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Assortative mating, residential choice, and ethnic segregation☆

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ABSTRACT

This paper presents a study of the relationship between assortative mating and ethnic segregation in Stockholm, Sweden. We examine how segregation influences couple formation, where newly cohabiting couples choose to live, and how union formation and mobility jointly influence residential segregation. 1990–2012 Swedish population registers allow us to identify the onset of cohabiting relationships and residential mobility for newly cohabiting couples. Estimates based on two-sex models of assortative mating and discrete choice models of residential mobility reveal that non-Western ethnic groups are largely confined to non-Western partners and to neighborhoods with disproportionately high representations of non-Western groups. Simulations based on our empirical models indicate that assortative mating and residential mobility both contribute to segregation. Tendencies to partner with singles who live nearby and who share the same ethnicity and nativity increase segregation. The results demonstrate how residential segregation and homogamous patterns of union formation are mutually constitutive and suggest that more attention should be paid to family demography when studying segregation.

1. Introduction

Residential segregation—the unequal spatial distribution of groups—is a "structural linchpin" in systems of racial and ethnic stratification (Massey, 2016; Pettigrew, 1979). This is partly due to the direct effects of neighborhoods on their residents. Racial and ethnic segregation can engender unequal exposures to socioeconomic disadvantage and pollution (Bruch, 2014; Crowder & Downey, 2010; Massey & Denton, 1993; Quillian, 2012), which contribute to inequalities across a host of socioeconomic and health outcomes (Chetty et al., 2016, 2020; Chetty & Hendren, 2018; Ludwig et al., 2013; Manduca & Sampson, 2019; Wodtke et al., 2011; Yang et al., 2020). Segregation also indirectly affects stratification by shaping the make-up of families. On the one hand, where people live influences whether, when and with whom they will partner, even in the digital age (Bruch & Newman, 2019; Lewis, 2016; South & Crowder, 1999, 2000; Xia et al., 2013; Zhang et al., 2022). In a segregated city, this can induce group differences in family structure and resources that foster inequality for subsequent generations (Bloome, 2014; Coleman et al., 1972; Neal & Johnson, 1996). On the other hand, residential moves necessitated by the onset of cohabitation depend on the preferences and resources of both partners (Brandén & Haandrikman, 2019; Chan & Ermisch, 2015; Dahl & Sorenson, 2010a, 2010b; Gabriel, 2015; Gabriel & Spring, 2019). Patterns of union formation that reinforce group differences in these preferences or resources will also reinforce inequality in neighborhood attainments and, hence, their effects (Bayer & McMillan, 2005; Leibbrand & Crowder, 2018; Pais et al., 2012; Quillian, 2015; South et al., 2016; White & Sassler, 2000).

The study presented in this paper examines the relationships between residential segregation, family formation, and ethnic stratification. However, rather than examining how neighborhoods and families affect the socioeconomic attainments and health outcomes of individuals with different ethnic and racial backgrounds, we examine how the *ethnic stratification of neighborhoods* affects and is affected by family formation processes. Specifically, we examine how ethnic segregation is both a cause and consequence of *ethnic assortative mating*—the pattern of union formation within and across ethnic boundaries—and new

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couples' *residential choices*—the neighborhood destinations where couples form their new households.

Our study builds on existing research showing how interracial households depress levels of segregation in the United States (Ellis et al., 2007). A key insight of this research is that inter-ethnic mixing at the household level necessitates mixing at the neighborhood level. Ethnic homogamy—the tendency to partner with someone from one's own ethnic group—can have a direct effect on segregation by thwarting household-level mixing that is *ipso facto* neighborhood-level mixing. One of our contributions is to reveal this mechanism at work in a European context using Swedish register data.

We also advance this research by demonstrating that unique segregation dynamics result from interactions between assortative mating and residential choice processes. Assortative mating modifies the segregating effects of residential choices because heterogamous couples make different residential choices than their homogamous counterparts (Ellis et al., 2011; Gabriel, 2015; Gabriel & Spring, 2019; Holloway et al., 2005; Wright et al., 2011, 2012). Studies of single-race households have established that subtle differences in the effects of racial or ethnic composition on residential choices can drive substantial variations in segregation (Bruch & Mare, 2006, 2009; Schelling, 1971; Van De Rijt et al., 2009; Xie & Zhou, 2012). If segregation depends on the population-level distribution of these composition-dependent mobility behaviors, and this distribution hinges on the extent of household-level mixing between groups, then the combined effects of ethnic homogamy and residential mobility on segregation are likely more than the sum of their individual parts.

Previous studies of inter-ethnic couples and segregation have been unable to examine the interaction between assortative mating and residential choice because they have not articulated models of union formation. Instead, previous analyses have taken homogamous and heterogamous couples as given, only then examining their residential mobility and settlement patterns. We address this shortcoming by estimating both two-sex assortative mating models (Qian & Preston, 1993; Schoen, 1981) *and* discrete choice models of residential mobility among new couples (Bruch & Mare, 2012; McFadden, 1978), assessing their joint effects on segregation using micro-simulation. This allows us to decompose year-to-year changes in segregation into (1) the assortative mating mechanisms affecting household-level mixing, (2) the residential choice mechanisms affecting neighborhood-level mixing, and (3) interactions between these household- and neighborhood-level mixing mechanisms. Crucially, we demonstrate that ethnic homogamy *enables* segregating residential choices.

Another unique contribution of our study is to reveal how existing segregation perpetuates itself by structuring union formation and residential mobility processes. We do so by explicitly considering space as an intervening variable. This analytical maneuver is enabled by Swedish population registers, which contain more than 20 years of detailed socio-demographic and residential history records for virtually all residents of Stockholm—our study context. This allows us to identify when, where, and with whom singles form cohabiting unions with remarkable precision. Using these data, we show that segregation is preserved when people form unions with those who live nearby—a phenomenon known as *residential propinquity*—and when the resulting couples move to neighborhoods near to the partners' origins—a phenomenon we refer to as *residential inertia*. Using our analytic framework, we not only demonstrate that propinquity and inertia perpetuate segregation, but also that there is an interaction between these two behavioral tendencies. Propinquity when finding a partner enhances the segregation preserving effects of inertia.

By focusing on union formation, we build on an emerging stream of research highlighting variations in segregation across family types and the life course (e.g., Owens, 2016). Other studies of segregation dynamics have elided family and life course processes, instead emphasizing residential mobility among populations distinguished mainly by race, ethnicity, and socioeconomic status (Bruch, 2014; Bruch & Mare, 2006; Fossett, 2006; Quillian, 1999; Schelling, 1971). Our analysis addresses this omission. While we do not specify general mechanisms that apply to all individuals and families, we gain precision by examining mechanisms operating among demographically important subpopulations at critical moments in their lives. In so doing, we provide a fresh demonstration of how micro-level family processes can influence macro-level social stratification outcomes (e.g., Kye and Mare, 2012; Mare and Maralani, 2006).

2. Theory and background

Our theoretical framework, sketched in Fig. 1, focuses on how union formation and residential mobility affect segregation dynamics, i.e., changes in segregation between one time, t, and a subsequent time, $t+1$. In this framework, there is no direct effect of initial segregation on subsequent segregation. Instead, existing segregation, as well as the cultural background of ethnic preferences and biases, impose constraints on the romantic and residential choices of singles and couples, with these micro-level choices effecting incremental, macro-level change (Coleman, 1986; Hedström, 2005). In the paragraphs that follow, we elaborate and summarize evidence concerning the key components of this theoretical model. We discuss how existing segregation and ethnic preferences affect both assortative mating (Fig. 1, Path A and B) and residential choices (Path C and D). In the process, we consider how the spatial proximity of partners prior to cohabitation, as well as their ethnicity, modulate residential choices (Path E) and how these choices aggregate up into changes in segregation (Path F).

