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The joint distribution of age and race in racially integrated neighbourhoods

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Abstract

Like many other wealthy nations, the United States is experiencing substantial population ageing, particularly among Whites, whose median age is over a decade older than Blacks' and Hispanics'. To date, analyses of this demographic divergence have been limited to national and state levels; we know little about its manifestation at smaller scales. This study introduces three micro-level measures of the joint distribution of age and race, demonstrating that Whites are older than their non-White neighbours in most integrated neighbourhoods, with notable variation across regional and local characteristics. Racial age gaps significantly predict subsequent declines in neighbourhoods' White population, indicating that racial change has an understudied age dimension. Meanwhile, neighbourhoods with relatively younger Whites are rare, clustered in coastal metros, and linked to gentrification. Drawing on theories of multidimensional heterogeneity, I suggest that local consolidation of age and racial differences may undermine stable integration and reinforce inequality.

KEYWORDS

ageing, gentrification, neighbourhoods, race, residential integration

1 | INTRODUCTION

Recent trends in American immigration, fertility, and mortality have produced a notable age gap between non-Hispanic Whites and members of other ethnoracial groups: the White median age is about 10 and 15 years greater than the Black and Hispanic median ages, respectively. Scholars have proposed that this national demographic divergence is producing economic, political and cultural conflict between White seniors and younger people of colour (Mather et al., 2015; Poterba, 1997). Yet to date, analyses of the interplay between age and race are limited to the national and state levels, and we know little about how these dynamics play out at the neighbourhood scale.

Neighbourhoods have long been a central site for sociological research. There is a well-documented relationship between neighbourhood racial composition and life chances, and an emerging body of literature reveals that neighbourhood age structure also has a causal effect on resources, risks and opportunities. Given (1) the ongoing changes in the age structures of different racial groups at the

national level and (2) the US's legacy of racial segregation and spatial inequality, I propose that scholars should not study racial composition and age structure as unrelated dimensions of neighbourhood life; rather, investigating their joint distribution can bring to light meaningful differences between neighbourhoods and their trajectories. From a sociological standpoint, an integrated neighbourhood made up of White retirees and young Hispanic families looks quite different from one made up of White Millennials and elderly Hispanic residents, yet measures in existing quantitative studies do not capture these nuances.

How do national racial differences in age structure manifest at the local level? Are there certain places where age gaps between neighbours of different races are particularly dramatic? Finally, can racial age gaps shed light on the distinction between stably integrated neighbourhoods and those that eventually undergo White population loss or gentrification? In this study, I use three waves of tract-level data from the U.S. Decennial Census (1990, 2000, and 2010) and the American Community Survey five-year estimates (2014–2018) to construct novel measures of the joint distribution of age and race.

Results from descriptive analyses reveal that in the vast majority of tracts where both Whites and non-Whites are present (comprising 10% or more of the tract population), Whites are substantially older than their non-White neighbours. This pattern of racial age gaps is most pronounced in tracts where the two largest racial groups are Whites and Hispanics but is also observed in White-Asian and White-Black tracts. Neighbourhoods where Whites are younger than their non-White neighbours are extremely rare and concentrated in a handful of large coastal metropolitan areas. Consistent with previous literature linking this configuration of age and race to gentrification, I find that such neighbourhoods have a disproportionately high likelihood of socio-economic upgrading as time passes, even after accounting for a variety of initial characteristics. Finally, neighbourhoods with high racial age gaps in 2000 experienced significantly greater declines in white population as time passed, implying that neighbourhood racial change has an under-studied age component. Results are robust to a variety of different model specifications. In sum, cross-racial interactions in integrated neighbourhoods are also likely to be cross-generational. In the final section of the paper, I draw on theories of population heterogeneity, social homophily, and racial categorisation to explore potential consequences of racial age gaps. These theories suggest that racial age gaps will reinforce inequality by (1) reducing intergroup trust and cooperation, (2) solidifying racial stereotypes, (3) intensifying competition for resources, and (4) undermining the long-term stability of integration. I conclude by describing avenues for further research.

2 | AGEING AND THE “DIVERSITY GAP” BETWEEN GENERATIONS

Increasing longevity and declining fertility have contributed to a gradual ageing of the United States population. As of 2010, the population of seniors (adults aged 65 and older) was over 40 million, and that group is growing faster than the wider population as successive baby boomer cohorts reach their 65th birthdays. The share of seniors is expected to roughly double between 2010 and 2050, with the ranks of the “oldest old”—those over age 85—expanding particularly rapidly due to medical advancements targeting old-age mortality (Thorpe & Angel, 2013). With the rise in the old age dependency ratio (the number of seniors for every 100 working-age adults), scholars have predicted myriad large-scale economic and political consequences

(Gerst-Emerson & Burr, 2013) and heightened cultural relevance of generational lines (witness the emergence of the “OK Boomer” meme). Prior to the COVID-19 pandemic, policymakers were already grappling with issues around retirement age, pensions, and health care, and intergenerational political cleavages in these domains were prominent (Busemeyer et al., 2008). COVID-19’s devastating impact on seniors, contrasted with its relatively milder effects among children and young adults, may prove to make age an even more salient social marker in the coming years.

Narratives of population ageing often overlook ethnoracial variation in current and projected age structures. Americans over 65 are much whiter than younger generations; put differently, White Americans are much older than other groups (Mather et al., 2015). Over three-quarters of seniors are categorised as White, compared to fewer than half of newborns (Lichter, 2013). The median age of US residents who identify as non-Hispanic White is 43.7 years, substantially higher than that of those who identify as Asian (37.9 years), Black (34.8 years), and Hispanic (29.8 years) (Table 1). This demographic divergence can be explained in part by differential fertility/mortality rates between groups but is primarily due to immigration (particularly for Hispanics), since most recent immigrants arrive as children or working-age adults and identify as something other than non-Hispanic White. Demographers predict that age gaps between Blacks, Asians, and Whites will narrow slightly by 2050, but Hispanics will stay considerably younger than the rest of the population due to ongoing immigration and higher fertility (Gerst-Emerson & Burr, 2013). Although other Western countries are characterised by different configurations of ethnoracial groups, the general pattern of demographic divergence is not unique to the U.S. context: many countries in Europe are also home to ageing white native populations, with international immigrants constituting a growing share of the youth and working-age populations in many urban centers (Neumann, 2018).

The ageing of the White population is frequently presented as evidence of a “third demographic transition,” that is, a large-scale shift from a primarily native-born White population to a “majority-minority” society made up of non-Whites and immigrants. Some scholars argue that the national demographic divergence is already generating tension between America’s largely White senior population reliant on Social Security and Medicare and more diverse younger generations with fewer resources and a less secure social safety net (Mather et al., 2015; Poterba, 1997). However, Lichter (2013) cautions against

TABLE 1 Median age, share under 18, and share over 65, by race

	White alone, not Hispanic	Hispanic, any race	Black	Asian
Median age (years)	43.7	29.8	34.8	37.9
% under 18	18.6%	30.8%	24.3%	19.0%
% over 65	20.9%	7.7%	12.1%	13.3%
Total population	196,789,401	60,481,746	41,989,671	18,636,984

Note: Source: American Community Survey, 2015–2019 5-Year Estimates. Sample includes all U.S. residents identifying as White alone (not Hispanic), Hispanic (any race), Black alone, or Asian alone.

using differential racial fertility/mortality/immigrant rates to forecast imminent catastrophe, as the impulse towards “demodystopia” relies on essentialist views of race (Alba, 2018) and erodes popular support for safety net programs targeted at specific age groups such as the elderly and low-income children. Further, in recent years “majority-minority” rhetoric has ignited White supremacist anxieties surrounding the replacement of the White population in the U.S. and Europe, resulting in senseless violence.

Mindful of these risks, I suggest that scholars move towards an alternative framework for examining the joint distribution of age and race and its consequences. A more fruitful approach will shift the conversation away from national-level “age-race wars” (Minkler & Robertson, 1991) in favour of exploring how racial age imbalances manifest at the local level. Rather than atheoretically treating ageing as an individualised process, it will recognise age as a “culturally powerful organizing criterion that channels resource allocation and social dynamics” (Kelley-Moore & Thorpe, 2013:498). Finally, it will emphasise the structural roots of racial and ethnic hierarchies and highlight how life course stages are experienced by individuals in different social positions.

3 | AGEING IN PLACE, AGEING EMPLACED

Economists and political scientists often take a macro-level view of population age structure, examining consequences at the state, national or international scale (Busemeyer et al., 2008; Tosun et al., 2009). On a more local level, geographers and urban sociologists explore how urban landscapes in Western societies are increasingly *generationed*, “visibly defined by generation and age” (Moos, 2016: 2904). Neighbourhood-level variation in age structure is a product of historical urban development patterns as well as contemporary residential sorting dynamics. In the U.S., explosive population growth in the 20th century fuelled demand for newly-constructed urban and, later, suburban neighbourhoods. Because brand-new developments tend to be populated by young households who then stay put, a neighbourhood's age structure is tightly bound to the period in which it develops. Figlio and Fletcher (2012) show that American suburbs that emerged in the 1940s and 1950s had significantly older populations than those from the 1960s, even after multiple decades had passed. Furthermore, municipal land ordinances create residential landscapes in which most neighbourhoods are dominated by just one or two types of housing stock (apartments, duplexes, detached single-family homes, etc.) (Baar, 1996), meaning that as households form, expand and contract, changing housing needs require a move to a different neighbourhood or even city. In other words, age segregation occurs through both “ageing in place” and “ageing by feet” (McCallion, 2013; Neumann, 2018). As a result, two-thirds of U.S. census tracts have age distributions that differ significantly from the national age composition, either over-representing young adults, families, or seniors (Moorman et al., 2016).

