given birth to (see Figure 2). The question was first asked in the 1981 Census and has been included in every census except those for 1991 and 2001. From 1981 to 2011, the question included an instruction to include only live births. This instruction was removed from the 2016 Census due to sensitivities around stillbirths (Australian Bureau of Statistics 2018). It is unclear whether the removal of this instruction affected the estimates in this paper. Some stillbirths that were not recorded in previous censuses may have been reported in the 2016 Census, which would have the effect of increasing reported fertility compared to previous years. If this was the case, fertility estimates in this paper for 2016 will be higher than if the question had remained unchanged.

Figure 2 Household form question about number of children ever borne, 2016 Census



The answers to this question are used to examine two measures of fertility: the proportion of women who have ever borne a child and the average number of children born to each woman. Because 2006 Census data on number of children born are top-coded for those reporting six or more children, the average numbers of children are calculated by assigning an average of 6.5 children to women who have borne six or more children for each census year.

For each measure, any women with missing data on this item are excluded from the analysis. Unlike data about social marital status, which are derived by the ABS and have no non-response, a non-trivial proportion of respondents did not answer the question about the number of children borne. Among the Indigenous population, the proportion of women aged 15 years or older who had missing data about the number of children borne was 8.2% in 2006, 6.6% in 2011 and 7.4% in 2016. This is more than double the non-response rate for the same question for non-Indigenous women. Non-response to this question was higher for younger women (12.6% of Indigenous 15–19-year-olds in 2016) and for women living in remote areas (14.5% in 2016). It is unclear how non-response may influence the results in this paper. Higher rates of non-response in remote areas, where average fertility is higher, may result in these results underestimating true fertility rates. Conversely, high non-response among younger women may be biasing the results upwards.

Indigenous status in the census is self-identified based on information from the household form. Indigenous people are defined as those who are identified as either Aboriginal, Torres Strait Islander or both Aboriginal and Torres Strait Islander. This analysis excludes those who have missing data for Indigenous status (see Markham & Biddle 2017 for a discussion of missing data on Indigenous status in the 2016 Census).

This paper examines trends in partnering and fertility for the entire Indigenous population and then by highest level of educational attainment. The population is divided into four educational groups: less than Year 12, Year 12 only (with no post-school qualifications), vocational qualification (certificate, diploma or advanced diploma qualification, regardless of Year 12 completion) and bachelor's degree or higher (regardless of Year 12 completion).

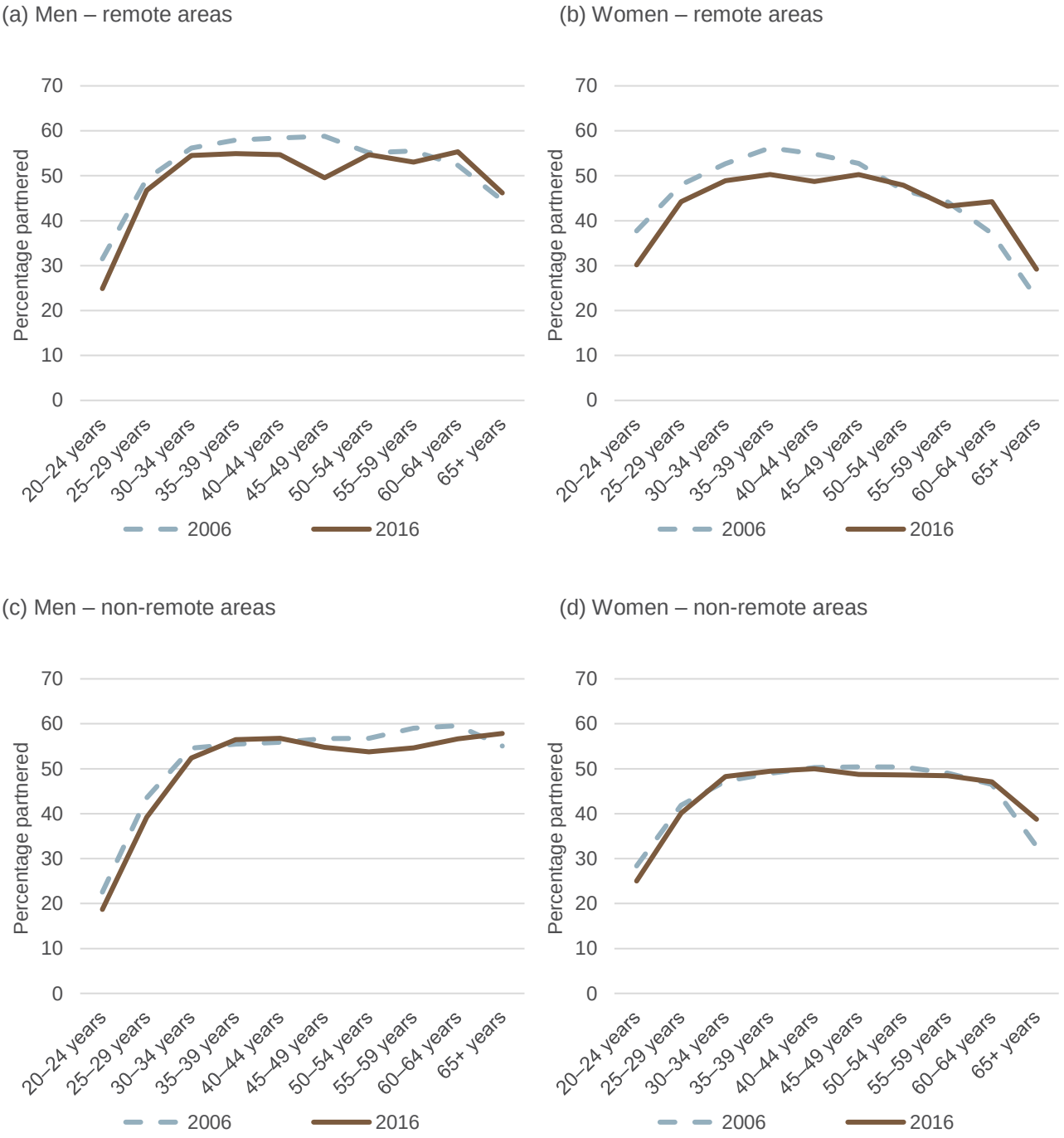
To examine the effects of changes in the educational attainment of the population on changes in the partnering and fertility rates between 2006 and 2016, a shift share decomposition was employed by education. Using this analytical technique, the percentage of the change in partnering rates and average number of children born can be decomposed into the component due to changes within each education level and the component due to changes in the educational distribution of the population. Further details on the decomposition technique can be found in Appendix 1.

Partnering

Partnering trends

Figure 3 shows trends in rates of partnering (the proportion of the population who are partnered) over the life course for Indigenous men and women in remote and non-remote areas. Indigenous people living in remote areas tend to partner earlier and have higher partnering rates than those in non-remote areas. However, between 2011 and 2016 there was a substantial decline in rates of partnering for Indigenous men and women aged under 50 years in remote areas. The proportion of Indigenous men in their 40s living in remote areas who were partnered fell from 59% in 2006 to 52% in 2011. For women, the proportion fell from 54% to 49% over the same period. As a result, in 2016, partnering rates for Indigenous people in remote and non-remote areas were similar in 2016.

Figure 3 Proportion of Indigenous adults in a registered or de facto marriage by age, 2006 to 2016



Source: Data from the 2006 and 2016 Censuses.

Among Indigenous men in their late 40s and 50s in non-remote areas there was also a reduction in the percentage who were partnered between 2006 and 2016. However, partnering rates for Indigenous women in non-remote areas remained unchanged over the same period. For all groups, there was an increase in the proportion of the population aged 65 years and over who were partnered. This is likely to reflect improvements in life expectancy.

Partnering rates among young people in their 20s declined for all groups between 2006 and 2016. The reductions were the greatest for Indigenous people living in remote areas. Among 20 to 24-year-olds, between

2006 and 2016, the proportion of partnered people fell from 32% to 25% for Indigenous men in remote areas, from 23% to 19% for Indigenous men in non-remote areas, from 38% to 30% for Indigenous women in remote areas and from 28% to 25% for Indigenous women in non-remote areas.

