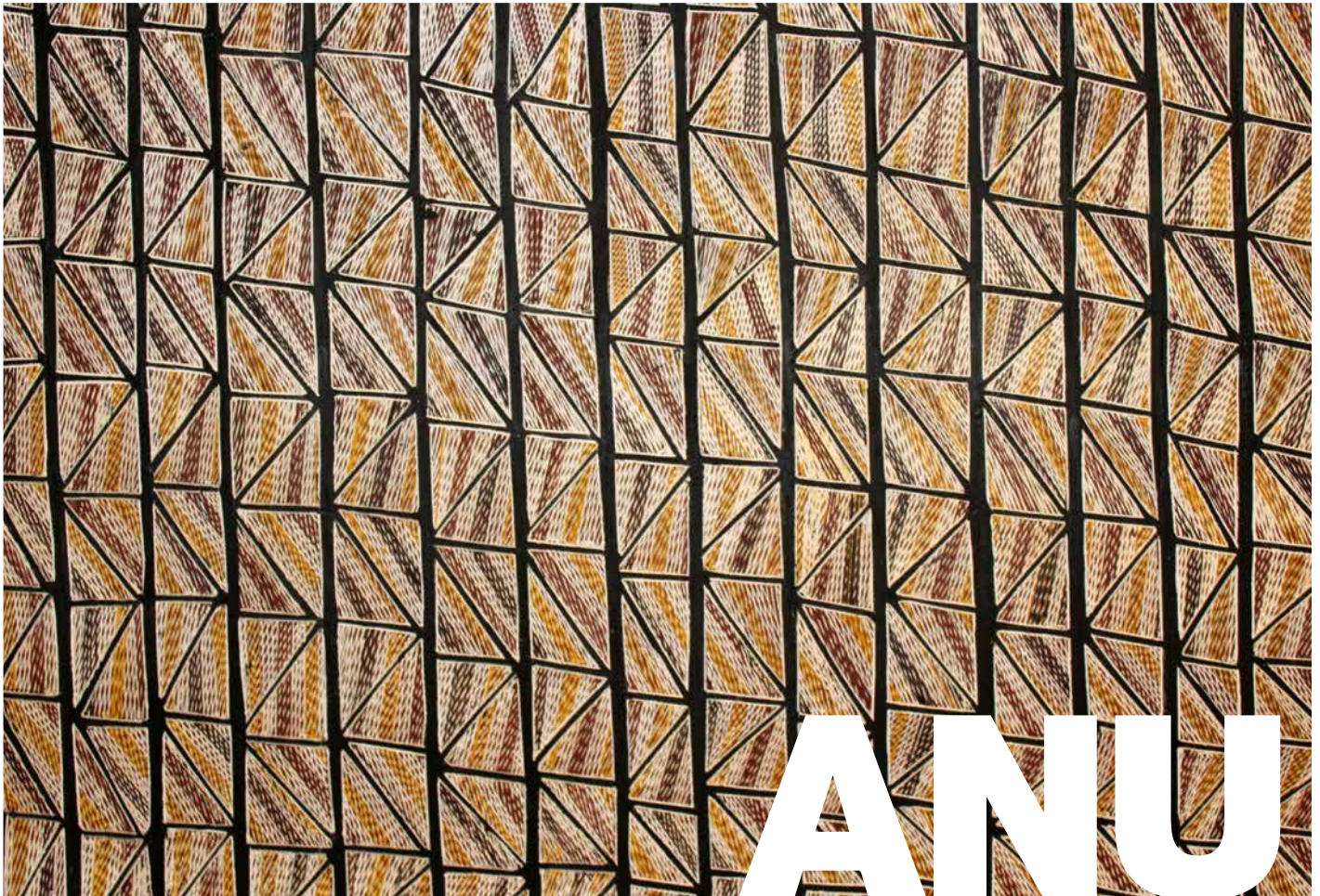




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INDIGENOUS RESIDENTIAL  
SEGREGATION IN TOWNS AND CITIES,  
1976–2016

F MARKHAM AND N BIDDLE

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College of Arts & Social Sciences  
The Australian National University  
April 2018