Unlike other markers of social difference (race, SES, gender), age is not a durable characteristic; likewise, neighbourhood age structure

is inherently dynamic as residents progress through the life course (barring extremely high residential turnover rates, as in university neighbourhoods whose student populations rotate every few years). This feature has meant that age structure is often overlooked in the literature on neighbourhood effects. However, new research links neighbourhood age structure with a variety of outcomes, including political ideologies, resource availability, social engagement, and health (Cagney, 2006). Some relationships are purely compositional: if young people are more likely to commit crimes, neighbourhoods with more young people will exhibit higher crime rates. However, others suggest the presence of emergent properties. For example, in areas with disproportionately large cohorts of young people, teenagers exhibit lower trust in institutions and less consistent political ideologies, perhaps because “youth bulges” allow for more same-age peer interaction and weaken adult influence (Hart et al., 2004). Studying the upper end of the age distribution, Browning et al. (2006) find that although advanced age is linked to increased mortality at the individual level, the proportion elderly is actually protective against neighbourhood mortality rates: with their high levels of free time and orientation towards the local community, seniors may take action to improve neighbourhood problems and promote health-sustaining conditions.

Neighbourhood age structure also dictates demands for certain services and amenities. Areas with high proportions of elderly residents may have increased demand for services related to ageing, accessibility and health; by contrast, young families might advocate for child-friendly recreational spaces and crime prevention, while childless young professionals seek cultural, retail and dining spaces (Cagney, 2006; Chen & Rosenthal, 2008; Moorman et al., 2016). Thus, if a neighbourhood has a disproportionate share of one age cohort, or a relatively high/low median age, it can affect conditions for residents of all ages, and differences in priorities across age groups may lead to intergenerational competition for neighbourhood resources.

4 | RACIAL SEGREGATION AND NEIGHBOURHOOD CHANGE

Given the national differences in age structure between racial groups, understanding neighbourhood age structure requires reckoning with the United States' history of residential segregation. Pettigrew (1979) famously wrote that segregation serves as the “structural linchpin” of racial stratification, a claim that has since been bolstered by numerous studies (Massey, 2016). There is huge variation in neighbourhoods' structural conditions, and racial minorities—Blacks and Hispanics in particular—are concentrated in the most disadvantaged neighbourhoods. Racial segregation cannot be explained by socio-economic gaps alone, as Whites live in neighbourhoods that are wealthier and more highly educated than what would be expected based on their household socio-economic status (South et al., 2005; Tienda & Fuentes, 2014). Rather, scholars have documented a broad array of discriminatory legal, institutional, and social practices that have historically separated Whites from minorities and continue to do

so today (Crowder et al., 2011; Gaddis & Ghoshal, 2015; Krysan & Crowder, 2017; Massey & Denton, 1993; Sugrue, 2014). By enabling the use of spatial logics of resource distribution, segregation concentrates rewards and opportunities among Whites while selectively withholding resources from minorities; consequently, segregation widens racial disparities in educational attainment, income, employment, wealth, and health (Ananat, 2011; Massey & Denton, 1993; Sampson, 2012; Sharkey & Faber, 2014). Even if resources were evenly distributed across neighbourhoods, segregation would limit opportunities for cross-racial social interactions, which under some conditions can reduce prejudice and increase inter-group trust (Allport, 1954).

Against this backdrop of severe, durable, and consequential racial segregation, scholars and policymakers often look to neighbourhood integration—that is, the representation of multiple racial groups at socially meaningful rates—as a strategy for reducing racial inequality. While different studies employ a variety of taxonomies for defining integrated neighbourhoods, there is a clear consensus that the number of integrated tracts has risen over the past few decades (Wright et al., 2020). For example, Ellen et al. (2012) find that the number of tracts with at least 20% White and 20% non-White residents increased by 50% between 2000 and 2010, and the percentage of Whites living in such neighbourhoods also climbed significantly. Similarly, Zhang and Logan (2016) show that “global” neighbourhoods where Whites, Blacks, Hispanics, and Asians are all represented at meaningful levels are expanding beyond what could be expected from changing metro composition alone. Residential integration is particularly prevalent in the growing Sunbelt region stretching across the lower half of the United States (Glaeser & Vigdor, 2012; Logan et al., 2004; South et al., 2001); meanwhile, segregation in the Northeast and Midwest has hardly budged since the 1970s, leading Logan (2013) to gloomily re-label the Rust Belt “America's Ghetto Belt.” Such regional variation can be partly attributed to the Northeast and Midwest's history of discriminatory housing policies and anti-integration campaigns, a legacy which is less pervasive in newer Sunbelt cities (ibid). Integrated neighbourhoods are also more likely to be located in central cities (Ellen et al., 2012), near large universities and military bases (Farley & Frey, 1994), and in places with small and stable minority populations, minimal restrictive zoning regimes, and lower anti-Black and anti-Hispanic sentiment (Rugh & Massey, 2013).

What of the trajectories of integrated neighbourhoods? The distinction between temporary and stable integration has important implications for inequality. A neighbourhood in transition may be considered “integrated” if viewed at just one point in time, yet a longitudinal examination might reveal it as an example of White flight or White-led gentrification en route to resegregation.¹ Scholars have begun to identify characteristics of metropolitan areas that are conducive to stable integration, but predicting which integrated tracts are stable, which will eventually resegregate, and which will undergo significant changes in racial makeup but stay “integrated” remains an empirical puzzle (Ellen et al., 2012; Tienda & Fuentes 2014; Zhang & Logan, 2016). Furthermore, as Pattillo (2014) and others (Abascal & Baldassarri, 2015; King & Wheelock, 2007; Newman, 2013;

Quillian, 1995) argue, integration does not automatically result in lower prejudice and harmonious inter-group contact. Thus, a second puzzle lies in determining the conditions under which residential integration upholds or disrupts underlying systems of White advantage.

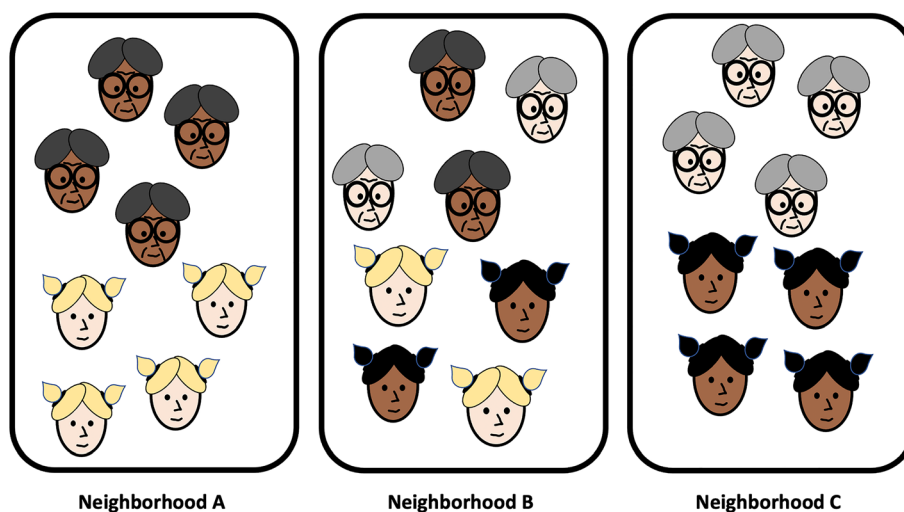
5 | AGE AND RACE AS OVERLAPPING SOCIAL CLEAVAGES

As the prior sections have shown, both age structure and racial composition are important dimensions of neighbourhood life. To date, they have been treated as unrelated phenomena and, consequently, studied separately. Yet in light of the substantial divergence in the age structures of racial groups in the United States, as well as the nation's complex dynamics regarding segregation, White flight, and gentrification, sociologists ought to closely examine the joint distribution of age and race in geographic space, its consequences for segregation and inequality, and the mechanisms through which these consequences unfold.

Figure 1 shows a stylized example of the joint distribution of race and age in three neighbourhoods. Overall, the three neighbourhoods are identical with respect to age structure and racial composition. However, in Neighbourhoods A and C, there is a high degree of racial age incongruity: Neighbourhood A is home to Black seniors living alongside White Millennials, and Neighbourhood C is home to White seniors and Black Millennials. Only in Neighbourhood B are the two racial groups balanced with respect to age. Scholars that focus on either age structure or racial composition would be unable to distinguish between these three communities, but theory suggests that they would be characterised by different patterns of resource distribution, intergroup encounters, and future trajectories.

Georg Simmel (1955) urged social scientists to avoid studying heterogeneity unidimensionally, as societies are defined by multiple sets of cleavages (race, age, religion, occupational sector, etc.) that are correlated to one another to varying degrees. Later theorists such as Coser (1956) and Blau (1994) expanded on this idea, arguing that although heterogeneity frequently results in tension, even heterogeneous populations can be socially sustainable if cleavages are “cross-cutting,” that is, when people who share certain characteristics are still likely to diverge on others, and vice versa. The manifold allegiances of cross-cutting cleavage systems create a level of interdependence that “prevents disintegration along one primary line of cleavage” (Coser, 1956: 72). In these conditions, when conflicts emerge, people are more likely to seek common ground rather than attack. Thus, cross-cutting cleavages will weaken the overall level of antagonism within a community. By contrast, “consolidated” cleavage systems will result in low social mobility, inter-group conflict, a lack of communication across group boundaries, more durable status hierarchies, and a breakdown of democratic processes. Blau (1994) calls upon scholars of cleavage systems to attend to spatial scale, as sorting processes can lead to different patterns of cross-cutting and consolidation at different levels of aggregation. Empirical evidence supports these theoretical propositions: consolidated cleavages of various

FIGURE 1 Stylized illustration of the joint distribution of age and race in three integrated Neighbourhoods. Each imaginary neighbourhood has the same racial composition and the same age distribution, but the joint distributions are different



types are associated with political conflict, ineffective public goods provision, greater in-group identification, stereotyping, and distaste for redistributive policies (Cioraianu, 2020; Desmet et al., 2017; Higashijima & Houle, 2018; Yang, 2003).