2.1. Structural and preferential determinants of union formation

Patterns of assortative mating across social groups have long been a subject of sociological inquiry. Across many kinds of social classifications, people tend to form unions with partners who share the same or similar social characteristics (Kalmijn, 1998; Schwartz, 2013). The present study focuses on assortative mating by *ethnicity*. Just as racial homogamy is a well-established pattern in the United States (Kalmijn, 1993; Kalmijn and van Tubergen, 2010; Qian, 1997; Qian & Lichter, 2007; Schoen & Kluegel, 1988), growing evidence suggests that ethnic homogamy is a feature of national and sub-national marriage markets in Europe (Carol, 2016; Celikaksoy et al., 2010; Dribe & Lundh, 2008, 2011; Elwert, 2020; Feng et al., 2010; Kalmijn & van Tubergen, 2006; Lucassen & Laarman, 2009; van Tubergen & Maas, 2007).

Observed patterns of homogamy result from a mix of preferential and structural mechanisms (Blau, 1977). *Preferential mechanisms* refer to the dispositions of people towards own and out group members, including both positive and negative (i.e., discriminatory) sentiments. Ethnically homogamous preferences appear to be a feature of European marriage markets (Carol, 2013; Huijnk et al., 2010). Some of these preferences may be related to perceived cultural dissimilarities between natives and immigrants (Carol, 2016; Dribe & Lundh, 2011; Lucassen & Laarman,

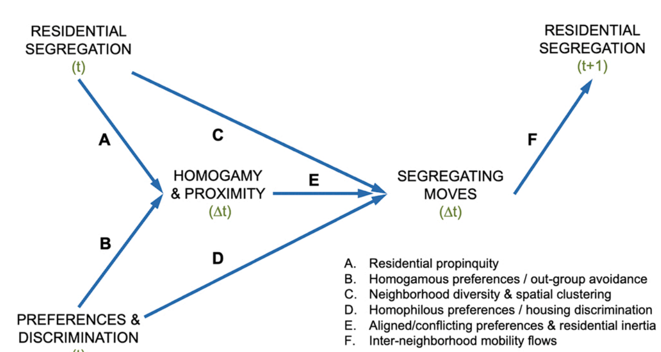

Fig. 1. The links between assortative mating, residential mobility, and segregation.

2009). In Sweden, these preferences may be partly responsible for relatively high levels of union formation between natives and people with Western immigrant backgrounds and lower levels of union formation between natives and people with African and Middle Eastern backgrounds (Behtoui, 2010; Dribe & Lundh, 2008). Overall, the evidence in Sweden suggests that ethnically *homogamous preferences* contribute to ethnically *homogamous patterns* of assortative mating (Fig. 1, Path B).

Structural mechanisms refer to demographic and institutional backgrounds affecting the probability that members of different groups will make the social contacts necessary to form romantic unions (Blau, 1977). All else equal, higher rates of contact should lead to higher rates of union formation. Here, the spatial proximity of groups acts as an important structural constraint. People are less likely to encounter those who are geographically distant, and distant potential partners may be less preferred as mates because long distance relationships are more difficult to maintain (Bailey et al., 2018; Bruch & Newman, 2019; Lewis, 2016; Xia et al., 2013). This means that metropolitan-level variations in ethnic diversity and the availability of opposite sex partners impose fundamental demographic constraints on patterns of assortative mating (Blau et al., 1982, 1984; Fossett & Kiecolt, 1991; Lewis & Oppenheimer, 2000; Lichter et al., 1991). In the United States, these regional and metro-level population structures account for a substantial portion of observed patterns of racial and ethnic assortative mating and between group-differences in exogamous marriage rates (Choi & Tienda, 2017; Harris & Ono, 2005).

However, cities themselves are internally differentiated, containing neighborhoods with varying social, demographic, and economic characteristics which are often spatially clustered (Lee et al., 2008; Östh et al., 2015; Reardon et al., 2008; White, 1983). These patterns of spatial segregation influence residents' awareness, knowledge, and evaluations of neighborhoods (Krysan & Bader, 2007, 2009), which translates into the stratification of where people engage in day-to-day activities like attending school, going to work, shopping, etc. (Bischoff & Tach, 2020; Ellis et al., 2004; Jones & Pebley, 2014; Owens, 2016; Wong & Shaw, 2011). These segregated *activity spaces* give shape to local marriage markets by determining who will be most likely to meet whom (Huckfeldt, 1983; Kalmijn & Flap, 2001).

The spatial segregation of groups can lead to homogamous patterns of assortative mating through a propinquity mechanism (Fig. 1, Path A). Propinquity refers to the tendency of people to meet potential partners who live nearby or to prefer partners who are more spatially proximate (Bossard, 1932; Catton & Smircich, 1964; Haandrikman, 2011, 2019). Residential segregation increases the likelihood that people with similar characteristics will live, work, and play in overlapping activity spaces, increasing rates of contact and rendering socially similar partners more appealing by dint of their proximity. In segregated places, these structural and preferential aspects of propinquity can induce homogamy even if people have no preferences for their partners' other social attributes.

Studies of assortative mating in Western countries have used a variety of methods to assess the relative importance of propinquity and homogamous preferences for patterns of assortative mating. Classic studies have tended to use ad hoc approaches applied to unique, but idiosyncratic, geocoded marriage data (Kennedy, 1943; Morgan, 1981; Peach, 1974, 1980; Ramsøy, 1966). Findings suggest that propinquity and preferences both contribute to observed patterns of homogamy, and that the two are at least partly independent: controlling for one does not appreciably affect estimates of the other. More recently, single-sex models of assortative mating have been used to indirectly account for sub-regional variation in the spatial proximity of groups by deploying metropolitan-level measures of segregation (Choi & Tienda, 2017) or neighborhood-level measures of composition (Feng et al., 2010; Lievens, 1998; Muttarak & Heath, 2010) as explanatory variables in models of racial and ethnic endogamy. This research has shown that higher levels of ethnic segregation at the metro level and greater co-ethnic exposure at the neighborhood level are associated with lower levels of ethnic intermarriage. A more direct approach involves using distance as an explanatory variable in disaggregated, individual-level models of partner choice (Haandrikman & van Wissen, 2012). Findings indicate that people who live closer together are more likely to form a union, and that proximity mediates homogamy effects. These findings support the idea that the spatial distribution of populations within regions matters for rates of inter-ethnic marriage, with propinquity tending to increase rates of homogamy.

2.2. The segregating effects of assortative mating

Whether shaped by preferences or population structure, assortative mating has implications for patterns of segregation. The effect of assortative mating on residential segregation is realized through two sets of mechanisms: those affecting household-level mixing and those affecting neighborhood-level mixing. At the household-level, sharing a housing unit necessarily involves sharing a neighborhood. When couples are ethnically heterogamous, this *ipso facto* neighborhood mixing supports ethnic heterogeneity and suppresses segregation, as shown in the United States (Ellis et al., 2007, 2011). Conversely, homogamy should tend to reinforce ethnic homogeneity at the neighborhood level, and hence sustain segregation.