# Indigenous residential segregation in towns and cities, 1976–2016

F Markham and N Biddle

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## Abstract

Indigenous people tend to live in different parts of Australian towns and cities than the non-Indigenous population. This is due to a combination of historic and contemporary government policies, the agency of Indigenous people, and the constraints placed on residential location by the interaction of the housing and labour markets. This study traces the trajectory of Indigenous residential segregation in 60 Australian towns and cities, using census data from 1976 to 2016. Segregation is measured using the index of dissimilarity and the threshold method. Indigenous residential segregation has been declining steadily since 1976 nationally. However, there has been a great deal of variation in segregation trajectories among towns and cities. In Sydney and Melbourne, segregation remained relatively high over the study period. The level of segregation in 1976 appears to be related to the geographical remoteness of the town, with remote towns generally having lower levels of segregation in 1976. Segregation has been decreasing most rapidly in regional towns in New South Wales and Queensland. Finally, this study has found a long-run increase in the proportion of Indigenous residents living in highly Indigenous neighbourhoods, consistent with the increasingly close settlement of Indigenous people in Australian towns and cities. This trend is at odds with the apparent decrease in segregation found when segregation is measured using the index of dissimilarity. Detailed case studies may be required that examine how concrete historical geographies and policy legacies combine with contemporary housing markets to produce the configuration of segregation that we see today.

**Keywords:** Indigenous Australians, residential segregation, cities, neighbourhoods, urban geography

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## Acronyms

ABS	Australian Bureau of Statistics
ANU	The Australian National University
CAEPR	Centre for Aboriginal Economic Policy Research
CD	Collector District
SA1	Statistical Area 1

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## Introduction

### *Desegregation and urban population growth*

The place that a person lives is a key policy outcome for two reasons. First, it plays a role in determining their life chances – known in the academic literature as ‘neighbourhood effects’. Research in this field has mostly focused on urban locations within cities (Massey & Denton 1989, Kearns & Parkinson 2001, Sampson et al. 2002, Friedrichs et al. 2003, Musterd 2003). Empirical researchers from a range of disciplines have shown that the type of environment in which a person lives affects their life chances. The quality of local schools, the strength of local labour markets, experiences of discrimination, the local availability of services and facilities, and the level of political power held by residents of an area all directly contribute to short-, medium- and long-term outcomes (Pickett & Pearl 2001, Galster 2012). Recent evidence suggests that these kinds of neighbourhood effects are causal (e.g. Pickett & Pearl 2001, van Ham & Manley 2010, Galster 2012, Chetty & Hendren 2016ab), meaning that the neighbourhood in which people live has strong impacts that endure across people’s lifecourse.

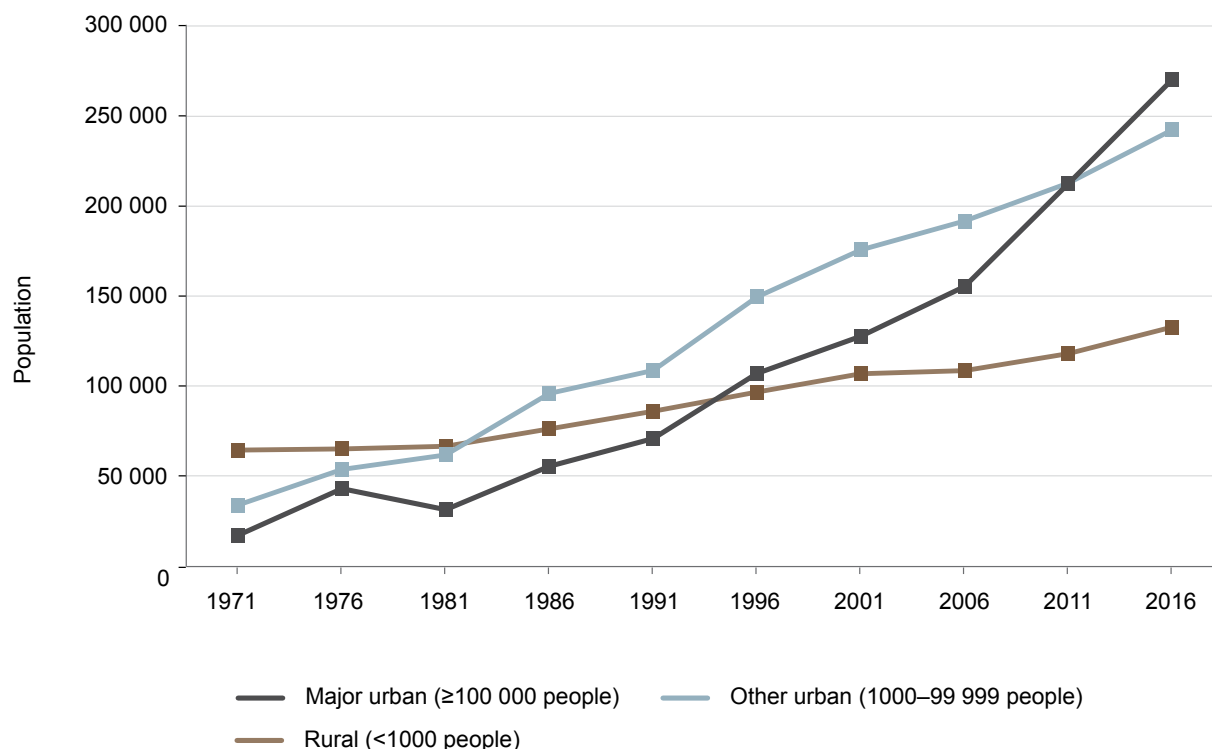
Second, and conversely, people’s life chances also affect the neighbourhoods in which they live (Slater 2013ab). In Wacquant’s (2016:1078) sociological account, residential sorting is the result of ‘multilevel structural processes whereby persons are selected, thrust and maintained in marginal locations’. These processes implicate myriad institutions and social actors, including governments, policy makers, financial institutions, councils and landlords. Consequently, the locations in which people live, particularly *within cities*, should be viewed as an outcome worthy of investigation in its own right.

