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Research Article

Metropolitan racial residential segregation in the United States: A microlevel and cross-context analysis of Black, Latino, and Asian segregation

Amber Crowell

Mark Fossett

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Metropolitan racial residential segregation in the United States: A microlevel and cross-context analysis of Black, Latino, and Asian segregation

Amber Crowell¹

Mark Fossett²

Abstract

OBJECTIVE

We seek to establish the direct quantitative link between micro- and macrolevels of segregation for White–Latino, White–Asian, and White–Black metropolitan segregation using new methods for segregation analysis and test prevailing frameworks in segregation research that emphasize spatial assimilation and place stratification dynamics.

METHODS

We reformulate a popular segregation measure as a difference of group means and estimate regression models of household locational attainments that are operationalized as the microlevel components that comprise the segregation index. We perform regression standardization and decomposition analysis to identify the extent to which segregation is determined by group differences on resources and group differences on rates of return on those resources, comparing these effects across low- and high-segregation contexts. These analyses are possible by using restricted-use microdata, and we specifically use the 2010 census and the 2008–2012 American Community Survey five-year sample.

RESULTS

We find that spatial assimilation dynamics are stronger for Latino and Asian segregation than for Black segregation, but that place stratification dynamics prevail for all groups. Additionally, we find that Black segregation aligns more with a segmented assimilation pattern rather than classical spatial assimilation. Finally, we document that place stratification dynamics are stronger, and spatial assimilation dynamics weaker, in high-segregation contexts.

¹ California State University, Fresno, USA. Email: acrowell@csufresno.edu.

² Texas A&M University, College Station, USA.

CONTRIBUTION

We demonstrate new techniques for understanding and measuring segregation as a group inequality, which can be analyzed at the microlevel while aligning with conventions in both inequality and demographic research. This approach creates opportunities to link the micro- and macrolevel dimensions of segregation and explore new questions about the complexity of segregation dynamics.

1. Introduction

Residential segregation continues to hold sociological relevance as an important indicator of race relations in the United States because it can inhibit intergroup social interactions and contribute to creating and maintaining social inequities through resource and opportunity hoarding (Charles 2003; Massey 2007). An extensive sociological literature has sought for decades to understand the mechanisms that shape segregation patterns, from discrimination to preferences to group differences in resources such as income and other social characteristics (Charles 2003). In this study we advance innovative strategies to overcome certain challenges in residential segregation research using new methods for segregation and locational attainments analysis. Specifically, we establish the quantitative link between segregation at the macrolevel and locational attainments at the microlevel by analyzing household locational attainments that directly determine the overall level of residential segregation in the metropolitan area. We focus on White–Black, White–Latino, and White–Asian segregation in metropolitan areas in 2010 using detailed, restricted-use census and survey data. This study accomplishes two goals: (1) Substantively, we bring forth more nuanced and comprehensive understandings of the microlevel mechanisms of racial residential segregation in metropolitan settings across the United States, giving attention to how these effects vary across low- to high-level segregation contexts, and (2) we demonstrate new methodological approaches that expand opportunities for pursuing sociological questions about residential segregation as a stratification outcome.

Our unique contributions to the expansive literature on residential segregation stem from three methodological features of this study. First, we use a reformulation of the popular dissimilarity index that operationalizes uneven distribution as a difference of group means on neighborhood outcomes, therefore situating segregation as an aggregation of individual (i.e., household) locational outcomes and as a measure of inequality. Second, we use decomposition analysis, which has a long tradition in demographic research, to test prevailing theories of residential segregation in ways only made possible by reformulating the dissimilarity index. Finally, we accomplish all of this

by accessing the restricted-use decennial census and American Community Survey (ACS) microdata files, which contain individual and household records that include neighborhood-level geographic information.

Most research on residential segregation falls within one of two traditions of analysis (South, Crowder, and Pais 2011). The first is the study of macrolevel residential segregation, which consists of analyzing how aggregate segregation patterns in broadly defined communities vary over time and by area-level characteristics. Studies of this nature typically use large areas (e.g., metropolitan) as the unit of analysis and measure all variables at the aggregate level, treating the segregation index as the dependent variable and using contextual independent variables such as population size, growth rates, and percent minority (e.g., Iceland and Scopilliti 2008; Lichter et al. 2010; Massey and Denton 1987). These studies make contributions by documenting how segregation patterns vary across areas and over time and how they relate to characteristics of communities.

The second major tradition is to conduct microlevel analyses of locational attainments. Here the unit of analysis is the household, and all measurements for dependent and independent variables are at the level of the household. Studies in this tradition often use neighborhood outcomes such as the percentage of White residents in a neighborhood as the dependent variable and include social characteristics of the household such as income and nativity as independent variables in addition to race, while at times incorporating larger area contextual variables (e.g., Alba and Logan 1992, 1993; South, Crowder, and Pais 2008; Pais, South, and Crowder 2012; Yu and Myers 2007). These studies provide insights into how household characteristics are related to residential locational outcomes as defined by some characteristic of the neighborhood and help us understand how socioeconomic and demographic characteristics are determinants of residential location.

These two research traditions have pursued fundamentally different questions about residential segregation: Macrolevel studies seek to understand variation in overall segregation patterns across areas and over time, while microlevel studies focus on the neighborhood attainments of households. Nonetheless both recognize that these questions are intrinsically linked to a broader question of how race and social characteristics shape locational attainments that form larger segregation patterns. Theoretically and intuitively, we understand that segregation arises from microlevel social processes of locational attainments. Indeed, research by Alba and Logan in the early 1990s explored methods for establishing the link between the two using public census files (Alba and Logan 1992). But that study, as well as other more recent studies seeking to explicate this connection by incorporating community characteristics into microlevel locational attainment models (e.g., Pais 2017; South, Crowder, and Pais 2011), has to date fallen short of modeling the direct quantitative connection between microlevel processes and macrolevel segregation

in a straightforward and empirical way that would permit the disaggregation of a segregation score into individual locational attainment outcomes. This is due in large part to methodological challenges and fundamental differences in the way segregation is analyzed within the two traditions. We overcome these challenges with the methodological innovations described briefly above and in more depth in later sections, allowing us to move this literature forward.

2. Background

2.1 Racial residential segregation in the United States

Residential segregation is a common feature of most metropolitan areas, and where one resides can affect the nature and extent of social interaction with other groups as well as access to amenities and resources such as educational opportunities, access to employment opportunities, and access to optimal healthcare (Charles 2003; Massey 2007; Owens 2020; Sharkey and Farber 2014; White, Biddlecom, and Guo 1993). Residential locational outcomes are in part shaped by preferences but also by many factors beyond individual preferences and residential goals. An individual's ability to achieve desired residential outcomes may be constrained by the resources and information needed to secure quality housing and neighborhood amenities in the housing market. Structural factors including institutional discrimination, exclusionary zoning, siting of highways and public works projects, and systematic disinvestment in segregated neighborhoods can also restrict where people reside and determine patterns of neighborhood racial composition. Thus while important policy changes have occurred in recent decades, the literature documents that a long history of legally sanctioned policies promoting and maintaining segregation and housing discrimination left a lasting legacy of residential segregation and inequality that persists for people of color in the present day (Charles 2003; Massey and Denton 1993; Massey 2020; Rothstein 2017; Taylor 2019; Trounstone 2018).

Segregation operationalized as disparities in residential contact with White households is a convention that dominates the literature, which we also follow for substantive and methodological reasons. It is widely understood that neighborhood resources important for more favorable life chances and social mobility often tend to positively correlate with the percentage of White residents in a neighborhood (Alba and Logan 1993). Predominantly White neighborhoods typically hold more advantages and resources due to the power and status leveraged by White neighborhoods, particularly affluent White neighborhoods (Logan 1978). Additionally, there is an important technical benefit, which is that the percentage of White residents in a neighborhood is a key

component of all widely used indices of residential segregation, where segregation is conceptualized as residential separation from the dominant group. Accordingly, we focus on the locational attainment of residential contact with White households based on its relevance for social stratification dynamics in US urban areas and its technical centrality in segregation measurement. This choice should not be seen as an endorsement of normative prescriptions implying that living in White neighborhoods should or would be preferable as a goal in itself. Rather, we take the percentage of White residents in a neighborhood as an important outcome for measuring and understanding residential segregation in both its patterns and consequences (Crowell and Fossett 2018).

2.2 White–Black residential segregation

The Black population continues to be the most segregated racial group across the nation (Massey 2020), in some cases coming down from conditions of hypersegregation (i.e., high levels of segregation on several distinct dimensions [Massey and Denton 1989]) in large metropolitan areas that are home to a disproportionate share of the Black population nationally (Massey 2020; Massey and Denton 1989; Massey and Tannen 2015; Wilkes and Iceland 2004). Although declines in Black segregation have been documented over recent decades (Frey 2018; Iceland 2014; Iceland, Weinberg, and Steinmetz 2002; South, Crowder, and Pais 2011), with more significant declines occurring in regions with Black population growth (Wilkes and Iceland 2004), White–Black segregation in metropolitan areas remains exceptionally high and carries intergenerational consequences that have been challenging to overcome (Sharkey 2013).

