The Roots of Structural Racism: Twenty-First Century Racial Residential Segregation in the United States

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I. Introduction

In 2020, disparate rates of infection and deaths from the Covid-19 pandemic and a series of shocking police encounters captured on video, culminating in the brutal murder of George Floyd by the Minneapolis police, prompted what media organizations labeled "a National Reckoning on race." A greater portion of the American public awakened to the fact that too many people of color were disadvantaged in ways that seemed to shape life chances and overall well-being. Demonstrations supporting the Black Lives Matter movement occurred not only in large metropolitan regions, but spread to many predominantly white and rural counties across the country. Books on race and racism shot up best seller charts, polls indicated a groundswell of public support for race-conscious policy reforms, and the term "systemic racism" entered the mainstream lexicon.2

Racial disparities in health and well-being, policing and the criminal justice system, schools and universities, corporations and labor markets, and in neighborhoods and housing are stark and difficult to ignore. Whereas such disparities may once have been attributed to differences in intelligence, motivation or effort, the surge in anti-racism activism and reading has helped engender greater awareness of the structural inequities that underpin these outcomes. Journalists have probed these phenomena more deeply than in the past, revealing the circumstances and conditions that contribute to these outcomes or the subtle differences in treatment or care that create stunning inequities.3

Despite these efforts, however, there remains a surprising lack of appreciation for the centrality of racial residential segregation in forming and sustaining these disparities. It is residential segregation, by sorting people into particular neighborhoods or communities on the basis of race, that connects (or fails to connect) residents to good schools, nutritious foods, healthy environments, good paying jobs, and access to health care, clinics, critical amenities and services. Aggressive "broken windows" policing practices target racially and economically isolated Black and Brown neighborhoods, while jobs and the tax dollars flow to white communities, leaving crumbling infrastructure, poisonous water, predatory financial institutions, and food deserts behind.4 For these reasons, and many more, racial residential segregation remains the "lynchpin"—the deep root cause— that sustains systemic racial inequality.5

Protesters outside a real estate office demanding an end to discrimination, in Seattle, Washington in 1964. (Wikicommons)

Given the centrality of racial residential segregation to the reproduction of racial inequality —not just as a fact of history, but in contemporary terms—there is a remarkable ambivalence about this fact, and what to do about it, and not just among those who oppose racial justice advocacy or stand on the sidelines in such policy debates. For many middle-aged African Americans, the short-lived experiment in educational desegregation was a mixed bag—an infusion of resources and expansion of educational opportunities at the expense of community, more micro-aggressions (or worse), and fewer caring and committed teachers and administrators invested in their future.6 And desegregation proved fleeting. White hostility and unrelenting opposition to integration produced bursts of violence even in northern cities like Chicago and Boston, accelerating white flight, which further undermined the project of federally mandated desegregation, long before courts largely abandoned this effort in the early 1990s.7

And unlike school desegregation, the nation never embarked upon a national project to integrate neighborhoods, let alone declared an unambiguous commitment to that goal. There has never been a *Brown v. Board of Education*-like decision for housing. Integrating neighborhoods was always going to be more difficult than integrating schools.8 No matter how unpopular, students could be assigned to different schools in a district or region, and bused accordingly, by a centralized public authority under the mandate of federal courts. But there is no comparable institution or authority that has the

power to compel the integration of neighborhoods, workplaces, or public spaces. The Fair Housing Act of 1968, the final legislative achievement of the civil rights movement, prohibited discrimination in housing (sale, rental, lease, etc.) of housing on the basis of race.9 It began to break down barriers to integration by prohibiting discrimination, but was comparatively weak in terms of proactively integrating existing segregated communities.10

Nonetheless, following the passage of the federal Fair Housing Act in 1968, residential integration increased significantly between 1970 and 1980,11 to such an extent that many reasonable observers felt that the residential patterns established in the early and middle decades of the twentieth century might actually fade away in time. Previously all-white neighborhoods changed complexion as non-white neighbors arrived, and vice versa.12 Although progress incrementally slowed each subsequent decade, the in-migration of people of color into the suburbs—especially between 1990 and 2000—seemed to suggest a different and more hopeful racial trajectory, such that two economists declared the "End of the Segregated Century."13 The downward trend of residential segregation, at least as popularly measured, seemed to portend eventual widespread residential integration. But as we'll explain later in this report, these encouraging observations turned out not to reflect the actual dynamics of what was occurring. In most regions, segregation was in fact increasing.

Aside from public health and epidemiology, one arena where policymakers, parents, and scholars speak frequently and unabashedly about the harms of segregation is in the context of education, where sharp disparities in educational outcomes and demographic profiles are stark and persistent.14 Schools have gradually re-segregated in the 65 years since *Brown v. Board of Education* was decided.15 The problem today is that our nation's public schools replicate the demographic profiles of the communities and neighborhoods they serve.16

Given the failures of integration, or, more accurately, the failure to integrate (and sustain it), many anti-racism advocates evince ambivalence about integration itself, or carefully elide the issue, focusing instead on the symptoms, such as abusive policing, inadequate health care, and underperforming schools. For example, in his popular treatise *How to be an Antiracist*, Ibram X. Kendi writes, "What really made the schools unequal were the dramatically unequal resources provided to them, not the mere fact of racial separation."17 He's right on this point, of course, but his implied solution, to simply equalize resources, is woefully insufficient as a comprehensive remedy, for reasons we will show.

> It is unlikely that we can ever close out racial disparities let alone significantly improve life outcomes for racially marginalized people in a racially segregated society. ... Racial residential segregation so effectively sorts people across space and bundles vitalizing resources that no redistribution plan can ever match the swift efficacy of the underlying mechanism.

This report refocuses attention on the *roots* of structural racism: racial residential segregation. First, we explain how segregation functions not only to perpetuate and sustain racial inequality, but as a widespread and surprisingly commonplace global driver of inter-group inequality. By illustrating its near universality as an inequity-causing mechanism, we can better appreciate the continuing function of racial segregation in American society today. To that end, we briefly canvass the social scientific literature on the harms of racial residential segregation in the realms of public health, education, and economics.

Second, we will show how racial residential segregation is much more pervasive and endemic than we generally acknowledge. Not only are most of our major metropolitan regions and cities highly segregated, but we find that nearly 81 percent American cities and metropolitan regions are more segregated today than they were in 1990, after more than two decades of federal policy applied to this problem.

Part of the failure to recognize this is a byproduct of overreliance on inadequate measures of segregation that are no longer capable of helping us gauge the extent of segregation in an increasingly diverse and multi-racial society. Racial residential segregation has evolved during the last century, but our prevailing ways of understanding and describing it are stuck within a twentieth century paradigm.

To address these problems, we apply more recently developed measures and gauges of segregation and introduce a functionally new measure of racial residential integration. We describe regional differences in segregation and identify the most and least segregated cities in the nation, and flag places that have changed the most in recent years, either becoming less segregated or moreso.

Third, we present key findings and insights from an analysis of our observed measures of racial residential segregation. We find consistent and strong correlations between the degree of racial residential segregation and key life outcomes, such as poverty rates, home values and rents, educational outcomes, life expectancy, economic mobility, and more. For example, we find that neighborhood poverty rates are highest in segregated communities of color (21 percent), which is three times higher than in segregated white neighborhoods (7 percent).

A half-abandoned short block of buildings in downtown Chester, Pennsylvania pictured in May 2019. The city experienced a massive "white flight"after the Great Migration in the mid-twentieth century. (Library of Congress)

We compare highly segregated white neighborhoods to highly segregated Black and Latino neighborhoods and integrated neighborhoods, as well outcomes for different-race residents, to demonstrate the structural role of racial residential segregation in shaping access to vitalizing resources. For example, we find that Black children raised in integrated neighborhoods earn nearly $1,000 more per year as adults than those raised in highly segregated communities of color. Latino children raised in integrated neighborhoods earn $844 more per year as adults than Latino children raised in highly segregated communities of color.

We also describe the relationship between historical redlining and contemporary patterns of segregation, suggesting the enduring effects of government policy nearly a century ago. We also illustrate the relationship of racial residential segregation and political polarization with implications for the process of political districting.

Finally, we introduce a sophisticated and powerful new mapping tool that is capable of more vividly illustrating the extent and degree of racial residential segregation in our nation and illuminating the extent of the problem. This interactive tool can be used to observe racial residential segregation in any community at any level of geography (neighborhood, city, region), and to see changes over time.

It is our hope that this tool and the granular data made available by this project will engender not only greater awareness of the problem of segregation at the local level, but will facilitate the creation of local histories and deeper knowledge that can support local advocacy and policy change.[18] For that reason, we supplement our mapping tool with a repository of city snapshots and local histories to serve as examples, educational tools and inspiration.

II. The Function and Effects of Segregation

Second only to outgroup violence, segregation is the oldest and most ubiquitous source of inter-group inequality. From the most ancient human civilizations to the present, segregation has been used to separate people on the basis of race, ethnicity, sex, class, profession, caste, and religion in public and private realms. In contemporary societies, where violence and discrimination are either outlawed or otherwise verboten, segregation is the primary mechanism for controlling access to resources, spaces and people. Segregation undergirds a vast array of resource disparities, tangible and intangible.[19]

It is important to emphasize at the outset, however, that racial segregation, like racial violence or discrimination, is generally not established, justified, or propounded on the basis of hatred, animus or invidiousness. Rather, it is usually advanced on the basis of peace, security, social harmony, and order, and sometimes on the basis of purity, religious or otherwise. Thus, the US War Department placed Japanese Americans into internment camps on the ground that they were a security threat to the United States during World War II;[20] the California Department of Corrections segregated inmates on the basis of race ostensibly to tamp down inter-group violence within prisons as recently as 2005;[21] and, ancient European kingdoms isolated Jewish people into "ghettos" ostensibly to protect Christian religious purity.[22]

Residents of Japanese ancestry pictured in front of posters with internment orders as they register for evacuation and housing, in San Francisco, in April 1942. (Library of Congress/Wikicommons)

To better appreciate the universality of segregation as a mechanism of inequality, briefly consider cases of segregation and their effects in contexts aside from race and outside of the United States: religious segregation in Northern Ireland, sex segregation in Saudi Arabia, and caste segregation in India. Through these cases, American readers will better appreciate the actual function of segregation, before we present a summary of findings on the harmful effects of American racial segregation.

India's ancient caste system deems the lowest caste, Dalits, as "untouchables."[23] This is not merely a rhetorical flourish, but a literal article of faith among many Hindus. In many villages, Dalits are forbidden to drink from upper-caste wells or to worship at their temples.[24] In 2020, a 17-year-old Dalit was shot and killed for entering a temple "belonging" to an upper caste.[25] In many ways, this kind of caste-based segregation is similar to that of Jim Crow, which restricted access to public accommodations for Black Americans.

Saudi Arabia's "Guardianship" system created an interlocking set of rules that segregates women from men.[26] Until very recently, these rules not only prohibited women from driving or traveling outside the country without a male family member's explicit permission,[27] they also restricted access to public spaces, such as movie theaters or concerts, and provided separate seating areas and entrances for men and women in restaurants and other public venues.[28] Again, this kind of public accommodations segregation resembles elements of Jim Crow, which provided separate seating areas in restaurants, courts and theaters, and on public transit.

For many decades in the twentieth century, Northern Ireland was a site of intense violence between Irish Catholics and "Unionist" Protestants. The conflict was dubbed "The Troubles."[29] In the course of this conflict, as a result of violence and enmity, neighborhoods in Northern Ireland became increasingly religiously segregated, with Catholics moving to predominantly Catholic neighborhoods and Protestants moving to more heavily Protestant neighborhoods.[30] These neighborhoods provided differential access to critical resources, such that today, Irish Catholic life expectancy there is 74.1 years compared to 81.7 for Protestant men.[31] Protestant women live 4.7 years longer than Catholic women.

Racial residential segregation in the United States is associated with similar disparities in life outcomes. In the San Francisco Bay Area, for example, we found that life expectancy is more than five years greater in white neighborhoods (84 years) than in highly segregated Black/Latino neighborhoods (79 years).[32] By virtually any measure of well-being, from employment, income, educational attainment, access to health care and a healthy environment, residential segregation based upon group identity is a driver of unequal outcomes.