In Australia, Indigenous people tend to live in very different neighbourhoods, towns and cities from the rest of the population (Biddle 2013). When detailed national statistics for the entire population were first collected in the census in 1971, following the 1967 referendum relating to Indigenous Australians, it was clear that Indigenous Australians were far more likely to live in remote and regional areas than the rest of the Australian population (Altman & Nieuwenhuysen 1979). However, during the subsequent 45 years to 2016, these patterns of residential location have rapidly changed. The 2016 Census reported that more Aboriginal and Torres Strait Islander people are living in large towns and cities than ever before. This is true in both absolute and relative terms (Markham & Biddle 2017). By 2016, around 80% of Indigenous people enumerated in the census lived in towns and cities. The

increasing concentration of the ‘statistical’ Indigenous population – that is, the population of people who are identified as being of Aboriginal or Torres Strait Islander origin in official statistical collections at a given point in time, as opposed to the population of all people with Aboriginal or Torres Strait Islander ancestry – in urban areas is one of the most striking demographic changes in that population since the 1967 referendum (Taylor 2013).

As Fig. 1 shows, the number of Aboriginal and Torres Strait Islanders enumerated in censuses in towns and cities has increased significantly. Specifically, the number living in either a ‘major urban’ area (a city of more than 100 000 people) or an ‘other urban’ area (a town or city with a population between 1000 and 99 999) has increased 10-fold, from 51 000 in 1971 to 511 000 in 2016. This is a very rapid population increase, equating to an annual compound growth rate of 5.2%. During the same period, while the number of Indigenous people identified as living in towns with a population of less than 1000 has nearly doubled to 132 000, the growth of this population has been more gradual, at 1.6% per year. In total, the percentage of the Indigenous population living in urban areas increased from 44.3% in 1971 to 79.4% in 2016, a substantial shift in population location.

Much of the early research on this population shift focused on the migration of Aboriginal and Torres Strait Islander people into towns and cities from missions and stations as a result of the removal of discriminatory barriers. Fay Gale’s (1972) survey of the Aboriginal population of Adelaide in the mid-1960s is exemplary of this literature. Gale documents the rise and fall of explicitly segregationist policies in South Australia, through the creation of reserves and missions in the 19th and early 20th centuries, and the imposition of the *Aborigines Act 1911*, which empowered the Chief Protector of Aborigines with extreme legal control over most aspects of the lives of Aboriginal people in the state. This control included the legal segregation of Aboriginal people into reserves and missions, as well as controls over freedoms to marry, rear children and own property. These policies were not reversed until 1962. The end of such explicit segregation led to a wave of migration from reserves into towns and cities. In her survey, which was intended to be representative of the Aboriginal population of Adelaide, Gale found that 80.0% of her sample had migrated to Adelaide after 1950, with the majority migrating after 1962 (Gale 1972:72). Much of this migration was an exercise of newly won freedoms of movement, but urban migration was never a wholly positive or voluntary experience. In South Australia, for example, a substantial portion of the rural-to-urban relocations documented by Gale were the result of

**FIG. 1.** Aboriginal and Torres Strait Islander population by size of town or city in which they were enumerated, 1971–2016

incarceration in urban gaols, the forced removal of Indigenous children from their families, and potentially a relative lack of services and opportunities in some rural areas.