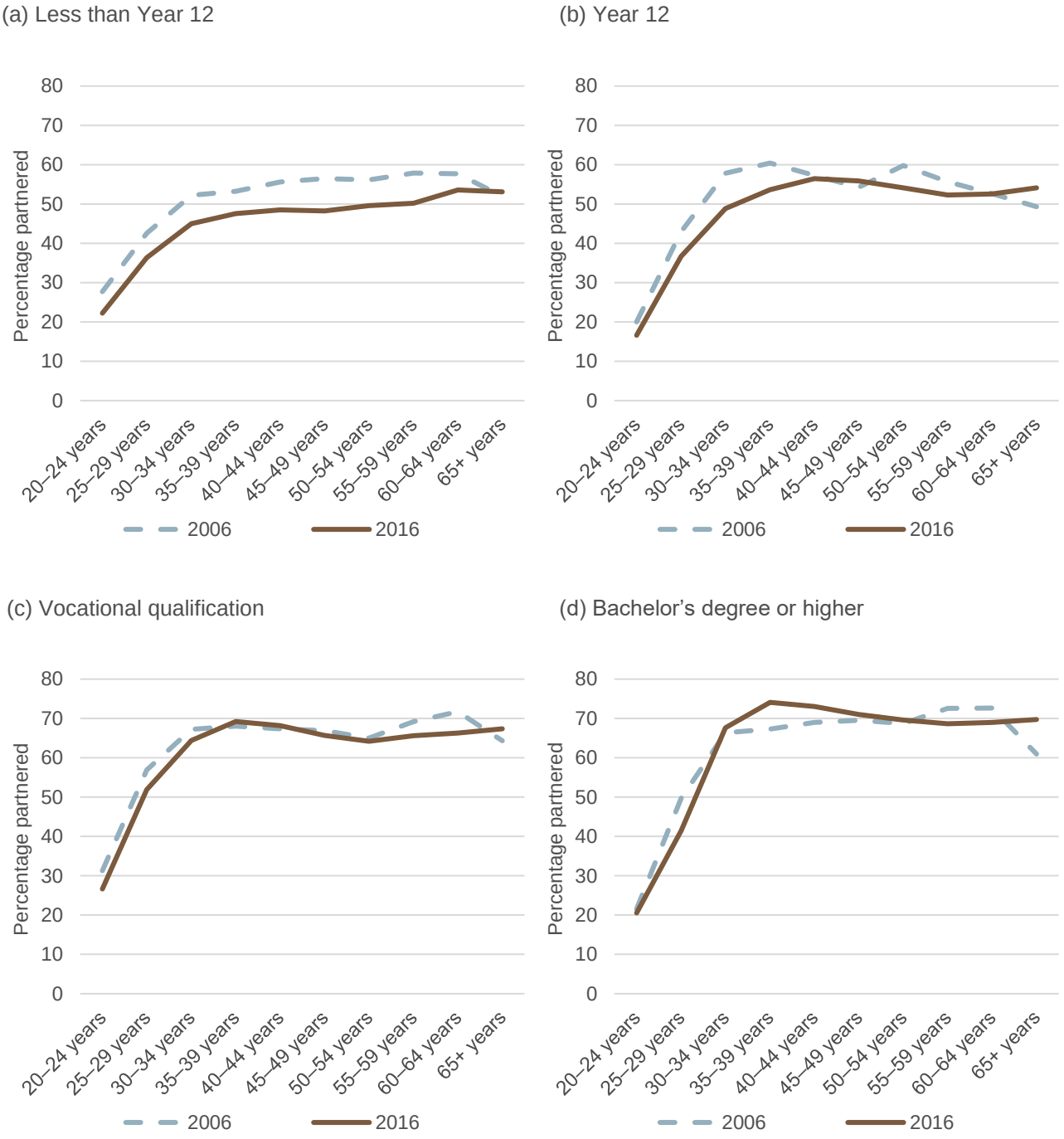
Partnering and education

Although participation in education is associated with lower rates of partnering during people's teens and early 20s, for people aged 30 and older, partnering rates are highest for those with the highest levels of education. For example, in 2016, among Indigenous men aged between 35 and 39, 74% of those with a bachelor's degree or higher were partnered, compared with 48% of those who had not completed Year 12 (see Figure 4).

Between 2006 and 2016, there was a substantial reduction (of approximately five to eight percentage points) in rates of partnering for Indigenous men who had not completed Year 12, across much of the life course. There was also a decline in partnering rates for men in their 20s and 50s across all education levels. Among men with vocational or university qualifications, partnering rates increased for those in their late 30s and early 40s.

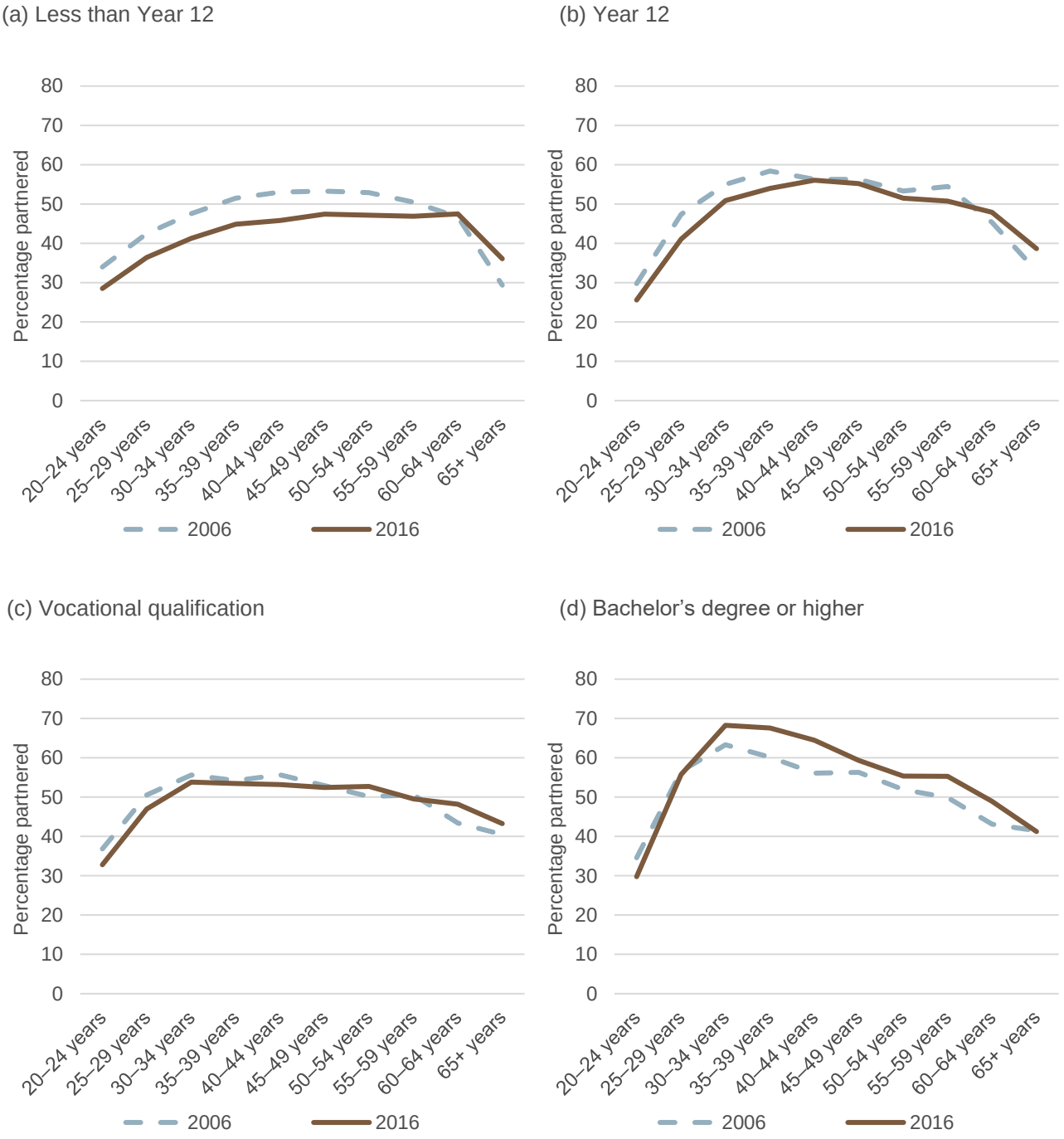
Similar patterns are evident for Indigenous women (see Figure 5). Partnering rates are considerably higher for those with higher levels of education. Approximately 68% of women aged between 35 and 39 with a bachelor's degree or higher were partnered, compared with 45% of women who had not completed Year 12. Between 2006 and 2016, partnering rates declined considerably for most women with less than Year 12 education, for Year 12 graduates in their 30s and for all women in their 20s. There was relatively little change in rates of partnering among women aged over 30 who had vocational qualifications. However, there was a considerable increase in rates of partnering for women in the same cohort with a bachelor's degree or higher.