> One of the fundamental problems in our world is the divide between people who want a community built around a single, primary salient identity and those who want to live in diverse, pluralistic communities. The exclusionary enclave sentiment undergirds anti-immigrant and xenophobic sentiment worldwide, but it is also rampant within societies, including in the United States. This is the essence of segregation.

Perhaps the most extensive research on the harmful effects of racial residential segregation is in the field of public health.[33] Racial residential segregation has been linked to infant mortality,[34] asthma,[35] cardiovascular disease,[36] diabetes,[37] hypertension,[38] obesity,[39] and many other health conditions and illness,[40] including Covid-19 infections.[41] Segregated communities of color often have less access to grocery stores, child care facilities, and other important neighborhood resources, and are more likely to have hazardous waste facilities in close proximity.[42] Segregation disproportionately exposes Black communities to environmental pollutants and isolates Black populations from essential health resources such as improved recreational spaces, quality pharmacies, clinics and hospitals, and healthy food options.[43]

The harms of segregation are well documented in the educational context as well.[44] Segregated schools are associated with teacher turnover and lower teacher quality, larger class sizes, fewer extracurricular offerings, lower test scores and graduation rates.[45] In contrast, integrated schools have more credentialed teachers, lower drop-out rates, and greater capital investments into school buildings and infrastructure.[46]

A recent study of schools found that racial segregation is strongly associated with the magnitude of achievement gaps in third grade, and with the rate at which gaps grow from third to eighth grade. The study found that racial segregation appears to be harmful because it concentrates minority students in high-poverty schools, which are, on average, less effective than lower-poverty schools.[47]

In a landmark longitudinal study of Black and white students in desegregated schools in the southern United States, Berkeley professor Rucker Johnson found that desegregated schools greatly improved educational outcomes for Black children with no corresponding decrease in outcomes for white children.[48] He found, for example, that at least five years spent in desegregated schools yielded an estimated 25 percent increase in annual earnings and increased annual work effort of 195 hours for Black boys. He found that each additional year of attendance in desegregated schools increased Black men's adult annual earnings by roughly 5 percent, increased their wages by 2.9 percent, and led to an annual work effort that was 39 hours higher. This reduced their chances of poverty as adults as well. Furthermore, attending a desegregated school as a child reduced by 14.7 percent the probability of spending time in jail by age 30.

Black and white school children on a school bus, riding from the suburbs to an inner city school in Charlotte, North Carolina, in February 1973. (Library of Congress)

The economics literature on racial residential segregation also firmly establishes the harmful effects on economic and social mobility and other economic outcomes. Higher levels of racial segregation are associated with lower median and per capita incomes for Black and Latino Americans.[49] It is also associated with unemployment and idleness.[50] Racial residential segregation is also strongly associated with disparities in lending practices and access to credit.[51]

It is an uncomfortable truth for anti-racism advocates, but one that we must confront and acknowledge: it is unlikely that we can ever close out racial disparities let alone significantly improve life outcomes for racially marginalized people in a racially segregated society. Compensatory schemes that redistribute resources can help to ameliorate these inequities, but racial residential segregation so effectively sorts people across space and bundles vitalizing resources that no redistribution plan can ever match the swift efficacy of the underlying mechanism.[52]

Moreover, even if it could eliminate some disparities, such efforts would fail to remedy every element inside the bundle. For example, even if redistribution could match the inequity in school funding, it might fail to do so in terms of jobs. But even if it could do so in terms of jobs, it might fail to do so in terms of health care or providing a healthy environment. And even if it could do that, it might not in terms of social capital and communal fiscal stability. This is why racial residential segregation is the lynchpin of racial disparities in the United States.

III. A Fresh Look at Racial Residential Segregation

When we think of segregation, we may think of Jim Crow lunch counters or race-based pupil assignments. While the segregation of public accommodations was the primary form of segregation in the South, in the North and West, segregation was accomplished primarily through residential patterns—by law and violence that prohibited Black movers from entering any but a small number of tightly bound neighborhoods. The federal government reinforced racial residential segregation through policies such as redlining and other federal mortgage guarantees, which were promulgated locally and spread through the private market.53 Although we dismantled much of Jim Crow by the late-1960s, northern-style residential segregation overtook the country, even as most neighborhoods diversified.

By prohibiting discrimination in housing on the basis of race, the 1968 Fair Housing Act began to open up previously all-white neighborhoods to people of color. Despite these prohibitions, our growing diversity and the decline in single-race communities, racial residential segregation remains a stubborn and persistent fact of life. Today, most white children live in segregated, white communities, and most Black children, similarly, live in segregated, Black neighborhoods.54 Racially identifiable communities are everywhere, and students and families are more racially isolated than they would like to be, even controlling for income, wealth, and demographic preferences.55

> Schools have gradually re-segregated in the 65 years since *Brown v. Board of Education* was decided. The problem today is that our nation's public schools replicate the demographic profiles of the communities and neighborhoods they serve.

The prevailing narrative around gradual residential integration relies primarily on a measure of segregation that is misleading and flawed in many ways, but chiefly because it focuses on the binary of Black-white segregation. This widely used measure of Black-white segregation indicates a relatively significant decline in segregation between 1970 and 1980, with more modest declines between 1980 and 1990, 1990 and 2000, and 2000 and 2010, with the 2010 measures as either high, moderate-high, or moderate for virtually every major metropolitan area in the United States.56 So, although this traditional measure of segregation reflects gradual declines in overall levels of segregation, for many, if not most, regions of the country, overall Black-white segregation remains high or moderately high.

One reason for the gradual decline in Black-white segregation (from extremely high to merely high or moderately-high) is the presence of anti-discrimination laws and their enforcement. As a consequence of the passage of the Fair Housing Act, there are far fewer homogeneous all-white (or all-Black) communities in the United States any more. At least some members of different races have been able to move into previously single-race communities. But a relatively small number of different-race residents should not obscure the fact that racially isolated neighborhoods are still commonplace. The fact that these neighborhoods are no longer entirely same-race does not mean that they are truly integrated, just that the ramparts of racial exclusion are no longer impermeable.

A related problem with traditional perspectives and measures of racial residential segregation is that the form that racial residential segregation takes has evolved in critical respects. Whereas racial segregation once separated people of different races into different neighborhoods in the same cities (such as different neighborhoods in Oakland, Chicago, New York, or Detroit), racial residential segregation today is more "mobile" and regional.57 People of color have greater freedom to move to different communities than they did several generations ago, but those neighborhoods and communities are more likely to be struggling, either declining urban areas or struggling inner-ring suburbs or far-flung exurbs. In this sense, people of color are no longer locked into a small number of neighborhoods, but are channeled into certain types of often disadvantaged communities, like Ferguson, Missouri, or Vallejo, California.

As a result, racial residential segregation today occurs between cities and places as much as it does between neighborhoods within the same cities. This is what is meant by "regional" segregation: racial residential segregation is more inter-municipal than intra-municipal. Thus, the simple patterns of segregation that defined metropolitan regions in the second half of the twentieth century, such as the "Chocolate city, Vanilla suburb," no longer hold.58 Segregation is more prominent between different-race suburbs today than the traditional urban-suburban divide would suggest. Measures that are more sensitive to these dynamics are needed.

> Contrary to prevailing impressions of the United States, the most segregated regions are the Midwest and Mid-Atlantic, followed by the West Coast. Southern states have lower overall levels of racial residential segregation, and the Mountain West and Plains states have the least.

A more serious problem with traditional binary measures of segregation is that they fail to account for America's growing diversity. A great paradox of racial segregation in America is that segregation persists despite the nation's growing diversity, and also despite the fact that there are fewer and fewer places that are racially homogenous. In other words, there are far fewer all-white or all-Black neighborhoods today than there were 50 years ago. And so many of our regions and states are more diverse than they were a generation ago.

A large and growing influx of Asian and Latino residents has dramatically shifted the complexion of our racial geography nationwide, but especially in states like California, Texas, and Washington. This diversity means that simple binary measures of racial residential segregation can no longer suffice to convey a fulsome portrait of underlying conditions or patterns. Holistic measures that can account for growing diversity are needed, and they tell a very different tale.

For that reason, we employ a relatively new measure of segregation that overcomes these problems, and better accounts for America's current diversity. This project measures segregation in a way that better accounts for Asian, Latino, and Native American populations, as described throughout. The appendix to this report contains a technical description of the various measures of segregation, and a more comprehensive explanation of our preferred measure over the alternatives. We find, for example, that

many highly diverse regions in the United States are either as segregated or more segregated as of 2010 than they were in 1970 or even 1990. For example, Tucson, Arizona; San Jose, California; and Honolulu, Hawaii are cities that have overall much higher levels of racial residential segregation than would be suggested by Black-white segregation.59

Overall, we found that racial residential segregation was much greater and more pervasive than is generally appreciated. We calculated the level of segregation for every city and metropolitan region in the United States. Out of every metropolitan region in the United States with more than 200,000 residents, 81 percent (169 out of 209) were more segregated as of 2019 than they were in 1990. In most cases the increase or reduction in segregation was modest, but in some cases the changes were dramatic as indicated in Tables 1 and 2 below, which provides a list of the metropolitan areas with the greatest overall increase or decrease in segregation in that time period, and indicates racial compositional changes that may have contributed to these changes in the level of segregation.

Table 1: Top 10 Metros with the Greatest Increase in Segregation (1990-2019, Minimum 200,000 people)

Rank	Metro	% Black	% Latino	% White
1	Fayetteville-Springdale-Rogers, AR-MO	2% (+228%)	16% (+1140%)	73% (-24%)
2	Reading, PA	4% (+55%)	21% (+312%)	72% (-21%)
3	Scranton--Wilkes-Barre, PA	3% (+232%)	10% (+1626%)	84% (-15%)
4	Allentown-Bethlehem-Easton, PA-NJ	5% (+174%)	17% (+304%)	73% (-21%)
5	Providence-New Bedford-Fall River, RI-MA	5% (+86%)	13% (+227%)	75% (-17%)
6	Green Bay, WI	2% (+379%)	7% (+977%)	83% (-13%)
7	Salt Lake City, UT	2% (+140%)	18% (+191%)	72% (-20%)
8	Sioux Falls, SD	4% (+786%)	4% (+838%)	85% (-12%)

| 9 | Boston-Cambridge-Quincy, MA-NH | 8% (+45%) | 11% (+143%) | 70% (-19%) |
| 10 | Salem, OR | 1% (+26%) | 24% (+219%) | 68% (-23%) |

Table 2: Top 10 Metros with Greatest Decrease in Segregation (1990-2019, Minimum 200,000 people)

Rank	Metro	% Black	% Latino	% White
1	Savannah, GA	33% (-4%)	6% (+414%)	56% (-13%)
2	San Antonio-New Braunfels, TX	6% (+4%)	55% (+18%)	34% (-26%)
3	Miami-Fort Lauderdale-Pompano Beach, FL	20% (+24%)	45% (+62%)	30% (-44%)
4	Lubbock, TX	7% (-11%)	36% (+52%)	53% (-21%)
5	Mobile, AL	36% (+15%)	3% (+248%)	57% (-15%)
6	Port St. Lucie, FL	15% (+22%)	17% (+303%)	64% (-22%)
7	Flint, MI	20% (+1%)	3% (+67%)	72% (-6%)
8	Chicago-Joliet-Naperville, IL-IN-WI	16% (-13%)	22% (+102%)	53% (-21%)
9	Corpus Christi, TX	3% (-11%)	61% (+21%)	33% (-27%)
10	Jackson, MS	49% (+15%)	2% (+358%)	47% (-17%)

The complete results of this analysis, indicating the change in level of segregation and racial composition for every metropolitan area from 1990 to 2019, are available here.