Nevertheless, Gale's study documented a great desegregation of Australia's reserves, towns and cities, as Aboriginal people who had previously been subject to coercive isolation and control became 'locationally ... a part of the general Australian community' (1972:1). Studies in other towns and cities documented similar processes of desegregation through Indigenous rural-to-urban migration across Australia, coinciding with the end of destructive regimes of protectorship in the 1960s (in New South Wales, see Morgan 2006; nationally, see Rowley 1970, 1971ab; for a review, see Taylor 2013). The end of the segregation era might be marked by both the 1967 referendum and the passage of the *Racial Discrimination Act 1975*, which, among other reforms in the 1970s, signalled the beginning of an era of formal legal (if not social) equality.

In the decades since the 1970s, scholars have examined the rapid growth of the urban-residing Indigenous population, with particular reference to census data (Smith 1980; Gale & Wundersitz 1982; Gray 1989, 2004; Taylor & Bell 1996, 1999; Taylor & Biddle 2008, 2010;

Biddle 2009b; Taylor 2011, 2013; Biddle & Markham 2013). The key result – for the purpose of this Census Paper – consistently found in this body of research is that net migration by Indigenous people to capital cities since 1976 has been modest in magnitude, despite rapid urban population growth. Indeed, more Indigenous people have reported leaving Sydney and Melbourne than migrating to these cities (Smith 1980, Gray 1989, Taylor & Bell 1999). Survey evidence of cities but not their hinterlands, such as Adelaide (Gale 1972, Gale & Wundersitz 1982), provided extensive evidence of rural-to-urban migration, but failed to describe the magnitude of urban-to-rural counter migration, creating an understandable but incomplete impression of migration-driven urban population growth. Even Gale's Adelaide-focused survey data, however, documented a slowdown in rural-to-urban migration between 1966 and 1980, leading her to conclude that the 'main thrust' of rural-to-urban migration following desegregation was already complete by 1980 (Gale & Wundersitz 1982:96).

This presents something of a puzzle: why is the urban Indigenous population growing so much more rapidly than the remote Indigenous population if this population growth is not driven by migration? Taylor and Biddle (2008, 2010) sought to answer this question by comparing 2001 and 2006 census data, measured at the Indigenous

Area level. They found that, in urban areas, 76% of population increase was due to natural increase, 10% was due to net migration and 14% was due to 'non-demographic factors'. Part of the explanation for rapid natural increase in the Indigenous population of urban areas – particularly in southeastern Australia – is the large and increased likelihood that Indigenous people in urban areas will partner with non-Indigenous people, with the children from these partnerships identifying as Indigenous more often than not (Kinfu & Taylor 2005). The causes of nondemographic population increase include enumeration change (i.e. changes in data collection and processing methods that increase the probability of counting Indigenous people) and identification change (i.e. the increased propensity of individuals who are counted in the census to identify as being of Aboriginal or Torres Strait Islander origin). This finding concurs with recent accounts of Indigenous urban residency that stress that, although Aboriginal and Torres Strait Islander people have always been present in cities, 'their persistent presence ... is nearly invisible to scholars' (Blatman-Thomas 2017, cf. Smith et al. 2008).

### *Processes and policies leading to residential segregation*

Several urban policies and processes are likely to have constituted and maintained Indigenous urban residential segregation. As Phillips (2007) noted, segregation is almost always the result of multiple, interacting social and policy processes. However, several processes that are particularly relevant to the Indigenous population can be identified.

The first policy area was the establishment of reserves in which the Indigenous population was confined in the 19th and 20th centuries. Many of the reserves and missions to which Indigenous Australians were consigned were located in, or on the periphery of, towns and cities. These spaces of Indigenous segregation had remarkably different historical trajectories in different Australian jurisdictions. In Victoria, for example, all but two Aboriginal reserves were revoked by the mid-20th century, as lands formerly reserved for Aboriginal people were transferred by the state to settlers under pressure from agricultural interests (Felton 1980).

Similar pressures were felt in New South Wales, although dozens of Aboriginal reserves still remained when the era of assimilation ended in the late 1960s (Goodall 1996, Morgan 2006, Norman 2015). When the Aborigines Welfare Board was disbanded in 1969, ownership of Aboriginal reserves was transferred to the Aboriginal

Lands Trust (ALT). Consequently, by 1979, between 8000 and 9000 of the Aboriginal population of 40 000 in New South Wales lived on 150 ALT-managed former reserves (Norman 2011). Although some were subsequently revoked, most of these reserves passed into Aboriginal hands with the passage of the *Aboriginal Land Rights Act 1983* (Goodall 1996), permanently establishing pockets of Aboriginal land.

Similar historical trajectories can be traced for 'town camps' – formerly informal Indigenous settlements on the fringes of towns that have become formalised under various land rights regimes (e.g. on the town camps of Alice Springs, see Drakakis-Smith 1980, 1981; Heppel & Wigley 1981; Sanders 2004). Although the historical trajectories of reserves and town camps varied between jurisdictions and regions, for the purposes of this paper, it is important to note that their varied legacies have often been pockets of segregated Indigenous space within and beside cities.