Figure 4 Proportion of Indigenous men (excluding students) in a registered or de facto marriage, by age and level of education, 2006 to 2016



a. Excludes current students and respondents who did not state their educational attainment.
Source: Data from the 2006 and 2016 Censuses.

Figure 5 Proportion of Indigenous women (excluding students) in a registered or de facto marriage, 2006 to 2016



a. Excludes current students and respondents who did not state their educational attainment.
Source: Data from the 2006 and 2016 Censuses

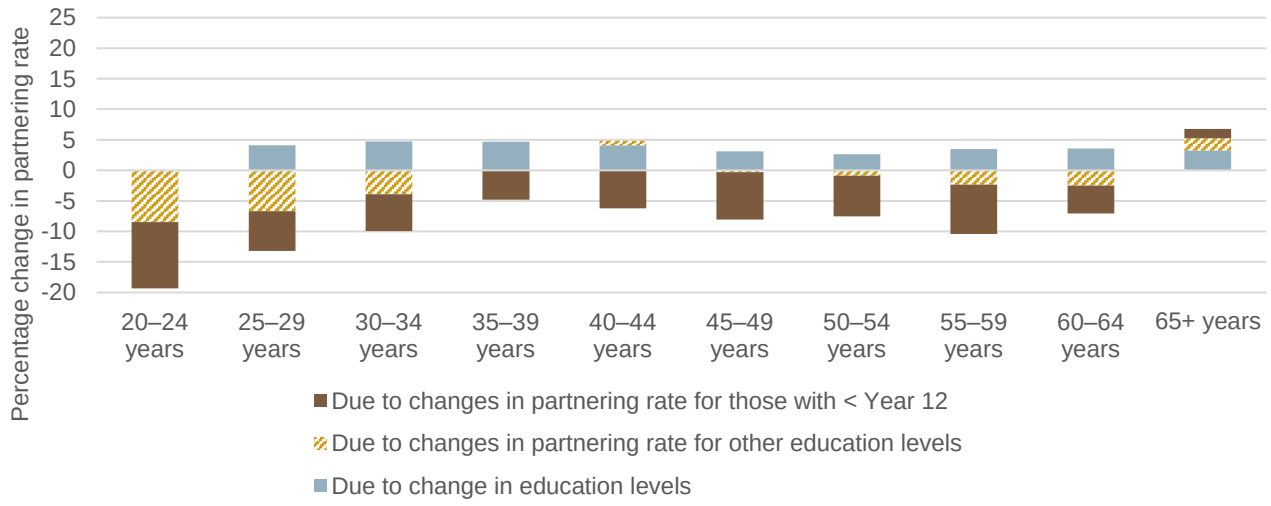
It might be expected that increasing educational attainment among the Indigenous population would lead to higher rates of partnering. However, the previous section demonstrated that rates of partnering have been declining for young people and Indigenous people in remote areas across the life course.

It is possible to decompose the total percentage change in partnering rates between 2006 and 2016 into the component that is due to a shift in levels of educational attainment (e.g. from less educated groups that have

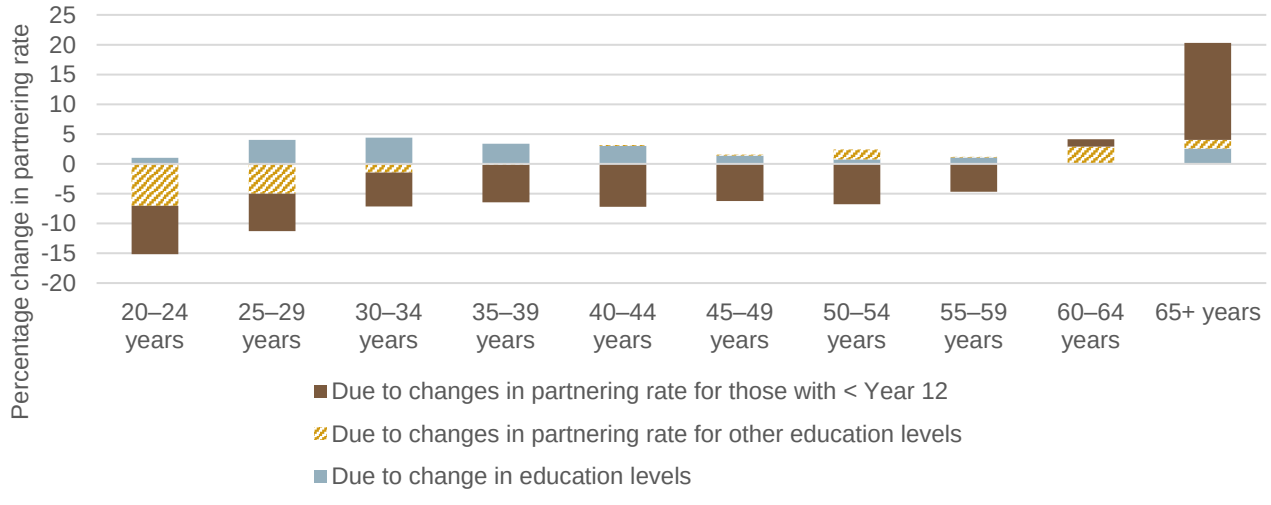
low rates of partnering to highly educated groups with higher rates of partnering) and the component that is due to changes in rates of partnering within the level of education (see Appendix 1). Figure 6 demonstrates the results of the decomposition. As an example of interpretation, for Indigenous men aged between 20 and 24, partnering rates declined by approximately 19% between 2006 and 2016. Slightly more than half of this decline was due to changes in rates of partnering for those with less than Year 12 education. Slightly less than half was due to changes in rates of partnering for other educational groups. None of the changes in rates of partnering for this group were due to changes in the educational distribution of the population.

Figure 6 Decomposition of percentage change in proportion of Indigenous adults (excluding students) in a registered or de facto marriage (partnering rate), 2006 to 2016

(a) Indigenous men



(b) Indigenous women



Note: Education levels used in decomposition are based on the highest completed qualification. Categories used are less than Year 12, Year 12, vocational and bachelor's degree or higher. See Appendix 1 for further details.
Source: Authors' calculation using data from the 2006 and 2016 Censuses.