We also calculated a complete list of the most-to-least segregated cities and metropolitan areas in the United States (again, available on the "Tables" menu on the right hand side of the project page). The top 10 most segregated metropolitan areas are presented below in Table 3, and are generally consistent with more traditional measures of segregation.[60]
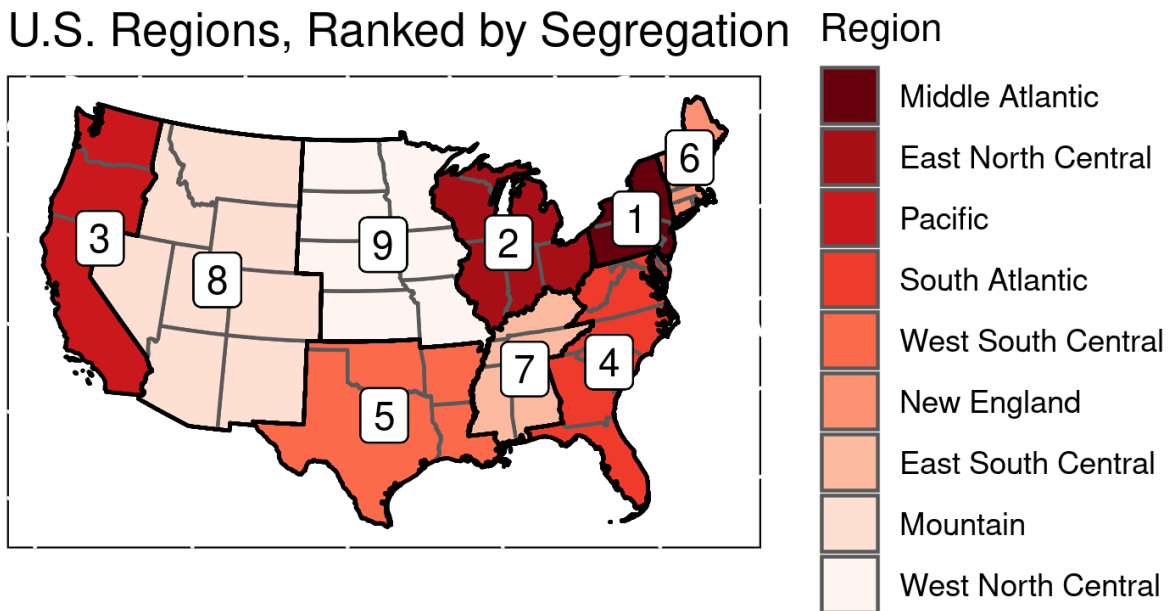
Table 3: Top 10 Most Segregated Metropolitan Statistical Areas (2019, Minimum 200,000 people)

Segregation Rank	Metro
1	New York-Northern New Jersey-Long Island, NY-NJ-PA
2	Chicago-Joliet-Naperville, IL-IN-WI
3	Milwaukee-Waukesha-West Allis, WI
4	Detroit-Warren-Livonia, MI
5	Miami-Fort Lauderdale-Pompano Beach, FL
6	Los Angeles-Long Beach-Santa Ana, CA
7	Trenton-Ewing, NJ
8	Cleveland-Elyria-Mentor, OH
9	Philadelphia-Camden-Wilmington, PA-NJ-DE-MD
10 (tied)	Beaumont-Port Arthur, TX
10 (tied)	New Orleans-Metairie-Kenner, LA

Our nation's largest cities and metropolitan areas remain highly segregated using any measure, but the rustbelt cities of the industrial Midwest and mid-Atlantic disproportionately make up the top 10 most segregated cities list, which includes places like Detroit, Cleveland, Milwaukee, Philadelphia, and Trenton. It is no coincidence that these were places where major Black Lives Matter protests occurred even before the 2020 demonstrations, and that they were also sites of major racial uprisings in the 1960s.61 These were also places where the Great Migration (1916-1970) had the strongest pull.

As these tables suggest, we find that contrary to prevailing impressions of the United States, the most segregated regions are the Midwest and Mid-Atlantic, followed by the West Coast (See Figure 1). Southern states have lower overall levels of racial residential segregation, and the Mountain West and Plains states have the least.[62]

Figure 1

U.S. Regions, Ranked by Segregation

Region legend (most to least segregated):
- Middle Atlantic
- East North Central
- Pacific
- South Atlantic
- West South Central
- New England
- East South Central
- Mountain
- West North Central

*Alaska and Hawaii included in the Pacific Division

Consistent with the regional pattern, many mid-Atlantic and Midwestern cities like Scranton and Green Bay have had large increases in segregation in the last 30 years (see Table 1, above). Conversely, southern cities in states like Florida and Texas have had equally significant demographic change, but managed to reduce racial residential segregation (see Table 2, above).

In addition to using a relatively new measure of segregation, we created a functionally new measure of integration for this project that identifies places that are both diverse and have lower levels of residential racial isolation (this is also described in the Technical Appendix). Some communities and regions may appear to have relatively little racial residential segregation, but that could be because they are not very diverse. Thus, we combine diversity thresholds with our preferred measure of segregation to find places that can be truly characterized as integrated.

Although there are many integrated neighborhoods around the country, very few cities and metropolitan areas meet our definition. Out of the 113 largest cities examined, only Colorado Springs, CO and Port St. Lucie, FL qualify as "integrated" under our rubric. Similarly, out of the 221 largest metropolitan regions, only San Luis Obispo-Paso Robles, CA and Colorado Springs, CO qualify as "integrated." Overall, the United States remains very racially segregated.

Using our preferred measures of segregation and integration, we have a clearer and more accurate view of the extent racial residential segregation around the country. Moreover, using these measures we can better understand the relationship between segregation and key life outcomes.

IV. Key Findings

Examining demographic data (income, race, etc.) and our preferred measures of segregation and integration, we find a number of apparent and sometimes startling relationships. Most prominently, we find a striking relationship between income by race and racial residential segregation. Specifically, we find that Black and Latino income is higher in more integrated neighborhoods. Poverty rates are significantly lower (14 percent compared to 21 percent) in integrated neighborhoods compared to segregated communities of color.63

Table 4 below includes a summary of our main findings, which compares conditions and outcomes in integrated neighborhoods with outcomes in highly segregated white neighborhoods and highly segregated communities of color ("POC Segregation"). Despite the strong correlations, we caution that this analysis cannot prove that racial segregation is the cause of these neighborhood outcomes, but the consistent direction of outcomes across a large set of variables along these types of neighborhoods is highly suggestive and consistent with the "neighborhood effects" literature, which attributes life outcomes to community conditions.64

Table 4: 2019 Segregation and Select Neighborhood Outcomes6566

Indicator	Integrated Neighborhoods	Highly Segregated Communities of Color	Highly Segregated White Neighborhoods
Median Household Income	$63,830	$54,278	$100,956
Median Home Values	$244,162	$266,927	$474,798
% Below Poverty	14%	21%	7%
% Owner-Occupied Homes	59%	46%	77%
% With Bachelor's Degree	30%	23%	46%
Life Expectancy	78	77	81

Median Rent	$1,177	$1,174	$1,545
% Unemployed	6%	8%	4%
% of US Land Area	7%	9%	7%
% of US Population	12%	20%	11%

The best life outcomes are found, however, in highly segregated white neighborhoods, which is consistent with a theory of "opportunity hoarding" that predominantly white cities and communities have greater resources and often have the fewest people of color living in them.67 Household incomes in these neighborhoods are nearly twice those in segregated communities of color. That income differential contributes to wealth disparities, as home values are also nearly twice as high. Even life expectancy is four years longer in these neighborhoods than in segregated communities of color.68 But critically, these neighborhoods are difficult to access: monthly rents are more than $300 and $400 per unit higher than in either integrated or highly segregated POC neighborhoods, respectively.

It is also notable that home ownership is much higher in both white segregated neighborhoods and integrated neighborhoods than in segregated communities of color. Homeowner occupancy is 77 percent in highly segregated white neighborhoods, 59 percent in well-integrated neighborhoods, but just 46 percent in highly segregated communities of color. Homeownership is a critical pathway to wealth accumulation.

We also examined economic outcomes (and rates of incarceration) for children of different races born between 1978 and 1984 across these neighborhood types (as measured in 1990).69 We found clear and consistent evidence that children raised in integrated neighborhoods had better outcomes than children raised in segregated communities of color (see Table 5).70 Black children raised in integrated neighborhoods earn nearly $1,000 more per year as adults than those raised in highly segregated communities of color. Latino children raised in integrated neighborhoods earn $844 more per year as adults than Latino children raised in highly segregated communities of color.

The best economic outcomes, however, again occurred in highly segregated white neighborhoods. Average income is substantially higher in those neighborhoods, not just for white children, but for Black and Latino children as well. Black children raised in highly segregated white neighborhoods earned nearly $4,000 more as adults than Black children raised in highly segregated communities of color. Similarly, Latino children raised in highly segregated white neighborhoods earned about $5,000 more per year as adults than Latino children raised in segregated communities of color.

Neighborhood segregation appears to affect outcomes for people of all races residing in them, not just members of certain racial groups. By shaping outcomes for all residents irrespective of race, these results reinforce our view that racial residential segregation is a

structural force that allocates and distributes vitalizing resources.

Table 5: 1990 Neighborhood Segregation and Select Outcomes for Racial Groups

Indicator	Integrated Neighborhoods	Highly Segregated Communities of Color	Highly Segregated White Neighborhoods
Future Average Income	$29,593	$27,685	$38,035
Future Black Income	$22,996	$22,061	$25,867
Future Latino Income	$34,354	$33,510	$38,122
Future White Income	$34,968	$34,940	$41,066
% of Children Imprisoned as Adults	3%	3%	2%
% of Black Children Imprisoned as Adults	5%	6%	5%
% of Latino Children Imprisoned as Adults	2%	2%	2%
% of White Children Imprisoned as Adults	2%	3%	2%

Although the form that racial residential segregation takes in the United States has evolved in ways described in the previous section, we nonetheless find that federal policy in the New Deal and post-war period may continue to shape those patterns. Using digitized Home Owners Loan Corporation (HOLC) city survey security maps, we analyzed the relationship between levels of segregation in our map and the designation of neighborhoods by the HOLC, an agency created during the 1930s to slow the tide of foreclosures and extend credit for home loans.71

The HOLC ranked neighborhoods as part of its survey program. Neighborhoods marked in Green (grade A) were considered "Best," blue (grade B) were considered "Still Desirable," yellow (grade C) were "Definitely Declining," and red (grade D, hence the term "redlining") were deemed "Hazardous."72 Using the digitized HOLC security maps from the 1930s and our preferred measure of segregation, we can infer the extent to which federal policy nearly a century ago may be shaping racial residential segregation today.73

Table 6 indicates the percentage of HOLC graded neighborhoods within each level and type of racial residential segregation.[74] For example, of well-integrated neighborhoods as of 2010 that were given a HOLC grade in the 1930s, 5.8 percent were graded A, 25 percent were graded B, 46.5 percent were graded C, and 22.6 percent were graded D. This shows that very few integrated neighborhoods today were given high HOLC grades.

The most important finding from the table is the evidence of the lingering effects of past governmental policy. Of the highly segregated communities of color as of 2010, only 2 percent were graded "A" in the 1930s, while 83 percent were graded either "C" or "D." This suggests that lower HOLC grades (and by extension federal mortgage insurance policy) may have contributed to the perpetuation of racial residential segregation. The unsurprising corollary to this finding is that highly segregated white neighborhoods as of 2010 had the fewest percentage of "C" and "D" HOLC rankings and the highest percentage of "A" rankings among the neighborhood types presented. Nearly a century later, federal policy has a long tail.

Table 6: HOLC Grades by 2010 Neighborhood Segregation Type

| Segregation Category	HOLC Grade A	HOLC Grade B	HOLC Grade C	HOLC Grade D
Well Integrated	5.8%	25.1%	46.5%	22.6%
Medium Segregation	9.8%	26.4%	44.5%	19.3%
Highly Segregated Communities of Color	1.9%	15.0%	47.3%	35.7%
Highly Segregated White Neighborhoods	15.8%	31.4%	37.0%	15.8%

Another issue we examined was the relationship between segregation and political polarization. Some scholars have argued that racial residential segregation may be a driver of political racial polarization, and have found evidence supporting this claim.[75] For example, a recent study found that "cross-ethnic" exposure in childhood predicted political preferences decades later.[76] We apply our preferred measure of segregation to investigate this issue.

Political polarization is a nuanced concept that refers not simply to partisanship or the intensity of partisan feelings, but the degree to which people gravitate to the ends of the political spectrum rather than cluster in the middle.[77] Aggregate election results by

themselves do not necessarily tell us the degree of political polarization that may exist (since options in general elections are essentially binary, i.e. Republican vs. Democrat), but measures of political segregation can indicate regional political polarization.