A second major policy influence on Indigenous urban location has been the provision of public and community housing. The pursuit of Indigenous rights saw the Australian Government launch four Aboriginal housing programs between 1969 and 1975, including grants to state and territory governments for Indigenous public housing, earmarked for towns and cities, and the establishment and funding of Aboriginal community housing associations (Sanders 1993, Long 2000). Although government commitments to urban Indigenous housing have varied over time and between jurisdictions (Walker & Barcham 2010), public and community housing has remained important for housing Indigenous people in Australian towns and cities. Whereas the legacy of Aboriginal reserves has been to increase segregation, social housing programs may have had an effect that varies with geographic scale. At the microspatial or neighbourhood level, public housing is likely to increase segregation, insofar as the provision of public housing in apartment buildings increases the probability that multiple Indigenous households live in the building. At the level of the suburb and the broader urban fabric, however, public housing policies reduced Indigenous segregation. In many cities and towns, Indigenous housing was scattered in a 'salt and pepper' pattern throughout Australians towns and cities (Memmott 1996, Walker & Barcham 2010). In the case of Sydney (about which most has been written), this policy was adopted specifically to 'discourage the formation of Aboriginal solidarities' facilitated by urban proximity (Morgan 2006, 2008:78). A similar rationale was the basis for this policy in other cities, such as Perth (Delmege 2015).

A third process that is likely to contribute to patterns of urban segregation is Indigenous agency. Many people prefer to live near to their kin, and thus will choose to live near households containing other family members. A preference for close living, even if not universal, will tend to increase residential segregation when coupled with an existing clustering of Indigenous households within a city. This preference is likely to be particularly pronounced among the Indigenous population, given the importance of kinship and sharing to many Indigenous people living in cities (Brough et al. 2006, Cowlshaw 2009).

Survey evidence supports the importance of this process of location choice in producing segregation. Gale and Wundersitz's (1982) survey of 463 Aboriginal residents of Adelaide in 1980 analysed the location of Aboriginal households, their housing tenure and the distance to another household containing Aboriginal kin. The longer an Aboriginal person in this study had lived in Adelaide, the closer they tended to live to their kin. The authors suggested that Aboriginal families in Adelaide lived in locations determined by access to public housing when first migrating to the city. Subsequently, they would tend to relocate nearer to family members, to enjoy the sociality and mutual aid enabled by proximate habitation. In consequence, the authors suggested that Aboriginal households in Adelaide would tend to become more spatially clustered over time. This process is likely to be repeated in other towns and cities across Australia, and is likely to have become more important as Indigenous people living in urban areas have become increasingly reliant on social housing.

Kinship aside, a great deal of literature has documented a preference among culturally distinct groups to live in close association. In a recent review, Phillips (2007:1148) noted that 'extended social and cultural relations, social support, a sense of belonging and well-developed community infrastructures may give rise to a sense of well-being'. It is likely that this aspect of segregation may represent the result of Indigenous Australians making autonomous decisions.

Finally, although tenure diversification has potentially given Indigenous people more freedom in choosing where they live, it has also increased the likelihood that housing and labour markets will play a role in Indigenous residential location. A large corpus of international literature has documented how racial discrimination in housing markets by real estate agents, mortgage lenders, landlords and public housing authorities has led to segregated outcomes in a number of countries (Phillips 2007). Given the widespread reports of discrimination against Indigenous people in private housing markets

(Solonec 2000), it is likely that racism leads to Indigenous people either staying in the social housing system or being segregated in particular parts of towns and cities at a greater rate than would otherwise be the case. Furthermore, it is likely that housing and labour markets function to segregate Indigenous people indirectly through a process that economists refer to as residential sorting. The economic resources available to a household strongly influence that household's ability to compete in the housing market. In most Australian cities, there is a clear housing market geography of advantage and disadvantage (with the latter tending to increase with distance from the city centre), sorting residents into suburbs and neighbourhoods with different types of housing in terms of tenure, value, quality and desirability. This leads to the emergence of an uneven urban geography of high- and low-income suburbs (Randolph & Tice 2014, 2016). Although this market mechanism affects everyone in the housing market (Markham & Biddle 2018), it is likely to increase tendencies towards Indigenous residential segregation because Indigenous people live in households that have, on average, lower incomes than non-Indigenous households.