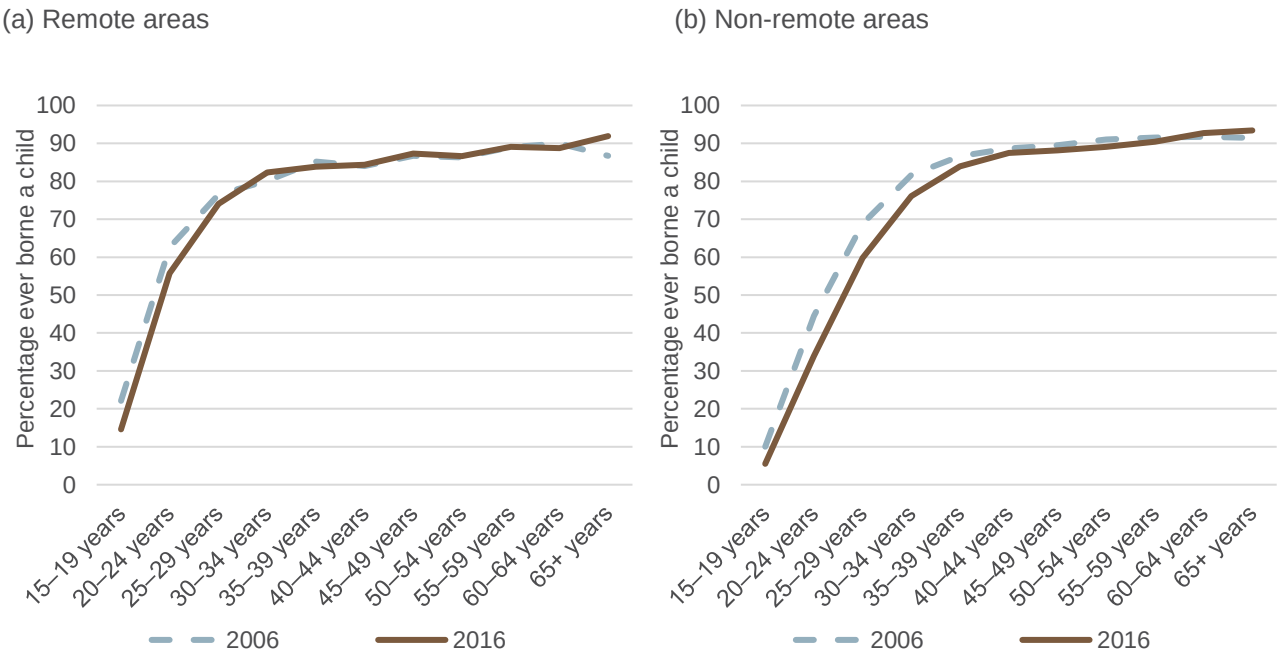
For all men aged 25 years and over, and for women from their late 20s to early 40s, increased educational attainment would have been independently sufficient to increase partnering rates by between 3% and 5%. However, this effect was offset by decreases in partnering rates within educational groups. For people in their 20s, the reduction in partnering occurred across educational groups. For Indigenous people in their 30s, 40s and 50s, almost the entire reduction in partnering observed between 2006 and 2016 was the result of a decline in partnering rates for people with less than Year 12 education.

Fertility

Fertility trends

This section examines trends in fertility for Indigenous women. Between 2006 and 2016, there was a sharp decline in teenage parenthood among Indigenous women. The decline was particularly large in remote areas (see Figure 7). The proportion of Indigenous teenagers who had ever borne a child fell from 22% to 15% in remote areas and from 10% to 5% in non-remote areas. The proportion of Indigenous women in their 20s and (in non-remote areas) those in their early 30s who had ever borne a child also fell. By contrast, there was relatively little change in the proportion of women in their 40s and older who had ever borne a child. For example, among those aged between 45 and 49, 87% of Indigenous women in remote areas had ever borne a child in both 2006 and 2016, while the proportion of Indigenous women in non-remote areas who had ever borne a child decreased slightly from 89% to 88% over the same period. This indicates delayed fertility, rather than an increase in lifetime childlessness.

Figure 7 Proportion of Indigenous women who have ever borne a child, 2006 to 2016

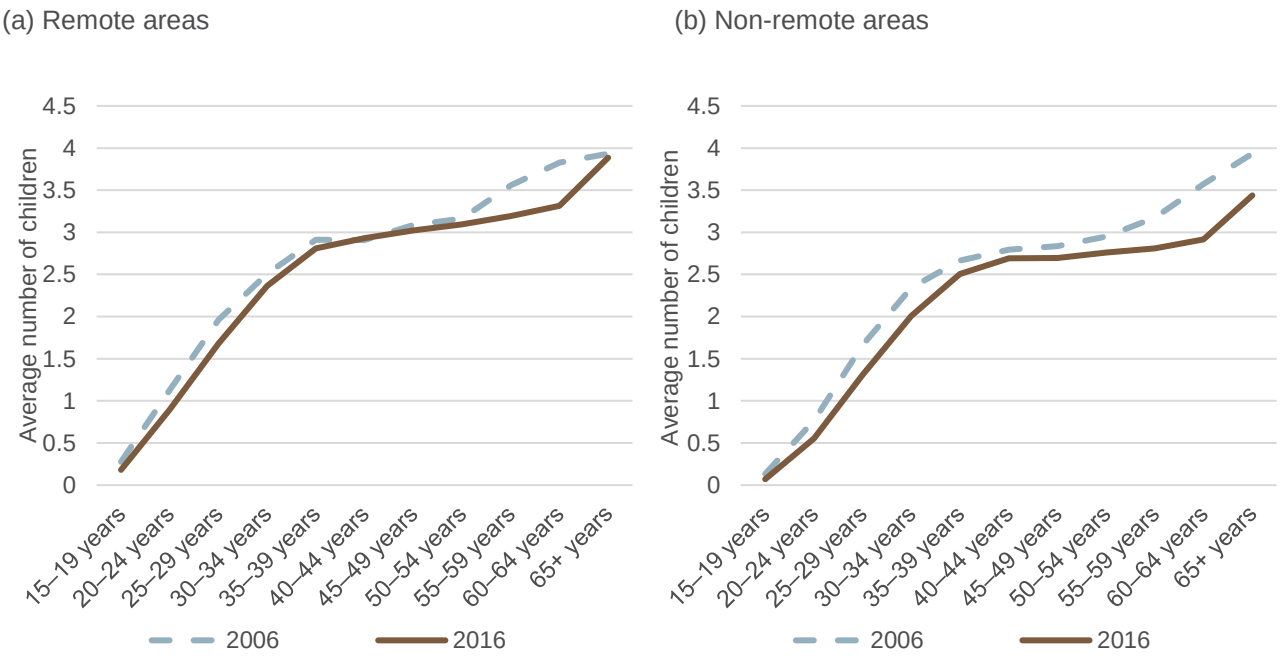


Source: Data from the 2006 and 2016 Censuses.

A different pattern emerges when considering trends in the numbers of children ever born (see Figure 8). Between 2006 and 2016, there has been a decline in the average number of children born to Indigenous women at both ends of the life course, consistent with falling average fertility rates. For young women, the biggest reduction was among those aged between 25 and 29, with the average number of children borne by women in

remote areas falling from 2.0 to 1.7 and from 1.7 to 1.3 among those in non-remote areas. There was also a large decline in the average number of children borne by those in their 50s and 60s. For Indigenous women aged between 60 and 64, the average number of children born fell from 3.8 to 3.3 in remote areas and from 3.6 to 2.9 in non-remote areas between 2006 and 2016.

Figure 8 Average number of children ever borne by Indigenous women, 2006 to 2016



Source: Data from the 2006 and 2016 censuses.

The results presented in this section suggest that the proportion of Indigenous women postponing childbirth from their teens into their 20s and 30s is increasing. Similar percentages of women in their 40s and 50s have ever borne a child compared with their counterparts 10 years earlier. However, the declining average number of children suggests that postponing the birth of their first child leads to women having fewer children over their lifetimes.