We analyzed the relationship between racial residential segregation and regional political segregation for 314 metropolitan areas, and the results are illustrated in Figure 2 below.

Figure 2. Racial Residential Segregation and Regional Political Segregation, By Metropolitan Areas
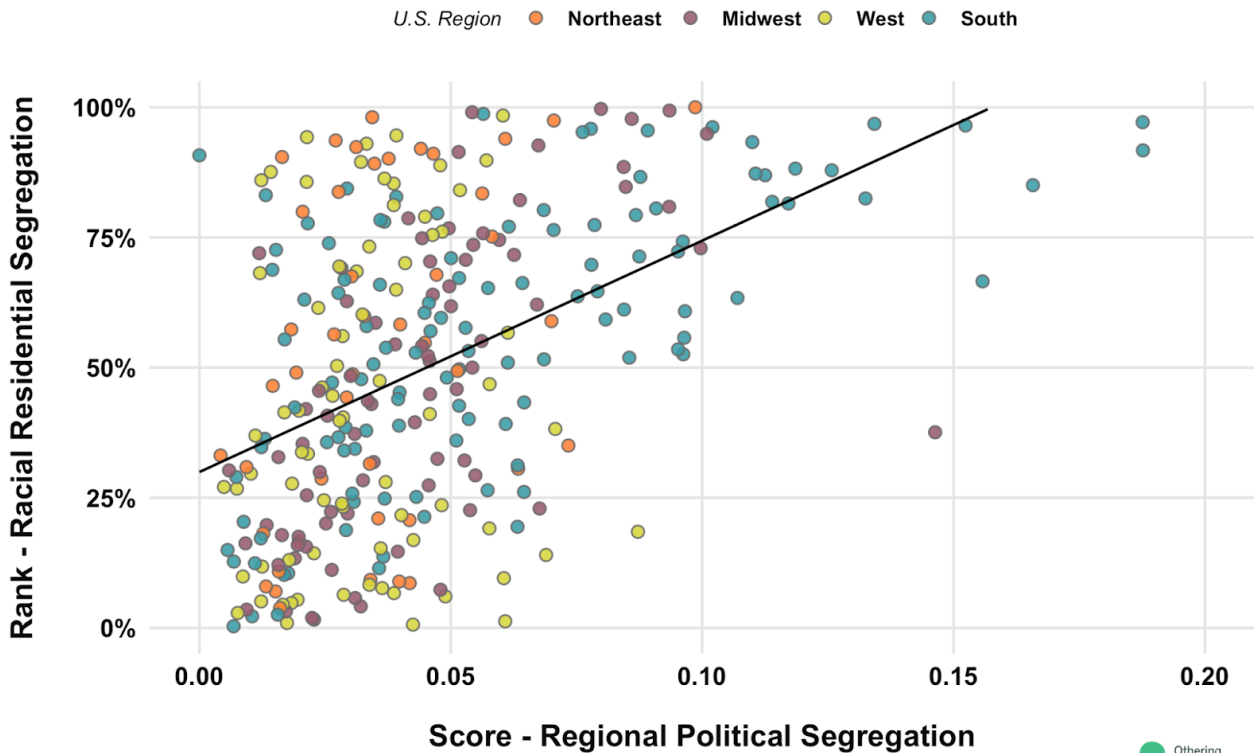
Data: @UpshotNYT

Figure 2 presents our percentile rank of racial residential segregation on the vertical axis and metropolitan political polarization on the horizontal axis (see endnote for a description of our measure).78 The graph shows a strong correlation (.54). In simple terms, the greater the level of racial residential segregation, the greater the level of political polarization. Whether there is a causal relationship between the two or some deeper force explaining both is a matter of some academic interest, but one we need not resolve here.

In any case, the finding presents a very important policy implication. When racial segregation is greater, political gerrymandering—the process of drawing political districts for political advantage—may be easier. By sorting people across space within a region, racial residential segregation makes gerrymandering techniques like "packing" and "cracking" easier at the same time that racial political polarization makes race a stronger predictor of political voting patterns.79 This is yet another reason to be concerned about racial residential segregation.

V. Using our Interactive Mapping Tool

Our preferred measure of segregation and novel measure of integration is not just more insightful, it helps us present far more intuitive visualizations of the reality and extent of racial residential segregation in the United States. To accompany this report, we created a new interactive mapping tool to illustrate the level of segregation for every city, region and neighborhood in the United States while also indicating the racial composition of any neighborhood selected.

After clicking "begin," the map's default layer displays the holistic level of segregation for every city and metro area in the country using our preferred measure. Users can then either enter an address or city into the search bar or use the zoom function to locate any specific area of the country and directly observe the level of segregation that exists there, at the level of census tract, or neighborhood.80 The color scheme and legend indicate the level of segregation (or integration). When selecting a census tract on the map, the chart on the left-hand side of the map provides the racial composition of the tract, the tract number, and the specific segregation value and percentile.

For example, take a look at the Detroit metropolitan region, one of the most segregated regions in the country (99th percentile of segregation). Blacks and Latinos are heavily over-represented (89 percent of the city compared to 27 percent of the metro in 2010), and highly isolated within the city (see Figure 3 below). The surrounding cities within the region are often either more integrated and representative areas like Eastpointe City (48th percentile), or highly white segregated areas like Livonia City (90 percent white, 77th percentile).81

Figure 3
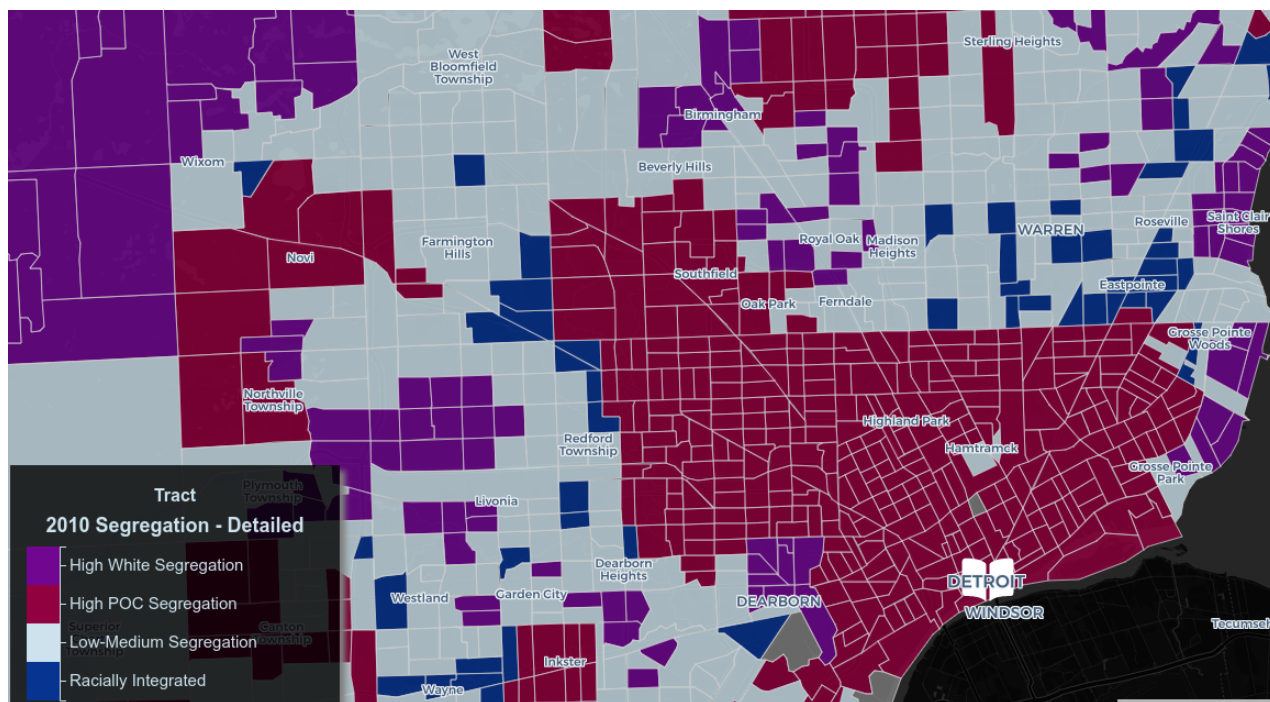
Not only does the interactive map indicate the level of racial residential segregation for every neighborhood in the United States, but also for different census years (as well as for different measures of segregation, which we describe in the Technical Appendix to this report). The default left-hand menu allows you to view the level of segregation for any

place in 1980, 1990, 2000, or 2010 (2020 census data has not yet been released at the time of this publication).82 Using the slider, you can compare how segregation has changed in your own community or any other community of interest.

For example, if we look at a neighborhood in the French Quarter of New Orleans, we find that the level of segregation is "moderate" as of 2010, our default year. But if we use the slider, we find that the level of segregation for that neighborhood was "low" in 1980 and became more segregated in the intervening years (peaking in 2000).

Users may also switch between different measures of segregation and select any corresponding geography they would like to retrieve scores or values for those measures (see the Technical Appendix for a description of measures). Users may also use the slider to move forward to backward in time for their preferred measure.

In addition to allowing users to directly observe the level of racial residential segregation for any place in the United States since 1980, we have developed nine city snapshots that briefly highlight cities in the country that have 1) most rapidly integrated over this time period or 2) remain the most stubbornly segregated places in the country. Simply click the "storybook" icon to read the city snapshot. We have provided snapshots of Chicago, New Orleans, Detroit, Boston, Aurora (CO), Colorado Spring (CO), Inglewood (CA), Killeen (TX), and New York City.

> A great paradox of racial segregation in America is that segregation persists despite the nation's growing diversity, and also despite the fact that there are fewer and fewer places that are racially homogenous.

It is our hope that this tool can be used by local grassroots organizations and fair housing advocates to support fair housing litigation and policy reforms, as well as the development of local histories. With the underlying data (both segregation and racial composition) made readily available to any user for free, it should be relatively simple for fair housing advocates to input key data points to support arguments on behalf of integration.

To aid in the development of local histories, we have created a backend database of reports, articles, essays, chapters, and books pertaining to specific localities that provide accounts of how segregation occurred in those places. An annotated bibliography of these resources is viewable on the right-hand menu to the web report or as a layer in the map. We provide those narratives not only to contextualize the data in our map, but also as models for other groups to emulate.

VI. Conclusion

One of the fundamental problems in our world is the divide between people who want a community built around a single, primary salient identity and those who want to live in diverse, pluralistic communities. The exclusionary enclave sentiment undergirds anti-immigrant and xenophobic sentiment worldwide, but it is also rampant within societies, including in the United States. This is the essence of segregation.

As the "root" metaphor suggests, reducing racial disparities in health care, criminal justice enforcement or education without addressing racial residential segregation is treating symptoms and not causes. Segregation remains one of the principal causes of group-based inequality, by separating people from life-enhancing resources, such as good schools, healthy environments, and access to jobs. This was the raison d'être for public accommodations segregation in the Jim Crow South: to maintain a racial caste system. But residential segregation does this with nearly the same wicked efficiency today. We must act if we are serious about remedying systemic and structural racism. But before we can act, we first need to recognize the problem. Our primary goal with this report is to better help us do just that.

Our concerns with persistent racial residential segregation in the United States are primarily empirical, not philosophical. They are based upon a careful review of the ever-accumulating and already voluminous social science evidence that racial residential segregation is associated with harmful impacts in terms of health, educational attainment, employment, income and wealth. This evidence supports our view that racial residential segregation is the mechanism that sorts people into advantaged or disadvantaged environments based upon race, and therefore is the taproot of systemic racial inequality.

Although this project is based upon a careful review of the evidence of the harms caused by racial residential segregation, there are other grounds to be concerned about the persistence of racial residential segregation. As we said in another recent publication, "racial residential segregation undermines the possibility of a national community with a sense of shared purpose and common destiny; this is a less immediate danger and more difficult to perceive and fully appreciate."83

Indeed, this was one of the principal insights of the prophetic Kerner Commission report of 1968. As it stated in its chapter on "The Future of the Cities," integration is "the only course which explicitly seeks to achieve a single nation" rather than a dual or permanently divided society.84 Even if it were possible, however unlikely, to ameliorate extreme inequalities between segregated communities and achieve the "separate, but equal" status which was a transparent fiction in *Plessy v. Ferguson*, that would merely reinforce societal balkanization, not help engender a cohesive yet diverse nation where everyone belongs.