Given the diversity of causes of Indigenous urban segregation, it cannot be seen as exclusively 'good or bad' (Peach 1996a). In many policy areas, differences between Indigenous and non-Indigenous outcomes can be understood positively, as a result of the assertion of Indigenous agency, or negatively, as a result of structural discrimination against Indigenous people (Sanders 2010). In the case of urban residential segregation, the historical experience of forced segregation onto reserves was an unambiguously negative one: a form of coercive racialised separation. As Atkinson et al. (2008, 2010) argued, contemporary residential segregation may serve to perpetuate that historical separateness and continue to exclude Indigenous people from material resources.

However, some contemporary forms of Indigenous segregation are experienced in more positive ways. Gale and Wundersitz's (1982) study suggested that residential clustering may be the result of Indigenous agency: the active choices of Indigenous people to live close to their kin, thereby enabling the provision of mutual support (Schwab 1995). Segregation has at times been the result of intense Indigenous social struggle, as in the case of 'the Block' in Redfern, Sydney – a collection of Aboriginal community housing properties that was secured through the actions of Aboriginal activists (Anderson 1993). Furthermore, given the minority status of Indigenous people in most Australian towns and cities, residential segregation may facilitate the development of distinctively Indigenous urban places and associated

Indigenous institutions (e.g. schools, health service facilities). Residence in urban neighbourhoods with a large Indigenous population can provide a form of social capital. As Brough et al. (2006) described, a connection to highly Indigenous neighbourhoods both builds a sense of shared Indigenous identity and provides a refuge from the discrimination faced by Indigenous people in 'mainstream' spaces.

Given the ambivalent nature of Indigenous residential segregation, this paper does not seek to make normative claims about the nature of segregation. Rather, it aims to describe the historical trajectory of Indigenous segregation in Australian towns and cities, and speculate on, or test, some of the drivers of these patterns.

### *Measuring urban residential segregation*

The 'urban gap in the Indigenous housing research' (Long et al. 2008), although declining, is evident in the sparsity of research literature on Indigenous urban segregation. Much has been written about the relative concentration of Indigenous people in nonurban areas and Indigenous migration to the city, but very little research has engaged quantitatively with intra-urban mobility and desegregation in the era of formal equality. As late as 2007, Johnston and others were able to assert that 'there is no evidence of any spatial segregation of the Aboriginal population (defined in the census as those of Aboriginal and Torres Island descent) in Australian cities', not because of an absence of segregation, but because they were not aware of serious investigation of the issue (Johnston et al. 2007:735). Such statements overlook the early quantitative research by authors such as Gale (Gale 1972, Gale & Wundersitz 1982).

More recently, a small body of research has begun to examine Indigenous residential location within Australian towns and cities using standard indices of segregation. The first of these studies investigated whether the 'ghetto model' of ethnic segregation, based on the examples of the Jewish diaspora in Europe (Wirth 1946) and African-American segregation in the United States (Cutler et al. 1999), applied to ethnic segregation in Australian cities (Poulsen & Johnston 2000). That paper examined the spatial pattern of residency in Australian cities, based on answers to the 1996 Census question on country of birth (for international immigrants) and Indigenous origin (for Aboriginal and Torres Strait Islander persons). It found that, in 1996, neither Indigenous people nor immigrant groups lived in concentrated areas that could be described as 'ghettos' in the sociological sense. The absence of Indigenous or other ethnically defined ghettos in this study referred to the absence of areas in

which ethnic groups were segregated 'as an instrument of closure and control' (Wacquant 2004), rather than the complete absence of residential clustering.

A decade later, however, Atkinson et al. (2008, 2010) noted that the sociospatial separation of Aboriginal and Torres Strait Islander people from the non-Indigenous population is considerable when examined using a variety of indices, including residential segregation. Their analysis showed that Indigenous people in Sydney, Melbourne and Brisbane are disproportionately concentrated in poorer neighbourhoods on these cities' fringes. According to these authors, residential segregation is part of a system of social separations and absences that mark Indigenous invisibility in white Australia. In other words, residential segregation contributes to 'the general ability of a prosperous, white and urban community to live its life in ways that prevent the consequences of underinvestment, exclusion and absolute poverty [of Indigenous people] being witnessed' (Atkinson et al. 2010:328).