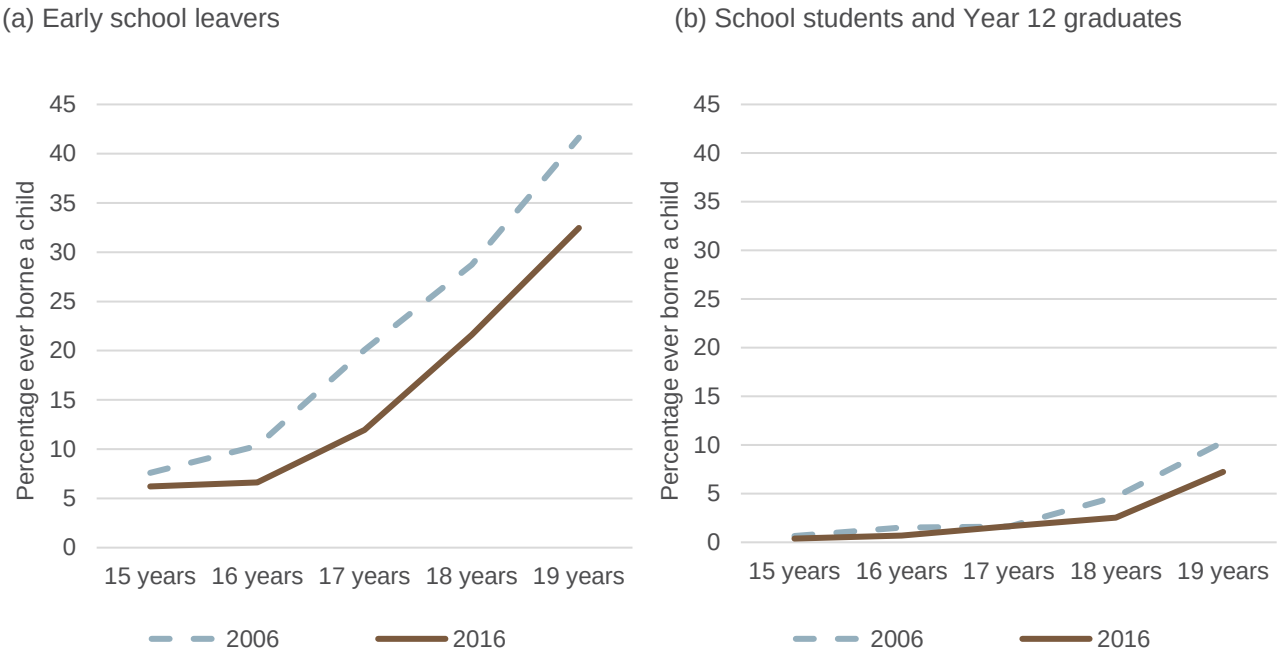
The following two sections examine how increasing educational attainment among Indigenous women is associated with fertility rates across the life course. The analysis begins with an examination of fertility and educational participation for teenagers and follows with a discussion of how educational attainment affects fertility for those aged 20 years and over.

Teenage fertility and education

Figure 9 demonstrates that the likelihood of teenage motherhood is substantially higher for women who have left school before completing Year 12 than for students and Year 12 completers. For example, in 2016, among early school leavers, the percentage who bore a child ranged from just over 6% of 15 and 16-year-olds, to 33% of 19-year-olds. In comparison, less than 1% of 15 and 16-year-old school students had borne a child and 7% of 19-year-olds who were school students or Year 12 graduates had borne a child. Between 2006 and 2016, there has been a considerable decline in the proportion of early school leavers who have borne a child and also a small decline in teenage motherhood for non-early school leavers aged between 17 and 19. Over the same period, Year 12 retention and completion rates have increased substantially (Crawford & Venn 2018). This

raises questions about the association between fertility rates and increasing educational attainment over this period.

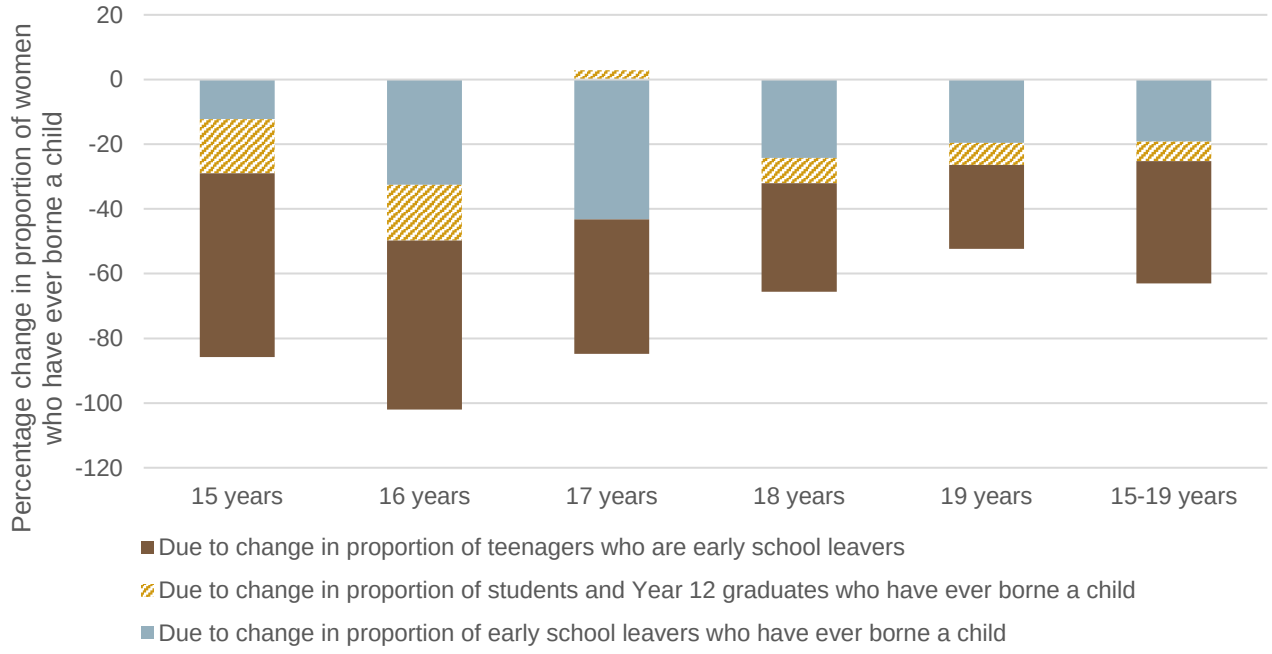
Figure 9 Proportion of Indigenous teenage women who have ever borne a child by school-leaver status, 2006 to 2016



Source: Data from the 2006 and 2016 Censuses.

When the total reduction in teenage motherhood rates between 2006 and 2016 is decomposed, it can be observed that approximately half is due to the decline in the proportion of young women who leave school without finishing Year 12 (see Figure 10). This effect is particularly important for explaining the decline in teenage motherhood for 15-year-olds. There has been a relatively small decline in teenage motherhood among students and Year 12 completers. However, the bulk of the remaining decline in teenage motherhood is associated with a sharp reduction in the rate of teenage motherhood among early school leavers.

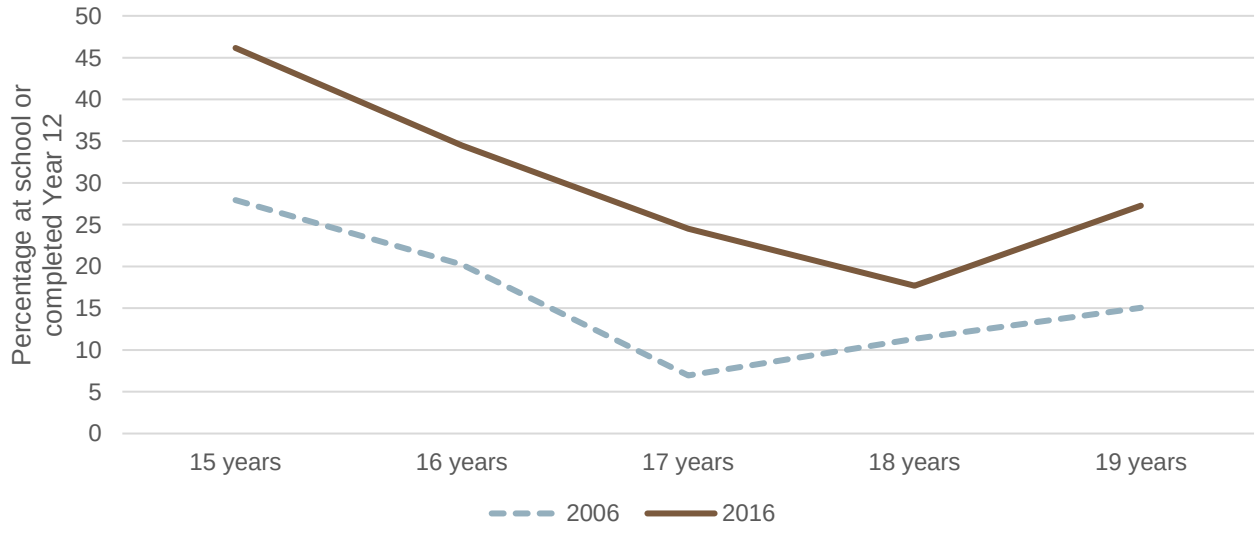
Figure 10 Decomposition of percentage change in proportion of Indigenous teenage women who have borne a child, 2006 to 2016



Source: Authors' calculations using data from the 2006 and 2016 Censuses.