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Technical Appendix: An Explanation of our Measures of Segregation and How to Use the Map

Our ultimate aim with this project is to raise awareness of the extent and persistence of racial residential segregation in the United States and to draw attention to its connection to structural racial inequality. We also hope that our map will be used by fair housing

advocates, policymakers, and educators to study the problem of segregation, its effects, and to inform litigation and policy reforms. To accomplish these goals, our immediate objective is to make our mapping tool the most widely used (and useful) segregation map in the United States.

There are a number of other static or dynamic racial residential segregation maps that can be accessed free of charge on the internet, but many of them are not actually segregation maps. For example, a mapping tool that Wired Magazine dubbed "The Best Map Ever Made of America's Racial Segregation" is not, in fact, a segregation map.i Although visually stunning and suggestive of racial segregation, the map is actually a racial composition map, illustrating the presence of members of different racial groups in different communities. Similarly, "JusticeMap" combines demographic information on race and income for some revealing data visualizations. But these visualizations, at best, imply segregation, and do not represent them.

A few years ago, the Washington Post launched a mapping tool that purported to represent segregation and diversity in the nation's largest metropolitan areas.ii Similarly, three highly regarded academic institutions launched a website that purported to represent diversity and segregation for all 50 states and the nation's 53 largest metropolitan areas.iii There is even a website called "Mapping Segregation" which presents an assortment of racial composition "dot" maps and Home Owners Loan Corporation "redlining" maps.iv

These well-intended efforts are misleading, however, since racial composition, racial demographics, and even racial diversity itself are not the same thing as racial segregation, which represents the degree of residential separation and distance between members of different racial groups. Not only does our map directly show racial residential segregation itself, indicating the level of segregation in every neighborhood in the United States (as well as indicating the racial composition of that tract), it does this for every major measure of segregation.

We believe it is the most sophisticated interactive racial segregation mapping tool ever created because of the multiplicity of measures and timescales that can be visualized. For instance:

- Our map can represent 35 different forms of segregation using five completely different measures of segregation

- These measures can be represented at the city or census tract level

- These measures are displayed for the years 2010, 2000, 1990, or 1980

- Our map is also capable of illustrating the degree of change between any of those two census dates at those geographies

In short, our map is distinct from every other available segregation map as a "super" segregation map, with more measures than any other we are aware of. However, because of the volume of viewing options, users will need assistance to understand how

to use our tool beyond the default settings.

This appendix is intended for the reader who wishes to delve more deeply into our methodology, understand our measures better, or get the most out of the mapping tool. In this technical appendix, we explain in more detail what segregation is, how to measure it, what each measure of segregation represents (that is, what question it answers), but also what it obscures and its respective limitations as a definitive gauge of racial residential segregation. We also present and explain our novel measure of integration, which we feature in our map and upon which our tables are based. In the process, we hope to impart a clear understanding of how to use every feature in our mapping tool, and therefore how to make the most of it, for whatever purposes you may have in mind, whether they are for advocacy, reform, or just a deeper understanding of the problem.

Defining Segregation

Segregation is the separation across space of one or more groups of people from each other on the basis of their group identity.v Racial segregation is the separation of people from each other on the basis of race. Racial *residential* segregation is the separation of people on the basis of race in terms of residence, rather than some other form, such as occupational or educational segregation, or the segregation of public accomodations, such as buses, trains, or theaters. These forms of segregation can occur together or not. Places of worship may remain segregated, for example, even as schools and workplaces integrate.

The term "segregation" has certain connotations that can lead to confusion, especially when used in more precise and descriptive ways. For example, when speaking of "segregated" schools or neighborhoods, many journalists, scholars, or courts are referring to those that are predominantly non-white. Thus, a "segregated school," let alone a "hyper-segregated" school, generally refers to a heavily Black or Latino school.vi Or a "segregated community" may refer to a Chinatown, Japantown, or other ethnic or racialized area.

Upon reflection, however, it should be obvious that segregated non-white schools cannot exist without equally segregated white schools. In the Jim Crow South, for example, pupil assignments were made on the basis of race, with state laws and school district policies requiring white students to attend white schools and Black students to attend Black schools. Both sets of schools were segregated, and this was accomplished through the same means (pupil assignments based on race). To regard one set of schools as segregated but not the other is nonsensical. White and Black segregation, in this case, are reciprocal of each other. But commentators infrequently characterize disproportionately white schools as "segregated," even though Black or Latino schools are often characterized this way.

This leads to another nuance with respect to segregation: the difference between *de jure* and *de facto* segregation. *De jure* segregation refers to segregation that occurs by force or under the color of law. *De facto* segregation describes segregation that occurs due to

other reasons, including, but not limited to, individual preferences and private or market-based discrimination.

Some jurists and policymakers claim that segregation must be the manifestation of a deliberate and intentional effort to segregate. The implication is that any result not caused by a deliberate segregative force is not segregation, but mere racial isolation, imbalance, or separation. These semantic debates are unfortunate for a number of reasons, not least of which is that private and public decisions are so deeply interwoven as to make it impossible to claim that public policy played no role in causing or sustaining de facto patterns of racial residential segregation.[vii] But whether segregation is sustained explicitly by law and policy or by the unintentional interaction of policy and private decision making, the harms may be just as serious and grave, and may justly merit a policy response.

None of the foregoing is intended to suggest that all forms of racial separation are harmful. Certain forms of racial solidarity and community, such as an Irish festival or an Italian-American pride parade, religious services, holiday celebrations, or social gatherings are either innocuous or beneficial. But when segregation leads to the inequitable distribution of resources or access to life-enhancing goods or networks, then it is a source of great harm.

Because of the centrality of "place" to critical public goods, such as schools, hospitals, jobs, and green spaces, high levels of racial residential segregation is strongly indicative of racial inequity, and a very likely source of racial disparities, as the research canvassed in the main body of this report illustrates. Thus, we should be more keenly aware of the degree of racial residential segregation in our communities. Our maps can help users do this.

Measuring Segregation

Segregation is a surprisingly difficult concept to map and measure.[viii] This is because, upon close inspection, it is a multi-faceted concept that describes varying, and often quite different, patterns of group-based separation.[ix] We will present and describe the measures of segregation we have included in our mapping tool, and indicate what they represent.

In our map, the base units of geography are:

- **Census tracts:** These are small, relatively permanent statistical subdivisions of a county that contain, on average, 4,000 people.[x] These are used as proxies for neighborhoods in this research

- **Cities:** Census defined incorporated places with each state and is an intermediary geography between tracts and CBSAs

- **Core-Based Statistical Area (CBSA):** CBSAs are the Metro- and Micropolitan Statistical Areas of the US, which contain at least 10,000 people and are meant to represent normal commuting patterns[xi]

The default layer of the map presents the entire United States, and displays the level of segregation or integration for every CBSA or county (for areas that fall outside of CBSAs). A description of what these designations indicate is provided below our summary of the measures included on the map.

A. The Dissimilarity Index

The most common measure of segregation is the Dissimilarity Index.xii When presented with a claim about the overall level of segregation in a community or statistical claim of segregation, it is more likely than not that such claims refer to the Dissimilarity Index.xiii This index measures the degree of segregation that exists between any two racial groups by indicating the percentage of either racial group that would have to move to a different-race neighborhood to create perfect integration.

Scored from 0 to 1 or 0 to 100 (the same values just rescaled to either range), a higher value indicates a higher level of segregation, with a value of 0 indicating perfect integration and a value of 1 (or 100) indicating complete segregation. Generally speaking, anything above 0.6 or 60 is considered "highly" segregated, while anything between 0.3 and 0.6 is moderately segregated.xiv At the national level, the United States scored a 59 according to the Black-white Dissimilarity Index in 2010, meaning that 59 percent of white or Black people in the United States would have had to move to achieve perfect integration.

Our mapping tool provides four different dissimilarity scores: Black-white, Hispanic-white, Asian-white, and Black-Hispanic. Toggling between all four measures, you can see very different degrees of racial residential segregation across the United States depending on the sub-measure. With this understanding of what the measures mean, you may feel free to skip ahead to the next subsection, describing the next measure. The remainder of this section describes the limitations or flaws in the Dissimilarity Index.

The Dissimilarity Index suffers from at least five serious limitations, only some of which exist for other measures. First, it is a binary measure of segregation that only describes the degree of segregation that exists between any two racial groups at a time. This drawback can be mitigated somewhat by examining the dissimilarity score for multiple racial pairings. But the Dissimilarity Index fails to provide a single, holistic value for all racial groups simultaneously. For states or regions of the country that are highly diverse, such as California, Texas, New York City, Miami, or Seattle, the Dissimilarity Index is not among the most useful or revealing measures of segregation. It can obscure the overall patterns of segregation by focusing on a particular racial pairing to the exclusion of other dynamics.

A second but related problem is that, as an artifact of the formula used to calculate the Dissimilarity Index, dissimilarity values can fluctuate even if no member of either race pairing has moved to a different-race neighborhood. For example, if an influx of Asian or Hispanic people move into previously all-white or all-Black neighborhoods, the Black-

white dissimilarity for that region or city may decline, even if no Black or white person moved into a different-race neighborhood.xv This underscores the limitations of using the Dissimilarity Index in places with greater racial diversity.

A third problem with the Dissimilarity Index falls under the header of the "modifiable areal unit problem," which are actually a subset of problems related to changes in geographies.xvi One of the most serious aspects of this general problem is that the Dissimilarity Index becomes "progressively more inaccurate and misleading as either the overall population of the area analyzed, the number of geographic units, or the relative size of either of the compared groups becomes smaller."xvii This makes it hard to compare scores between places using the Dissimilarity Index.

A fourth and related problem is the lack of "decomposability." The Dissimilarity Index generates a single value for an entire geography, typically a metropolitan area, and therefore cannot tell you much about patterns of segregation within that area.xviii Thus, it is useful for comparing the overall levels of segregation within the same metropolitan region over time or between different metropolitan regions, but is insensitive to particular patterns of segregation within that region. For example, it cannot tell you whether segregation within a region tends to be neighborhood segregation within cities or segregation between homogeneous municipalities, or whether particular neighborhoods are more or less segregated within that region. Other measures of segregation can.

Finally, and perhaps most seriously, the Dissimilarity Index values mask the average or typical case. Dissimilarity Index scores can improve when a small number of members of a different group move into previously homogeneous neighborhoods, while the average or typical member of those groups remain stuck in racially segregated neighborhoods. For example, if middle-class African Americans move into previously exclusively white neighborhoods (as they in fact did), the dissimilarity score can drop, even as the vast majority of Black people remain in racially isolated neighborhoods. To get a sense of the "average" case, we will need another measure of segregation altogether, the Isolation Index. But these flaws with the Dissimilarity Index are why we did not make it our default measure.

B. The Isolation Indices

There are two isolation indices, the Isolation Index and the Exposure Index. These indices measure the flip sides of each other and seek to calculate the degree of "exposure" or isolation experienced by the average member of a particular racial group. The only difference is that the Isolation Index measures "exposure" to the same race.

What is important or novel about the isolation indices is that, rather than looking at overall patterns, they focus on the typical, or average, case. An Isolation Index score of 50 indicates that the average African American resides in a community that is 50 percent Black, whereas a Black-white Exposure Index score of 30 suggests that the average African American lives in a community that is 30 percent white. Similarly, a white-Black Exposure Index score of 10 suggests that the average white person lives in a community that is 10 percent Black.

Our map allows users to observe Black, white, Asian, or Hispanic isolation, as well as the exposure values for every CBSA/County, and city between all four racial groups (white-Black exposure, white-Asian exposure, white-Hispanic exposure, and so on), offering a total of sixteen different measure values.

In the United States, the average Black resident resided in a community that was 45 percent Black, 35 percent white, 15 percent Hispanic, and 4 percent Asian in 2010. A similar community racial composition existed for Hispanics in 2010. The average Hispanic lived in a community that was 46 percent Hispanic, 35 percent white, 11 percent Black, and 7 percent Asian.