Empirical studies have generally observed lower levels of social mobility and higher rates of poverty in comparison to other populations (Chetty et al. 2020; Massey and Denton 1993; Sharkey 2013; Williams and Collins 2001). Many of these outcomes can be linked back to the broad and lasting sociological importance of social environment associated with residential location. Access to critical resources, which often are neighborhood based, is an important factor in determining social outcomes over the life course. Black households are not only more likely to reside in segregated neighborhoods but also more likely to experience concentrated poverty, which can worsen when economic conditions change (Massey 2020; Massey and Denton 1993).

2.3 White–Latino residential segregation

Despite rapid population growth, Latino households continue to be only moderately segregated from White households (Frey 2018; Iceland 2014). However, while holding

uneven distribution constant, high levels of Latino population growth and the effects of chain migration have necessarily brought higher levels of isolation and a decrease in exposure to White households (Charles 2003; Frey 2018; Iceland, Weinberg, and Hughes 2014; Massey and Denton 1987). Additionally, White–Latino segregation on the dimension of evenness across the United States has either increased or at best remained stable with only slight declines, particularly in metropolitan areas with the largest increases in the Latino population (Frey 2018; Iceland 2014; Iceland, Weinberg, and Hughes 2014; Iceland, Weinberg, and Steinmetz 2002; Logan and Stults 2011; Massey 2001). Nonetheless, locational attainments research suggests that Latino households are more likely to experience significant social mobility and higher levels of residential contact with White households as they acculturate and assimilate on socioeconomic status (Alba and Logan 1993; Charles 2000; Chetty et al. 2020; Crowell and Fossett 2018, 2020; Massey and Fong 1990).³

The role of nativity is of particular interest, as nativity could moderate the effect of socioeconomic status on residential mobility. For example, immigrant Latino households may be drawn to enclaves or conversely may be constrained by higher barriers to enter White neighborhoods (Akresh and Frank 2018; Charles 2000; South, Crowder, and Chavez 2005a). To add more demographic context, the majority of the Latino population is Mexican origin at 63%, with the second-largest portion of the population being of Puerto Rican origin at 9.2% (Ennis, Rios-Vargas, and Albert 2011). Finally, while the Latino population also makes up a large portion of the foreign-born population and represent a wide range of nationalities, the majority of the population nationwide (nearly 60%) are born in the United States (American Community Survey 2012 five-year estimates), and many in this population can trace their ancestry back for several generations in the United States.

2.4 White–Asian residential segregation

Similar to the Latino population, the Asian population of the United States is experiencing small increases in uneven distribution and isolation (Charles 2003; Frey 2018; Iceland 2014; Iceland, Weinberg, and Hughes 2014). Also like the Latino population, this is primarily the result of Asian population growth and immigration (Iceland, Weinberg, and Hughes 2014; Logan and Stults 2011; Massey 2001). Research has consistently found that among non-White groups, the Asian population as a whole is generally the least residentially segregated from White households and experience greater rates of social mobility in comparison to other minority groups, particularly among later

³ The possible exception to this pattern would be in the case of Black Latino households, which may exhibit higher levels of segregation more similar to that of non-Latino Black households (Logan 2003).

generations, which in turn may increase their residential contact with White households (Crowell and Fossett 2020; Massey and Denton 1987; Massey 2020; Sakamoto, Goyette, and Kim 2009; Zhou and Logan 1991). However, despite empirical evidence of social mobility and attainment, the role of racialization and racism must still be understood as shaping the experiences of Asian and Asian American individuals in the United States (Lee and Kye 2016).

Over the past half century Asian immigration has transformed the overall US Asian population from being predominately Chinese- and Japanese-origin descendants of families immigrating prior to 1920 to being recent immigrants, which now include other groups such as Filipinos, Koreans, Asian Indians, Vietnamese, Cambodians, and Laotians (Frey and Farley 1996). Like the Latino population, the Asian population is characterized by sustained rapid growth and are now the fastest growing major racial group in the United States since 2010, primarily due to immigration. Of those who identify as Asian alone, approximately 70% are born outside the United States, and foreign-born Asian individuals comprise over a quarter of the total foreign-born population in the United States (American Community Survey 2012 five-year estimates). Patterns of Asian segregation must be understood by accounting for the heterogeneity of the Asian population. The Asian population represents a wide range of cultural and ethnic diversity, with each nationality holding a unique sociopolitical history with the United States. All these factors are likely to interact and determine a wide variation in residential outcomes for Asian households (Iceland, Weinberg, and Hughes 2014; White, Biddlecom, and Guo 1993).

3. Conceptual framework

Consistent with previous research in this area (Crowell and Fossett 2018, 2020; Iceland and Scopilliti 2008), we draw on three major theoretical perspectives – *spatial assimilation*, *place stratification*, and *segmented assimilation* – to frame our analysis and conclusions. These perspectives guide demographic studies focused on racial segregation while considering other social factors such as socioeconomic status and immigration (e.g., Iceland and Scopilliti 2008). Each perspective holds potential relevance for the residential segregation patterns of Black, Latino, and Asian households. One innovation in our study is that we draw on this multi-perspective framework to understand how the effects of factors operating in microlevel locational attainment processes may vary in shaping segregation across different community contexts and, in particular, across low- and high-segregation settings.

We review these three perspectives briefly, noting first that they are not mutually exclusive and in fact can both contribute independently and complement one another to

provide a more complete, nuanced understanding of the complexities of racial residential segregation processes. This point is made in Crowder and Krysan's (2016) critique of the simplicity with which these theories are often applied. Furthermore, we recognize that these three theories of segregation are not exhaustive of the perspectives that could be employed to develop a theoretical framework for residential segregation and attainments. For example, Krysan and Crowder's social structural sorting perspective (2017) is an important lens for understanding the nature of household residential movements and the role of networks and information in determining residential location. However, the hypotheses of this and other theories are not testable within the scope and design of our study.

3.1 Spatial assimilation

The spatial assimilation perspective holds that as members of a racial or ethnic minority group acculturate toward characteristics of the dominant group and experience socioeconomic mobility within and across generations, they become more likely to move away from ethnically concentrated neighborhoods and into higher-status neighborhoods with a greater presence of White households (Alba and Logan 1991; Charles 2003; Duncan and Lieberman 1959; Massey 1985). As Charles (2003) explains, this perspective emphasizes group differences in social characteristics as a primary reason for residential separation. Socioeconomic differences, typically measured by income and education, determine what neighborhoods households are able to afford, which can lead to racial segregation when there is racial economic inequality and neighborhoods are stratified on housing quality and amenities. Acculturation is also key to this perspective and is often operationalized in locational attainment models as English language ability and citizenship. The origins of this theoretical perspective are based on observations of White ethnic groups in the 20th century who moved away from inner-city immigrant enclaves and into suburbs where US-born White households resided as they experienced social and economic mobility, intermarriage, and language assimilation, accelerated by a decline in European immigration and generational shifts along with increased economic opportunity. Thus, cultural characteristics and acculturation are emphasized as determinants of residential location.

Spatial assimilation as a conceptual framework has persisted in residential segregation research with renewed attention following the work of Alba and Logan (1991; 1992; 1993) and is often used to guide the research design of locational attainments analysis. When applied in more contemporary research, this framework has had some useful explanatory power for understanding Latino and Asian residential trends. For example, studies show that, over time and across generations, Latino and

Asian households experience residential mobility and increased contact with White households. Thus, Latino and Asian households with high socioeconomic status, where English is spoken exclusively or very well, and with several generations removed from immigration have more residential contact with White households in comparison to foreign-born Latino and Asian households with lower socioeconomic status (Alba and Logan 1993; Alba, Logan, and Stults 2000; Charles 2003; Iceland, Weinberg, and Hughes 2014; Iceland and Nelson 2008; Iceland and Scopilliti 2008; Massey 1985; South, Crowder, and Pais 2008; Yu and Myers 2007). For these groups where immigration is a major factor, newer arrivals may initially rely on enclaves with language support and established networks for entry into the labor market and social institutions, especially for those households with low socioeconomic status. As members of these groups acculturate and experience upward mobility, they may be less reliant on enclaves, which will be especially true for their second- and third-generation descendants (Alba et al. 1999; Charles 2003; Massey 1985). Their social distance from White households will be reduced, and they will experience higher levels of residential integration.

The impact of spatial assimilation dynamics can potentially be seen at both the macrolevel and the microlevel. As noted above, spatial assimilation theory predicts the microlevel finding that coresidence with White households will be more likely with social mobility. While the perspective also predicts that aggregate-level segregation will be greater when group differences on social and economic characteristics are more pronounced, the predicted pattern must also include evidence that segregation and group differences coincide for reasons beyond being jointly determined by discrimination and constrained opportunity. That is, there must be evidence indicating that reductions in group differences will lead to reductions in segregation. The new methods of segregation analysis we use allow us to examine this issue with quantitative precision not possible in previous research.

There is the potential for complex patterns to emerge as spatial assimilation dynamics initially take root and play out. If group disadvantage is rooted in a pervasive web of discrimination and constrained opportunities, group disparities will be large when segregation is high, but spatial assimilation at the microlevel will be weak, and reducing group disparities will have little or no short-term impact on reducing segregation. Alternatively, if group differences trace discrimination that was higher in the past than in the present, as might be the case for the Black population, or if it traces to a group's historical immigration experience, as might be the case for the Latino or Asian populations, group differences might be smaller than in the former case yet have a greater potential impact on reducing segregation in the present because the microlevel spatial assimilation process is stronger. In a later section we discuss how this possibility leads us to search for evidence that the impact of group disparities on segregation will vary by context.