There also appears to have been an increase in the proportion of Indigenous teenage mothers who remain engaged with the education system. Between 2011 and 2016, there was a considerable increase in the proportion of Indigenous teenage mothers aged between 15 and 17 who were either at school or had completed Year 12 (see Figure 11). Between 2006 and 2016, there was a steady increase in the proportion of 18 to 19-year-old Indigenous mothers who were attending school or had completed Year 12.

Figure 11 Proportion of Indigenous teenage mothers who are attending school or have completed Year 12, 2006 to 2016



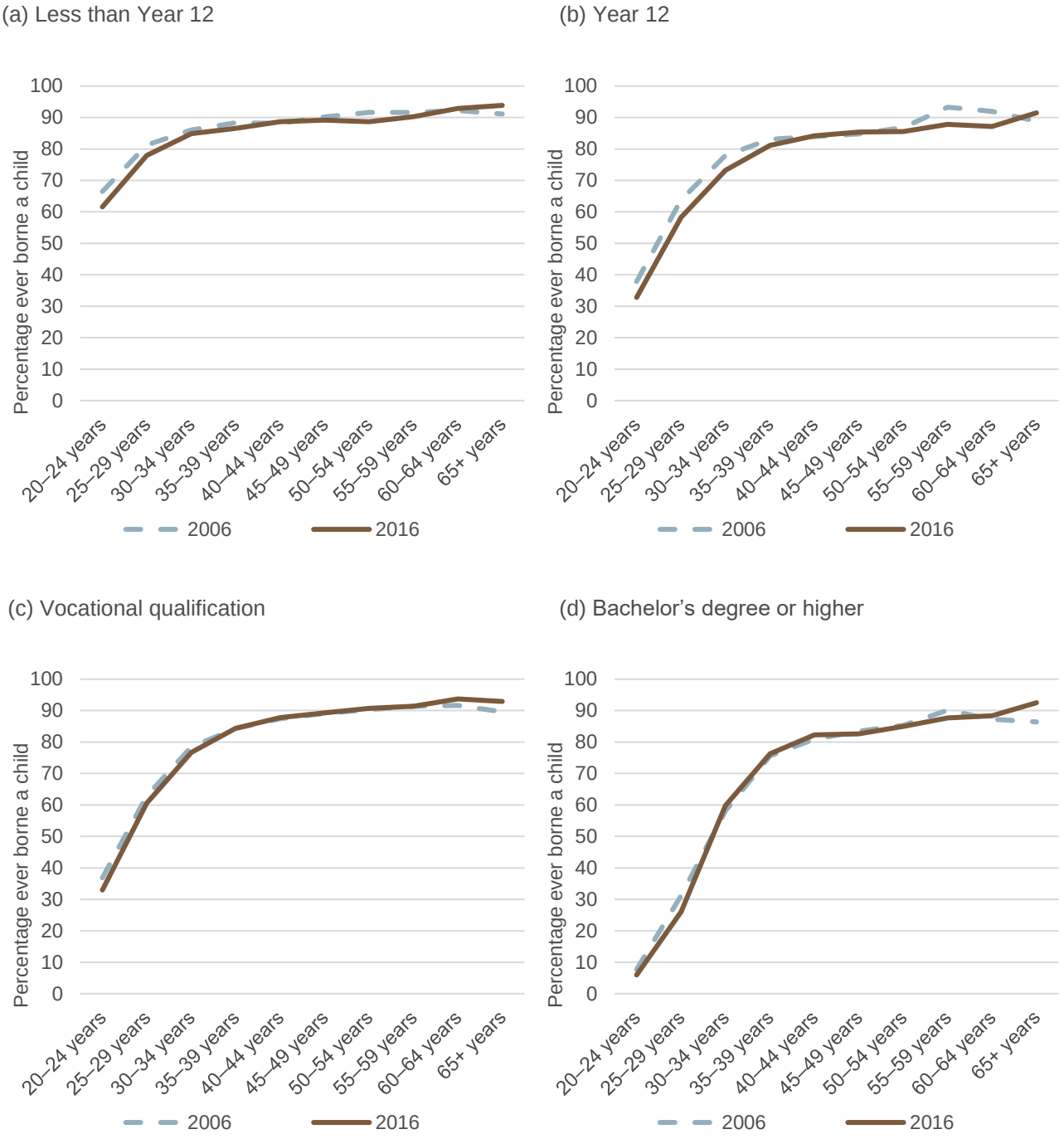
Source: Data from the 2006 and 2016 Censuses.

Adult fertility and education

Among Indigenous women aged 20 years and over, there is a strong correlation between educational levels and fertility. Among women in their 20s, those with less than Year 12 qualifications are far more likely to have ever borne a child than those with higher qualifications (see Figure 12). In 2016, approximately 78% of 25 to 29-year-olds with less than a Year 12 qualification had borne a child, compared with around 60% of those with Year 12 or a vocational qualification and 26% of those with a bachelor's degree or higher. However, among 40 to 44-year-olds, an age group in which many women largely finished bearing children, the differences are considerably smaller. The vast majority of women in this age group have borne a child, ranging from 82% of those with a bachelor's degree or higher, to 89% of those with a vocational qualification or who have not completed Year 12.

Between 2006 and 2016, the proportion of women in their 20s who had borne a child fell across all education levels and also for those in their early 30s with less than bachelor's degree qualifications. For those with a bachelor's degree or higher qualification, there was a slight increase in the proportion who had borne a child among those in their late 30s and early 40s. However, the sample size for this group is relatively small and this result should be treated with some caution.

Figure 12 Proportion of Indigenous women (excluding students) who have ever borne a child by highest level of education completed, 2006 to 2016