Despite the significance of age as a structural characteristic in producing social meanings, norms, and inequalities, it has not often been considered in studies of population cleavages. However, the above theories suggest that a tighter coupling of age and race will reinforce group boundaries and negate the positive potential of racial integration. Neighbours who differ on the basis of both age and race may find it difficult to see common ground, identify with each other, or engage in cooperative activities.

6 | EMPIRICAL EVIDENCE ABOUT THE JOINT DISTRIBUTION OF AGE AND RACE

The limited research on the nexus of age and race at large geographic scales supports the premise that the consolidation of age and race reproduces inequality when this consolidation takes the form of ageing whites and younger people of colour. For example, Pastor et al. (2017; see also Pastor, 2019) measure the county-level “racial generation gap” (the difference between the percent of a county’s seniors who are White and the share of youth who are White) and observe significant geographic variation across region and immigrant composition; for example, they show that most extreme gaps are found in rural counties dominated by agriculture and meat packing, which are increasingly common destinations for young Hispanic immigrants seeking work. Concerningly, the authors estimate that for each percentage point increase in the racial generation gap, there is a 1.5% decline in per-child education funding, a disparity that can add up to thousands of dollars over the course of a child’s education. Studies by Poterba (1997), Figlio and Fletcher (2012) and Nations and Martin (2020) also find that racial mismatches between adult and school-aged populations are causally related to cutbacks in local school funding. These results suggest that ageing Whites are resistant

to investing their tax dollars in public schools with sizable minority populations, pointing to political processes as one mechanism tying age gaps to unequal outcomes. Furthermore, regardless of whether White seniors actively withdraw support in response to the changing demographics of their local school-age populations, racial inequality may widen in places with ageing White populations due to compositional factors, since both Whites and retirees are disproportionately influential in local politics, and voter preferences are partly informed by generational self-interest (Poterba, 1997; Bussemeyer et al., 2008; Tosun et al., 2009; see also Murphy’s [2010] writings on “skeletal suburbs” in the American Rustbelt, whose populations are predominately black but are “ruled by older, white local elites” [555]).

A handful of qualitative researchers have drawn attention to interactional dynamics that emerge when people of colour move into neighbourhoods where the original population is primarily elderly Whites. For example, Woldoff (2011) used ethnographic methods to study relationships between Black and White residents in “Parkmont,” a working-class neighbourhood in the Northeastern United States that has undergone racial turnover. She explains that as Parkmont’s Black population grew, young White families fled to more homogenous communities while elderly Whites were more likely to stay, producing a sizable generational gap between remaining White and Black residents. Woldoff observes the tensions—and opportunities—that emerge when elderly Whites are invested in the idea of “ageing in place” as their communities change around them. In some instances, White seniors’ stereotypes about youth and Blackness are mutually reinforcing (e.g., associations with disorder and “rowdiness”), exacerbating perceived social distance. However, Woldoff emphasises that many Whites rely on their younger Black neighbours for help with household chores, and that this cross-racial caregiving facilitates meaningful relationships. Across the nation, suburbs like Parkmont are diversifying rapidly, making the stereotype of suburbs as bastions of Whiteness increasingly inaccurate (Nicolaidis & Wiese, 2017). However, we do not yet have a complete picture of the distinct age structures of the White and non-White populations in newly integrated suburban neighbourhoods, nor do we

know whether integration in neighbourhoods with large racial age gaps is less stable than in neighbourhoods where racial groups have similar age structures.

Because the United States's racial system involves considerable asymmetries in status and cultural dominance (Baldassarri & Abascal, 2020), evidence about elderly Whites' willingness to invest in the education of non-White children and engage in cross-racial neighbouring does not necessarily extend to places where older non-Whites live alongside younger Whites. Instances of the opposite pattern, where Whites skew younger than other racial groups, are found in work on gentrification that frames Whiteness and young age as signifiers of "gentrifier" status alongside more traditional measures of income and education. Ethnographic accounts of gentrifying neighbourhoods point to generational as well as racial differences between gentrifiers and the established population, using the phrases "young White professionals," "20-somethings," "yuppies," "Millennials" and "gentrifiers" interchangeably (Burns et al., 2012; Galcanova & Sykorova, 2015; Manzo, 2012; Montgomery, 2015). Furthermore, while White-led gentrification is perceived as a threat by many people of colour, qualitative interviews emphasise that this threat is particularly salient for elderly people, who tend to spend more time in their immediate neighbourhoods than working-age adults. Seniors in gentrifying neighbourhoods may struggle to adjust to changes in the built environment, the loss of long-standing cultural institutions, and symbolic challenges to their identity as "old-timers" and neighbourhood "anchors" (Morris, 2017; Weil, 2019).

Quantitative research from various national contexts provides evidence that gentrification and "youthification" (Moos, 2016) go hand in hand. Keels et al. (2013) find that in Chicago neighbourhoods that are becoming whiter and wealthier, local elementary schools experienced no change in the shares of White children, suggesting that early gentrifiers are often young, White, childless professionals. Similarly, Moos (2016) shows that gentrifying neighbourhoods in Canada tend to remain young over time because they steadily attract new young adult residents who leave once their household size increases due to marriage and/or childbearing. Studying the Netherlands, Teernstra (2014) finds that upward changes in neighbourhood socio-economic status are frequently driven by influxes of young professionals with average incomes upon arrival but steep earnings trajectories. These studies view changes in age structure as an important dimension of the gentrification process, and they also highlight the distinction between gentrifying neighbourhoods that continually "churn" (attracting successive cohorts of young people who stay for a few years and then leave) and those that "turn" (attracting a cohort of young people who then age in place) (Cagney, 2006).

In their article on early warning systems for gentrification, Chapple and Zuk (2016) describe various approaches that researchers have used to predict gentrification and identify neighbourhoods in need of anti-displacement interventions "before the pace of change accelerates and patterns become entrenched" (109). Existing models based on standard economic and racial indicators have been largely unsuccessful, either because they do not identify at-risk tracts early

enough, or because they yield "false positives" wherein tracts that are expected to gentrify do not. However, to date, no studies have incorporated racial age gaps in such models, despite the aforementioned observations that early gentrifiers are often young Whites moving into established Black and Hispanic neighbourhoods. While Whites are older than members of other racial groups at the national level, it seems likely that in gentrifying neighbourhoods, this pattern will be reversed.

The contributions described above are notable exceptions to the lack of scholarship on the joint distribution of age and race. Most gentrification research does not make the intersections of age, class, and race explicit, nor does it note the national context of increasing demographic divergence, which contributes to a lack of clarity about gentrification's national prevalence and its impacts on established residents of different ages and racial background. Likewise, in research on White flight and racial dynamics in integrated neighbourhoods, the relationship between age and race is generally implicit, with scholars hinting at generational differences between newcomers and established communities without analysing these differences as a central component of the analysis. While Pastor et al. (2017) have produced notable findings about regional variation in the county-level racial age gap, scholars of residential context have long emphasised that social processes can operate in distinct ways depending on the geographic scale in question (Sharkey & Faber, 2014), and there have not been systematic attempts to track neighbourhood-level racial age gaps or explore how they vary by different neighbourhood characteristics (i.e., geographic location, urbanicity, racial composition, and history of racial stability/change). Without a clear description of the joint distribution of age and race at the neighbourhood level, we cannot understand where racial age incongruities are most extreme, or whether neighbourhoods experiencing different forms of racial change (i.e., urban gentrification, White flight, suburban diversification, etc.) exhibit distinct patterns regarding their populations' age structures, much less identify the consequences of racial age gaps at the neighbourhood level.

This investigation aims to fill these gaps by describing trends regarding the joint distribution of age and race in integrated census tracts since the year 2000. I introduce three measures of the racial age gap and use them to address the following research questions:

1. In neighbourhoods where multiple ethnoracial groups are present (i.e., comprising at least 10% of the population), do different groups tend to have similar age structures, or are racial age gaps more typical?
2. How much does the racial age gap vary across neighbourhood- and metropolitan-level characteristics (racial composition, urbanicity, and region)?
3. How do racial age gaps relate to racial and socio-economic changes in neighbourhood composition over time?

I conclude by identifying directions for future research, with a particular focus on the potential consequences of the racial age gap at the neighbourhood scale.

7 | DATA AND METHODS

Data are drawn from the tract-level summary files of the 1990, 2000, and 2010 decennial censuses and the 2014–2018 American Community Survey (ACS) 5-year estimates. Tracts are normalised to 2010 boundaries to account for changing tract boundaries in intercensal years (Manson et al., 2019). The sample consists of all tracts with a meaningful presence of Whites and at least one other non-White group (Black, Asian, or Hispanic); following Walton and Hardebeck (2016; see also Friedman, 2008; Wright et al., 2020), 10% is used as a minimum threshold for “meaningful presence.” Depending on which non-White group is largest, tracts are subsequently categorised as White–Black, White–Asian, or White–Hispanic. This approach allows for measurement of age differences between a tract's Whites and its primary non-White group, which would not be feasible in homogeneous and mixed-minority tracts.

The racial age gap is measured three different ways, capturing the differences between racial groups' median ages, youth share, and senior share.² This tripartite approach allows for an understanding of divergences across the entire age spectrum. The first measure, Median Age Gap, takes the difference in years between the median White age in a given tract and the median age of the tract's largest minority group. I also present the Median Age Gaps between Whites and all non-Whites in each tract, and between White adults and adults who are members of the largest non-White group. While the publicly-available census files do not include tracts' median age estimates by race, they do include race-specific counts of residents in 2- to 5-year intervals through age 85, allowing me to isolate the age interval containing the 50th percentile and estimate where the 50th percentile is likely to fall within that interval based on (1) the cumulative frequency up to the median group, (2) the frequency of the median group, and (3) the bin width of the median group, yielding a more precise estimate than a simple midpoint.