The effects of assortative mating on segregation also depend on the ethnic compositions of neighborhoods to which couples move when they form their households. This depends on how partners negotiate discriminatory barriers and their potentially conflicting ethnic preferences (Fig. 1, Path D and E) within a segregation-constrained set of neighborhoods with varying ethnic compositions and degrees of spatial accessibility (Path C). Available evidence suggests that *singles'* residential preferences and mobility behaviors are consistent with high levels of segregation in Sweden, with natives avoiding stigmatized immigrant groups, and ethnic minorities moving to neighborhoods with disproportionately high shares of co-ethnics (Aldén et al., 2015; Bråmå, 2006; Farley et al., 1997; Giménez de La Prada, 2021; Krysan et al., 2009; Bruch & Mare, 2006; Xie & Zhou, 2012). This leads us to expect that couples' residential choices with respect to ethnic composition will likely support segregation as well.

However, the possibility of heterogamy among couples complicates this picture. When couples are ethnically mixed, residential choices may require compromise between differing sets of ethnic preferences and discriminatory constraints. In the United States, for example, mixed couples often live in or move to neighborhoods that are more racially and ethnically diverse than homogamous couples (Gabriel, 2015; Gabriel & Spring, 2019; Holloway et al., 2005; Wright et al., 2011, 2012). If partners forming mixed couples originate in own group majority neighborhoods and subsequently move together to more diverse neighborhoods, this will deconcentrate their origins and enhance the diversity of their destinations, leading to a reduction in segregation. Alternately, if heterogamous couples meet in and move to diverse neighborhoods, this will maintain, but not increase, segregation. In contrast, homogamous couples can only reduce segregation if they move to neighborhoods that are more diverse than their origins. In the more likely case that homogamous couples move to neighborhoods where their own group is as dominant or more dominant than in the partners' origins, then their moves will at best maintain, and at worst increase, segregation. This suggests an interaction: the segregating effect of ethnicity-dependent residential choice behaviors will be highest when couples follow homogamous patterns of assortative mating.

The effects of residential propinquity and inertia on segregation (Path A→E→F and C→F in Fig. 1) are comparatively unexplored. Propinquity may reinforce segregation simply by increasing the number of homogamous couples and preventing household-level mixing. However, propinquity may also perpetuate segregation by interacting with residential inertia—the tendency of people to move to housing units near their residential origins (Blaauboer, 2011). When partners live near each other prior to cohabitation, their joint residential inertia should lead them to form their new household in one of a narrow set of neighborhoods in the vicinity of both of their (spatially proximate) origins. When demographically similar neighborhoods are clustered together in space—a common aspect of segregation—the interaction of propinquity and inertia will lead partners' neighborhood origins, as well as their destination as a couple, to be demographically similar. In fact, if propinquity and inertia were sufficiently strong, singles would find partners and form households within the boundaries of their origin neighborhoods. This would involve no inter-neighborhood residential mobility at all, meaning that neighborhood ethnic compositions and hence segregation would be perfectly preserved. However, when partners live far apart prior to cohabitation, their origins are more likely to be demographically distinct, and their moves may be to a wider variety of neighborhoods that lie somewhere between their origins. This implies an increased chance of de-segregating residential moves.[1] Thus, we expect an interaction between propinquity and inertia: the segregating effects of propinquity will be highest when residential choices are constrained by residential inertia.

To recapitulate the above arguments (summarized in Fig. 1), we expect propinquity and ethnocentric preferences will increase rates of ethnic homogamy. This will tend to increase segregation by curtailing household-level mixing. Partners in ethnically homogamous unions should be more likely to move to neighborhoods where their own groups are disproportionately represented due to ethnic sorting, meaning that ethnic homogamy will enhance the segregating effects of ethnicity-based residential choices. Meanwhile, residential propinquity and inertia will act to preserve neighborhood demographic compositions and, hence, segregation. Taken together, the mechanisms of assortative mating and residential mobility we have identified should sustain segregation.

3. Data

Data for our analyses are drawn from the Swedish population registers, a comprehensive, longitudinal database containing records for all individuals and households who reside in Sweden, including yearly residential locations geocoded down to the property level, family rosters, places of birth, marital statuses, and other basic demographic and socioeconomic characteristics. We restrict our study population to people living and forming opposite-sex partnerships in Stockholm County between the ages of 17 and 44 during the period 1990–2010. While Sweden allowed same-sex registered partnerships beginning in 1995, and legalized same-sex marriage in 2009, we restrict our analyses to opposite-sex couples because we observe very few same-sex unions in our data and faced great uncertainty in defining the pools of singles at risk of forming such unions. We further restrict our analysis to younger ages because older people were less likely to have parental place of birth recorded in the registers, but also because most new unions occur in the 17–44 age range. As of 2010, Stockholm County had a population of over two million residents, of which approximately one million lived in Stockholm Municipality. The remainder of the Stockholm County population resided in outlying municipalities that belong to the same urban agglomeration and are readily accessed from Stockholm via subway, commuter rail lines, or car.

3.1. Dependent variables

Counts of new cohabitations are the dependent variable in our assortative mating analysis. We focus on co-residence rather than legal marriage because more than 90% of new marriages in Stockholm are preceded by a period of unmarried cohabitation, and many couples do not formally marry (Andersson & Philipov, 2002; Bracher & Santow, 1998). Additionally, because we are interested in the processes that link residential location and cohabitation, we focus on entry into cohabitation, rather than the status of cohabitation itself. While cohabitation status is not officially recorded in the registers, we leverage the longitudinal nature of our data to identify transitions into cohabitation. Using our approach, detailed in the online supplement, we identify 187,746 couples initiating cohabitation in Stockholm County during the study period.

Neighborhood destination is a polytomous dependent variable in our analysis of residential mobility among newly cohabiting couples. We identify neighborhood locations as the approximately 890 SAMS (Small Areas for Marketing Statistics) in Stockholm County. SAMS are spatially bounded residential areas containing, on average, approximately 2000 residents.

Segregation is the macro-outcome of interest in our simulations (detailed below). Because we are not interested in the patterns of segregation obtaining for any one group, but instead want to assess overall levels of segregation in our multi-ethnic population, we use the multigroup information theory index (Reardon & Firebaugh, 2002). The index ranges from 0 when a city is perfectly integrated and all neighborhood compositions are identical to 100 when the population is perfectly segregated, and all groups live in neighborhoods where all their neighbors come from the same group. We calculate these indices based on the division of the population into six, mutually exclusive ethnic groups, which we enumerate below.

3.2. Independent variables

From detailed country of origin data, we distinguish six broad *ethnic* categories: (1) Swedish; (2) Western; (3) Eastern European; (4) African or Middle Eastern, including Central Asian; (5) Latin American; and (6) Asian. Ethnicity is determined only by place of birth of individuals and their parents. Individuals born in Sweden to Swedish born parents are classified as Swedish, regardless of place of birth of grandparents or more remote kin. Sweden-born persons with mixed ethnicity parents are classified based on mother's place of birth.[2] A full accounting of the countries included in these broad ethnic groupings is presented in Online supplement. We use a simplified, six-category ethnic coding in part because these categories align with clusters of cultural differentiation identified in the World Values Survey (Haerpfer et al., 2020), in part because they roughly follow dimensions of religious and linguistic differentiation, and because they represent distinct channels of immigration to Sweden that occurred for different reasons (i.e., asylum seekers vs. labor migrants) and at different points in time. These groupings are sufficiently detailed to capture patterns of homogamous/homophilic behavior without making our two-sex approach to modeling union formation infeasible.