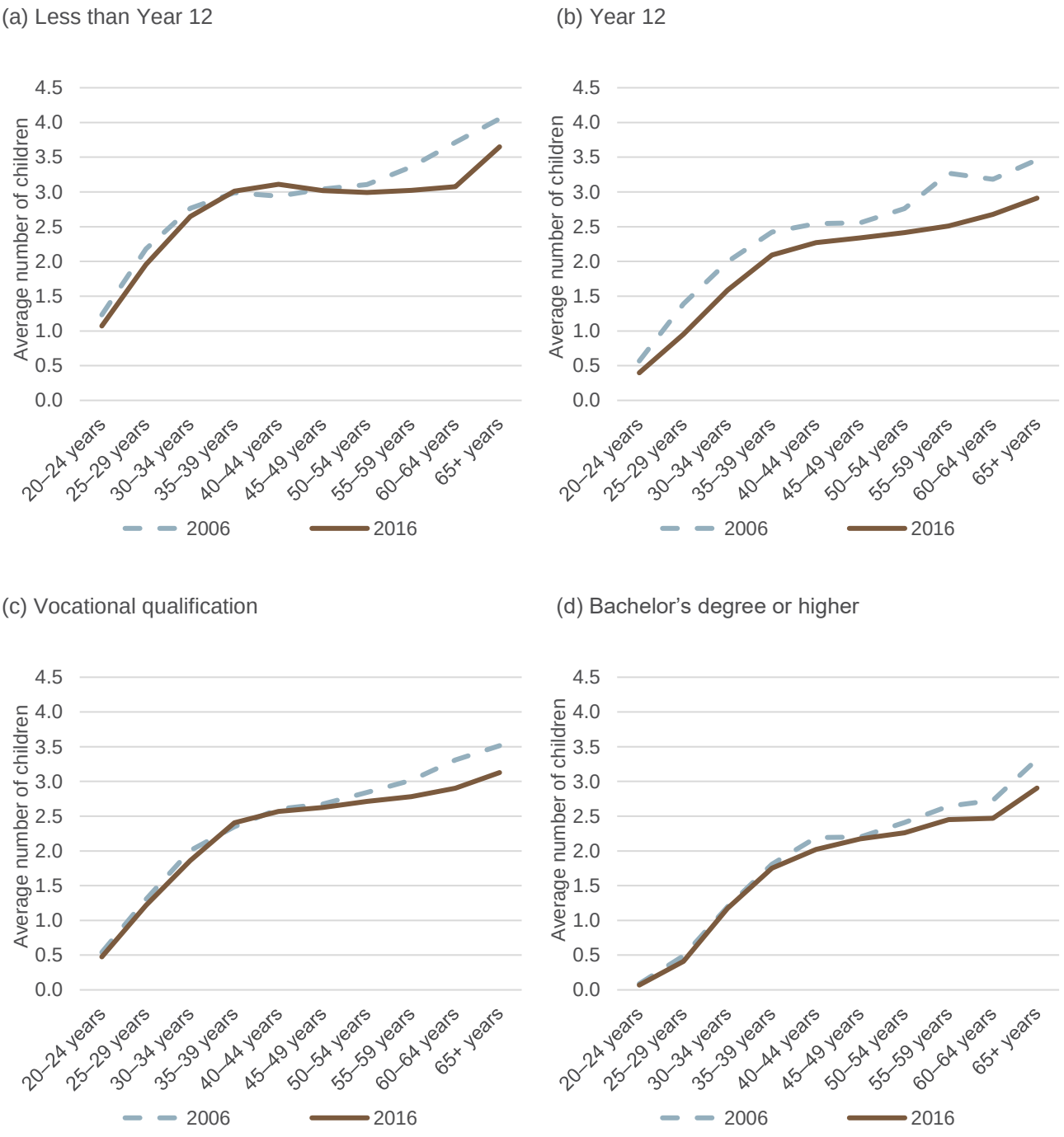


Source: Data from the 2006 and 2016 Censuses.

Analysis of the average number of children born demonstrates a similar pattern across education levels—on average, those with the lowest level of education have more children (see Figure 13). For example in 2016, on average, women aged between 30 and 34 with less than Year 12 education had 2.7 children, compared with 1.6 for those with Year 12, 1.9 for those with vocational qualifications and 1.2 for those with degree qualifications or higher. Unlike the proportion of women who have borne a child, these differences also occur in older cohorts. In 2016, on average, women aged between 40 and 44 with less than Year 12 qualifications had 3.1 children,

compared with 2.3 for women with Year 12, 2.6 for women with vocational qualifications and 2.0 for women with degree qualifications or higher.

Figure 13 Average number of children ever born to Indigenous women (excluding students) by highest level of education completed, 2006 to 2016



Source: Data from the 2006 and 2016 Censuses.

Trends in the number of children born between 2006 and 2016 demonstrate a much greater change than those presented in Figure 12, particularly for those at the upper end of the age distribution. For all levels of education, there has been a substantial decline in the average number of children born to Indigenous women aged 50 years and over. For those with Year 12 qualifications, there was a reduction in the average number of children

born across all age groups. For those with less than Year 12 education, there was also a decline in the average number of children born to those in their 20s and early 30s. For those with vocational or degree qualifications, there was relatively little change in the average number of children born to younger women.

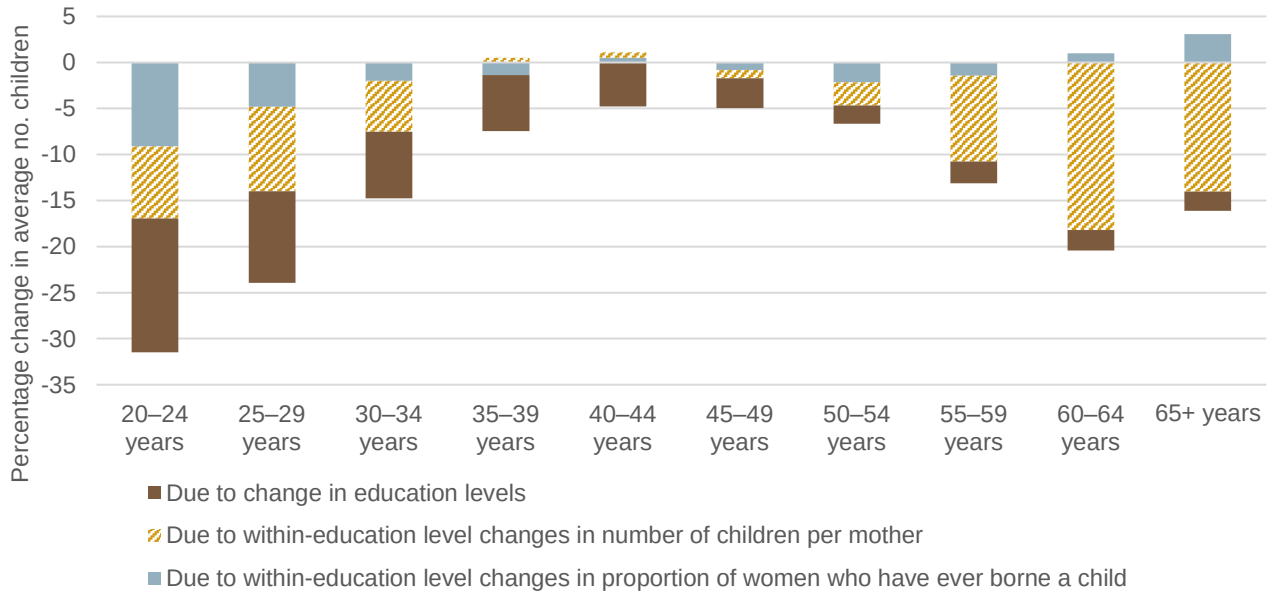
When the percentage change in the average number of children ever born between 2006 and 2016 is decomposed into the components attributed to changes in educational distribution, changes due to the likelihood of women having any children and changes due to the average number of children borne by those who do have children, three distinct patterns emerge (see Figure 14):

i. For women in their 20s and early 30s, increasing educational attainment explains approximately 40% of the decline in the average number of children ever born. There has also been a decline in the proportion of women within each education level bearing children (especially for those in their early 20s) and a decline in the number of children borne by those who do have children.

ii. For women in their mid-30s and 40s, there has been almost no change in the proportion of women bearing children or the number of children born within each level of education; almost all of the decline in the average number of children has been due to increasing educational attainment.

iii. For women in their 50s and 60s, increasing educational attainment, compared with previous cohorts, has had little effect on the average number of children ever born. There was also relatively little change in the likelihood of having children within each level of education. Instead, falling average numbers of children can be attributed to sharp declines in the number of children borne by those who do have children within every category of educational attainment.

Figure 14 Decomposition of percentage change in average number of children born to Indigenous women (excluding students), 2006 to 2016



Note: Education levels used in decomposition are based on the highest qualification completed. Categories used are less than Year 12, Year 12, vocational and bachelor's degree or higher.
Source: Authors' calculations using data from the 2006 and 2016 Censuses.

Conclusion

This paper has examined trends in partnering and fertility for Indigenous Australians and the role of increasing Indigenous educational attainment in driving observed trends. Consistent with previous research on the Australian population in general, on average, Indigenous people with higher levels of education have higher rates of partnering and lower rates of fertility than those with lower levels of education. Increases in rates of partnering associated with growing educational attainment have been offset by declines in partnering due to other factors. Rapidly increasing levels of educational attainment among the Indigenous population over the past decade, complementing other social trends, is associated with decreases in the average number of children born.

Rates of partnering have fallen considerably for Indigenous people in their 20s. These trends were observed across remote and non-remote areas and for all levels of educational attainment. Similar trends were observed for the non-Indigenous population. It is likely that reduced partnering among young people may, at least in part, be related to increased economic insecurity brought on by relatively weak labour market conditions for young people (Venn 2018) and high housing costs. Both factors may result in young people living at home for longer and delaying partnering (e.g., Cobb-Clark 2008).