The next two measures provide information about the tails of the age distribution, which are substantively important but masked by a single measure of central tendency. The Youth Ratio compares the share of a tract's White population that is under 18 to the share of the tract's largest minority group that is under 18. For example, in a White–Black census tract, if 10% of Whites were under 18% and 20% of Blacks were under 18, this variable would take the value of 10/20, or 0.50. I take the same approach with the Senior Ratio to compare tracts' share of Whites over 65 years old and the share of the largest minority group over 65 years old. Again, if 10% of a tract's Whites were over 65 and 20% of Blacks were over 65, this variable would take the value of 0.50. For ease of interpretation, these two ratio variables always represent the share of Whites in the age cohort divided by the share of the largest non-White group in that age cohort.

Tracts are sorted into their respective metropolitan areas, U.S. states, and Census regions (Midwest, Northeast, South, and West). Urbanicity is measured using a five-category scheme adapted from the National Center for Education Statistics: (a) Large City (principal city of a metropolitan core-based statistical area with at least 250,000 residents); (b) Midsize City (principal city of a metropolitan

area with fewer than 250,000 residents); (c) Suburb (non-rural locale that falls within a metropolitan area but is not a principal city); (d) Town (non-rural locale with a population of at least 2,500, outside of a metropolitan area); and (e) Rural (locale designated as at least 95% rural by the U.S. Census Bureau). Longitudinal change in tract composition is captured by the percent change in the tract's White population between 2000 and 2014–2018. Finally, gentrification status is measured by a categorical variable: “gentrified” tracts are urban, had a median income below the wider metropolitan area's median income in 2000, and experienced a greater percent increase in median income than the metropolitan area as a whole by 2014–2018. “Not gentrified” tracts are urban, had a median income below the wider metropolitan area's median income in 2000, but did not experience a greater change in median income than the metropolitan area as a whole. Tracts that are not urban and/or had a median income above that of the wider metropolitan area in 2000 are designated “not gentrifiable.”

To begin, I report descriptive statistics for the three measures of the racial age gap (Median Age Gap, Senior Ratio, and Youth Ratio). I provide an overview of national trends as well as a comparison of racial age gaps in different regions, metropolitan areas, urban categories, and across different types of neighbourhoods. I then examine between- and within-tract variation in the racial age gap using an empty variance-components model where tracts are nested within metropolitan areas and each tract has three observations (one for each wave of the data):

$$Y_{ijt} = \alpha + \zeta_j + \eta_{jt} + \varepsilon_{ijt}$$

In this maximum likelihood model, Y represents the median age gap for tract i in metropolitan area j , α is the intercept, and the error terms ζ , η and ε follow distributions $N(0, \sigma_\zeta^2)$, $N(0, \sigma_\eta^2)$, $N(0, \sigma_\varepsilon^2)$, respectively.

The next set of analyses centres the relationship between racial age gaps and neighbourhood change. Large age gaps can be seen as a sign that Whites are ageing in place as younger people of colour move in around them; as older whites leave, they are not being replaced by new young white residents, and the stage is set for racial turnover (Woldoff, 2011). Thus, I hypothesise that tracts whose White populations are older than their nonwhite neighbours will experience greater declines in their White populations over time. To test this hypothesis, I estimate regression models predicting the decline in the White population between 2000 and 2014–2018, with the primary predictor being the 2000 racial age gap (operationalised as the Median Age Gap as opposed to Senior or Youth Ratios due to its ease of interpretation, normal distribution, and low sensitivity to outliers). CBSA fixed effects account for unobserved characteristics of the surrounding metropolitan area. Model 2 predicts the percent change in the tract's White population with the 2000 Median Age Gap as the sole predictor, and Model 3 adds tract controls:

$$Y_{ij} = \alpha + \beta X_{ij} + \lambda \text{MedAgeGap}_{ij} + \zeta_j + \varepsilon_{ij}$$

where Y is the percent change in the White population between 2000 and 2014–2018 in tract i in metropolitan area j , X is a vector of tract-level covariates (initial share White, largest non-White racial group, overall median age, median income, and urbanicity), and ζ is a vector of dummy variables for metropolitan area. In this fixed-effects estimation, λ represents the within-metro association between the gap between the median ages of Whites and the tract's largest non-White group in 2000 and the subsequent change in White population. Model 4 accounts for prior trends by controlling for the percent change in the tract's White population between 1990 and 2000, and Model 5 tests an interaction between Median Age Gap and neighbourhood category.

The last set of analyses tests whether racial age gaps are an indicator of gentrification. I estimate a fixed effects logistic model (Model 6) predicting whether a neighbourhood gentrifies between 2000 and 2014–2018:

$$Pr(Y_{ij} = 1) = \frac{1}{1 + e^{-(\beta X_{ij} + \lambda MedAgeGap_{ij} + \zeta_j)}}$$

Here, Y represents a binary dependent variable indicating whether tract i in metropolitan area j experiences gentrification by 2014–2018. As with Models 2–5, the gentrification models include metro fixed effects and use Median Age Gap as the primary predictor. Model 7 adds tract controls from the year 2000 (initial share White, largest non-White racial group, overall median age, and median income), and Model 8 adds the percent change in the White population between 1990 and 2000. Model 9 includes an interaction between Median Age Gap and neighbourhood category. Finally, Model 10 replaces the continuous Median Age Gap with a binary variable indicating whether the Median Age Gap is negative (i.e., the White median age is younger than the median age of the tract's

TABLE 2 Descriptive statistics for sampled U.S. Census tracts

Variable		2000		2010		2014–2018	
		Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Median age gap (years)		9.87	7.56	10.70	8.35	11.26	10.87
Median age gap, whites/nonwhites (years)		8.98	6.73	9.81	6.99	12.82	9.19
Senior ratio		3.43	2.90	2.85	2.12	3.67	4.00
Youth ratio		0.73	2.22	0.65	1.91	0.73	1.26
Median household income, in 10,000 s		4.26	1.86	5.38	2.49	6.44	3.24
Neighbourhood category	White–Asian	0.11	0.31	0.12	0.33	0.13	0.34
	White–Black	0.43	0.50	0.37	0.48	0.35	0.48
	White–Hispanic	0.46	0.50	0.50	0.50	0.51	0.50
% White		0.55	0.22	0.53	0.21	0.53	0.21
% Hispanic		0.19	0.19	0.21	0.19	0.21	0.19
% Black		0.18	0.20	0.17	0.19	0.16	0.19
% Asian		0.06	0.09	0.07	0.10	0.07	0.10
Urbanicity category	Large City	0.26	0.44	0.25	0.43	0.24	0.43
	Midsize City	0.22	0.41	0.21	0.41	0.21	0.41
	Rural	0.06	0.24	0.05	0.21	0.05	0.21
	Suburb	0.38	0.49	0.41	0.49	0.42	0.49
	Town	0.09	0.28	0.08	0.28	0.08	0.28
Region	Northeast	0.13	0.34	0.14	0.34	0.15	0.36
	Midwest	0.12	0.33	0.14	0.35	0.15	0.36
	South	0.44	0.50	0.42	0.49	0.41	0.49
	West	0.30	0.46	0.30	0.46	0.28	0.45
% White, metropolitan area		0.62	0.16	0.58	0.16	0.57	0.17
% Hispanic, metropolitan area		0.17	0.15	0.20	0.15	0.20	0.15
% Black, metropolitan area		0.14	0.10	0.14	0.10	0.14	0.10
% Asian, metropolitan area		0.05	0.06	0.06	0.06	0.06	0.06

Note: Source: U.S. Census, 2000 & 2010; ACS 2014–2018 5-year estimates. Sample includes all tracts with nonmissing values for model covariates and whose population is at least 10% White and 10% one nonwhite group (Black, Hispanic, or Asian). $N = 29,791$ in 2000, 35,142 in 2010 and 38,298 in 2014–2018. Metropolitan areas are defined using the U.S. federal government's Core-Based Statistical Area boundaries.

largest non-White group). In these logistic regression models, the sample is restricted to tracts that are considered “gentrifiable” in the year 2000, that is, urban (within the principal city of a metropolitan area) and with a median household income lower than the surrounding metropolitan area.

8 | RESULTS

Table 2 presents descriptive statistics of the three measures of the racial age gap and other covariates in 2000, 2010, and 2014–2018; Table 3 presents descriptive statistics for the sub-samples used in the

analyses predicting racial change and gentrification. The sample represents about half (51.75%) of all Census tracts; the remainder are excluded due to their having less than 10% Whites and 10% Blacks, Asians, or Hispanics, which precludes reliable calculation of the racial age gap. Among the sampled tracts, the most common neighbourhood category is White–Hispanic (51%), while 35% are White–Black and 13% are White–Asian. Twenty-four percent are located in large cities, 21% in midsize cities, 5% in rural areas, 42% in suburbs, and 9% in towns. Tracts' average median household income is \$64,400 (SD \$32,400).