One notable limitation of the spatial assimilation framework is that even for US-born, high socioeconomic status Latino and Asian households, segregation from White households persists, albeit at lower levels (Crowell and Fossett 2018; 2020). Additionally, the spatial assimilation framework has had little relevance for understanding Black segregation; the predominately US-born Black population experiences moderate to very high levels of segregation from Whites households even at higher matched incomes (Alba and Logan 1991, 1992, 1993; Iceland, Sharpe, and Steinmetz 2005; Massey and Denton 1987; Spivak and Monnat 2013; Yu and Myers 2007). Therefore, other general theoretical perspectives must be considered that can address persistent racial residential segregation.

3.2 Place stratification

The place stratification perspective is an alternative to the spatial assimilation perspective, but it is complementary, rather than mutually exclusive, in positing that discrimination based on race holds an important role in maintaining levels of segregation. Where spatial assimilation takes on greater relevance when groups begin to experience a less obstructed path to social mobility and increased residential contact with White households, place stratification takes on greater relevance when segregation primarily reflects structural racism. Place stratification stresses the persisting role of racism and group conflict in the White population's efforts to maintain power, status, and privilege by restricting access to White neighborhoods (Charles 2003, 2006; Logan 1978). Mechanisms include direct and covert discrimination, exclusionary zoning, steering by real estate agents and landlords, housing-loan discrimination, and real and perceived hostility toward non-White families in predominately White neighborhoods. Thus, place stratification operates through both individual and institutional determinants (Massey 2020). These dynamics are hypothesized to be effective regardless of reductions in group differences on characteristics such as socioeconomic status or acculturation.

Work by Farley and colleagues in previous decades (Farley et al. 1978; Farley et al. 1994) lends some support to the place stratification perspective, finding that Black families perceive greater racial discrimination in the housing market while White families remain resistant to living in majority non-White neighborhoods, although White preferences have become more racially progressive over time (Farley and Frey 1994). Additionally, direct evidence has emerged over the past several decades that would indicate continuing discrimination in the housing market, particularly that which comes from audit studies. These studies generally find that although housing market discrimination may be declining, it is still significant and, furthermore, mortgage loan

discrimination shows no signs of abating (Massey and Lundy 2001; Galster 1990; Quillian, Lee, and Honoré 2020; Turner et al. 2013; Yinger 1995).

Recent sociological and historical research has also analyzed more structural dimensions to housing inequality and segregation. Desmond (2016) and Desmond and Wilmers (2019) highlight how the rental housing market continues to segregate and exploit low-income families and families of color, and Taylor (2019) describes the transformation of the urban ghetto as a result of housing reforms that enabled predatory behaviors in the real estate industry, which trapped Black families in substandard urban housing. Other recent research by Trounstein (2018) emphasizes the role of local politics in maintaining segregation to protect White property values and investments, and work by Rothstein (2017) brings a clearer understanding of how New Deal-era redlining cemented racial residential segregation.

The place stratification perspective is widely seen as relevant for understanding the continuing high levels of segregation for Black households but could also explain why Latino and Asian households may remain at some level of uneven distribution even though levels of segregation may be moderate or decreasing over time, as racism persists with consequences for all racially minoritized groups (Alba and Logan 1991; Charles 2003; Pais, South, and Crowder 2012).

3.3 Segmented assimilation

The final framework that informs this study is a theory positing that systems of stratification can create multiple trajectories of assimilation. This framework holds particular relevance for understanding divergent segregation patterns by nativity and across generations and can provide insight into how locational attainment dynamics may vary by group. Assimilation can mean experiencing upward social mobility and entrance into White neighborhoods, as posited by the traditional assimilation framework that informs the spatial assimilation perspective. But it can also result in being subjected to institutional racism and discrimination, being shut out of economic opportunities, or gravitating toward ethnic communities with supportive structures for social and economic opportunities.

Segmented assimilation was first empirically explored within the context of the labor market (e.g., Portes and Zhou 1993) but can be extended to many social outcomes that serve as indicators of social mobility and resources, including residential locational outcomes (Crowell and Fossett 2020; Iceland and Scopilliti 2008). The implications of this framework for understanding the segregation patterns of the groups considered here is that we may not observe uniform patterns of locational attainments but may in fact find attainment patterns that run counter to what the spatial assimilation hypothesis would

have us expect (South, Crowder, and Chavez 2005b). For example, in our past research on the Minneapolis–St. Paul metropolitan statistical area, we found that US-born Black households were more likely to be segregated from White households than foreign-born Black households, counter to what we found for Latino and Asian households (Crowell and Fossett 2020). From the segmented assimilation perspective, we argue this pattern results because Black households experience a trajectory of assimilation that is more strongly impacted by institutionalized racism and particularly an established legacy of Black residential segregation. This implies that in contrast to the traditional spatial assimilation perspective, the social and economic resources that would ease entrance into White neighborhoods give way to other more structural dynamics, including barriers that emerge from racialization and racism.

3.4 Framing cross-context segregation patterns

Finally, in this section we consider the possibility that spatial and segmented assimilation and place stratification dynamics may vary in relative salience and importance across metropolitan areas. To the extent that they do so, it will require us to take more care in assessing the quantitative importance of the different processes. Most importantly, group differences in socioeconomic characteristics and in locational attainments will have implications for reducing segregation that vary across low- to high-segregation contexts. If group differences in the effects of household social and economic characteristics on locational attainments were constant across metropolitan areas, it would be a simple matter to assess the impact of group disparities on resources and social characteristics on aggregate-level segregation. The impact of group disparities would be a simple function of the magnitude of the disparities. However, if the effects of household characteristics vary between low- and high-segregation contexts, the impact of group differences on those characteristics will vary, possibly in complex and sometimes counterintuitive ways.

Thus, we anticipate the following complexities: The role of spatial assimilation for segregation may loom largest in situations where segregation and group differences are in the middle range, spatial assimilation and place stratification dynamics are both salient, and group disparities are sizable. In contrast the role of spatial assimilation for segregation may ironically be smaller in high-segregation contexts. Group differences may be larger in such cities, creating the potential for important consequences for segregation. But the differences may in fact be less consequential for segregation because place stratification dynamics and other limiting factors such as those that are central to the social structural sorting perspective (Krysan and Crowder 2017) are stronger than spatial assimilation dynamics, reinforcing observed higher levels of segregation. Similarly, the role of spatial assimilation for segregation may be higher than expected in

low- to moderate-segregation contexts. If group differences on social and economic characteristics are in a lower range, the consequences for segregation could rival and match the consequences in medium segregation contexts where spatial assimilation dynamics are also stronger.

4. Methodology

4.1 Data and sample

For this study we used the restricted-use microdata files for the 2008–2012 American Community Survey (ACS) five-year pooled sample and the 2010 decennial census. Our method of analysis involves estimating household locational attainments using the social and economic characteristics of households to predict the characteristics of the neighborhoods where they reside. Therefore, we require household census records, which include neighborhood-level geography. This is not feasible using data in the public domain, where only limited geographic information is attached to census microdata. The restricted-use microdata files provide an alternative for overcoming the limitations of public data. Specifically, we can simultaneously know both neighborhood-level geography (i.e., census block) in combination with the full complement of social and economic characteristics of individuals and households.

Our reasons for using both the decennial census and the ACS are based on different needs for the dependent variable and the independent variables in the analysis. From the decennial census microdata, we obtain neighborhood-level measures of ethnic composition and avoid the concerns associated with measuring area composition using sample data (Napierala and Denton 2017). These measures of neighborhood-level ethnic composition serve as the dependent variable and are the components for constructing the segregation index, discussed more below. From the ACS we can access detailed information on individuals and households relevant for locational attainment analyses, including income, education, nativity, citizenship, and language obtained from an annual survey of approximately 1%–2% of the US population.⁴ These variables are not found in the decennial census, which is distributed only as what was once referred to as the ‘short-form’ questionnaire. We selected the 2008–2012 range of the ACS five-year files because it is centered on the 2010 census, which is the source of our dependent variable. Geographic variables are the same across the restricted-use versions of the decennial census and ACS. Thus, we adopt the restricted-use ACS as our primary analysis sample

⁴ The public version of the ACS is based on a 1% annual survey, but this is based on a nonpublic sample significantly larger in size.

for locational attainment modeling and use census block identifiers to merge in the block-level dependent variable constructed from the decennial census files.

Segregation dynamics can potentially play out at macro-, meso-, and micro-spatial levels (Fischer et al. 2004; Lichter, Parisi, and Taquino 2015), factoring in other geographic boundaries such as place boundaries. We assess residential segregation at the block level within metropolitan areas and so capture the maximum level of segregation that can be established using census geography.⁵ At the aggregate level the articles just noted show it is possible to decompose the observed level of segregation across blocks in the metropolitan area into, for example, a component reflecting block-level segregation within places and a component of segregation across places. While we did not undertake such an analysis, it is technically feasible for future studies to specify microlevel attainment models that can investigate how segregation at the block level is linked to place-level departures from even distribution, including variations across urban and suburban contexts.⁶ The models would be more complex than the models we report as household-level predictors, such as income and English language ability, for example, would potentially have different effects on place-level segregation versus block-level segregation with places. We note this to acknowledge that such models would not change any findings that we report, but they would contribute valuable supplemental information regarding how residential sorting at the block-level is shaped by residential sorting at higher levels of geography.