In several respects, the isolation indices are a superior measure of segregation to the Dissimilarity Index. While a significant number of African Americans have integrated in previously all-white neighborhoods—causing much of the decline in the Black-white dissimilarity score—many African Americans still reside in segregated neighborhoods. By focusing on the average member of a race, the isolation indices give us a different, perhaps more relevant, sense of how segregated a particular racial group remains.

Nationally, Black Americans in 2010 had an Isolation Index score of 45, which means that the average Black American resides in a neighborhood that is 45 percent Black. The Detroit metro area featured the highest Isolation Index value for African Americans (80.9) in 2010, suggesting that the average African American resides in a neighborhood that is nearly 81 percent Black, a strikingly high number, and one similar to its 1980 Isolation Index score. Many Rust Belt and southern metro areas fall in the top 10 metros for high Isolation Index scores for African Americans. A higher number of metros in the western region of the nation reported lower Isolation Index scores for Blacks in 2010, e.g. Los Angeles metro, Oakland metro, Riverside metro and Las Vegas metro.

While the Isolation/Exposure Indices are quite useful for helping us observe the degree of racial residential segregation experienced by different racial groups, they are still binary measures, indicating the exposure of one group to another. And like the Dissimilarity Index, these measures cannot be "decomposed" into census tracts or smaller geographies. In addition, these index values must be presented with additional context to tell us what these numbers mean. Higher exposure and lower isolation values might be a product of a smaller racial group population rather than meaningful integration. In deeply diverse contexts, the Exposure Index cannot really tell us if segregation is improving or worsening in a holistic sense.

C. Entropy Score

The Entropy Score has become one of the more widely used measures of "segregation" and "diversity."xix Both the Washington Post map and the MixedMetro map described in the introduction to this appendix employ the Entropy Score. Scaled from 0 to 1, a higher value suggests a greater degree of diversity. Within this range, research suggests that scores less than 0.37 can be categorized as "Low Diversity," whereas scores greater than 0.74 can be categorized as "High Diversity."xx Values between these two thresholds can be categorized as "Moderate Diversity." We can assess diversity of any geography as

long as we have data for each racial group, and these groups are mutually exclusive. For example, to calculate the Entropy Score for a county or a tract, we need data on the proportions of mutually exclusive racial groups within the geography of interest.

The Entropy Score provides a holistic value that represents the overall diversity of an area, and for all racial groups at once. On the other hand, the score goes up as the number of people of different races increases, irrespective of their physical or spatial distance. In other words, the Entropy Score is a measure of diversity, and not really a measure of segregation per se.

Nevertheless, we provide an Entropy Score value for every census tract in the country for all four decennial census periods (it is "decomposable," unlike the previous two measures). It provides a useful sense of how racial demographic change has occurred in communities with an absolute value that indicates growing or receding diversity.

D. The Divergence Index

This leads to our preferred, and default, measure of segregation: The Divergence Index.xxi The Divergence Index provides a holistic value for the level of segregation in any American community.xxii Whereas the Entropy Score measures relative diversity, the Divergence Index measures segregation at any geographic level and, thus, better matches the common sense definition of segregation.

The Divergence Index compares the relative proportions of racial groups (or any other groups) at smaller and larger geographies, looking for the degree of "divergence" between the two geographies, such as between a census tract and a county.xxiii For example, consider a census tract with the following racial distribution: 76 percent Black, 11.9 percent Latino, 9.3 percent white, and 2.8 percent Asian. Now what if that census tract is situated within a CBSA with the following racial distribution: 66.7 percent white, 11.9 percent Black, 10.8 percent Latino, and 10.6 percent Asian. Such a census tract will have a very high observed level of segregation as measured by the Divergence Index because it "diverges" so greatly from the surrounding region, especially in terms of the differences in proportion of Black residents. Indeed, the formula results show that this tract's Divergence Index value is 1.21.xxiv

To calculate the metropolitan CBSA (county, or city) score, we add the scores for each tract in the region, but weigh them by the tract's population. In this case of the tract and region described above, the region's CBSA Divergence Index score is 0.2642 as of 2010 (this happens to be the San Francisco-Oakland-Fremont CBSA).

The lowest possible value of the Divergence Index is "0" when the demographics of a geography does not differ, or diverge, from that of the larger geography, suggesting no segregation, whereas higher values suggest higher divergence, and hence higher segregation.xxv As the Divergence Index is a relatively novel measure of segregation, as of yet, there is no established set of ranges to demarcate the level of segregation in the relevant academic literature.

To address this issue, we take two approaches. First, for the Divergence Index, we sort areas by their divergence score to rank them in order of segregation (for which the Divergence Index is our preferred measure). Relatedly, our map emphasizes the Divergence Index percentile rank rather than raw score. This approach is useful for locating the most segregated cities and metropolitan areas in the United States without having to resolve the issue of delineating a precise threshold. Second, to categorize tracts, we combine the Divergence Index with other measures presented in this report, described in "Measuring Integration," below.xxvi

We believe that the Divergence Index is both more accurate and more precise as a measure of segregation than more traditional measures. It is more accurate because, by accounting for all racial groups simultaneously, it provides a more holistic sense of the overall level of racial residential segregation in a single value than can be conveyed, for example, by a Dissimilarity Index value.

But the Divergence Index is more precise as well because it is also "decomposable," meaning that it allows us to understand the dynamics of segregation at a more granular level than is typically possible with more popular measures. The Dissimilarity Index, for example, yields a value for an entire geography (such as a city or metropolitan area). Because the Divergence Index is decomposable, it can produce values at more granular levels of geography without needing access to special microdata.

Relatedly, on account of this advantage, the Divergence Index can allow us to distinguish between certain forms of segregation, such as "between-place" (or inter-municipal or regional segregation) and "within-place" (or intra-municipal) segregation.xxvii In other words, the Divergence Index allows us to measure the degree of segregation between neighborhoods within a city compared to the degree that it exists between cities within a metropolitan region. This is important because since the 1960s, more and more segregation occurs not within cities, but between them.xxviii Large diverse cities still have a significant degree of "within" place segregation,xxix but smaller, more homogeneous cities create segregation between places.xxx For example, Oklahoma City within its CBSA has a "within" score of 0.2215, placing it in the category of "High segregation," whereas its "between" score is 0.0175 (lowest within its CBSA), placing it in the category of "Low segregation."

In the main report, we alluded to how the Divergence Index's segregation scores can sometimes differ to a surprising extent from more traditional measures like Black-white dissimilarity. One obvious reason for this is that the segregation of Latinos and Asians may be increasing, even as Black-white dissimilarity values fall or plateau. The large percentage changes in racial composition presented in our table indicating changes in overall levels of segregation from 1990 to 2019 strongly suggests this. This is one of the principal reasons we find the Dissimilarity Index to be so potentially misleading as a holistic measure of American segregation.

But even if we re-run the divergence calculations to simply focus on Black-white divergence, we find that there remain substantial discrepancies between the two indices in terms of measured levels of segregation. Table 1 below presents the metropolitan

areas with the greatest discrepancies in this regard.

Table 1: Highest Difference Between Black-White Divergence and Dissimilarity, 2010 Metro Areas (Minimum Population: 200,000)

Rank	Metro	Black-White Divergence (Percentile)	Black-White Dissimilarity (Percentile)	Difference
1	Florence, SC Metropolitan Statistical Area	82	20	62
2	Gainesville, FL Metropolitan Statistical Area	79	32	47
3	Raleigh-Cary, NC Metropolitan Statistical Area	79	36	43
4	Lynchburg, VA Metropolitan Statistical Area	63	21	42
5	Longview, TX Metropolitan Statistical Area	65	25	40
6	Durham-Chapel Hill, NC Metropolitan Statistical Area	90	51	39
7	Spartanburg, SC Metropolitan Statistical Area	75	36	39
8	Las Vegas-Paradise, NV Metropolitan Statistical Area	59	22	37
9	Charlottesville, VA Metropolitan Statistical Area	49	14	35

| 10 | El Paso, TX Metropolitan Statistical Area | 44 | 11 | 33 |

The main takeaway from this table is that, even while focusing just on Black-white segregation, large discrepancies can exist between the two measures. A complete list comparing the percentile rank of both cities and metros between Black-white divergence and Black-white dissimilarity values is available here.

E. Location Quotient

The location quotient of racial residential segregation (LQ) is a small-area measure of relative segregation calculated at the census tract level. LQ shows how much more or less a racial group is represented in the tract relative to the CBSA/County. An LQ of 1 means that a tract's proportion of a given race is exactly equal to its CBSA/County. Higher and lower scores indicate over- or under-representation, respectively.

The strength of LQ is its ability to quickly show areas of concentration for a single race. However, it is limited to a single race, and is easily confounded when a CBSA/County has few members of a given race. Given its similarity for this purpose to the Isolation Index, it is important to note that one advantage of the LQ over the Isolation Index is that it can be derived for smaller geographies, such as census tracts.

Measuring Integration

Integration and Segregation are not necessarily opposite concepts. A place could have a low level of segregation and yet not reflect what we would intuitively describe as "integrated." This is because some places with little racial segregation may be racially homogeneous, with little underlying diversity to facilitate segregation.

The Divergence Index does a good job of indicating the separation of groups across space, but cannot, by itself, indicate if a place is truly "integrated." For that reason, we have created a functionally "new" measure of integration for our map, a combination of both the Entropy Score and the Divergence Index.

We define "integrated" not as a low level of observed segregation, but as any place that meets all of the following conditions: 1) falls in the bottom third of the Divergence Index nationally, 2) has an entropy score in the top 50 percent nationally, and 3) has at least 20 percent Black and/or Latino population. We believe this combination of characteristics helps us identify places that are meaningfully integrated, not just the apparent absence of segregation.

Let us consider two cities: Aurora and Colorado Springs, both in Colorado, with similar population sizes. Aurora, with a population of about 370,000, has a Divergence Index score of 0.1747, an entropy score of 0.9704 and a combined Black and Latino population of 44 percent. Colorado Springs, with a population of about 465,000, has a Divergence Index score of 0.0628, Entropy score of 1.29 and a combined Black and Latino population

of 22 percent. Both cities meet criteria #2 and #3, but Aurora's Divergence Index is in the middle-third nationally. Thus, Aurora is categorized as Low-Medium Segregation whereas Colorado Springs is designated as racially integrated on our map.

In addition, for places and tracts, we created two categories of segregation, which we term "highly segregated communities of color" and "highly segregated white neighborhoods." Highly segregated white neighborhoods are in the top third of the Divergence Index nationally, are majority white, and have a white Location Quotient above 1.25. Highly segregated communities of color are all other areas in the top third of the Divergence Index nationally. These two forms of segregation are necessarily combined within a CBSA/County. A CBSA/County with highly segregated white neighborhoods must also have areas where white people are proportionately underrepresented.

Getting the Most from our Maps

As described above, the default geography of the map is CBSAs and Counties. Users may switch to cities or census tracts. The level of segregation indicated is keyed to the Divergence Index (low, medium and high), while areas deemed "integrated" are based upon the criteria mentioned in the preceding section. Users may then switch to different levels of geography, measures of segregation, or years and observe the results.

For tract-based measures (such as the Divergence Index, Entropy, or Location Quotient) each tract is compared to its CBSA/County in this project. Measures of CBSA and city segregation are aggregated from their internal tracts. Because cities do not adhere to tract boundaries, tracts are assigned to the city using the location of their population-weighted centroids. Both segregation measures and place demographics are aggregated in this manner, meaning that some population figures in the map may differ slightly from the official statistics the Census Bureau reports for each city.