We also include *nativity* in the analysis because, by our definition, members of non-Western groups are necessarily either immigrants or the

[1] Note that we would expect residential inertia to increase segregation even in the absence of propinquity. Because Swedes are the largest group in the marriage market, even in the case of maximal heterogamy, where each non-Swede is partnered with a Swede, there will be a preponderance of homogamous Swedish couples originating in predominantly Swedish neighborhoods. Inertia will induce these couples to move to or remain in neighborhoods that are also predominantly Swedish, thus perpetuating segregation.

[2] The measures of ethnicity deployed here are necessitated by the Swedish data. Statistics Sweden does not collect population data on subjective ethnic identifications. The categories we use will only partially coincide with the ethnic categories that are salient to union formation and residential choices and will be subject to unquantified classificatory error. Assuming that this error is not systematic, this would lead to an understatement of the degree to which ethnicity structures both the marriage market and the spatial distribution of the population.

children of immigrants. Immigrants, taken as a whole, may be more spatially isolated than non-immigrants and may also participate in common acculturation activities (e.g., Swedish language learning and educational accreditation) that make it more likely that they will form unions with each other, even across ethnic boundaries. The three *nativity* categories are: (1) foreign born (i.e., first generation immigrants); (2) Swedish born to foreign-born parents (i.e., second generation immigrants); and (3) Sweden-born to Sweden-born parents (i.e., native). By construction, we align the latter category with the Swedish ethnic category.

Our approach to modelling residential mobility requires neighborhood-level measures of ethnic composition. However, in ethnically heterogeneous places, a priori categorizations of ethnicity at the individual level need not correspond to broadly recognizable variations in ethnic composition at the neighborhood level. To arrive at models of residential mobility that provide (1) good representations of salient variations in neighborhood ethnic composition and (2) good fit to observed mobility behaviors, we use an exploratory, factor-analytic approach (detailed in Online supplement) that makes use of fully disaggregated ethnicity data. Our factor analysis identifies six dimensions of ethnic differentiation, which we use to calculate neighborhood-level ethnic composition scores for all years in our study. The six factors correspond, respectively, to disproportionately high representations of immigrants from (1) East Africa and other refugee sending countries; (2) Lebanon, Syria, Turkey, and Iraq; (3) Western and East Asian countries; (4) Finland; (5) Balkan countries and the former Yugoslavia; and (6) Eastern European countries, particularly those on the Baltic (e.g., Estonia, Latvia, Poland, and Russia).

Finally, inter- and intra-neighborhood distances are key variables in our analysis of both assortative mating and residential mobility, capturing the effects of residential propinquity and inertia. We calculate straight-line distances, in kilometers, between neighborhoods based on the average distance between neighborhood residents. We log-transform these distances to achieve parsimonious fits in our models of residential mobility and segregation. The log transformation also corresponds to our expectations that percentage differences in distances, rather than linear increments, will influence partnership and residential choices. For the assortative mating analysis, we account for residual, within-neighborhood union formation by including dummy variables identifying cases where singles are living in same neighborhood prior to union formation. For the residential choice analysis, we construct dummy variables identifying neighborhoods where partners originate, to account for the possibility that one partner may simply move to the other's housing unit.

3.3. The changing Swedish marriage market

Over the study period, immigration has transformed the Swedish marriage market, including both the size of different ethnic groups and their distribution across neighborhoods. Fig. 2A shows that the Stockholm singles population, ages 17–44, became more diverse between 1990 and 2010. While ethnic Swedes remain the dominant group, non-Western ethnic groups are increasingly prevalent. The shift has been particularly pronounced for the African, Middle Eastern, and Central Asian group, with numbers now exceeding those with (non-Swedish) Western backgrounds.

Fig. 2B shows that levels of residential segregation for singles of different ethnic backgrounds have also shifted over time, although less dramatically. The overall multigroup information theory index has crept up steadily from 1990 to 2010. The figure also displays pairwise information theory indices comparing ethnic Swedes to the five non-Swedish groups. Overall increases in segregation have been driven partly by increases for African and Middle Eastern, Asian, and Eastern European singles. Meanwhile, segregation has declined for Latin American and Western singles. African and Middle Eastern singles have been the most segregated from the Swedish majority, while Western singles have been

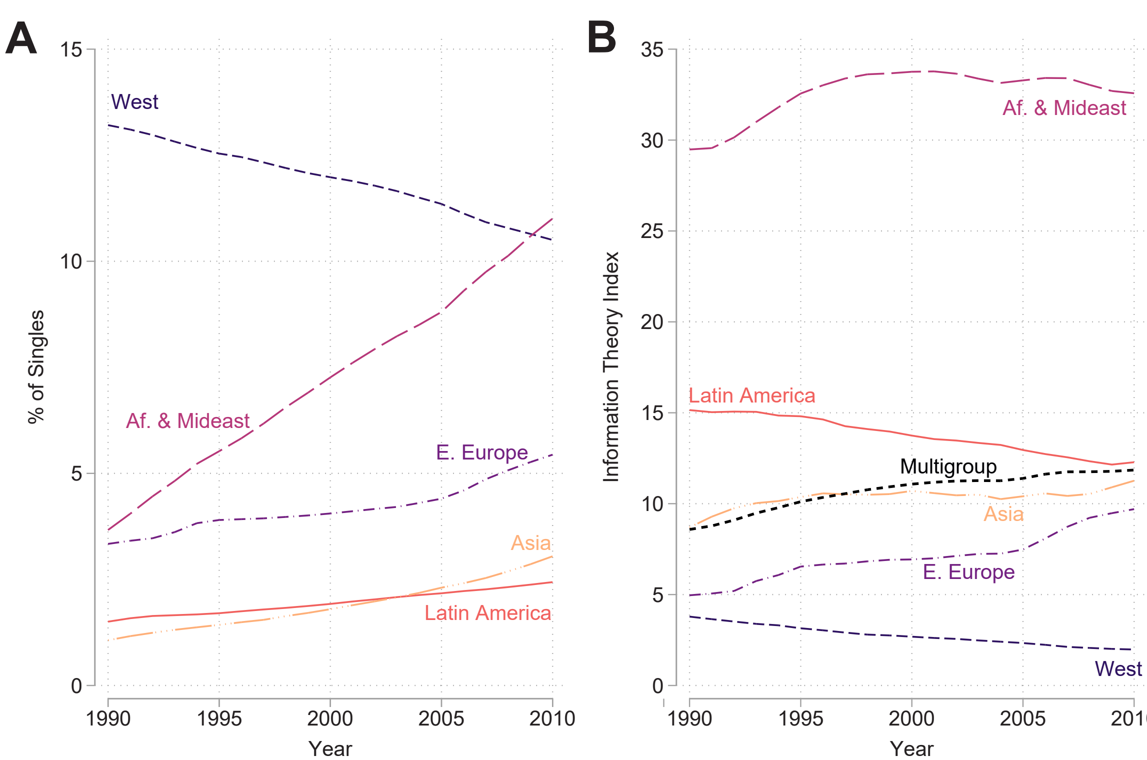

Fig. 2. Composition and segregation of Stockholm County singles by ethnicity, ages 17–44, 1990–2010. Panel A presents the ethnic composition of singles with ethnic Swedes omitted. The non-Swedish groups include both 1st and 2nd generation immigrants. Panel B displays the multigroup information theory index calculated across six ethnic groups in Sweden and the pair-wise information theory indices comparing ethnic Swedes to the five non-Swedish ethnic groups.
Source: Authors' calculations using Swedish population registers.

the least segregated. Asian, Eastern European, and Asian groups fall somewhere between these two extremes.