We investigate the locational attainments of Black, Latino, and Asian householders in comparison to White householders in 25 metropolitan areas, producing a total of 100 subsamples of householders for analysis. The metropolitan areas selected are among the largest in the United States by total population size, with some areas included due to having greater representation of certain groups, such as Asian householders. Of the 25 metropolitan areas, 24 of them are the largest by total population size. Beyond these 25 large metropolitan areas, it becomes difficult to disclose results from the restricted-use environment as populations get smaller, resulting in smaller underlying sample counts that pose a disclosure risk for confidentiality protections. Our unit of analysis is the respondent in the ACS who is identified as the householder, and we restrict the samples to those householders who are aged 15 and older. In Tables 1 and 2 we list the 25

⁵ All else equal, smaller spatial units reveal higher levels of measured segregation. Census block is the smallest census geography available. The only way to capture higher levels of measured segregation is to use sub-block-level areas, for example, using geocodes for individual housing units to group the units into areas smaller than blocks. As a practical matter, this will not yield appreciably higher levels of measured segregation as segregation within census blocks is not a major factor in residential segregation in metropolitan areas.

⁶ One important qualification: the segregation index used cannot be the index of dissimilarity or the Gini index as it is not possible to decompose contributions to D and G into a hierarchical geographic framework. The analysis would be feasible using measures that can be decomposed in this manner (for example, the Theil entropy-based index, the Hutchens square root index, and the separation index [i.e., eta squared or the variance ratio index]).

metropolitan areas included in the sample along with their characteristics in 2010, including group percentages and levels of segregation according to the dissimilarity index, a measure described below.

Table 1: Group percentages by race of householder in 25 metropolitan areas, 2010

Metropolitan Area	White	Black	Latino	Asian
Atlanta–Sandy Springs–Marietta	55.5	31.9	6.7	4.0
Baltimore–Towson	63.9	27.6	3.1	3.7
Boston–Cambridge–Quincy	79.6	6.1	6.8	5.3
Chicago–Joliet–Naperville	62.6	17.0	14.2	5.0
Dallas–Ft. Worth–Arlington	58.3	15.6	19.7	4.6
Denver–Aurora–Broomfield	73.7	5.4	15.9	3.0
Detroit–Warren–Livonia	70.9	22.3	2.7	2.6
Fresno	44.3	5.4	50.3	7.5
Houston–Sugarland–Baytown	47.9	17.8	27.0	5.9
Los Angeles–Long Beach–Santa Ana	42.7	8.0	32.6	14.3
Miami–Ft. Lauderdale–Pompano Beach	43.3	16.7	36.7	1.9
Minneapolis–St. Paul–Bloomington	84.6	6.4	3.4	3.9
New York City–Northern New Jersey–Long Island	55.3	16.0	18.4	8.5
Philadelphia–Camden–Wilmington	69.2	19.7	5.6	4.0
Phoenix–Mesa–Glendale	69.2	4.6	20.4	2.8
Pittsburgh	88.8	7.9	0.9	1.5
Portland–Vancouver–Hillsboro	82.7	2.6	6.9	4.6
Riverside–San Bernardino–Ontario	48.9	7.7	35.3	5.6
Sacramento–Arden–Arcade–Roseville	64.7	7.0	14.7	9.6
San Diego–Carlsbad–San Marcos	59.9	4.9	22.9	9.2
San Francisco–Oakland–Fremont	52.5	8.7	15.1	20.2
Seattle–Tacoma–Bellevue	74.9	5.3	6.0	9.6
St. Louis	77.9	17.3	1.8	1.8
Tampa–St. Petersburg–Clearwater	74.1	9.9	12.2	2.2
Washington–Arlington–Alexandria	54.8	25.8	9.3	7.9

Table 2: Dissimilarity index for White–Black, White–Latino, and White–Asian segregation in 25 metropolitan areas, 2010

Metropolitan Area	W-B	W-L	W-A
Atlanta–Sandy Springs–Marietta	64.9	47.0	48.7
Baltimore–Towson	70.0	30.3	43.6
Boston–Cambridge–Quincy	63.7	58.3	43.8
Chicago–Joliet–Naperville	78.6	53.4	43.5
Dallas–Ft. Worth–Arlington	59.7	49.8	45.1
Denver–Aurora–Broomfield	60.5	43.3	24.3
Detroit–Warren–Livonia	78.2	28.2	46.5
Fresno	46.7	45.6	31.0
Houston–Sugarland–Baytown	65.9	53.2	49.6
Los Angeles–Long Beach–Santa Ana	67.3	60.4	46.9
Miami–Ft. Lauderdale–Pompano Beach	68.4	60.1	26.2
Minneapolis–St. Paul–Bloomington	58.2	34.1	36.6
New York City–Northern New Jersey–Long Island	79.5	61.8	49.8
Philadelphia–Camden–Wilmington	72.3	50.8	43.0
Phoenix–Mesa–Glendale	39.8	46.5	25.7
Pittsburgh	67.5	6.8	49.9
Portland–Vancouver–Hillsboro	42.9	30.7	32.8
Riverside–San Bernardino–Ontario	44.1	42.1	41.5
Sacramento–Arden–Arcade–Roseville	54.8	34.5	46.8
San Diego–Carlsbad–San Marcos	50.0	48.2	46.4
San Francisco–Oakland–Fremont	63.0	44.7	44.1
Seattle–Tacoma–Bellevue	48.9	26.8	37.7
St. Louis	75.5	17.7	43.2
Tampa–St. Petersburg–Clearwater	60.5	40.0	31.3
Washington–Arlington–Alexandria	65.4	43.6	38.4

4.2 Measurement

In order to draw a direct quantitative link between locational attainments and residential segregation, we reformulate and reconceptualize a popular measure of evenness⁷ known as the dissimilarity index (D) using the difference of means formulation developed by Fossett (2017). The score for D is the same as the one obtained using the usual aggregate-level computing formulas, and it retains its interpretation of indicating the minimum percentage of one group that would need to be redistributed to different neighborhoods in the metropolitan area to bring about even distribution, the state wherein each neighborhood has the same pairwise ethnic composition as the metropolitan area overall (Fossett 2017; Massey and Denton 1988). In addition, the score for D has a new – and we think appealing and informative – interpretation (reviewed below). If D is high (with a maximum value of 1, or 100 when scaled) there is high segregation, and if D is low (with a minimum value of 0) there is low segregation approaching perfectly even distribution. This index is typically calculated and interpreted as an aggregate measure of segregation, used to describe macrolevel segregation patterns. This is in part due to the way that most commonly used formulas are constructed to facilitate the use of aggregated data, such as census summary tabulations. One such example of a familiar formula for D is presented here, using the example of White–Black segregation:

$$D = 1/2 \cdot \sum |w_k/W - b_k/B| \quad (1),$$

where k is an index for neighborhoods, w_k is the count of White households in neighborhood k , b_k is the count of Black households in neighborhood k , and W and B are the metropolitan area-wide totals for White and Black households, respectively.

This computing formula is well-known and convenient for application with aggregate-level data, but it has a major limitation; it provides no insight into how aggregate-level segregation arises from microlevel locational attainment processes in the area. Fossett (2017) shows that this limitation of D can be overcome by using an alternative, but mathematically equivalent, computing formula where the value of D represents group differences on individual locational attainments. This reformulation of D as a difference of means is a general framework that can be applied to any of the measures of pairwise uneven distribution. The motivation for this approach to computing D is basic and compelling. When the value of D is equated to a group difference of means on locational attainments, the index score is recast as a group disparity on locational attainment outcomes and can be analyzed using the standard tool kit for modeling and

⁷ Evenness holds when the proportion of minority members within all residential areas equals the citywide minority percentage and so “as areas depart from the ideal of evenness, segregation increases” (Massey and Denton 1988: 373).

unpacking group differences of means on socioeconomic attainments and other stratification outcomes.

The computing formula for D under the difference of means framework is simple and easy to explain conceptually and to implement in empirical research. Again using the example of White–Black segregation, the index is computed as follows:

$$D = (1/W) \cdot \sum w_i y_i - (1/B) \cdot \sum b_i y_i \quad (2),$$

where i is the index for householders and y_i is a locational attainment outcome set to 1 if the neighborhood-level proportion of Whites (p_i) is at or above parity (i.e., equal to or greater than the overall area proportion of Whites (P)) and set to 0 if neighborhood-level proportion of Whites (p_i) is below parity (i.e., less than overall area proportion of Whites (P)).

The dissimilarity index is now formulated as the difference in the average score on y_i for each group. The substantive interpretation for the dissimilarity index, based on this formula, is that it is the White–Black difference in the proportion who live in neighborhoods that are at or above parity in proportion to Whites, meaning that neighborhood-level proportion of Whites is equal to or greater than the proportion of Whites in the metropolitan area overall. To reiterate, this formula is mathematically equivalent to more popular formulas for the dissimilarity index. The key difference is that this formula registers segregation as group differences in household-level locational attainments. Fossett (2017) provides a review of the derivation of the formula and outlines how the difference of means formulation provides many benefits for segregation analysis.