Notably, neighbours of different ethnoracial backgrounds tend to have very dissimilar age profiles. In the most recent year of data

TABLE 3 Descriptive statistics in 2000 for racial change and gentrification sub-samples

Variable		Racial change sample		Gentrification sample	
		Mean	Std. Dev.	Mean	Std. Dev.
Median age gap (years)		9.87	7.56	10.48	8.36
Median age gap < 0		0.08	0.26	0.09	0.29
Percent change, white residents (2000–2018)		–10.37	12.48	–7.73	13.97
Percent change, white residents (1990–2000)		–12.24	11.18	–14.32	11.71
Median age, all residents (years)		34.01	5.42	32.12	5.44
		0.60	0.49	1.00	0.00
Median age gap, Whites/Nonwhites (years)		8.98	6.73	9.75	7.55
Senior ratio		3.43	2.90	3.98	3.15
Youth ratio		0.73	2.22	0.54	1.10
Median household income, in 10,000 s		4.26	1.86	3.19	1.00
Neighbourhood category	White–Asian	0.11	0.31	0.09	0.29
	White–Black	0.43	0.50	0.45	0.50
	White–Hispanic	0.46	0.50	0.46	0.50
% White		0.55	0.22	0.46	0.22
% Hispanic		0.19	0.19	0.22	0.22
% Black		0.18	0.20	0.22	0.23
% Asian		0.06	0.09	0.06	0.10
Urbanicity category	Large City	0.26	0.44	0.56	0.50
	Midsize City	0.22	0.41	0.44	0.50
	Rural	0.06	0.24	0.00	0.00
	Suburb	0.38	0.49	0.00	0.00
	Town	0.09	0.28	0.00	0.00
Region	Northeast	0.13	0.34	0.18	0.38
	Midwest	0.12	0.33	0.20	0.40
	South	0.44	0.50	0.35	0.48
	West	0.30	0.46	0.28	0.45
% White, metropolitan area		0.62	0.16	0.65	0.15
% Hispanic, metropolitan area		0.17	0.15	0.15	0.13
% Black, metropolitan area		0.14	0.10	0.13	0.09
% Asian, metropolitan area		0.05	0.06	0.05	0.05

Note: Source: U.S. Census. Racial Change Sample includes all tracts in the year 2000 with at least 10% whites and 10% one nonwhite group that have nonmissing values for model covariates in the years 1990, 2000 and 2014–2018; $N = 28,474$. Gentrification sample includes all gentrifiable tracts in the year 2000 with at least 10% whites and 10% one nonwhite group that have nonmissing values for model covariates in the years 1990, 2000 and 2014–2018; $N = 9711$.

collection, the White median age was, on average, 11.26 years (SD 10.87) older than that of the tract's largest non-White group, and 12.82 years (SD 9.19) older than the median age calculated for all non-White tract residents. Examining the tails of the age distribution, we also see that Whites in sampled neighbourhoods are much more likely to be over the age of 65 and less likely to be under the age of 18 than their non-White neighbours. The mean Youth Ratio is 0.73 (SD 1.26), indicating that Whites are about three quarters as likely to be under the age of 18 than members of the tract's largest non-White group. Meanwhile, the mean Senior Ratio is 3.67 (SD 4.00), indicating that Whites are almost four times as likely to be seniors than their neighbours who are members of the tract's largest non-White group.

Figure 2 displays histograms of the Median Age Gap grouped by year and neighbourhood category (White-Hispanic, White-Black, and White-Asian). In this figure, values above zero represent neighbourhoods in which the White median age is older than the largest minority group, and values below zero represent neighbourhoods where the White median age is younger. The distinct distributions in White-Black, White-Hispanic, and White-Asian neighbourhoods point to the limitations of white/nonwhite binaries in analysing racial age gaps. By far, differences in median age are greatest between White and Hispanic neighbours: in 94.07% of White-Hispanic neighbourhoods, the White median age is older than that of Hispanics. Moreover, this trend has become more pronounced since 2000, with the Median Age Gap in White-Hispanic neighbourhoods rising from 12.67 to 14.91 years. The Median Age Gap is smaller in White-Black neighbourhoods (7.97 years), and smallest in White-Asian neighbourhoods (5.88 years). Figure 2 also illustrates growing dispersion in Median Age Gap across all three types of neighbourhoods. By 2014–2018, over 20% of all sampled neighbourhoods had a Median Age Gap of over 20 years. These patterns can also be seen in Figures 3 and 4, which depict the distribution of Senior and Youth Ratios across different neighbourhood categories

and years. Again, age gaps are greatest in White-Hispanic neighbourhoods, where the mean Youth Ratio is 0.57 (compared to 0.87 in White-Black and 0.97 in White-Asian neighbourhoods) and the mean Senior Ratio is 4.57 (compared to 2.82 in White-Black and 2.62 in White-Asian neighbourhoods). Likewise, dispersion in these two measures increases between 2000 and 2014–2018.

Figures 5 and 6 depict 2014–2018 medians and means for Median Age Gap by U.S. Census Region and urbanicity, respectively, with the red dashed line marking the mean (11.26 years) for ease of reference. Western census tracts have the most extreme racial age gaps, with the average integrated tract characterised by a 12.99 year Median Age Gap, followed by the Midwest (11.67 years), Northeast (10.52 years), and South (10.29 years). Of the five urbanicity categories, Towns have the highest Median Age Gap (13.37 years), followed by Suburbs (12.28 years), Rural areas (11.59 years), Midsize Cities (11.45 years), and Large Cities (8.50 years).

These descriptive findings are congruent with the national differences in age structure across racial groups, where whites are by far the oldest racial group in the United States, while Hispanics are the youngest. Moreover, the findings confirm that the national demographic divergence manifests at small geographic scales. This is not inevitable. In populations with multiple sets of cleavages, sorting can produce local cleavage systems that differ substantially from that of the broader population (Blau, 1994; Tach et al., 2019). If elderly White people always selected into all-White neighbourhoods, then neighbourhoods with a >10% Black, Hispanic, or Asian presence might not exhibit any racial age gap. Or, if a high proportion of Whites in their 20s moved to racially-diverse urban neighbourhoods, neighbourhood racial age gaps might even be negative in large cities. The geographic variation in the racial age gap across region and urbanicity, as well as the temporal variation across the three waves of data, demonstrate that an appreciable degree of sorting is taking place.

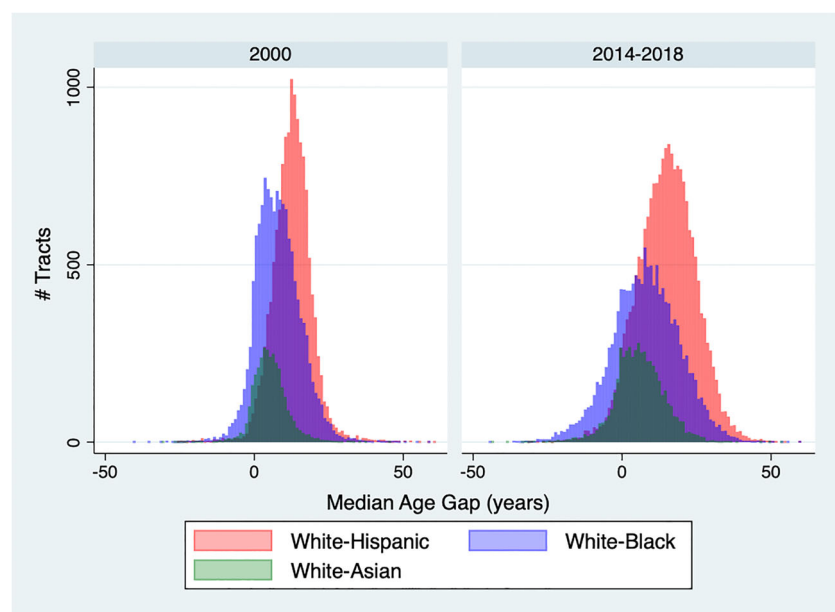


FIGURE 2 Median age gap, by year and neighbourhood category. Sample limited to tracts with at least 10% presence of whites and at least 10% presence of one other group (Hispanic, Black, or Asian). Data source: U.S. Census Bureau

FIGURE 3 Histograms of Youth Ratio by year and Neighbourhood category. Sample limited to tracts with at least 10% presence of Whites and at least 10% presence of one other group (Hispanic, Black, or Asian). Data source: U.S. Census Bureau

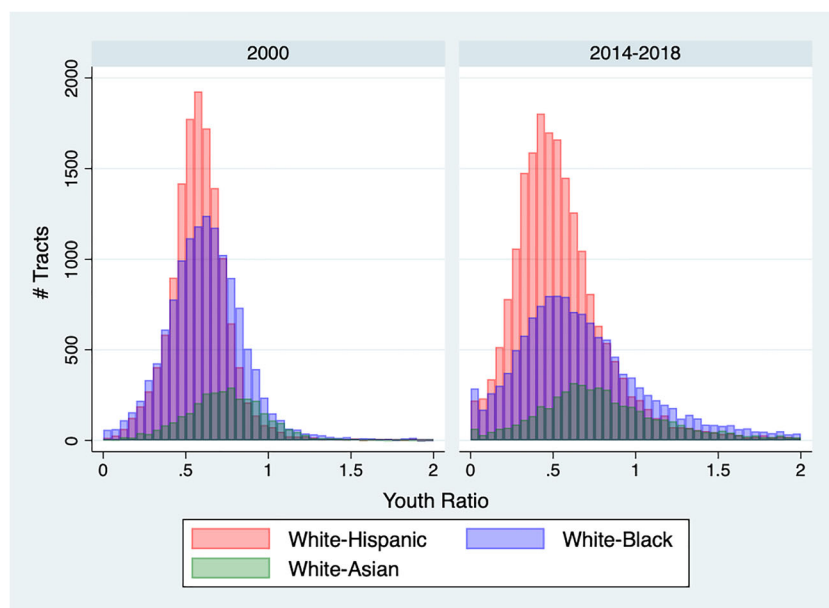
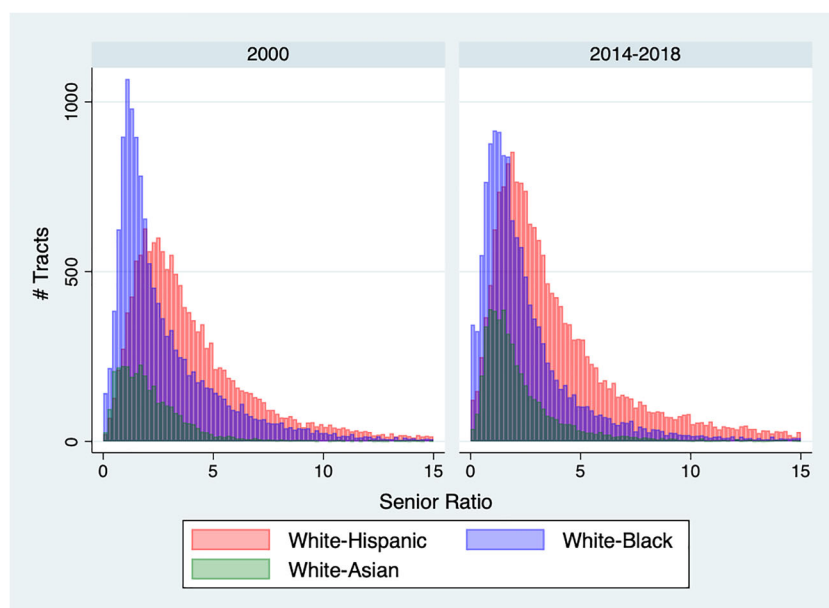