Figure 3 in the main report shows the divergence index result for tracts in and around the city of Detroit. In addition to displaying the same view of the area, the mapping tool allows users to switch to different measures of segregation, providing a more detailed and nuanced view of segregation than is usually possible. Figure 1 below illustrates the capacity of the mapping tool to display different dimensions of segregation from which to observe different aspects of this problem. The map also ranks each tract, place, and CBSA/County by percentile so users can discern gradients in the level of segregation.xxxi

Figure 1: Decomposing Segregation in the Detroit Metropolitan Area

A: Total Divergence/Segregation Index   B: Black Isolation
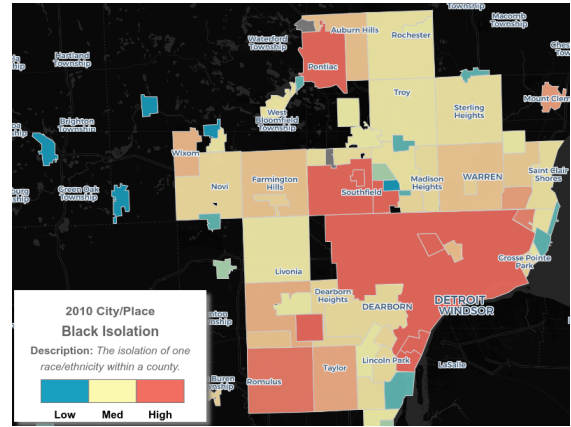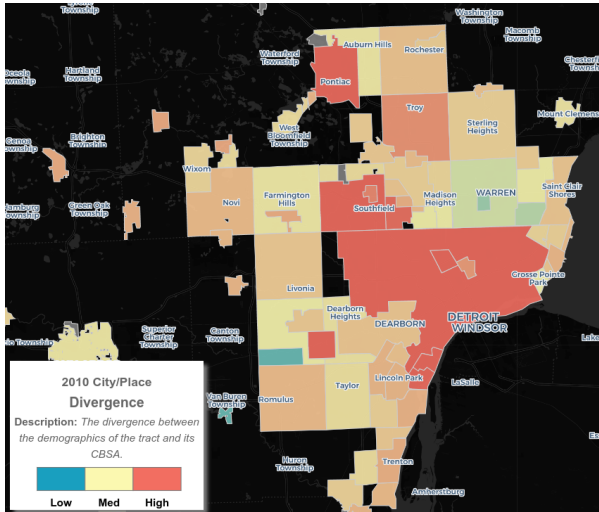
C: Neighborhood-Level Segregation (Detroit City)
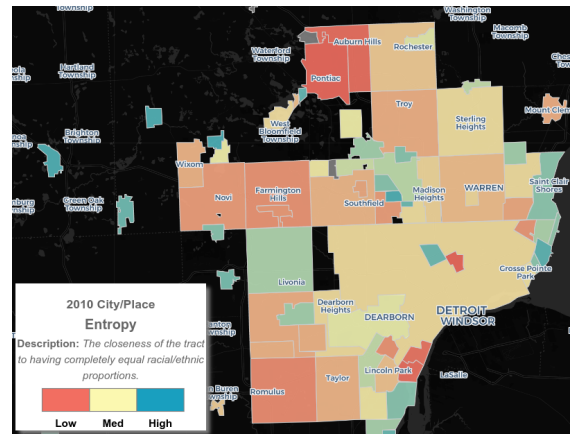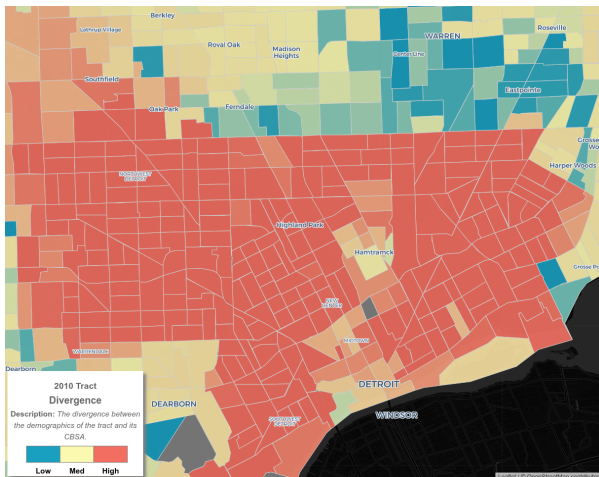
D: Entropy Index of Diversity

Figure 1A shows Detroit's overall segregation using the divergence index. Figure 1B shows Detroit's Black isolation within the city. As the juxtaposition illustrates, there is a strong correlation between the two measures in the case of Detroit. Our mapping tool allows users to zoom into particular neighborhoods within Detroit to see where segregation and isolation are occurring (Figure 1C).

Finally, our mapping tool allows users to observe segregation between cities within a metropolitan area. Figure 1D shows that the city of Detroit is less diverse than some of its municipal neighbors. Detroit is a highly segregated city, with a nearly 80 percent Black population and nearly 11 percent white population, while also being fairly racially diverse for its metro region which is over 66 percent white and over 22 percent Black, making clear the role of inter-municipal segregation as contrasted with intra-municipal or neighborhood segregation.

Conclusion

Our mapping tool does not exhaust every conceivable measure of segregation, let alone every measure we have encountered and catalogued. However, it provides a comprehensive, panoramic view of segregation using the most widely known or best measures of segregation available.

This appendix describes all five measures of segregation (six if we include both isolation indices) employed by our mapping tool, provides the formulas for each, describes what each measure represents, and notes their deficiencies and limitations. We hope that our map is useful for whatever purposes you may have in mind or subsequently discover.

If you have any further questions or requests, do not hesitate to reach out to us at belonging@berkeley.edu.

Report Endnotes:

1. This project has been in development for many years, and the authors would like to thank Lindsey Burnside, Peter Mattingly, Karina French, and Ruqayah Ghaus for their research support and contributions to this project. The authors would also like to thank external reviewers Richard Rothstein, George Galster, Sheryll Cashin, Alex Schafran, and Nancy McCardle for their expert feedback on this project.

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19. It is worth emphasizing this nuanced distinction. While equity advocates accurately appreciate the harms of segregation in terms of the distribution of tangible resources, the courts and many social scientists have also regularly understood the harms of segregation in intangible terms as well. In Brown v. Board of Education (1954), most notably, the US Supreme Court stipulated that "the Negro and white schools involved

have been equalized, or are being equalized, with respect to buildings, curricula, qualifications and salaries of teachers, and other 'tangible' factors." Brown, 347 U.S. at 492. It did so, based upon an agreement of the parties, so that the Court might rule against the doctrine of 'separate, but equal' on broader grounds, not as a legal fiction to be made honest. See john a. powell, RSF: The Russell Sage Foundation Journal of the Social Sciences 7, no. 1 (2021): 20-31, https://www.rsfjournal.org/content/7/1/20. Similarly, in United States v. Virginia, 518 U.S. 515 (1996), the Supreme Court struck down the state of Virginia's female-only alternative to its prestigious military institute, VMI. As the Court observed in a landmark opinion delivered by Justice Ruth Bader Ginsburg, VMI's reputation, unique history, unique training, and alumni network could not be duplicated at a sister institution, no matter how well resourced. In any assessment of the harms of segregation, we must try to look beyond tangible resources and simple disparities.

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59. Even when controlling for just Black-white Divergence, there are many cities that are much more segregated than the Black-white dissimilarity score would suggest. For example, Las Vegas, El Paso, Raleigh, Charlottesville, VA, Gainesville, FL, and Durham-Chapel Hill, NC have much higher Black-white divergence scores than Black-white dissimilarity scores. See Table 1 in our technical appendix, and the table "Comparing Black-White Segregation Measures" on the right-hand menu.

60. John R. Logan and Brian J. Stults, The Persistence of Segregation in the Metropolis: New Findings from the 2010 Census (Washington, D.C.: United States Census Bureau- US2010 Project, 2011), 6, https://s4.ad.brown.edu/Projects/Diversity/Data/Report/report2.pdf (listing Detroit, Milwaukee, New York, Newark, Chicago, Philadelphia, Miami, Cleveland, St. Louis, and Nassau as the top 10 most segregated cities in 2010 in Table 1). It is notable that at least 7 of our top 10 list are the same regions.

61. Protests and Uprisings in 1967 [map], 1:18, 475,000, "Othering & Belonging Institute," https://belonging.berkeley.edu/sites/default/files/protest_cities_v2.png. See also "Race & Inequality in America: The Kerner Commission at 50 Conference, February 27- March 1, 2018," Othering & Belonging Institute, 2018, https://belonging.berkeley.edu/kerner50.

62. There is considerable nuance lost in drawing broad conclusions about the overall level of segregation across regions, and these conclusions are highly sensitive to the measure used. For a scholarly investigation that came to a very different conclusion while also comparing other measures of segregation, see Trevon D. Logan and John M. Parman, "The National Rise in Residential Segregation," The Journal of Economic History 77, no. 1 (2017): 127-170.

63. The term "people of color" typically encompasses all non-white groups. However, for the purposes of this analysis, we are referring only to segregated Black and/or Latino communities. The reason for this is that there are vanishingly few tracts in the United States that are highly segregated and predominantly Native American and/or Asian. Therefore, "segregated communities of color" is almost coterminous with "segregated Black and/or Latino" neighborhoods.

64. See e.g. Robert J. Sampson, Great American City: Chicago and the Enduring Neighborhood Effect (Chicago, Illinois: The University of Chicago Press, 2012), 47, 358; Raj Chetty, Nathaniel Hendren, and Lawrence F. Katz, "The Effects of Exposure to Better Neighborhoods on Children: New Evidence from the Moving to Opportunity Experiment," American Economic Review 106, no. 4 (2016): 855-902.

65. Census tracts are classified into four groups for the purpose of this report: High White Segregation: Divergence Index in the top half nationally, majority white, and a white Location Quotient above 1.25. High POC Segregation: Divergence Index in the top third nationally, but not in the above category. Well Integrated: Divergence Index in the bottom third nationally, an Entropy score in the top 50% nationally, and at least 20% Black and Latino. All other Census tracts (not shown).

66. All figures are the average between the Census tracts in each category, weighted by population or households.

67. John L. Rury and Argun Saatcioglu, "Opportunity Hoarding," The Wiley Blackwell Encyclopedia of Race, Ethnicity, and Nationalism (2015): 1-3, https://onlinelibrary.wiley.com/doi/abs/10.1002/9781118663202.wberen435. The findings of this report are largely consistent with that report and our series on racial segregation in the San Francisco Bay Area, where we found similar results. Stephen Menendian et al., Racial Segregation in the San Francisco Bay Area (Berkeley, CA: Othering & Belonging Institute, 2020).

68. "U.S. Small-Area Life Expectancy Estimates Project (USALEEP)," Centers for Disease Control and Prevention, last modified June 9, 2020, https://www.cdc.gov/nchs/nvss/usaleep/usaleep.html.

69. "The Opportunity Atlas," Opportunity Atlas, accessed May 7, 2021, https://www.opportunityatlas.org/. Whereas our correlations are merely suggestive of some causal relationship, the authors of Opportunity Atlas have established a causal relationship based upon sibling pairs. See Raj Chetty and Nathaniel Hendren, "The Impacts of Neighborhoods on Intergenerational Mobility: Childhood Exposure Effects and County-Level Estimates," Harvard University and NBER (2015): 1-144, http://www.equality-of-opportunity.org/images/nbhds_paper.pdf.

70. These results control for income by focusing only on children born to parents at the bottom 25th percentile of income.

71. See Amy E. Hillier, "Residential Security Maps and Neighborhood Appraisals: The Home Owners' Loan Corporation and the Case of Philadelphia," Social Science History 29, no. 2 (2005): 207-233; Kristen B. Crossney and David W. Bartelt, "The Legacy of the Home Owners' Loan Corporation," Housing Policy Debate 16, no. 3-4 (2005): 547-574; Todd M. Michney and LaDale Winling, "New Perspectives on New Deal Housing Policy: Explicating and Mapping HOLC Loans to African Americans," Journal of Urban History 46, no. 1 (2020): 150-180, quoted in Jason Richardson et al., The Lasting Impact of Historic "Redlining" on Neighborhood Health: Higher Prevalence of Covid-19 Risk Factors (Washington, D.C.: National Community Reinvestment Coalition, 2020), 9, https://ncrc.org/holc-health/.

72. See e.g. Anthony L. Nardone et al., "Associations Between Historical Redlining and Birth Outcomes from 2006 through 2015 in California," PLoS ONE 15, no. 8 (2020), https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0237241.