Adopting the difference of means formulation allows us to obtain the value of D directly from the results of locational attainment models. One can obtain the exact value of D by estimating group-specific attainment models that include covariates (e.g., income, age, sex, etc.), generating predicted values, and taking the difference of the group means for the predicted values. This result will be recognized as the familiar starting position from which one can apply methods of regression standardization and decomposition analysis to analyze group disparities that are formulated as group differences of means on an attainment outcome (Althausser and Wigler 1972; Jones and Kelley 1984). This is the methodological key that establishes the direct quantitative link between microlevel locational attainments and macrolevel segregation and brings segregation analysis into alignment with conventional approaches to analyzing social disparity and inequality (Fossett 1988; 2017).

One final modification that we make to the dissimilarity index is the implementation of a refinement to the calculation of the dissimilarity index to eliminate the problem of upward bias in the measure that is inherent in its standard formulation and can inflate

values of D when segregation is measured using small spatial units, especially when measuring segregation between groups that are imbalanced in size. This undesirable property of D is well-established in the literature (e.g., Winship 1977). The most common approach to dealing with this concern is to avoid undertaking analysis of segregation in situations where the problem is likely to occur. However, Fossett (2017) establishes a better option by identifying a simple solution that eliminates the source of the upward bias in values of D . Briefly, the solution is to remove the reference individual from the calculation of percent White for their neighborhood. For example, when assigning a score to a White household based on the proportion of Whites in their neighborhood, that White household is removed from the calculation. This shift changes the calculation from proportion of Whites for the *area population* (which includes the focal household) to proportion of Whites for the household's *neighbors* (Fossett 2017). In this particular study we can note that the problem of upward bias in D was not a serious issue because our group comparisons did not involve dramatically imbalanced group sizes. Nonetheless, we use the refined unbiased version of the index because it is always preferred and eliminates any concern that comparisons are distorted by index bias.

This brings us to address some lingering concerns about the dissimilarity index. First, authoritative technical reviews (e.g., James and Taeuber 1985; Reardon and Firebaugh 2002) establish that the dissimilarity index (D) has a serious flaw; it fails to satisfy the principle of transfers because it is insensitive to segregation-promoting exchanges that involve neighborhoods that are either above or both below parity on area racial composition. This flaw remains when D is estimated without bias. The primary defense of D in relation to this concern is that landmark methodological studies have suggested the technical flaw has limited practical consequences. In particular, Duncan and Duncan (1955) and Massey and Denton (1988) report that D has strong correlations with values of the Gini index (G) and other indices that do satisfy the principle of transfers. Fossett (2017) replicates this empirical result but also reports that this finding holds under only narrow conditions. Specifically, the empirical result holds for empirical analyses that investigate segregation between relatively large groups in the 50 to 60 largest metropolitan areas. Importantly, the result does not hold for empirical analyses that investigate segregation in smaller metropolitan areas and nonmetropolitan communities or in studies that investigate segregation for smaller groups. Our study investigates segregation for relatively large groups in the largest metropolitan areas. Not surprisingly, we obtained similar results using alternative measures of uneven distribution (e.g., the separation index, also known as eta-squared, and the Theil entropy index). We would expect findings to vary by index choice in more complicated ways if our study were expanded to include smaller metropolitan areas.

The second concern is that measured segregation is potentially sensitive to the nature of the spatial units used in the analysis. For example, all else equal, measured segregation

will be higher when spatial units are smaller. Additionally, consideration of the modifiable areal unit problem highlights the possibility that, for spatial units of a given size, measured segregation can potentially vary with the particular placements of the spatial boundaries of the units involved. Happily, the findings in our study are not affected by these issues because we measure segregation using block-level data. Because blocks are small in terms of both spatial domain and population size, we are able to detect segregation when it exists regardless of city or the size of the groups in the comparison.

4.3 Analysis of household locational attainments

As we have in previous studies (Crowell and Fossett 2018; 2020), we model microlevel household locational attainments using fractional regression. Fractional regression is superior to ordinary least squares (OLS) regression on multiple counts. OLS regression incorrectly models the effects of independent variables on bounded outcomes as linear and additive, where fractional regression correctly models the effects as nonlinear and nonadditive. As a result, fractional regression predictions are more accurate and are always ‘in bounds’ while OLS predictions are less accurate, especially in the ranges 0.0 to 0.2 and 0.80 to 1.0, and occasionally take impossible values well outside the 0 to 1 range. Additionally, OLS statistical tests are questionable because assumptions that errors of prediction are normally distributed with constant variance across cases are not met. In contrast, fractional regression tests rest on assumptions that are more appropriate.

In some cases, OLS results and fractional regression results will be similar, but this does not justify using OLS. When OLS results are not misleading, fractional regression will produce identical predictions, so one is never worse off using fractional regression.⁸ But one can easily be worse off using OLS regression, especially for predictions below 0.2 and above 0.8, where OLS predictions are most prone to be inaccurate and can, and we find sometimes do, fall well outside the 0 to 1 range. In sum, the worst one can say about fractional regression is that, while the method is technically superior to OLS regression and generates predictions that are consistently more accurate than those generated by OLS regression, there may be occasions where the predictions obtained using fractional regression are not dramatically different from those obtained using OLS (Kieschnick and McCullough 2003; Papke and Wooldridge 1996; Powers, Yoshioka, and Yun 2011).

⁸ Fractional regression predictions of means track a logistic S curve. This functional form is flexible. Thus, when OLS results are acceptable, fractional regression will simply estimate elongated S curves that closely approximate the predictions obtained under OLS assumptions that effects are linear and additive (Kieschnick and McCullough 2003; Papke and Wooldridge 1996; Powers, Yoshioka, and Yun 2011).

Separate regression models are estimated for each group in each city in the analysis with the results providing the basis for conducting regression standardization exercises, described in more detail below. We report separate equations by group for practical, not technical, reasons; it facilitates comparison and discussion of group differences in locational attainment processes. The alternative approach would be to use pooled models with relevant interactions, which would exactly replicate coefficients and could be assumed to replicate tests of statistical significance reported in separate models. As an example of how the group-specific models are constructed, in the Chicago metropolitan area we estimate a total of six models – White households in the White–Black pairing, Black households in the White–Black pairing, White households in the White–Latino pairing, Latino households in the White–Latino pairing, White households in the White–Asian pairing, and Asian households in the White–Asian pairing. In total we estimated 150 separate regression models. Recalling that the dissimilarity index is based on a pairwise calculation of proportion of Whites, where only the two groups in the analysis are included in the calculation, it is necessary to estimate three separate models for White households in each metropolitan area.

4.4 Variables

The dependent variable in our locational attainment models is a binary score where a value of 1 indicates that the householder lives in a neighborhood at or above parity on pairwise proportion of Whites in comparison to the metropolitan area overall. Thus, the model is predicting the probability that a householder lives in a neighborhood where the proportion of Whites among the household's neighbors is at or above parity. The difference between the mean outcome for White households and the mean outcome for the households from the other group in the pairing (e.g., Black, Latino, or Asian households) will exactly reproduce the observed dissimilarity index (D) score for the metropolitan area. Significantly, the difference of group means for the predictions generated by the group-specific fractional regressions also reproduces the value of the dissimilarity index (D), and this sets the stage for conducting standardization and decomposition analyses to first establish how this group difference of means is produced and then to assess how the results compare with the predictions of the place stratification and assimilation frameworks.

The independent variables in the group-specific regressions consist of the indicators relevant to the spatial assimilation framework:

Socioeconomic – For socioeconomic indicators, we include measures of education and income. Education is a six-category measure that ranges from ‘less than high school’

to ‘graduate degree.’ Income is measured as household income to which we apply a natural log transformation.

Acculturation – We include several indicators of acculturation, the first of which is a combined measure of nativity and citizenship constructed with dummy variables: US-born citizen, naturalized citizen, and noncitizen. We also include a binary variable for those who are recent immigrants, defined as somebody who has arrived in the United States in the last 15 years. Finally, we include a measure of English language usage, which is a four-category variable that ranges from ‘does not speak English at all’ to ‘speaks English very well/speaks only English.’

Controls – In addition to indicators of socioeconomic status and acculturation, we also include controls for age, household family structure, and military participation.

4.5 Regression standardization analysis

We apply regression standardization techniques to assess how the level of segregation in any given area is determined by group differences in social characteristics, referred to as resources, and group differences in rates of return on those resources. In each pairing, this involves estimating average scores on the dependent variable for each group when model predictions are in turn based on (1) the group’s own resources (i.e., the group’s observed distributions on the independent variables) and the group’s own rates of return (i.e., estimated coefficients from the group’s attainment equation), (2) the group’s own resources but the rates of return for the other group in the analysis, and (3) the other group’s resources but the group’s own rates of return. This exercise allows us to answer two basic questions: How does the level of segregation change when both groups are matched on the dominant group’s resources, and how does segregation change when both groups are matched on the dominant group’s rates of return on resources? The predicted values can be used to produce segregation scores as observed, described as follows:

$\bar{Y}_{G1ReG1Ra}$ = the observed mean on the dependent variable for the first group (i.e., the mean of the predicted values (\hat{y}_i) for Whites under the attainment model for Whites) and

$\bar{Y}_{G2ReG2Ra}$ = the observed mean on the dependent variable for the second group (i.e., the mean of the predicted values (\hat{y}_i) for the non-White group under the attainment model for the non-White group).