FIGURE 4 Histograms of Senior Ratio by year and Neighbourhood category. Sample limited to tracts with at least 10% presence of Whites and at least 10% presence of one other group (Hispanic, Black, or Asian). Data source: U.S. Census Bureau



Only 14.17% of sample tracts have a White median age below the median age of the tract's largest non-White group, and most metropolitan areas do not have a single tract where the White median age is younger than the median age of their non-White neighbours. However, the share of tracts where the Median Age Gap is negative has almost doubled since 2000, when it was just 7.54%; this increase is noteworthy, given that the nation's White population has aged more than other groups during this time period. There are a handful of places where this type of tract is relatively common. Looking closer at the nation's 15 largest metropolitan areas (Figure 7), we see that tracts in which Whites are younger than their non-White neighbours make up approximately a quarter of sample tracts in the Washington, DC and San Francisco, CA, metro areas; this share is also over 20% in New York, NY, and Philadelphia, PA. Many of these metro areas have

been identified as epicentres of gentrification (Maciag, 2015), which provides support for the idea that gentrifying areas have disproportionately high concentrations of White young adults living alongside non-White neighbours of all ages. As a comparison, Riverside, CA is one of the nation's largest and fastest-growing metropolitan areas and is experiencing a substantial housing affordability crisis, but the White median age is younger than the largest non-White group in only 2.0% of Riverside's tracts, belying the idea that unaffordable housing necessarily coincides with an influx of 20-something Whites into minority neighbourhoods.

Observing these patterns, one might ask whether most variation in the racial age gap is attributable to differences across metropolitan areas; if that were the case, this investigation's focus on tracts as a unit of analysis might not be justified. However, Model 1—a null

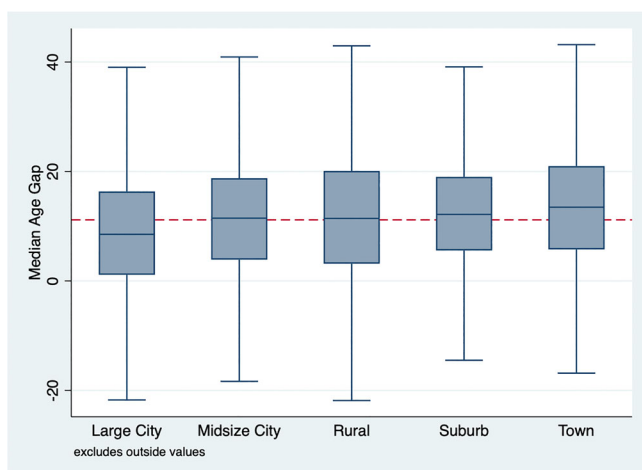


FIGURE 5 Box plot of median age gap in 2014–2018, by urbanicity category. Sample limited to tracts with at least 10% presence of whites and at least 10% presence of one other group (Hispanic, Black, or Asian). Data source: U.S. Census Bureau

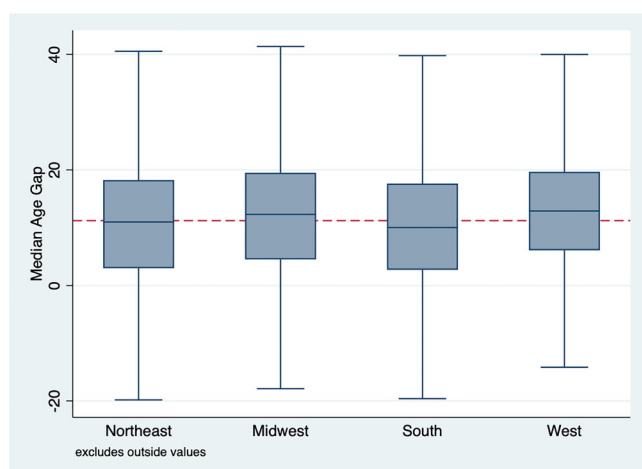


FIGURE 6 Box plot of median age gap in 2014–2018, by region. Sample limited to tracts with at least 10% presence of whites and at least 10% presence of one other group (Hispanic, Black, or Asian). Data source: U.S. Census Bureau

variance-components model predicting Median Age Gap with random effects for metropolitan area and tract—shows that variances for the random effects sum to 95.79, with just 20.86 units of variation (21.78%) associated with metropolitan areas (Table 4). A much larger portion of variation (47.85 units, or 49.95%) occurs at the tract level, meaning that there is a wide range of racial age gaps between tracts located in the same metropolitan area. The remainder (27.08 units, or 28.27%) occurs within tracts over time. The proportions remain stable in supplementary analyses conducted separately for each neighbourhood category (White–Hispanic, White–Black, and White–Asian). These results confirm that the neighbourhood is a relevant scale for understanding racial age gaps.

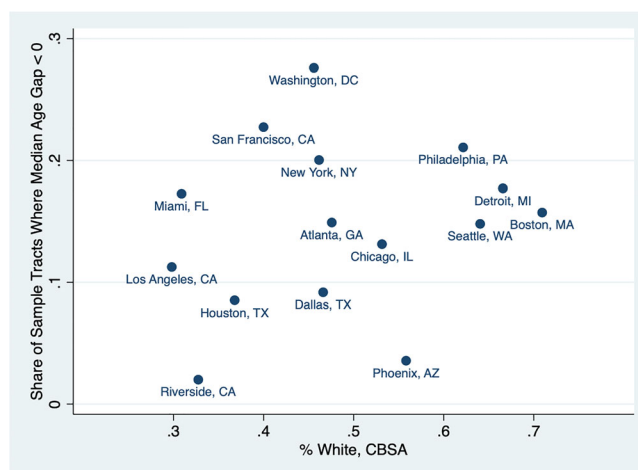


FIGURE 7 Racial composition and young White tracts in 15 largest metro areas, 2014–2018. Each point represents one metropolitan area (CBSA). Horizontal axis represents the share of the entire metro's population that is non-Hispanic, White Alone. Vertical axis represents the share of sample tracts in which the median White age is lower than the median age of the tract's largest non-White (Black, Hispanic, or Asian) group. Data source: U.S. Census Bureau

TABLE 4 Variance component model predicting median age gap with metropolitan and tract random effects (model 1)

	Variance	Std. err.	Percent of total variance
CBSA	20.86	1.39	21.78%
Tract	47.85	0.44	49.95%
Residual	27.08	0.16	28.27%
Total	95.79		100%

Note: Source: U.S. Census, 2000 and 2010; ACS 2014–2018 5-year estimates. $N = 98,999$ tract-years. Sample limited to tracts with at least 10% presence of whites and at least 10% presence of one other group (Hispanic, Black, or Asian). CBSA = Core-Based Statistical Area.

In the next set of models (Table 5), Median Age Gap in 2000 is used to predict the change in a tract's White population by 2014–2018 ($N = 28,474$ tracts). The models account for the neighbourhood's initial share White, the categorical variable indicating the neighbourhood's largest non-White group, urbanicity, median household income, and metropolitan area fixed effects. The coefficient on Median Age Gap is negative and highly significant ($p < 0.001$) in these models. Tracts where Whites were older than their non-White neighbours in 2000 experienced significant declines in their White populations in subsequent years: for each additional year separating the median ages of the White and largest non-White group in 2000, the White population declined by almost half a percentage point (Model 3). After accounting for prior trends in the tract's White share and including interaction terms between Neighbourhood Category (White–Black, White–Hispanic, and White–Asian), the magnitude of this coefficient declines slightly but remains highly significant ($\beta = -0.26$, $p = 0.00$). Comparing standardised coefficients

TABLE 5 Fixed effects models predicting racial change (% change in white residents)

Variable	Model 2	Model 3	Model 4	Model 5
Median age gap (years)	−0.24 (0.00)	−0.45 (0.00)	−0.18 (0.00)	−0.26 (0.00)
Neighbourhood category				
White Asian		(base)	(base)	(base)
White–Black		2.45 (0.00)	1.30 (0.00)	1.15 (0.00)
White–Hispanic		2.69 (0.00)	1.40 (0.00)	0.17 (0.62)
% white		−22.84 (0.00)	−26.35 (0.00)	−26.36 (0.00)
Median age, all residents		0.34 (0.00)	0.10 (0.00)	0.09 (0.00)
Median household income (10,000 s)		−0.69 (0.00)	−0.36 (0.00)	−0.34 (0.00)
Urbanicity				
Large City		(base)	(base)	(base)
Midsized City		−3.11 (0.00)	−3.06 (0.00)	−3.03 (0.00)
Rural		5.05 (0.00)	2.06 (0.00)	1.97 (0.00)
Suburb		−3.11 (0.00)	−3.49 (0.00)	−3.51 (0.00)
Town		0.63 (0.43)	−1.51 (0.04)	−1.53 (0.04)
Percent change, white residents (1990–2000)			0.46 (0.00)	0.46 (0.00)
Median age gap (years) x Neighbourhood category				
x White–Asian				(base)
x White–Black				0.05 (0.16)
x White–Hispanic				0.14 (0.00)
Constant	−8.31 (0.00)	−2.74 (0.00)	10.47 (0.00)	11.01 (0.00)

Note: Source: U.S. Census, 1990, 2000, and 2010; ACS 2014–2018 5-year estimates. $N = 28,474$ tracts. Sample limited to tracts with at least 10% presence of whites and at least 10% presence of one other group (Hispanic, Black, or Asian).

helps to put the results in perspective: a one-standard-deviation shift in the median age gap translates into a 1.99 percentage point decline in the tract's white population, while a one-standard-deviation shift in the tract's median income translates into a 0.64 percentage point decline, and a one-standard-deviation shift in the tract's starting white share translates into a 5.68 percentage point decline. The interaction terms in Model 5 do not produce major changes in output, but the relationship between Median Age Gap and White population change is slightly weaker in White–Hispanic neighbourhoods relative to White–Black and White–Asian neighbourhoods.