Two further studies have examined the specific issue of Indigenous urban residential segregation in more depth. Biddle (2009a) calculated an index of dissimilarity for the Indigenous population in Australia's 28 largest urban centres in 2001 and 2006, and also employed Peach's (1996b) threshold method. The dissimilarity index is a standard measure of segregation that estimates the degree to which the distributions of Indigenous and non-Indigenous people differ within a city. The index, which ranges from 0 to 1, represents the proportion of Indigenous (or non-Indigenous) Australians who would need to relocate before the two populations were evenly distributed across the city (Massey & Denton 1988). Although the dissimilarity index is simple to interpret and can be compared readily with the international literature, it performs poorly when the population under investigation is either relatively small or approaches the number of neighbourhoods used to measure segregation. This is exacerbated in the Australian context, in which census data on small populations in small geographic areas are 'perturbed', or randomly adjusted to between zero and three people in an area, rather than an accurate and exact number being given. Consequently, Peach (1996b) advocated a threshold method, in which the share of Indigenous people living in highly concentrated neighbourhoods is estimated (e.g. the share of Indigenous people living in neighbourhoods in which at least 30% of the population is Indigenous).

Employing both these methods, Biddle (2009a) found that residential segregation measured using the dissimilarity index was substantial in many Australian

towns and cities, reaching more than 0.5 in Sydney, Perth, Melbourne and Broome – that is, more than half the Indigenous population of these cities would need to move for a uniform spatial distribution of the Indigenous population to be reached. Furthermore, segregation rose in most towns and cities between 2001 and 2006 using this measure. Using the threshold method, however, Biddle found that segregation was greatest in Broome, Mount Isa, Darwin and Alice Springs, because these were the only urban centres with neighbourhoods in which at least 50% of the population was Indigenous. Furthermore, this study showed that the neighbourhoods with a high proportion of Indigenous residents were disproportionately disadvantaged.

Biddle (2013) extended this analysis with 2011 Census data across 54 significant urban areas. In addition to updating indices of dissimilarity using the most recent census, this study examined the characteristics of the neighbourhoods in which Indigenous people lived, conditional on their individual characteristics. It found that, although on average the proportion of a neighbourhood's population that was Indigenous was 1.9%, Indigenous people lived in neighbourhoods where an average of 8.2% of the population was Indigenous. This proportion was dependent on housing tenure. For Indigenous people living in community rental in urban areas, an average of 13.1% of their neighbours were also Indigenous, whereas, for Indigenous home owners, only 5.8% of their neighbours were Indigenous. Similar findings were described by income – that is, low-income Indigenous people had more Indigenous neighbours than high-income Indigenous people. Taken together, the findings of Biddle's (2013) paper suggested that much contemporary Indigenous segregation results from the position of Indigenous people in housing and labour markets.

Despite the recent interest in Indigenous urban segregation, no study to date has investigated the intra-urban spatial distribution of Aboriginal and Torres Strait Islander people over a period longer than one intercensal period (five years). This paper examines segregation over much of what might be referred to as 'the period of desegregation' – those years after the dismantling of the system of Aboriginal reserves across the country during which social housing was made available to many Aboriginal people. Specifically, this Census Paper charts the desegregation of the Aboriginal and Torres Strait Islander population in Australian towns and cities during the 40 years from 1976 to the present. It describes the trajectories of population concentration during this period and connects these findings to the broader research literature on the growth of the Indigenous

urban population summarised above. Because of the ambiguous normative status of contemporary Indigenous urban segregation, the paper does not seek to characterise segregation as 'good' or 'bad', but rather aims to provide a historical, descriptive account of its evolution in Australian towns and cities.

## Data and methods

This Census Paper analyses contemporary and historical census data. It is limited by the availability of historical census counts of the Indigenous population in small geographical areas referred to in this paper as 'neighbourhoods'. These neighbourhoods are proxied by census Collector Districts (CDs) for censuses from 1976 to 2006, and by Statistical Area 1 (SA1) for the 2011 and 2016 censuses. Ideally, this analysis would commence in 1971 because, although Indigenous population counts are available for the 1961 and 1966 censuses, the 1971 Census was the first to identify Aboriginal and Torres Strait Islander people using a question that aimed to enumerate all people who identified as being of Indigenous origin. However, the counts of people who identified as being of Aboriginal and Torres Strait Islander origin in the 1971 Census were not tabulated and published at the CD level. Consequently, this analysis commences in 1976. Furthermore, the 1981 and 1986 censuses have been excluded, because published CD-level tables for the 1981 Census are missing data for South Australia in the data file deposited with the Australian Data Archive (ABS 1982), and the 1986 CD-level tabulations did not include data on Indigenous origin (ABS 1986). Consequently, this paper analyses the intra-urban segregation of the Indigenous population in the censuses of 1976, 1991, 1996, 2001, 2006, 2011 and 2016.