And when standardized, they are as follows:

- $\bar{Y}_{G1ReG2Ra}$ = the mean standardized on the first group's resources (i.e., the mean of the predicted values (\hat{y}_i) for Whites under the attainment model for the non-White group) and
- $\bar{Y}_{G2ReG1Ra}$ = the mean standardized on the first group's rates of return (i.e., the mean of the predicted values (\hat{y}_i) for the non-White group under the attainment model for Whites).

Matching groups on distributions of resources explores the spatial assimilation expectation that reducing group differences on social characteristics will lead households in the minoritized racial group to be less segregated from White households. Conversely, matching groups on rates of return explores the place stratification expectation that racism acts as a barrier to locational attainments that would otherwise result in more residential contact with White households. If differences in resources account for most of the observed level of segregation between the two groups, the result is consistent with arguments of the spatial assimilation perspective. However, if differences in rates of return account for most of the observed level of segregation, the result is consistent with the arguments of the place stratification framework. More realistically, we expect to find partial support for both frameworks because we argue, as Crowder and Krysan (2016) do (also see Krysan and Crowder 2017), that these two perspectives are not mutually exclusive nor exhaustive and both dynamics can be operating simultaneously. To that extent, we also expect to find support for segmented assimilation as we review how the effects of characteristics such as socioeconomic status and nativity vary by group. In our discussion we review other possible factors that are not tested in this study.

Therefore, we leave open the possibility that this analysis may reveal the interplay of multiple distinct sociological dynamics that shape segregation, albeit at varying levels across groups and communities.

Applying the methods of Althausser and Wigler (1972) and Jones and Kelley (1984), we conduct the decomposition analysis using the following equations that incorporate the means of the predicted values described above:

- (D) $\bar{Y}_{G1ReG1Ra} - \bar{Y}_{G2ReG2Ra}$ = the observed overall level of segregation, reproduced using the predicted mean outcomes for each group based on each group's attainment model and distributions on the independent variables;
- (D_{Re}) $\bar{Y}_{G1ReG2Ra} - \bar{Y}_{G2ReG2Ra}$ = the 'resources' component of segregation, representing the portion of the overall level of segregation resulting from group differences in resources applied at the rates of return observed for the non-White group;
- (D_{Ra}) $\bar{Y}_{G2ReG1Ra} - \bar{Y}_{G2ReG2Ra}$ = the 'rates' component of segregation, representing the portion of the overall level of segregation resulting from group differences

in rates of return applied in combination with the resources of the non-White group; and
(D_J) $D - (D_{Re} + D_{Ra}) =$ the joint impact component of segregation, representing the portion of the overall difference in segregation resulting when observed group differences in resources are applied to (weighted by) the group differences in observed rates of return on resources.⁹ Substantively, this captures the ironic reality that group disparities in resources are less consequential when group disparities in rates of return are large. Relatedly, it indicates that eliminating group disparities in resources will produce larger reductions in segregation when it occurs after group differences in rates are eliminated.

This methodological approach allows us to explore a wider range of questions about the quantitative implications of microlevel dynamics of segregation while building on, rather than breaking from, the conventions established by previous locational attainments research.

5. Results

5.1 Microlevel analyses

For the sake of brevity, we omit the full set of 150 regression models and make these available in supplementary materials. In Table 3 we summarize our findings by presenting the means of the estimated coefficients across all models by group and pairing, where group refers to the racial group in the analysis and pairing refers to the combination for calculating pairwise segregation scores (e.g., White–Black, White–Latino, or White–Asian).¹⁰ Given that each metropolitan area has unique historical trajectories and processes of attainment, there is nontrivial variation in the regression coefficients. For this reason, we aim to convey the typical pattern of effects found in the micromodels and limit our interpretations of these findings to the implications of the directions of the coefficients. Deeper conclusions will be drawn out from the standardization and decomposition results presented in the next tables.

⁹ As Althaus and Wigler (1972) and Jones and Kelley (1984) advise, it is best to identify the joint component separately. Decompositions that do not identify this component necessarily, but rather implicitly, assign this component in whole or in part to the resources or rates component. By identifying the component separately, such assignments must be made explicit and justified.

¹⁰ Each pairing consists of a model for White households, with the dependent variable calculated based on the two groups involved. This results in three predicted outcomes for White households per area, one for each pairing.

Table 3: Mean fractional regression (logit) coefficients by group and group pairing

Variable	White-Black		White-Latino		White-Asian	
	White	Black	White	Latino	White	Asian
Degree	0.070	0.159	0.101	0.178	-0.068	0.027
(Ln) Household income	0.070	0.095	0.056	0.058	-0.008	0.015
Ever served in military	-0.152	0.172	-0.109	0.115	-0.003	0.134
<i>US-born citizen (ref)</i>						
Naturalized US citizen	-0.091	0.370	-0.047	-0.105	-0.371	-0.201
Not a US citizen	-0.115	0.345	-0.094	-0.317	-0.334	-0.318
Recent immigrant, <15 years	-0.215	-0.161	-0.124	-0.116	-0.199	-0.236
English language ability*	0.195	—	0.197	0.217	0.126	0.175
<i>Age 30-59 (ref)</i>						
Age 15-29	-0.280	0.042	-0.221	-0.177	-0.244	-0.151
Age 60+	0.306	-0.305	0.284	0.195	0.242	0.087
<i>Married-couple household (ref)</i>						
Single-mother household	-0.467	-0.483	-0.355	-0.347	-0.023	0.129
Other family household	-0.448	-0.279	-0.314	-0.158	-0.121	0.078
Moved in the last year	-0.212	0.231	-0.099	0.046	-0.139	0.059
Constant	1.256	-1.427	0.842	-0.541	2.781	0.958

Note: *Coefficients for Black households are not reported due to federal restrictions on disclosing results of statistical analysis of restricted-use census data for small subpopulations within groups.

The means of the estimated coefficients in Table 3 document distinct patterns aligning with the spatial assimilation hypothesis. We summarize our findings by stating that, in general, income and education are positive predictors of residential contact with White households for all groups. For example, the average estimated effect of income on residential contact with White households is positive for all other racial groups, which means that higher incomes increase the likelihood that Black, Latino, and Asian households live in neighborhoods that are at or above parity on the proportion of Whites. From the disaggregated data we found that these positive effects of socioeconomic status were especially consistent for Black locational attainments that determine levels of White-Black segregation and were largely consistent for Latino locational attainments that determine levels of White-Latino segregation.

Also, as expected, English language ability and citizenship are consistently positive predictors of residential contact with White households for Latino and Asian households, determining levels of White–Latino and White–Asian segregation. However, in the case of nativity and citizenship, these dynamics do not entirely hold true for Black households, where foreign-born Black householders experience greater residential contact with White households as compared to US-born Black householders in nearly all metropolitan areas, resulting in an average estimated coefficient that is positive for naturalized and noncitizens as compared to US-born citizens. This deviation from the spatial assimilation pattern for Black households could possibly be situated in the literature on segmented assimilation, which posits assimilation is not necessarily a straightforward process of upward mobility in tandem with more contact with White households, particularly for groups who experience the negative effects of racialization in the United States (Crowell and Fossett 2020; Iceland and Scopilliti 2008; Portes and Zhou 1993). We conclude our discussion of the broad findings from the regression results by noting that results for White households across individual models were inconsistent, demonstrating weaker effects that are consistent with past findings in the literature and reflecting the high levels of residential contact that White households have with one another (Pais, South, and Crowder 2012; South, Crowder, and Pais 2008).

To more fully understand the dynamics of locational attainments and how they shape overall segregation patterns, we next review our regression standardization and decomposition analyses, summarized in Table 4. We present the average contribution made by each component – group differences in resources, group differences in rates of return on resources, and the joint impact – to overall levels of segregation. We summarize these results across all 25 metropolitan areas, while results disaggregated by metropolitan area and pairing are made available in supplementary materials. We find that group differences in rates of return on resources overall make the larger contribution to White–Latino and White–Asian segregation as opposed to group differences in resources. Nonetheless, we also find that group differences in resources make sizable contributions to White–Latino and White–Asian segregation. This suggests an identifiable spatial assimilation process is at work even as place stratification is still a major factor in explaining White–Latino and White–Asian segregation. Finally, we find that the greatest moderating effect between the two components occurs with White–Latino segregation, where differences in resources and in rates of return on resources interact to a greater degree in determining levels of White–Latino segregation than they do for White–Asian or White–Black segregation, highlighting the complexities underlying White–Latino segregation.

Table 4: Summary of percentage share of each component to overall segregation, 2010

Component	White–Black	White–Latino	White–Asian
Average percentage share of resources component	9.25%	52.61%	36.95%
Average percentage share of rates component	90.69%	65.46%	65.42%
Average percentage share of joint component	0.06%	–18.06%	–2.36%
Average level of overall segregation	61.85	42.65	40.82

Note: Components analysis also includes a 'joint' component, which captures the extent to which the impacts of minority deficits on resources and rates are conditioned by each other.