4. Methods

To assess the implications of assortative mating, cohabitation, and accompanying residential mobility for patterns of segregation, the present analysis uses a three-pronged approach. First, we obtain empirical estimates of assortative mating patterns using a two-sex, harmonic mean model (Qian and Preston, 1993; Schoen, 1981). These models allow us to quantify the effects of homogamous preferences and residential propinquity on assortative mating (Paths A and B in Fig. 1). Second, we evaluate couples' residential moves using a conditional logistic regression model (Bruch & Mare, 2012; McFadden, 1978; Quillian, 2015) that assesses how residential inertia, ethnic homogamy, and neighborhood ethnic composition influence the inter-neighborhood residential mobility of couples. (Paths C, D and E in Fig. 1). Third, we combine these two empirical models into a simulation model of union formation and residential mobility that connects our micro-level results to macro-level changes in segregation (Path F in Fig. 1). We describe these analytic components in the sections that follow.

4.1. Models of assortative mating (AM)

The effects of ethnicity, nativity, and residential location on assortative mating (AM) are estimated using two-sex harmonic mean models (Qian & Preston, 1993; Schoen, 1981; Schoen & Kluegel, 1988). To do this, we construct yearly, six-way classifications of couples based on the male and female partners' ethnicity, nativity, and neighborhood origin. We then estimate Poisson models of the form:

$$\log\left(\frac{w_{(ab)fg(ij)t}}{E_{(ab)fg(ij)(t-1)}}\right) = \alpha_0 + \alpha_t + \alpha_{af} + \alpha_{bg} + \alpha_{ab} + \alpha_{fg} + \alpha_d \log(d_{ij}) + \alpha_o O_{ij} \tag{1}$$

Where w is the number of unions, a and b index the male and female partners' ethnicities, respectively; f and g index their nativities; i and j index their neighborhood origins; t indexes the year; d_{ij} denotes the distance between the male (i) and female (j) partners' neighborhoods prior to cohabitation; and

$$E_{(ab)fg(ij)(t-1)} = \frac{n^{singles}_{afi(t-1)} \times n^{singles}_{bgj(t-1)}}{\left(n^{singles}_{afi(t-1)} + n^{singles}_{bgj(t-1)}\right)} \tag{2}$$

expresses the mutual exposure of male and female singles as the harmonic mean of neighborhood-level counts of single men ($n^{singles}_{afi(t-1)}$) and single women ($n^{singles}_{bgj(t-1)}$) in each ethnicity-by-nativity category at the beginning of each interval. The time-varying harmonic mean term accounts for substantial shifts in the sizes of groups. The estimated parameters $\alpha_0, \alpha_t, \alpha_{af}$, and α_{bg} account for the overall mean rate of marriage formation, year-specific deviations from the mean, and group specific deviations from the mean for men and for women, respectively. The parameters α_{ab} and α_{fg} capture group specific ethnic and nativity homogamy effects, respectively, while the parameters α_d and α_o capture the effect of spatial propinquity, where d_{ij} is a function of the distance between the male and female partners' origins, and O_{ij} is a dummy variable indicating if the male and female partners are living in the same neighborhood.

4.2. Models of residential mobility (RC)

The effects of couple and neighborhood characteristics on couples' residential choices (RC) are estimated using a discrete choice, conditional logit model of neighborhood destinations (Bruch & Mare, 2012; McFadden, 1978). This model assumes that each couple, indexed by q, faces a *choice set* of potential neighborhood destinations, $C(q)$, and moves in year t to a neighborhood, k, from that choice set with probability:

$$\Pr\left(Y_{qkt} = 1 \middle| V_{qkt}, C(q)\right) = \frac{\exp\left(V_{qkt}\right)}{\sum_{l\in C(q)} \exp\left(V_{qlt}\right)} \tag{3}$$

where

$$V_{qkt} = \beta_{ab(q)} X^E_{kt-1} + \beta_{fg(q)} X^N_{kt-1} + \beta_d X^D_{ij(q)kt-1} + \beta_o X^O_{ij(q)kt-1} + \beta_{od} X^{OD}_{ij(q)kt-1} + \beta_c X^C_{qkt-1} \tag{4}$$

Here, Y_{qkt} is a binary variable that takes the value 1 if couple q moves to neighborhood k in year t, and zero otherwise. Meanwhile, $ab(q)$ identifies the ethnicity, $fg(q)$ identifies the nativity, and $ij(q)$ identifies the neighborhood origins of the male and female partners in couple q, respectively. X^E are neighborhood ethnic composition covariates, derived from our factor analysis, whose effects, $\beta_{ab(q)}$, differ depending on the ethnicity of the partners in the couple, and X^N are neighborhood nativity composition covariates, whose effects, $\beta_{fg(q)}$, differ depending on the couples' nativity. These covariates and their coefficients account for the sorting of different ethnic and nativity groups into different neighborhoods. To account for residential inertia, X^D are covariates describing the distance between the partners' origin neighborhoods and the potential destination neighborhoods, X^O are dummy variables coded 1 to identify the partners' origin neighborhoods, and X^{OD} are interactions between the distance covariates and the origin neighborhood dummies. We assume their effects are the same for all couples. Finally, X^C contains additional controls, including a control for the neighborhood size (taken as the log of the neighborhood population), interactions between neighborhood size and the neighborhood origin dummy variables, and an adjustment for choice set sampling (Bruch & Mare, 2012; Jarvis, 2019). All neighborhood covariates are time varying, accounting for changes in the residential opportunity structure.

4.3. Simulation model

We investigate the combined effects of assortative mating and residential mobility on segregation by simulating unions and inter-neighborhood mobility from our empirical models under counterfactual assumptions about the presence or absence of key AM and RC effects (Fig. 1, Path F). Additional details can be found in Online supplement. In broad strokes, we apply scaling factors (θ) to the AM coefficients (α) and the RC coefficients (β), setting them to either 0 or 1 to switch on and switch off the AM and RC effects expected to influence patterns of segregation. On the assortative mating side, we switch effects on and off in two groups corresponding to homogamous preferences (scaling factor θ_H applied to α_{ab} and α_{fg}) and residential propinquity (scaling factor θ_P applied to α_d and α_o). On the residential choice side, we switch on and off two related groups of effects: those for sorting by ethnic and nativity composition (scaling factor θ_C applied to $\beta_{ab(q)}$ and $\beta_{fg(q)}$), and those for residential inertia (scaling factor $\theta_I$applied to β_d and β_o). For each setting of these "switches", θ, we simulate unions from Eqs. (1) and (2) and assign simulated couples to neighborhoods using Eqs. (3) and (4),[3] doing so separately for each year of the twenty-year period, 1991–2010. We apply switches using a fully factorial design and perform 10 simulations for each combination of switch settings. Thus, we produce $2^2 \times 2^2 \times 10 \times 20 = 3,200$ simulations of counterfactual mobility flows for newly

[3] We also adjust the intercepts and the main effects of ethnicity and nativity in our assortative mating models to produce marginal numbers of cohabitations, by ethnicity and nativity, that match our empirical data. This ensures that our counterfactuals only involve changes in assortativity, not the number of unions formed by each group.

cohabitating couples.