Models 6–10 (Table 6) are logistic regressions with metropolitan area fixed effects predicting gentrification for the 9,739 tracts considered “gentrifiable” (urban tracts where the median income was lower than the metropolitan area's median income) in 2000. Tracts where Whites were older than their non-White neighbours were significantly less likely to gentrify in subsequent years. For each year increase in the Median Age Gap, the log-odds of gentrification by 2014–2018 decreased by 0.05 (Model 7), and this pattern persists after accounting for prior racial change in Model 8 ($\beta = -0.03$, $p = 0.00$). The coefficients on the interaction terms in Model 9 indicate that the relationship between racial age gaps and gentrification depends on whether the neighbourhood is White–Black, White–Hispanic, or White–Asian, with small and negative racial age gaps particularly indicative of future gentrification in White–Black neighbourhoods. These findings are summarised in Figure 8, which displays Model 9's

predicted probabilities of gentrification across different levels of the median age gap for each neighbourhood category (covariates set at sample means). In White–Black neighbourhoods, the predicted probability of gentrification is 53.63% when the White median age is 5 years younger than the Black median age, but diminishes to 44.45% when the White median age is 5 years older and to 31.52% when the White median age is 20 years older. In White–Hispanic neighbourhoods, predicted probability of gentrification is 64.99% when the White median age is 5 years younger than the Hispanic median age, declining to 57.97% when the White median age is 5 years older and to 46.89% when the White median age is 20 years older. Due to the scarcity of White–Asian tracts, the relationship between White–Asian age gaps and gentrification is less discernable, but the general pattern persists: predicted probabilities of gentrification decline as the gap between the White and Asian median ages grows larger. In Model 10, the continuous Median Age Gap is replaced with a dummy variable indicating whether the White median age was younger than the median age of the tract's largest non-White group in the year 2000; in these younger White tracts, the log-odds of gentrification by 2014–2018 increased by 0.48, and when other covariates are set at their means, predicted probability of gentrification is more likely than not in all three neighbourhood types. These results are consistent with the argument that the entry of relatively young Whites is an early warning sign of gentrification.

TABLE 6 Fixed effects logistic models predicting gentrification

Variable	Model 6	Model 7	Model 8	Model 9	Model 10
Median age gap (years)	−0.04 (0.00)	−0.05 (0.00)	−0.03 (0.00)	−0.01 (0.61)	
% White		−0.17 (0.30)	−0.17 (0.31)	−0.16 (0.34)	0.04 (0.81)
Median age, all residents		0.06 (0.00)	0.04 (0.00)	0.04 (0.00)	0.03 (0.00)
Neighbourhood category					
White Asian		(base)	(base)	(base)	(base)
White-Black		−0.46 (0.00)	−0.51 (0.00)	−0.31 (0.01)	−0.53 (0.00)
White-Hispanic		0.15 (0.32)	0.08 (0.59)	0.20 (0.35)	−0.03 (0.80)
Median household income, in 10,000 s		−0.19 (0.00)	−0.12 (0.00)	−0.13 (0.00)	−0.10 (0.02)
Percent change, White residents (1990–2000)			0.04 (0.00)	0.04 (0.00)	0.04 (0.00)
Median age gap (years) x neighbourhood category					
x White-Asian				(base)	
x White-Black				−0.03 (0.05)	
x White-Hispanic				−0.02 (0.10)	
Median age gap < 0					
0					(base)
1					0.46 (0.00)
Constant	0.32 (0.00)	−0.51 (0.07)	0.19 (0.58)	0.08 (0.82)	0.08 (0.82)

Note: Source: U.S. Census, 1990, 2000, and 2010; ACS 2014–2018 5-year estimates. N = 9,739 tracts. Sample limited to gentrifiable tracts in 2000 with at least 10% presence of whites and at least 10% presence of one other group (Hispanic, Black, or Asian). Gentrifiable tracts must be urban and have a lower median income than the area as a whole.

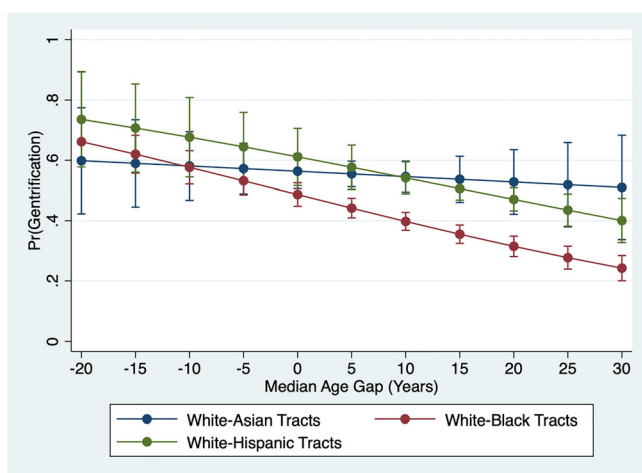


FIGURE 8 Predicted probabilities of gentrification, model 8. N = 9,739 tracts. Model covariates are set at sample means. Sample limited to gentrifiable tracts in 2000 with at least 10% presence of whites and at least 10% presence of one other group (Hispanic, Black, or Asian). Gentrifiable tracts must be urban and have a lower median income than the area as a whole. Data source: U.S. Census Bureau

9 | SENSITIVITY ANALYSES

To check the robustness of results, I re-estimated the models predicting white population loss and gentrification under a series of alternate specifications. One concern is that model results could be

distorted by the inclusion of tracts where one racial group is relatively small. In such tracts, race-specific measures of age distribution could be heavily impacted by just a few residents and, potentially, yield extreme values for the racial age gap. Thus, I ran all models on a more limited sample that defined “meaningful presence” as 20% (as opposed to 10%) of the tract’s total population to ensure that results were not overly sensitive to outliers of this type. This definition is in line with Ellen et al.’s (2012) category of “integrated neighbourhoods.” Results from this smaller sample of integrated tracts (15,090 tracts observed over three Census waves) were not substantively different from results from the full sample.

Isolating the racial age gap as a determinant of neighbourhood change requires controlling for tract racial composition and age composition. The main models thus include % White, whether the largest non-White group is Black, Hispanic, or Asian, and the overall median age of all tract residents. Including more terms (e.g., the relative size of each racial group, race-specific median ages, and measures of the age gap between each combination of racial groups) would induce multicollinearity, detract from model parsimony, and make results difficult to interpret, but the tradeoff is the potential for omitted variable bias. To explore this possibility, I replaced the overall tract median age (which serves as a control variable in Models 3–5 and 7–10) with the white median age in order to gauge whether results are mainly driven by Whites’ age structure, as opposed to the *divergence* between the age structures of Whites and their nonwhite neighbours. I also included a measure of the relative size of the tract’s largest nonwhite group (in addition

to the size of the white population and the categorical indicator of whether the tract's largest nonwhite group is Black, Hispanic, or Asian). Finally, while Models 5, 9 and 10 include an interaction term between median age gap and neighbourhood category (White–Hispanic, White–Black, and White–Asian) to facilitate comparison of coefficients, I estimated separate models for each neighbourhood category, essentially allowing for the interaction between the neighbourhood's specific group composition and all other covariates rather than just the main predictor. Results were robust to each of these different specifications.

As an additional test for effect heterogeneity, I ran models separately for each quartile of the distribution of tracts' initial White population share. Results indicated that the relationship between Median Age Gap and subsequent White population loss is significant across all four quartiles. However, the coefficient is strongest in the second quartile (tracts with initial White population shares ranging from 38% to 60%).

Finally, given the wide range of scholarly definitions of gentrification (Brown-Saracino, 2016), I re-ran Models 6–10 using two alternate measures of gentrification that are based on changes in the tract's college-educated (bachelor's degree or higher) population relative to the surrounding metropolitan area. Following Lee and Perkins (2021), I ranked tracts within each metropolitan area according to their share of college-educated residents in 2000 and in 2014–2018; I then identified tracts whose ranking improved by more than five percentage points during this time period (“moderately gentrifying”) and those whose ranking improved by more than 15 percentage points (“intensely gentrifying”). Consistent with the main model results, the racial age gap in 2000 significantly predicted both moderate and intense gentrification, in that tracts where the median age gap was relatively small in 2000 were more likely to gentrify by 2014–2018 compared to those with a larger median age gap. Lastly, I re-ran the gentrification models using a stricter definition of “gentrifiable,” limiting the sample to urban tracts where the 2000 median income was in the bottom third of the surrounding metropolitan area (rather than the bottom half), again reaching the same conclusions. Tables with regression coefficients from these supplementary analyses are available upon request.