These results stand in stark contrast to White–Black segregation, where on average 90% of the level of segregation can be attributed to group differences in rates of return while only 9% on average can be attributed to group differences in resources with little interaction between the two components. This finding suggests that even when White and Black households are matched on resources, segregation is reduced by only modest amounts because group differences in ability to convert those resources into more residential contact with White households is the dominant factor. In other words, place stratification is playing a prominent role in explaining White–Black segregation, with stronger effects than in the case of White–Latino or White–Asian segregation.

5.2 Locational attainments across segregation contexts

For further elaboration, we summarize variations in component contributions to overall levels of segregation in an area by area type and pairing in Table 5. We classify metropolitan areas using the following categories: low segregation ($D = 0–30$), medium segregation ($D = 30–50$), high segregation ($D = 50–70$), and very high segregation ($D = 70–100$). There is a telling pattern, which is that for all three group pairings, the contribution of group differences in rates of return to overall levels of segregation is greatest in metropolitan areas where segregation is high. In contrast, the role of group differences in resources is greatest in areas where segregation is lower. In other words, in higher segregation areas, segregation is less attributable to group differences in resources and more attributable to group differences in how those resources are converted into locational attainments. Segregation is more attributable to group differences only in resources rather than rates of return in the case of White–Latino segregation in low-segregation areas. Notably, for White–Black segregation group differences in rates of

return are persistently and disproportionately the larger component of segregation regardless of the level of segregation in the area.

Table 5: Mean shares of resources and rates components by overall level of segregation and group pairing

	Low segregation	Medium segregation	High segregation	Very high segregation
<i>White–Black</i>				
% Resources	—	13.11%	8.57%	6.53%
% Rates	—	84.52%	91.49%	95.88%
% Joint effect	—	2.37%	–0.06%	–2.41%
<i>White–Latino</i>				
% Resources	86.18%	51.03%	36.58%	—
% Rates	44.69%	66.67%	74.90%	—
% Joint effect	–30.87%	–17.70%	–11.48%	—
<i>White–Asian</i>				
% Resources	52.76%	34.79%	—	—
% Rates	63.50%	65.68%	—	—
% Joint effect	–16.26%	–0.47%	—	—

Note: Components analysis also includes a 'joint' component, which captures the extent to which the impacts of minority deficits on resources and rates are conditioned by each other.

To demonstrate how segregation can be analyzed by its microlevel dynamics in specific metropolitan contexts, we highlight the Los Angeles and Portland metropolitan areas, which represent high- and low-segregation contexts, respectively. In any given metropolitan context, regression standardization and components analysis can reveal the extent to which segregation is determined by place stratification dynamics, spatial assimilation dynamics, or both interactively. We present these results in Table 6. In the Los Angeles metropolitan area, regardless of the group comparison, group differences in rates of return on resources make the largest contribution to overall segregation. To clarify, in Los Angeles, place stratification plays a larger role in segregation patterns while group differences in resources make a smaller contribution. Thus, even when groups are matched on resources such as income or citizenship, they remain at least moderately segregated in Los Angeles due to place stratification factors. However, we find that for White–Latino and White–Asian segregation, there is a larger joint component, suggesting that the separate roles of place stratification and spatial assimilation covary to a greater extent for these comparisons.

Table 6: Components analysis by group pairing in Los Angeles and Portland

Component	Los Angeles			Portland		
	White-Black	White-Latino	White-Asian	White-Black	White-Latino	White-Asian
Resources	6.37	23.86	12.74	5.75	27.23	19.32
Rates	64.04	53.05	46.46	37.25	17.48	22.76
Joint	-3.07	-16.47	-12.30	-0.00	-14.05	-9.24
Dissimilarity	67.34	60.44	46.90	42.91	30.66	32.84

Note: The components reported additively reproduce the segregation index.

Results for Portland differ in a variety of ways that reflect the need to consider the segregation context. While the contribution of group differences in rates of return to segregation is nontrivial for White-Latino and White-Asian segregation, it is now on par with the contribution made by group differences in resources. In fact, for White-Latino segregation group differences in resources make the larger contribution. This implies that much of White-Latino and White-Asian segregation in Portland can be explained by group differences in social characteristics. However, for Black households the results remain the same as they do in many other metropolitan areas. Difference in rates of return between White and Black households are the larger determining factor in explaining segregation. Even in a low-segregation context, equalizing on resources does not drastically reduce levels of White-Black segregation because of stronger place stratification dynamics.

5.3 Effects of citizenship and nativity

Another advantage to regression standardization is that it is possible to isolate the effects and impact of group differences on certain social characteristics by holding other characteristics constant. Nativity is a key factor in the spatial assimilation framework, which posits that residential contact with White households will increase for other groups as they become increasingly socially and generationally distanced from immigration. We conduct a standardization exercise to assess the independent effects of citizenship and nativity, where both groups in the pairing are held constant on certain characteristics, including education at a high school level, income at the mean for high school-educated White householders, and household structure at married couple status. We do this by comparing the level of segregation of each non-White group from White households based on being a US-born citizen, a naturalized US citizen, a noncitizen who has not immigrated within the last 15 years, or a noncitizen who has immigrated within the last 15 years. White householders are held constant as US-born citizens.

To efficiently summarize our findings, we present the average level of segregation across all areas from White households by citizenship and nativity of the non-White group in Table 7 with predicted levels of segregation by categories of citizenship and nativity shown in Figures 1–3 for each pairing. For Asian and Latino households, segregation from US-born White households increases as their social distance by nativity and citizenship increases. Thus, US-born Asian and Latino households experience the lowest levels of segregation from US-born White households, and noncitizens who have recently immigrated experience the highest levels. This finding is consistent with the spatial assimilation hypothesis.

Table 7: Average predicted levels of ‘net’ segregation from US-born White households by race, citizenship, and nativity*

Race	‘Net’ Segregation				
	Overall	US-born citizen	Naturalized US citizen	Noncitizen, not recent immigrant	Noncitizen, recent immigrant
Black	61.9	61.3	55.3	55.4	59.8
Latino	42.7	31.3	36.5	42.2	45.8
Asian	40.8	32.5	39.7	43.1	50.8

Note: *In the difference of means formulation, ‘overall’ segregation is the majority–minority difference of means in attaining parity-level contact with Whites. ‘Net’ segregation is the expected majority–minority difference on predicted parity-level contact with Whites based on a specified set of social characteristics.

In contrast, we again find an entirely different outcome for Black households. On average, US-born Black households experience the highest levels of segregation from US-born White households in comparison to foreign-born Black households regardless of citizenship and time of immigration. This reflects a more complicated story for Black households in the United States that could be better informed by the place stratification or segmented assimilation hypotheses. Among foreign-born Black households, time of immigration does follow a more predictable pattern with recent immigrants experiencing higher levels of segregation than more established immigrant households, but even their levels of segregation are not as high as those of US-born Black households.

Figure 1: White–Black segregation by Black nativity and citizenship, 25 US metropolitan areas

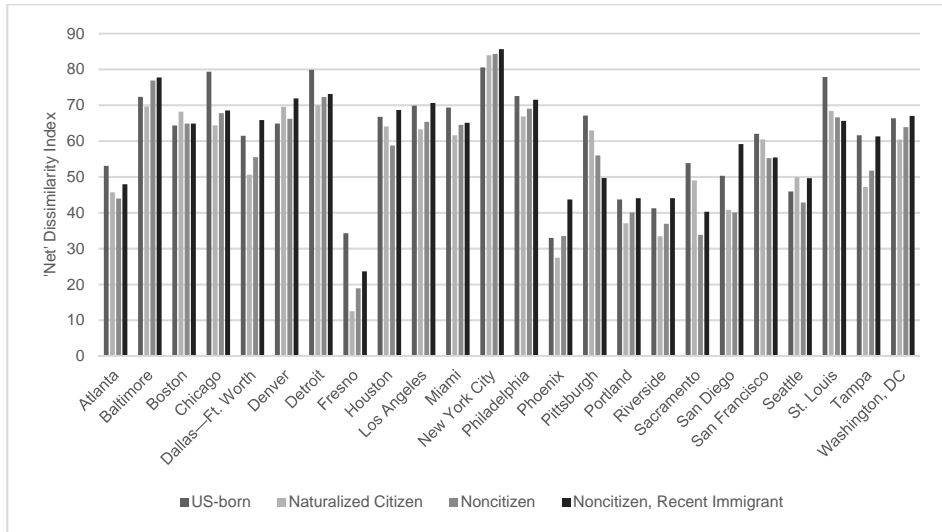


Figure 2: White–Latino segregation by Latino nativity and citizenship, 25 US metropolitan areas