For each simulation, *s*, in each year, *t*, we use the counterfactual flows to adjust neighborhood population counts observed empirically at the beginning of each interval, calculate the multi-group information theory index for the adjusted counts and for the initial counts, and subtract to obtain the implied changes, ΔS_{st}, to levels of segregation entailed by the counterfactual AM and RC patterns. We then perform linear regression analyses of simulated changes in segregation, treating the change in segregation as the outcome variable and the set of switch settings, $\{\theta_{H,ts}, \theta_{P,ts}, \theta_{C,ts}, \theta_{I,ts}\}$, as the explanatory variables.

$$\begin{aligned} \Delta S_{ts} \quad = \quad & \omega_0 + \omega_H \theta_{H,ts} + \omega_P \theta_{P,ts} + \omega_C \theta_{C,ts} + \omega_I \theta_{I,ts} \\ & + \omega_{H\times C} \theta_{H,ts} \theta_{C,ts} + \omega_{P\times I} \theta_{P,ts} \theta_{I,ts} \\ & + \text{other two} - \text{way interactions} + \varepsilon_{st} \end{aligned} \tag{5}$$

In these regressions, the simulation becomes the unit of analysis, and our model explains variations in counterfactual changes in segregation across simulations as a function of the behavioral mechanisms included or excluded—i.e., switched on or switched off—in the simulations. These regressions yield coefficients, ω_H, ω_P, ω_C, and ω_I, indicating the independent contributions of homogamy, propinquity, residential sorting, and residential inertia mechanisms to (simulated) changes in segregation in each year.

We also include two-way interactions between different switch settings to test for the AM-by-RC interactions we hypothesized in previous sections. We focus on the interactions between ethnic homogamy and ethnic sorting ($\omega_{H\times C}$) and between propinquity and inertia ($\omega_{P\times I}$). The inclusion of two-way interactions has an added interpretive benefit: the coefficients for the main effects can be interpreted as the segregating effects of these behaviors when the other behaviors are inactive. This means that ω_H and ω_P are the household-level mixing effects on segregation when residential choices are made randomly, while ω_C and ω_I are the neighborhood-level mixing effects of residential choices on segregation when couples are formed randomly. Note our model specification ensures that ω_0 has a clear interpretation: the intercept represents the expected change in segregation under a random AM and RC models, when all AM and RC mechanisms are switched off.

5. Results

5.1. *Assortative mating (AM)*

Fig. 3 displays select coefficient estimates from our assortative mating model. Full estimation results are presented in Table F1 of the online supplement. The spatial propinquity results (Fig. 3A) indicate that sharing a neighborhood is associated with higher rates of union formation. Likewise, larger distances between potential partners are associated with lower rates of union formation. The coefficient for log-distance is close to -1, meaning that a 1% increase in distance between singles is associated with approximately a 1% decrease in rates of union formation.

Fig. 3B presents our ethnic homogamy estimates, net of propinquity and homogamy by nativity. Ethnic Swedes have mildly exogamous behaviors. Controlling for the number and spatial proximity of available singles, as well as the homogamous tendencies of other groups, Swedes

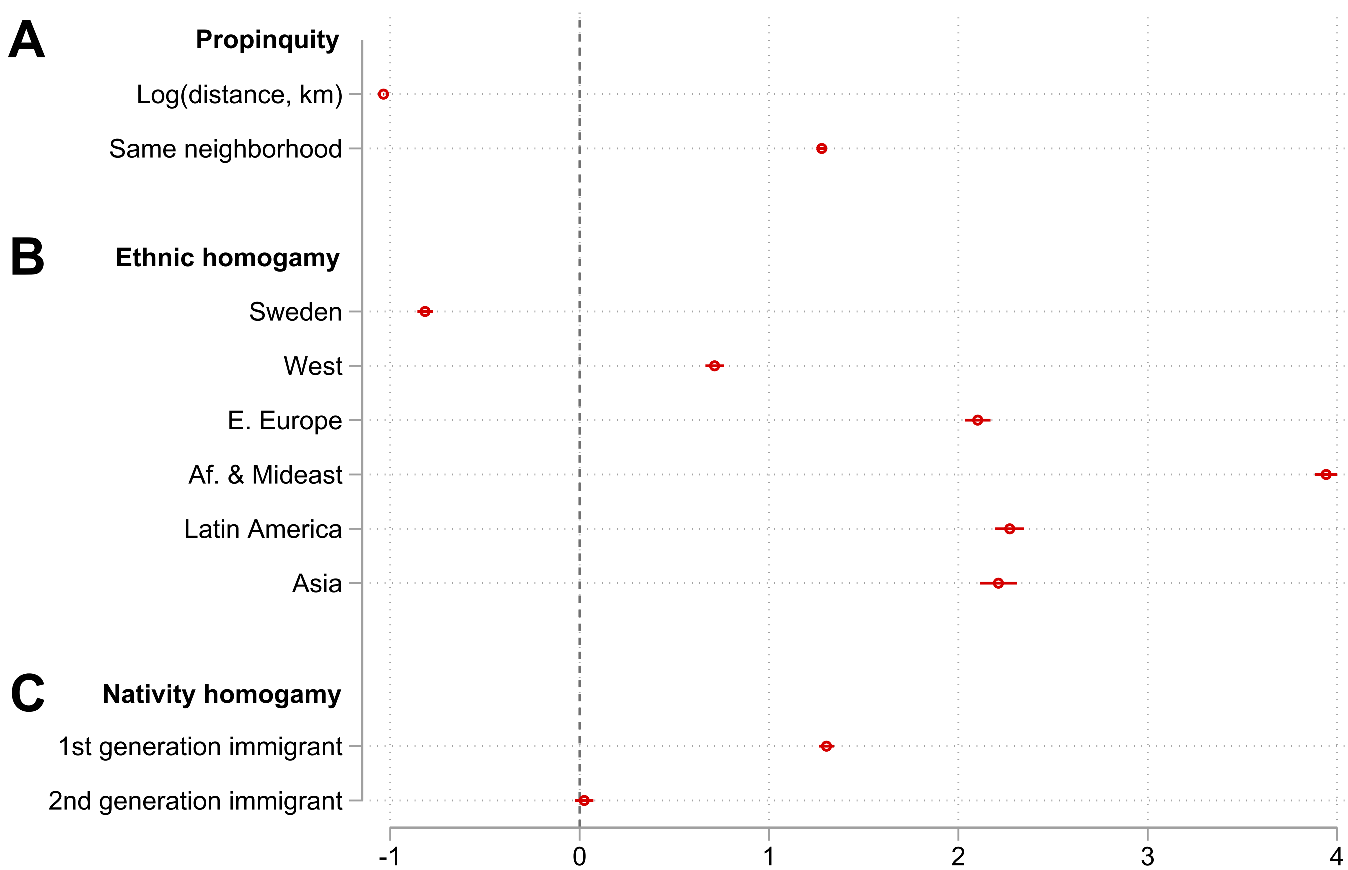

Fig. 3. Coefficients from Poisson models of assortative mating in Stockholm County. Sample is restricted to singles, ages 17–44, who resided in Stockholm County at the beginning and end of the one-year intervals in which unions are observed. The reference category for the *same neighborhood* dummy variable is *different neighborhood,* the reference category for the *ethnic homogamy* dummies is ethnic exogamy, and the reference category for the *nativity homogamy* dummies is nativity exogamy. Complete coefficients are listed in Table F1 of the online supplement.
Source: Authors' calculations using Swedish population registers.