73. There is more nuance to this story than we can present here. In brief, HOLC lending mostly wound down by 1936, but the appraisal system it created would live on for decades longer. In particular, this system spread throughout the private market, even where it had not already been implicitly present, and to the FHA redlining maps. See Price V. Fishback et al., "Race, Risk, and the Emergence of Federal Redlining," NBER Working Paper, no. 28146 (2020), https://www.nber.org/papers/w28146. There are also many other researchers using the digitized HOLC maps to assess their possible impact over time. See e.g. Daniel Aaronson, Daniel Hartley, and Bhash Mazumder, "The Effects of the 1930s Holc 'Redlining' Maps," FRB of Chicago Working Paper, no. 2017-12 (2017): 1-81, https://www.chicagofed.org/publications/working-papers/2017/wp2017-12 and Jacob W. Faber, "We Built This: Consequences of New Deal Era Intervention in America's Racial Geography," American Sociological Review 85, no. 5 (2020): 739-775, https://journals.sagepub.com/doi/full/10.1177/0003122420948464.

74. This is a very complicated table to render for a number of methodological reasons. But not every city was given a HOLC grade, and not every neighborhood within graded cities was graded at the time (because it may not have existed). Also, HOLC grades were not uniformly distributed. Overall, 6 percent of areas were grade A, vs 45 percent being grade C, which helps explain why such a large percentage of neighborhood types are "C" grades today.

75. See Jessica Trounstine, Segregation by Design: Local Politics and Inequality in American Cities (Cambridge, United Kingdom: Cambridge University Press, 2018). (Arguing that racial segregation could be both a cause and effect of political polarization). It could be a cause, as Trounstine argues, because racial residential segregation undermines broad support for investments in public goods. But it could also be an effect because racial residential segregation facilitates political gerrymandering. Indeed, the Supreme Court has suggested that racial gerrymandering is in effect state-based racial segregation. Shaw v. Reno, 509 U.S. 630, 1993 (Justice O'Connor characterized racial redistricting as "an effort to segregate voters into separate voting districts because of their race.") See also Miller v. Johnson, 515 U.S. 900 (1995) (Justice Kennedy wrote that "the essence of the equal protection claim recognized in Shaw is that the state has used race

as a basis for separating voters into districts"). The problem is that the Court has essentially refused to regulate political gerrymandering not based explicitly or obviously on race. Gill v. Whitford, 585 U.S. ___ (2018)

76. Jacob R. Brown et al., "Childhood Cross-Ethnic Exposure Predicts Political Behavior Seven Decades Later: Evidence From Linked Administrative Data," Science Advances 7, no. 24 (2021): 1-14, https://advances.sciencemag.org/content/7/24/eabe8432.

77. Polarization is an elusive concept. As a helpful analog, economic polarization is when a larger part of the income distribution exists at the tails rather than in the middle.

78. To operationalize a measure of political polarization, we use the Divergence Index formula: Broadly speaking, we define political polarization as the degree of "divergence" in political attitudes to ideological extremes. For this analysis, we calculate the share of Democratic and Republican votes from the 2020 US Presidential Election for individual voting precincts and compare that share with the greater metropolitan area. Using the Divergence Index, we configure how extreme ideologies are in a precinct based on how over- or underrepresented that ideology is relative to the surrounding precincts within that area. For example, the metropolitan area of Jackson, Mississippi ranks first in political divergence, indicating the presence of ideological extremes where precincts overwhelmingly voted in favor of one party while neighboring precincts voted in favor of the other party. Comparatively, the metropolitan area of Carson City, Nevada has one of the lowest political divergence scores, suggesting that neighboring precincts tended to vote less in favor of one candidate and that the share of votes between parties was relatively consistent across all precincts within that area.

79. Nicholas Stephanopoulos and Eric McGhee, "Partisan Gerrymandering and the Efficiency Gap," University of Chicago Law Review 82 (2015): 831-900, https://chicagounbound.uchicago.edu/cgi/viewcontent.cgi?article=12542&co....

80. We anchor these findings with the Metropolitan/Micropolitan (Core-Based) Statistical Area or county, as available. "Core-Based Statistical Areas," United States Census Bureau, last modified December 7, 2016, https://www.census.gov/topics/housing/housing-patterns/about/core-based-....

81. We aggregate place population from the census tract, so our reported percentages differ slightly from official Census counts. See the Technical Appendix for more details https://belonging.berkeley.edu/technical-appendix.

82. As soon as the tract-level 2020 census results are out, we will update our map and key findings in this report.

83. Nirali Beri, Richard Rothstein, and Stephen Menendian. The Road Not Taken: Housing and Criminal Justice 50 Years after the Kerner Commission Report. (Berkeley, CA: Othering & Belonging Institute, 2019). https://belonging.berkeley.edu/road-not-taken.

84. Otto Kerner et al., Report of The National Advisory Commission on Civil Disorders (Washington, D.C.: United States Government Publishing Office, 1968), 406.

Appendix Endnotes

i. Kyle VanHemert, "The Best Map Ever Made of America's Racial Segregation," Wired, August 26, 2013, https://www.wired.com/2013/08/how-segregated-is-your-city-this-eye-openi....

ii. Aaron Williams and Armand Emamdjomeh, "America is More Diverse Than Ever — But Still Segregated," Washington Post, published May 2, 2018; last modified May 10, 2018, https://www.washingtonpost.com/graphics/2018/national/segregation-us-cit....

iii. Jonathan Chipman et al., "MixedMetro: Mapping Diversity and Segregation in the USA," accessed May 7, 2021, http://www.mixedmetro.us/.

iv. See E.g. Johnny Finn, "Mapping Segregation," Living Together/ Living Apart, accessed May 7, 2021, https://www.arcgis.com/apps/Cascade/index.html?appid=5ccb9580d7a9489c918...

v. See the definition of "segregation" in the Oxford English Dictionary online. "Segregation," Oxford English Dictionary, accessed May 7, 2021, https://en.oxforddictionaries.com/definition/segregation.

vi. Ulrich Boser and Perpetual Baffour, Isolated and Segregated: A New Look at the Income Divide in Our Nation's Schooling System (Washington, D.C.: Center for American Progress, 2017), 2, https://www.americanprogress.org/issues/education-k-12/reports/2017/05/3....

vii. Stephen Menendian and Samir Gambhir, Racial Segregation in the San Francisco Bay Area, Part 3: Measuring Segregation (Berkeley, CA: Othering & Belonging Institute, 2019), https://belonging.berkeley.edu/racial-segregation-san-francisco-bay-area.... See text associated with endnotes 8-15.

viii. Sean F. Reardon and David O'Sullivan, "Measures of Spatial Segregation," Sociological Methodology 34, no. 1 (2004): 121-162, https://doi.org/10.1111/j.0081-1750.2004.00150.x.

ix. In their landmark book American Apartheid, Douglas Massey and Nancy Denton describe segregation in five different ways: (un)evenness, exposure, concentration, centralization, and clustering. Douglas Massey and Nancy A. Denton, American Apartheid: Segregation and the Making of the Underclass (Cambridge, MA: Harvard University Press, 1993), 75-76. Subsequent scholarly analysis has led to the conclusion that these five concepts map two different gradients: 1) Eveness-Clustering and 2) Isolation-Exposure. For a summary of this debate, see Sean F. Reardon and David O'Sullivan, "Measures of Spatial Segregation," Sociological Methodology 34, no. 1 (2004): 121-162, https://doi.org/10.1111/j.0081-1750.2004.00150.x.

x. "Census Tracts," (presentation, Geographic Products Branch- United States Census Bureau), https://www2.census.gov/geo/pdfs/education/CensusTracts.pdf.

xi. "Glossary," US Census Bureau, last modified September 16, 2019, https://www.census.gov/programs-surveys/geography/about/glossary.html#pa....

xii. D=0.5*∑|ratio of proportions of racial group 1 in a tract to the proportions of racial group 1 in the city/county/CBSA - ratio of proportions of racial group 2 in a tract to the proportions of racial group 2 in the city/county/CBSA|

xiii. See e.g. Richard H. Sander, Yana A. Kucheva, and Jonathan M. Zasloff, Moving Toward Integration: The Past and Future of Fair Housing (Cambridge, MA: Harvard University Press, 2018), 37.

xiv. John R. Logan and Brian J. Stults, The Persistence of Segregation in the Metropolis: New Findings from the 2010 Census (Washington, D.C.: United States Census Bureau-US2010 Project, 2011), 25, https://s4.ad.brown.edu/Projects/Diversity/Data/Report/report2.pdf.

xv. For a technical description, see Stephen Menendian and Richard Rothstein, "Putting Integration on the Agenda," Journal of Affordable Housing 28, no. 2 (2019): 156, https://belonging.berkeley.edu/putting-integration-agenda. ("[imagine a community that is] 85% white and 15% black, and where the typical black lives in a 100% black neighborhood (and consequently, the typical white lives in a 100% white neighborhood). Imagine that the community gains a population of Latinos so that it becomes 70% white, 10% black, and 20% Latino, and all the Latinos settle in previously black neighborhoods. In that case, the typical African American would now live in a neighborhood that was 33% black and 67% Latino. The biracial (black-white) index of dissimilarity for blacks would fall from .85 to .69 ((.33-.10)/.33), without a single African American gaining a white neighbor.")

xvi. Ibid, fn 25.

xvii. Sander, Kucheva, and Zasloff, Moving Toward Integration, 522.

xviii. There is, however, an exception where some researchers have access to more granular census data and can generate dissimilarity scores at a smaller geography. See Id.

xix. The formula used in calculating the entropy score is $E_i = \sum x_{im} \ln(1/x_{im})$, where x_{im} is the proportion of racial group m within the geography. E_i is the entropy score for geography i. Value of E for n groups within a geography ranges from the maximum value of $\ln(n)$ if all groups have the same proportion, to 0 if the geography is dominated by one group only. The final score is scaled from 0 to 1 by dividing the entropy score by $\ln(n)$.

xx. Chipman et al., "MixedMetro."

xxi. Elizabeth Roberto, "The Divergence Index: A Decomposable Measure of Segregation and Inequality," aRxiv, December 2, 2016, https://arxiv.org/pdf/1508.01167.pdf.

xxii. The formula for the Divergence Index for location i is $DI_i = \sum x_{im} Ln(x_{im}/x_m)$, where x_{im} is the proportion of racial group m within the smaller geography i, x_m is the proportion of racial group m within the bigger geography, and DI_i is the Divergence Index for this geography. The lowest value of DI is '0' when the demographics of a smaller geography are similar to that of the larger geography. Higher values suggest higher segregation.

xxiii. See footnote #12 in the main report for the racial taxonomy. Divergence Index requires mutually exclusive racial groups for the index calculations.

xxiv. Divergence Index for this tract = [0.093*Ln(0.093/0.667)]+[0.76*Ln(0.76/0.119)]+ [0.119*Ln(0.119/0.108)]+[0.028*Ln(0.028/0.106)] = 1.21

xxv. The upper bound on divergence is the natural log of the number of races, which varies depending on Census data. For 2010, the maximum value would be Ln(7), the races being: white, Black, Hispanic, Asian, Native American, Native Hawaiian or Pacific Islander, and all other races as a single group.

xxvi. In our attempt to apply this index to the 9-county Bay Area, we classified any score below .1075 as "low," and any score above .215 as "highly" segregated, with any score falling between those values as "moderately" segregated. These values do not necessarily generalize either to the United States as a whole, nor to either the place or CBSA/County, which are compiled from tract scores. See Stephen Menendian and Samir Gambhir, Racial Segregation in the San Francisco Bay Area, Part 1: Segregation (Berkeley, CA: Othering & Belonging Institute, 2018), https://belonging.berkeley.edu/racial-segregation-san-francisco-bay-area.

xxvii. Divergence score is the sum total of "within" Divergence and "between" Divergence.

xxviii. Claude S. Fischer et al., "Distinguishing the Geographic Levels and Social Dimensions of U.S. Metropolitan Segregation, 1960-2000," Demography 41, no. 1 (2004): 46, http://www.jstor.org/stable/1515212.

xxix. The "within" divergence score for, say, a place, is the population weighted sum of tract divergence values.

xxx. See e.g. Stephen Menendian, Arthur Gailes, and Samir Gambhir, The Most Segregated (and Integrated) Cities in the SF Bay Area (Berkeley, CA: Othering & Belonging Institute, 2020), https://belonging.berkeley.edu/most-segregated-and-integrated-cities-sf-....

xxxi. For CBSA/County, Metropolitan Areas, Micropolitan Areas, and Counties are each ranked on their own scale, so this may result in a higher percentile score, but lower divergence scorem for some geographies relative to others on our map.