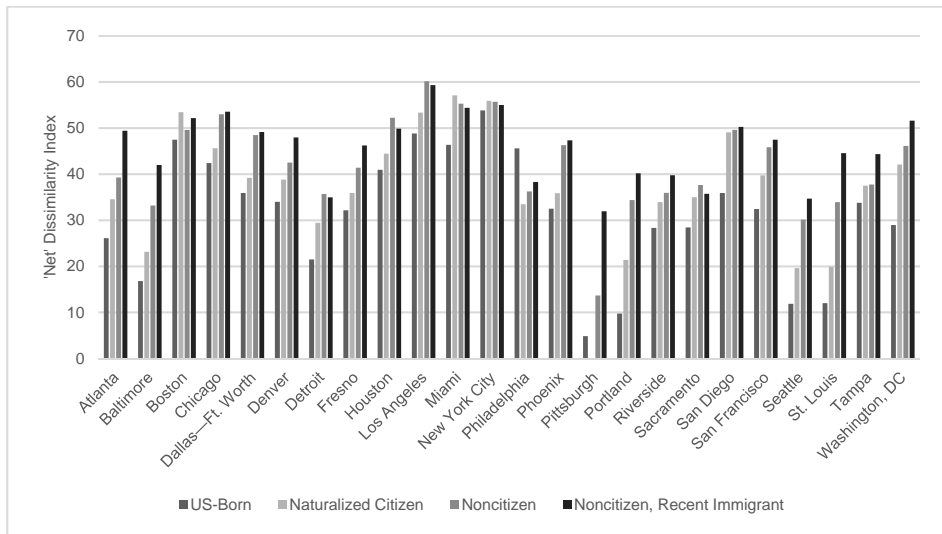
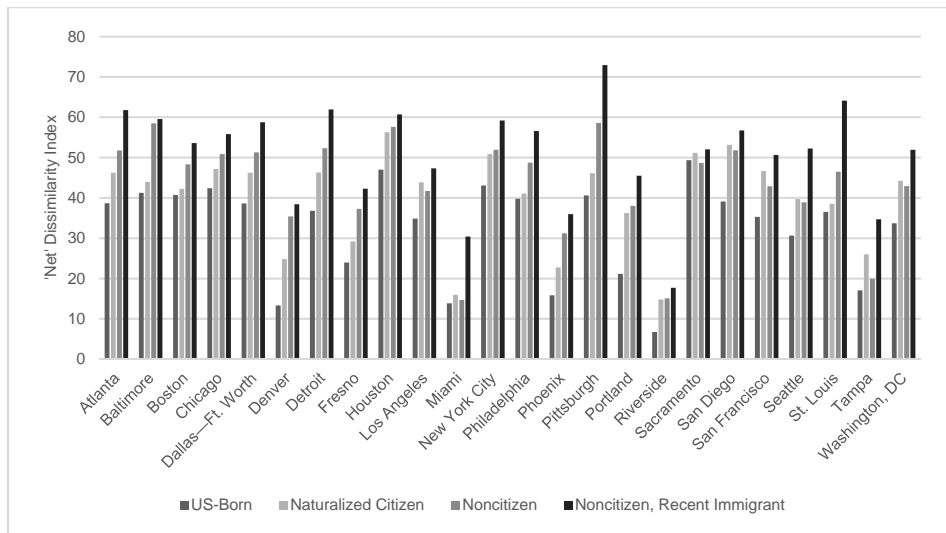


Figure 3: White–Asian segregation by Asian nativity and citizenship, 25 US metropolitan areas



6. Discussion

Our findings detail the complexities of locational attainment processes that underlie segregation patterns and demand a more dynamic analytical framework. For Latino and Asian households, spatial assimilation dynamics are consistently evident, but place stratification dynamics often predominate. For Black households, the story is straightforward in some ways and not in others. In general, group differences in resources are less important to White–Black segregation, as Black locational attainments more strongly reflect place stratification effects. We also find that the classical spatial assimilation model is less applicable to understanding Black segregation as nativity works in the opposite direction for Black households in comparison with Latino and Asian households, consistent with our past research and suggesting a pattern of segmented assimilation (Crowell and Fossett 2020). While a deeper analysis of Black immigrant segregation is beyond the scope of this study, other research has offered further insight into variation in Black immigrant segregation patterns (Scopilliti and Iceland 2008; Tesfai 2019).

Standardization and decomposition analysis strengthen our argument that the role of race as employed by place stratification and segmented assimilation is prominent

throughout, but more consistently and to a greater quantitative degree for Black households. This puts the historically rooted barriers to residential integration for Black households into sharp relief and speaks to the apparent fact that Black families in the United States encounter a far more entrenched system of segregation and oppression than other groups, while Latino and Asian households experience weaker place stratification barriers. For Black families, social disadvantages that are intrinsically linked with segregation are far more difficult to overcome and, according to Sharkey (2013), are likely inherited in a way that is parallel to how social advantages are inherited in White families.

Finally, we find that the segregation context of the area matters, with place stratification playing a larger role in explaining levels of segregation in high-segregation contexts. In low-segregation contexts, while place stratification dynamics still have an effect on locational attainments and overall levels of segregation that are worth noting – and remain strong in the case of White–Black segregation – much more of the levels of segregation in these areas can be attributed to group differences in characteristics such as income, education, nativity, and language. In contrast, a rise in segregation is accompanied by a rise in the importance of group differences in the returns given on social characteristics. In other words, in high-segregation contexts, whether or not groups are equalized on resources is less directly consequential because the differential rates of return on those resources are more determinant of locational attainments. Thus, spatial assimilation dynamics are consistently weaker in high-segregation contexts for all groups.

High-segregation areas have patterns of segregation that are more resistant to any advances made by minoritized racial groups on various aspects of social status. There is also likely a feedback loop, where segregation enables neighborhood disadvantage, which then makes it more difficult for non-White groups to achieve and maintain those social advancements (Sharkey 2013). Segregation in these high-segregation contexts can also be reinforced through structural sorting dynamics, as theorized by Krysan and Crowder (2017). These dynamics are shaped by information networks, where locational attainments are affected by the information that households have about other neighborhoods in the area. In a highly segregated metropolitan area, groups may have knowledge about neighborhoods that is more limited by the social networks and neighborhoods that they regularly access, a manifestation of stratification that creates the structural sorting process that Krysan and Crowder (2017) describe.

These cross-context findings allow us to speculate on what conditions they reflect. There are lower returns for minoritized racial groups in highly segregated metro areas possibly because of ongoing structural constraints emphasized by the place stratification theory that limit possibilities for residential integration. It is important to again note, however, that for White–Black segregation, differences in rates of return always make

the larger contribution to overall segregation regardless of the level of segregation. This is reflective of the more deeply rooted, racial history of White–Black segregation, which is not so easily overcome through a locational attainment process. Segregation for Black households in the United States is more concretely shaped by a racist legacy of separation, while Latino and Asian households experience more fluidity in locational attainments and have segregation patterns that are more influenced by immigration. Indeed, the role of immigration calls for further exploration given the emergence of immigrant ‘new destinations,’ or areas beyond the largest metropolitan areas that have become destinations of initial settlement for immigrants, particularly Latino immigrants. Research on residential segregation in these areas suggests that immigrants are experiencing higher or rising levels of segregation in these new destinations as compared to what are referred to as ‘established areas of settlement’ (Hall 2013), a category that applies to the majority of the metropolitan areas analyzed in the present study.

An important contribution of this study is that it demonstrates the value of adopting new approaches to understanding the microlevel dynamics of residential segregation patterns. The locational attainments analyses we perform fully adhere to the traditional approach of modeling microlevel locational attainments while adopting the difference of means formulation of the dissimilarity index. This approach allows us to use the results of locational attainment models to directly reproduce and explicate a macrolevel analysis of overall levels of segregation shaped by microlevel processes. With this nuanced, multilayered approach, we identified household-level characteristics that are meaningful predictors of locational attainments and describe their direct, quantitative implications for overall levels of segregation. Our particular microlevel approach to locational attainments analysis also makes it possible to conduct standardization and decomposition analyses, which provide evidence relevant for evaluating some of the major conceptual frameworks for explaining residential segregation. Finally, building on the standardization and decomposition analysis, we can compare areas with varying contexts and draw out the salience of social characteristics for locational attainments from low- to high-segregation contexts.

A note to the reader about data is warranted here because these analyses were also possible due to our ability to access the restricted-use census microdata that is only available in Federal Statistical Research Data Centers (RDCs). The barrier for access to these data is high, which may discourage researchers from adopting our approach. But we encourage researchers who may not have access to an RDC to seek out other sources of household survey data where neighborhood geography (e.g., blocks, tracts, etc.) is available, which can be linked to public-use decennial census summary files. The decennial census summary files can be used to calculate neighborhood racial composition necessary for constructing the segregation index while avoiding the pitfalls of measuring segregation with sample-based estimates (Napierala and Denton 2017), while the survey

data can provide the covariates for conducting locational attainment analyses. This approach will appropriately situate segregation as a stratification outcome driven by microlevel dynamics while establishing continuity with those locational attainment analyses in the existing literature that stop short of drawing a direct link to overall segregation outcomes.

In conclusion, these findings highlight the complex nature of residential segregation in metropolitan settings in the United States and demonstrate the competing roles of locational attainments that reflect group differences but are also hindered by place stratification barriers. With this study we continue to explore new ways of understanding these complexities using innovative methodologies for identifying and explaining the microlevel factors that shape segregation patterns and how these relationships vary in different segregation contexts. Equalizing group differences on relevant social resources does not have a uniform effect on segregation across groups or areas, and the effect is markedly lower when segregation is high, reflecting the ability of residential segregation to persist once it is firmly in place.

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