are slightly less likely to form homogamous unions than heterogamous unions. Western ethnic groups show a nearly equal and opposite tendency towards homogamy. Taken together, this means that the odds of a Western single forming a union with another Western single, as opposed to a Swedish single, are roughly equal to the odds of a Swedish single doing the same ($e^{0.713-0.816} \approx 0.9$). In contrast, the strongest tendency towards homogamy is observed for the African and Middle Eastern group. The strong positive coefficient indicates that the odds of an African or Middle Eastern single forming a union with another African or Middle Eastern single, as opposed to a Swedish single, are $e^{3.942-0.816} \approx$ 23 times higher than those same odds for a Swedish single. Singles with Eastern European, Latin American, and Asian backgrounds have roughly comparable homogamy coefficients, occupying a middle ground between the African and Middle Eastern group and the Western group. Compared to ethnic homogamy, Fig. 3C reveals relatively weak homogamy along nativity lines, but only for first generation immigrants. Overall, these results suggest a marriage market that is structured both by propinquity and ethnic preferences, with immigrants from Africa and the Middle East standing out as particularly isolated.

5.2. Residential mobility (RC)

Select coefficients estimated from our model of residential mobility are presented in Fig. 4. Full estimates are presented in Table F2 of the online supplement. While the model stipulates compositional effects that vary with the ethnic background of both male and female partners, Fig. 4A displays only the ethnic composition coefficients for hypothetical, ethnically homogamous couples. Homogamous Swedish and Western couples exhibit somewhat similar residential mobility behaviors with respect to neighborhood ethnic composition, net of controls for the nativity composition, proximity, and size of potential destination neighborhoods in Stockholm County. Both Swedish and Western couples are less likely to move to neighborhoods with high representations of African and Middle Eastern groups, although this apparent avoidance behavior is stronger for Swedish couples, particularly with respect to the presence of Middle Eastern residents. Both Swedish and Western couples are less likely to move to neighborhoods with greater representation of Western and East Asian groups, with Western couples particularly likely to avoid these neighborhoods. Finally, Swedish and Western couples are less likely to move to areas with higher Balkan representation and more likely to move to neighborhoods with greater Finnish representation.

The mobility behaviors of Swedish and Western couples contrast with non-Western groups. All non-Western couples are more likely to move to neighborhoods with higher “Africa” factor scores. While all other groups appear to either avoid Middle Eastern neighborhoods or remain neutral with respect to the presence of Middle Eastern residents, homogamous African and Middle Eastern couples are significantly more likely to move to neighborhoods with more Middle Eastern residents. Other notable coefficients include the significant, positive coefficient for Western, East Asian, and Balkan representation for homogamous Asian couples, as well as the significantly lower, albeit still positive, coefficient for the representation of African groups in the neighborhood destinations of homogamous Eastern European couples. In general, our results indicate that non-Western couples tend to move to neighborhoods with

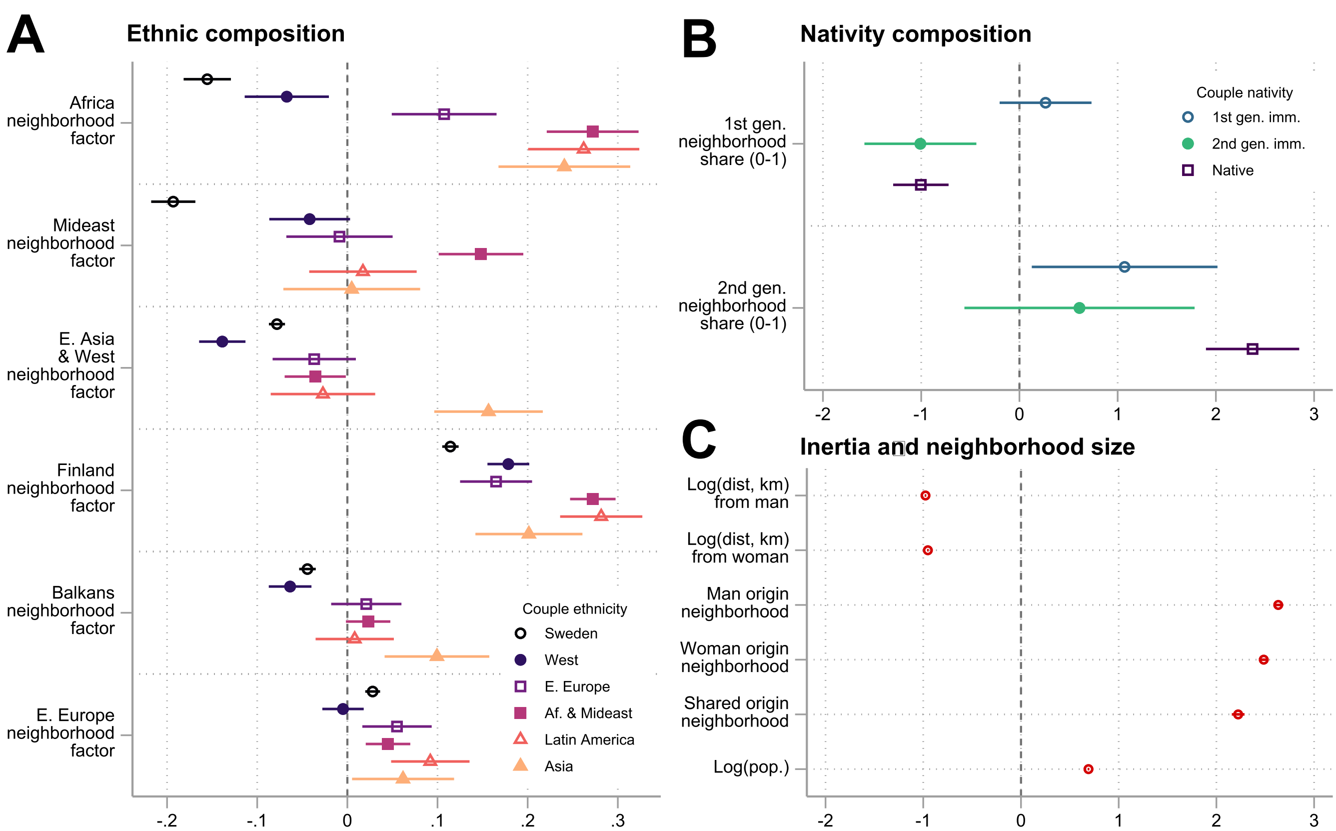

Fig. 4. Coefficients from conditional logistic regression models of neighborhood destinations among newly cohabiting couples in Stockholm County. Sample is restricted to couples in which partners are ages 17–44 prior to cohabitation and who reside in Stockholm County at the beginning and end of the one-year intervals in which union formation is observed in the 1990–2012 period. Panel A displays ethnic composition coefficients. These correspond to variables derived from the factor analysis described in the text. Only coefficient estimates for homogamous couples are shown, broken down by the ethnicity of the couple. Panel B shows nativity composition coefficients. Neighborhood nativity composition covariates are on a 0–1 scale. The share of natives is omitted. Panel C displays inertia and neighborhood size effects. The origin neighborhood dummies correspond to a categorical variable with four categories. The omitted category corresponds to neighborhoods that are neither partner’s origin.
Source: Authors’ calculations using Swedish population registers.

higher non-Western group shares, while Westerners and native Swedes move to neighborhoods with lower non-Western representation.