### *Census question*

One complication is that the census question on Indigenous origin changed considerably during this period. The 1971 and 1976 censuses asked 'What is this person's racial origin?' (ABS 1971, 1976). These census forms further advised respondents 'If of mixed origin, indicate the one to which this person considers himself/herself to belong. Tick one box only: European origin, Aboriginal origin, Torres Strait Islander origin, Other origin'. The 1981 Census changed this question to remove the reference to race (ABS 1981). Instead, it asked respondents 'Is the person of Aboriginal or Torres Strait origin?', with the options being 'No', 'Yes, Aboriginal' and 'Yes, Torres Strait Islander'. Respondents were advised 'For persons of mixed origin, indicate the one to which

they consider themselves to belong'. This forced choice arguably resulted in an under-enumeration of Indigenous people, since it is likely that some people who considered themselves to be of both Indigenous and non-Indigenous origin simply answered 'No'. Consequently, the census question was changed again in 1996 (ABS 2000).

Although it still asked respondents 'Is the person of Aboriginal or Torres Strait origin?' and presented the same list of possible answers, the advisory text was amended to read 'For persons of both Aboriginal and Torres Strait Islander origin, mark both "Yes" boxes'.

Furthermore, different degrees of detail are available in tabulations of the Indigenous origin question in different census years. For example, in the 1976 and 1991 tabulations, no option was given for respondents to identify as being of both Aboriginal and Torres Strait Islander origin. Therefore, in this paper, we analyse the Aboriginal and Torres Strait Islander populations jointly. More concerning is that, in several census tabulations, only Indigenous census counts are given, without matching non-Indigenous counts or counts of the number of people who did not answer the Indigenous status question. Consequently, in this analysis, we classify all those census records with no recorded answer to the Indigenous origin question as non-Indigenous, to maximise historical comparability.

### *Delineating towns and cities over time*

This paper calculates segregation indices for towns and cities delineated using the Australian Bureau of Statistics (ABS) 2016 Urban Centres and Localities classification (ABS 2017). This classification is designed to identify contiguous areas of an urban nature. Although the designation of areas as urban uses a complex set of criteria, the key criterion is that part of the urban centre has a population density of 200 people or more per square kilometre. Contiguous urban centres that cross state or territory boundaries (e.g. Canberra–Queanbeyan and Gold Coast – Tweed Heads) are merged into a single urban centre in this study.

Comparing urban centres over time is difficult, however, because (a) cities grow spatially over time, incorporating previously nonurban hinterlands, (b) the boundaries of the ABS smallest geographic units change with time, and (c) the methods used by the ABS to group spatial units into urban centres and localities have changed with time. Consequently, in preparing this paper, we used two approaches to identifying a set of towns and cities that are consistent over the period 1976–2016.

The first approach used urban boundaries that varied over time, to avoid incorporating areas that had a rural character in historical censuses and had urbanised by 2016. This approach identified urban centres and localities in each census using the urban centre classification for that year, and then allocated historical urban centres to 2016 urban centres on the basis of spatial overlap. Historical urban centres that had any spatial overlap with a 2016 urban centre were allocated in whole to whichever town or city they had the largest overlap with. This method has the conceptual advantage of incorporating changes to the definitions of urban centre boundaries when centres merge as a result of spatial urban growth. However, it has the disadvantage that changes to the ABS method for delineating localities over time can cause locations to change their urban centre classification over time.

The second approach used the 2016 ABS urban centre and localities boundaries, and allocated each historical CD or SA1 to a 2016 town or city. Historical CDs or SA1s that partially spatially overlapped a 2016 town or city were proportionately allocated to the 2016 town or city, on the basis of the fraction of the historical CD or SA1 that fell inside the 2016 town or city. This method has the conceptual advantage of minimising the impact of the changing methods by which the ABS has delineated towns and cities over four decades. However, it has the disadvantage of misclassifying some rural historical neighbourhoods as being urban (e.g. areas that were entirely rural in 1976 but were incorporated into a city by 2016 were classified as being part of that city in 1976).

With either approach, the changing boundaries of ABS geographical units pose a problem. In general, as population densities have increased and computer technology has become more sophisticated, the spatial resolution of CDs and SA1s has increased over census years, with the statistical units coming to more closely approximate a neighbourhood. However, in some cases, neighbourhoods of interest, such as Indigenous town camps, were historically incorporated by the ABS into larger rural geographic units outside the boundaries of the urban centre. This is likely to bias segregation indices downwards in older census collections for towns where Indigenous urban peripheries were poorly delineated by ABS spatial units.

Ultimately, the patterns of segregation estimated using either metric were remarkably similar, regardless of which approach we used. Consequently, we present only segregation indices calculated using the second approach to identifying towns and cities consistently

















