10 | DISCUSSION

At the beginning of this investigation, I noted the substantial national-level differences between the age structures of racial groups and asked how these differences manifest at the local level in racially integrated census tracts. Countless scholars have documented the extent and consequences of segregation, and a growing body of research underscores the importance of local age structure, yet these two bodies of research have very little overlap, and there are few studies examining racial composition and age structure in tandem. Drawing on tract-level U.S. Census data from multiple years, this study has produced five key descriptive findings regarding the joint distribution of age and race:

1. In the vast majority of tracts, Whites are older than their non-White neighbours, with an average Median Age Gap of more than a decade (11.26 years).
2. Age gaps are particularly dramatic in White–Hispanic neighbourhoods, where Whites are almost 15 years older than their Hispanic neighbours, over four times as likely to be senior citizens, and about half as likely to be under 18.
3. The racial gap is not evenly distributed across the country, and is greatest in the Western census regions, a pattern which is largely explained by the regional concentration of White–Hispanic tracts.
4. Tracts with larger age differences between White and non-White residents have less stable racial compositions than those where age is more balanced across racial groups. Over time, tracts where Whites are older than their non-White neighbours experience significant declines in their White populations, even after controlling for prior trends in the White population.
5. Neighbourhoods where Whites are *younger* than non-Whites are extremely rare and concentrated in large coastal metropolitan areas. These tracts are significantly more likely to gentrify in subsequent years.

The growth in integrated neighbourhoods has been celebrated on multiple counts: residential integration facilitates social interactions between different racial groups, and even in the absence of meaningful inter-group contact, integration should theoretically disrupt processes of racial inequality that arise from spatial logics of resource distribution. However, this analysis demonstrates that in integrated neighbourhoods, cross-racial interactions are also likely to be cross-generational, raising new questions about processes surrounding neighbourhood change and geographic inequality. These questions may be particularly pressing for White–Hispanic communities, which represent a large and fast-growing segment of the country's integrated neighbourhoods and are characterised by the highest levels of racial age incongruity.

10.1 | Racial age gaps in changing neighbourhoods: Gentrification and white flight

As this study has shown, neighbourhoods where the White median age is younger than that of their non-White neighbours are rare and mostly concentrated in metropolitan areas that have been previously identified as hotbeds of gentrification (e.g., San Francisco, Washington, D.C., and New York City). Furthermore, tracts whose Median Age Gap was small or negative in the year 2000 were significantly more likely to gentrify in subsequent years. By introducing racial age gaps as an “early warning sign” (Chapple & Zuk, 2016) of gentrification, the present study offers urban stakeholders a new tool to identify where gentrification is likely to occur and assess the potential for anti-displacement measures before the process is already well underway. It also extends Moos's (2016) argument that gentrification and “youthification” go hand-in-hand. These findings uncover a need for more quantitative research tracking the geography of race and

ageing, as well as more qualitative research exploring the dynamics of racial age gaps in different kinds of gentrifying neighbourhoods, including historically black neighbourhoods and newer immigrant enclaves.

Describing the joint distribution of age and race also helps situate gentrification vis-a-vis other forms of neighbourhood change, particularly White flight. To date, explaining why some neighbourhoods stay integrated while others re-segregate due to White population loss has been difficult. This study sheds some light on this puzzle, showing that many integrated neighbourhoods are home to Whites who are ageing in place while younger non-White residents move in around them; these tracts are more likely to lose White residents in subsequent decades, particularly when the initial shares of White and non-White populations are roughly equal. By contrast, neighbourhoods with more racially-balanced age structures are more stably integrated. The gradual departure of residents in different life cycle stages is less likely to induce drastic change in the neighbourhood's racial composition. Future investigations can explore this process in more detail, perhaps leveraging panel designs in which individual respondents are followed over time and across places. Such a design would allow for more insight into the specific demographic processes (white out-mobility versus mortality) and combinations of White, Hispanic, Black, and Asian populations that contribute to White population loss from neighbourhoods with high racial age gaps, which are obscured in the present analyses due to the limitations of aggregate census tract data.

A word of caution is warranted regarding the generalizability of the present findings. The United States is just one of multiple wealthy Western nations in which whites are ageing relative to nonwhite and immigrant populations. Still, the patterns of racial age gaps and neighbourhood change described herein are unlikely to be replicated in countries with different racial and ethnic hierarchies, patterns of segregation, and urban development timelines. Additional studies should be conducted to track the joint distribution of age and race (and, where relevant, immigration background) in non-US contexts.

10.2 | Directions for future research on the consequences of racial age gaps

As Simmel, Coser, and Blau have proposed, heterogeneity is most likely to result in conflict and widening inequality when multiple cleavages are consolidated. Thus, in addition to serving as a determinant of neighbourhood change, racial age gaps may contribute to patterns of inequality that play out within integrated neighbourhoods. Here, I discuss three potential mechanisms (political, social, and psychological/symbolic) through which this could occur. First is a political mechanism, whereby Whites actively withdraw support for public services that target younger generations. In neighbourhoods with high racial age gaps, integration on its own may not disrupt processes of place-based racial inequality if older Whites are more successful at securing their local political interests than younger people of colour. Older Whites have multiple advantages in this regard: their racial privilege protects them from discrimination in informal and institutional

settings, they have greater financial resources,³ and once they reach retirement age they often become more active in local politics.⁴ Accordingly, White seniors may be well-positioned to advocate for their preferred life cycle amenities and services such as elder care facilities, a more accessible built environment, and daytime community programming, which could direct resources away from initiatives for (non-White) children and young families (Winkler, 2013). This hypothesis is borne out by empirical evidence that per-pupil educational spending is lower in states and districts where the school-aged population is more racially diverse compared to older generations (Figlio & Fletcher 2012; Nations & Martin, 2020; Pastor et al., 2017; Poterba, 1997), but little is known about whether similar processes play out on smaller geographic scales. More generally, when local governments use neighbourhood age structure to guide service provision without accounting for the racial composition of different age groups, racial age gaps may produce mismatches between where services are distributed and where they are needed most. Future research can extend this line of inquiry to identify the political consequences of racial age gaps at multiple spatial scales, particularly when it takes the form of older Whites living alongside younger Blacks and Hispanics.

Social homophily, the tendency of actors to be connected to others similar to themselves, may serve as a second mechanism linking racial age gaps to inequality. Age homophily is an established feature of both romantic and platonic relationships, and its influence has become stronger over time (Smith et al., 2014). Neighbourhoods are an important site for both dating and developing friendships, so if individuals prefer close-in-age social and romantic ties, racial age gaps will limit their probability of connecting with members of different racial groups, even in the absence of in-group preference. The resulting lack of interracial ties would reduce opportunities to equalise access to information, opportunities and resources across groups (Lichter, 2013; Shiao & Tuan, 2008; Smith et al., 2014).

Social psychologists' work on status characteristics points to a third and final mechanism, operating in micro-interactional contexts, whereby the combination of age and racial differences could increase stereotyping and reify racial categories. Although inter-group encounters are often seen as a way to decrease "us and them" distinctions, studies have found that when groups differ on multiple status characteristics, these encounters actually magnify the grouping categories' "fit" (the extent that they are perceived to reflect social reality) and "accessibility" (the frequency and ease of calling them up in different situations) (Hornsey, 2008). Perceived social distance widens, and stereotypes about inherent racial differences become more salient. Hence, racial age gaps may temper the positive potential of contact. In neighbourhood settings where age and race are consolidated, interactions may foster attitudes of mutual distrust and prevent neighbours from finding common ground (Blau, 1994; Hewstone & Brown, 1986; Wagner & Berger, 2002). In their aggregate, such interactions both reflect and re-construct racial difference. Delaney (2002) and Bonilla-Silva (2015) urge sociologists to consider how racial formation is localised: local contexts are always embedded in a broader racial regime, yet an area's history, racial demography, and built environment all shape how race is lived and remade. Contrary to the

popular prediction that a “majority-minority” population will make race obsolete, growing diversity in contexts where age and race are tightly coupled may actually reinforce racial boundaries.

11 | CONCLUSION

Non-Hispanic Whites may be ageing and declining in number, yet the United States is not entering a “post-racial” era (Alba, 2018). Among American children, a group that is already majority non-White, there are stark racial disparities in access to resources and opportunities, gaps that are unlikely to disappear as this generation enters adulthood (Lichter & Qian, 2018). While scholars of spatial inequality typically focus on how segregation contributes to inequality by facilitating resource extraction from marginalised communities and opportunity-hoarding by advantaged groups, the present findings suggest that when age and race are consolidated, processes of spatial inequality may occur within an integrated neighbourhood. Furthermore, this study has shown that measures of the joint distribution of age and race are significant predictors of neighbourhood change, both in the form of White population loss and gentrification. In the coming decades, local dynamics between older Whites and their younger non-White neighbours are likely to shape the logics of resource distribution, residential mobility, and the meanings attached to both race and age.

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CONFLICT OF INTEREST

The author declares that there are no conflicts of interest.

ENDNOTES

¹ Gentrification and the accompanying “Whitening” of urban neighbourhoods occupy a central place in public discourse on neighbourhood change, yet nationally representative research finds that it is relatively rare and concentrated in a few places. As Zhang and Logan (2016) note, “[A]lthough some movement into all minority neighbourhoods is observed, White entry occurs much less than White exodus.”

² In the present investigation, I focus on divergence between tracts’ race-specific age structures rather than a multiplicative interaction between tracts’ overall racial and age composition (e.g., percent white * median age). An interaction term might shed light on whether the association between racial composition and neighbourhood outcomes is stronger or weaker in places with older populations, but it would not yield information about the role of age differences between racial groups, which requires disaggregating the age composition of each tract by race and then comparing them.

³ Whites’ peak wealth-building years are between 59 and 67 years old, and the racial wealth gap widens substantially with age (McKernan et al., 2013)

⁴ Kaskie et al. (2008) argue that for many senior citizens, particularly those with greater education and financial security, civic engagement constitutes a distinct “retirement role,” as the demands of work give way to

increased free time, flexible schedules, and familiarity with community matters.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are openly available from IPUMS at the National Historical Geographic Information System repository (Version 14.0) using <https://data2.nhgis.org/main> (datasets 1990_STF1, 2000_SF1a, 2010_SF1a, and 2014_2018_ACS5a).

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