There has also been a very large reduction in partnering in remote areas and for people with less than Year 12 education. This effect has been so large that it has negated increases in rates of partnering resulting from increasing educational attainment. Further research is required to improve understanding of the factors causing rates of partnering to fall for these groups. Labour market conditions can play a major role in explaining partnering behaviour (Harknett & Kuperberg 2011). Further, there is evidence that labour market conditions for Indigenous people in remote areas deteriorated over the period examined (Venn & Biddle 2018). An examination of longitudinal census data could also further illuminate whether falling rates of partnering are the result of fewer people forming partnerships or existing partnerships becoming less stable.

Teenage parenthood has reduced considerably, due to a combination of fewer young women leaving school before finishing Year 12 and a substantial decline in the proportion of early school leavers bearing children. This trend is likely to have positive implications for aggregate employment, educational attainment, income and health, as, on average, teenage mothers and their children have poorer social and economic outcomes over their lifetimes than older mothers (e.g., Gibb et al. 2015; Jeon et al. 2011; Kalb et al. 2015).

It is difficult to ascertain the direction of the causal relationship between education and fertility for young women. Remaining at school may increase young women's options and the opportunity cost of motherhood in terms of future earnings or ability to participate in post-school education. However, this may be less of a factor in remote areas with more post-school education options and weaker labour markets. In this case, policies such as increasing the school leaving age to 17 (as implemented in many Australian states and territories between 2006 and 2010) may have had flow-on effects on teenage fertility. Conversely, teenage motherhood can disrupt education participation, resulting in those with higher fertility having lower educational attainment. Although this is likely to be the case for some teenage mothers, there is evidence that teenagers in Australia and New Zealand typically leave school before becoming pregnant, rather than the other way around (Gibb et al. 2015; Jeon et al. 2011). It has also been demonstrated in this paper that fewer Indigenous teenage mothers are leaving school early and more are completing Year 12. Therefore, the causal link between teenage fertility and educational attainment may be weakening over time. Future research could take advantage of emerging linked census and administrative datasets (e.g., the Multi-Agency Data Integration Project coordinated by the Australia Bureau of Statistics) to establish the direction of causation between trends in fertility and education. This can be achieved by exploiting geographical differences in contraception access or adjustments to the school leaving age that occurred at different times between 2006 and 2011 in different states and territories.

Rapid increases in educational attainment among the Indigenous population are clearly associated with declining fertility rates at younger ages and decreases in the average number of children born to Indigenous women. It is important to keep in mind that the fertility of each cohort is compared with their predecessors 10 years earlier, rather than looking at how the fertility rate of particular cohorts have changed over the life course.[4] Even so, the results suggest that, similar to the Australian population more generally (e.g., Heard & Arunachalam 2015), Indigenous women with higher levels of education begin bearing children at a later age than those with lower levels of education and, although equally likely to bear children in their lifetime, bear fewer children on average.

An important area for further research is the implications of the trends observed in partnering and fertility for family formation and structure. Unpublished estimates derived by the authors from the census suggest that, in non-remote areas, over time, more Indigenous children are living in couple families than lone parent families. This is the combined result of increased rates of partnering and declining fertility in these areas. In remote areas, the opposite is true: the proportion of Indigenous children living in lone parent families has increased since 2006. This is consistent with rates of partnering in remote areas falling more quickly than fertility rates, so that Indigenous children in remote areas have an increased chance of living in a lone parent family. More work is required to understand these trends and their implications, keeping in mind that there is some debate about the relevance of ABS family classifications for describing the structure of Indigenous households, particularly those in remote areas (Morphy 2006).

The analysis in this paper does not take into account changes in Indigenous identification over time. Both the previous and current censuses provide strong evidence that the number and proportion of people who identify as Indigenous have increased over time and that the newly identified Indigenous population has better socioeconomic status than the previously identified population (Markham & Biddle 2018). The implications of identification change for fertility and partnering are not immediately clear. In remote areas, where identification change is minimal, the results are expected to be relatively unaffected. However, the increasing propensity of groups with higher socioeconomic status to identify as Indigenous in non-remote areas could be driving some of the increase in fertility and rates of partnering that have been observed.

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[4] Cohort analysis of the Indigenous population using census data is hampered by increasing rates of Indigenous identification over time. For example, this means that Indigenous 20 to 24-year-olds in the 2011 Census are likely to be a substantially different group than Indigenous 25 to 29-year-olds in the 2016 Census. The release of linked census records in the 2006 to 2016 Australian Census Longitudinal Dataset would allow for further examination of fertility and partnering trends over a decade within cohorts. However, it would not be possible to examine changes between cohorts at the same point in the life cycle.

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Appendix 1: Shift share decomposition

Each of the decompositions used in this paper employ a similar technique to divide the total percentage change in the variable of interest (partnering rate, fertility rate, average number of children) into the components due to changes within each level of education and the component due to changes in the share of the Indigenous population with each level of education.

For the partnering and average number of children decompositions, four levels of education were used to undertake the decomposition: less than Year 12, Year 12, vocational qualification (certificate, diploma or advanced diploma, regardless of Year 12 completion) and university qualification (bachelor's degree or higher, regardless of Year 12 completion).

For the teenage fertility decomposition, three levels of participation in education were used to undertake the decomposition: current school student, completed Year 12 and early school leaver, which is defined as not a current student and has not completed Year 12. In each decomposition, percentage changes over time are approximated as:

$$\frac{\Delta x}{x} \approx \frac{(x_t - x_{t-1})}{average(x_t, x_{t-1})}$$

Partnering rate decomposition

$$Partnering\ rate = \frac{partnered}{population} = \sum_i \frac{partnered_i}{population_i}$$

where $\sum_i population_i = population$

partnered$_i$ is the number of people living in a registered or de facto marriage in each education group *i* and *i* represents groups with different education levels. The decomposition of the percentage change in the partnering rate can be written as:

$$\frac{\Delta partnering\ rate}{partnering\ rate} = \sum_i \left[\frac{partnered_i}{partnered} . \frac{\Delta(partnered_i/population_i)}{(partnered_i/population_i)}\right] + \sum_i \left[\frac{partnered_i}{partnered} . \frac{\Delta(population_i/population)}{(population_i/population)}\right]$$

where the first component is the effect of changes in the partnering rate within education levels and the second component is the effect of changes in the proportion of the population in each level of education.

Teenage fertility rate decomposition

$$Fertility\ rate = \frac{mothers}{population} = \sum_i \frac{mothers_i}{population_i} . \frac{population_i}{population}$$

where $\sum_i population_i = population$

mothers$_i$ is the number of women who have ever borne a child in education group. *i* and *i* represents groups with different levels of education. The decomposition of the percentage change in the rate of partnering can be written as:

$$\frac{\Delta fertility\ rate}{fertility\ rate} = \sum_i \left[\frac{mothers_i}{mothers} . \frac{\Delta(mothers_i/population_i)}{(mothers_i/population_i)}\right] + \sum_i \left[\frac{mothers_i}{mothers} . \frac{\Delta(population_i/population)}{(population_i/population)}\right]$$

where the first component is the effect of changes in the proportion of women who have ever borne a child within education levels and the second component is the effect of changes in the proportion of the population in each level of education.

Average number of children decomposition

$$Average\ children = \frac{children}{population} = \sum_i \frac{children_i}{mothers_i} . \frac{mothers_i}{population_i} . \frac{population_i}{population}$$

where $\sum_i population_i = population$

children$_i$ is the total number of children ever born to women in education group *i*, *mothers*$_i$ is the number of women who have ever borne a child in education group *i* and *i* represents groups with different levels of education.

The decomposition of the percentage change in the partnering rate can be written as:

$$\frac{\Delta average\ children}{average\ children} = \sum_i \left[\frac{children_i}{children} . \frac{\Delta(children_i/mothers_i)}{(children_i/mothers_i)}\right] + \sum_i \left[\frac{children_i}{children} . \frac{\Delta(mothers_i/population_i)}{(mothers_i/population_i)}\right] + \sum_i \left[\frac{children_i}{children} . \frac{\Delta(popuation_i/population)}{(population_i/population)}\right]$$

where the first component is the effect of changes in the number of children ever born to mothers within each level of education, the second component is the effect of changes in the proportion of women who have ever borne a child within education levels and the third component is the effect of changes in the proportion of the population in each level of education.

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