The remaining coefficients relate to sorting along nativity lines and residential inertia. Fig. 5B shows that homogamous native (i.e., Swedish) and second-generation immigrant couples tend to avoid neighborhoods with larger shares of first-generation immigrants. Meanwhile, homogamous native couples are more likely to move to neighborhoods with greater shares of second-generation immigrants, with this effect being lower for both first- and second-generation homogamous couples, and the effect for the latter not achieving statistical significance ($p > 0.05$, two-tailed test). Fig. 5C reveals that couples moves are subject to residential inertia: Couples are less likely to move to neighborhoods that are more spatially distant from partners' origin neighborhoods and are more likely to move to neighborhoods where one partner or the other originated.

5.3. Simulations

Table 1 presents the results from our linear regression analyses (Eq. 5) of simulated changes in segregation under our modified AM and RC models. These regressions quantify how residential propinquity and ethnic/nativity preferences (Fig. 1, Path A and B) combine with ethnic preferences/discrimination and residential inertia (Path C, D and E) to produce stability or change in segregation (Path F).

Panel A of Table 1 depicts simulated changes in segregation under the model with all AM and RC mechanisms turned on (the full model) and with all AM and RC mechanisms turned off (the random assignment model). The first number, corresponding to the intercept in Eq. 5, reveals that the random assignment of singles to partners and the resulting couples to neighborhoods reduces simulated segregation, on average, by approximate 0.2 points on a 0–100 scale. Substantively, this is a small reduction, but this is because only a few thousand couples are formed each year, out of a total population of approximately 2 million people living in Stockholm. The second number in Panel A indicates the combined segregating effect of all AM and RC mechanisms, including their two-way interactions. This is the sum of all coefficients, $\sum_k \omega_k$, in Eq. 5, excluding the intercept. We find that the included mechanisms increase simulated changes in segregation by 0.162 points on a 0–100 scale, on average. Aggregated over two decades, this contribution to segregation is non-trivial and roughly equivalent in magnitude to the change in segregation we observe between 1990 and 2010. The third number in Panel A compares the size of the combined, segregating effect of AM and RC mechanisms to the simulated decrease in segregation under the random assignment model. In the presence of all AM and RC mechanisms, the reduction in segregation predicted by the random assignment model is attenuated by 80.8%. Assortative mating and new household formation are desegregating events, but, thanks to the segregating effects of the specified AM and RC mechanisms, less so than they otherwise would be.

Panel B of Table 1 presents coefficient estimates for the main effects of the different AM and RC mechanisms as well as their two-way interactions. The cells above the diagonal indicate the effects in terms of the multigroup information theory index metric, measured on a 0–100 scale. The numbers below the diagonal express these coefficients as percentages of the simulated, average yearly decline in segregation under the random assignment model (i.e., $100 \times \omega_k / |\omega_0|$). These percentages indicate how much the mechanisms and their interactions offset (or augment) the declines in segregation obtaining under the random assignment model.

The cells along the diagonal in Panel B of Table 1 reveal that the AM and RC mechanisms are segregating when considered in isolation. Of these, the largest effects stem from sorting according to ethnicity and nativity when couples make their residential choices. These mechanisms of neighborhood-level mixing add 0.083 points to the index when considered alone, counteracting 41.5% of the desegregation expected under random assignment. This is followed by residential inertia, adding 0.031 points of segregation, counteracting 15.3% of desegregation relative to the random model. The effects of household-level mixing mechanisms are more modest, but not trivial. Residential propinquity at the assortative mating stage adds 0.020 points to the segregation index and counters 10.2% of the segregation decline expected under the random model. Homogamy along ethnic and nativity lines adds 0.017 points of segregation and counteracts 8.5% of desegregation obtaining under the random model.

When it comes to interactions between AM and RC mechanisms presented in Table 1, we find the strongest interactions are between the homogamy and ethnic/nativity sorting mechanisms (1 and 3), and between the residential propinquity and inertia mechanisms (2 and 4). These interactions are positive, indicating that the combination of these behaviors contributes more to segregation than their contributions considered in isolation. The interaction between homogamy and ethnic sorting mechanisms contributes 0.018 points to segregation, offsetting 9.0% of the average yearly decline in segregation generated using a random model. The magnitude of this interaction effect is as large as the main effect of homogamy alone. The interaction between propinquity and inertia has nearly identical magnitude, contributing 0.018 points to segregation beyond their effects in isolation and counteracting 8.9% of the decline in segregation simulated using the random model. In addition, there is an un-hypothesized negative interaction between residential sorting by ethnicity and nativity and residential inertia. When both sorting and inertia are included in our simulations, we obtain average yearly reductions in segregation of 0.017 points. This partly undercuts, but does not reverse, the independent, segregating effects of these neighborhood-level mixing mechanisms. The remaining interactions are comparatively weak or non-significant.

Table 1
Segregating effects of assortative mating (AM) and residential choice (RC) mechanisms and their interactions.

A. Total segregating effects of AM & RC mechanisms				
Δ Segregation under random model (ω_0)			-0.200	
Total segregating effects ($\sum\omega_k$)			0.162	
% Desegregation prevented ($\sum\omega_k/\|\omega_0\|$)			80.8 %	
B. Main & two-way interactive effects of AM & RC mechanisms				
Mechanism	(1)	(2)	(3)	(4)
(1) AM: Homogamy	0.017 8.5 %	-0.006	0.018	*0.003*
(2) AM: Propinquity	-3.1 %	0.020 10.2 %	-0.005	0.018
(3) RC: Composition	9.0 %	-2.3 %	0.083 41.5 %	-0.017
(4) RC: Inertia	*1.3 %*	8.9 %	-8.4 %	0.031 15.3 %

Note: In Panel B, numbers on the diagonal indicate the main effects. Off-diagonal elements indicate two-way interactions. Above the diagonal are estimated effects on simulated changes in the multigroup information theory index measured on a 0-100 scale. Below the diagonal are effects on simulated changes in segregation assessed as a percentage of the expected change in segregation under the random mating and residential choice models. The hue indicates the direction of the effect, while the intensity indicates the strength of the effect. Italicized coefficients are non-significant ($p > 0.05$, two-tailed tests). All other coefficients are significant with $p < 0.01$.

6. Discussion

Results from our micro-level models of assortative mating and residential choice confirm, in broad strokes, the existence of key behavioral mechanisms that we hypothesized to sustain segregation. On the assortative mating side, we observe a clear pattern of residential propinquity whereby proximate singles are more likely to form cohabiting unions. This represents a mechanism by which existing segregation—i.e., the spatial clustering of ethnic groups—can induce assortative mating along ethnic lines. Net of propinquity and the relative sizes of groups, we also observe homogamy by ethnicity and nativity. We did find evidence of mildly exogamous behaviors among ethnic Swedes, but the strength of this exogamous tendency is only of sufficient magnitude to set Swedes and other Western groups on equal footing. It is not sufficient to induce high rates of union formation between Swedes and non-Western groups. For non-Westerners, especially those with African and Middle Eastern backgrounds, union formation rates are considerably higher between singles with the same ethnic and nativity backgrounds.

We attribute these patterns of assortative mating to preferences, but admit that our analytical approach does not allow us to distinguish between in-group affinities and out-group aversion. That is, we cannot say if those with African and Middle Eastern backgrounds are more likely to form unions with each other because of a positive preference to do so, or because other groups are resistant to partnering with them. Further, because ethnicity, nativity, and distance are, for practical reasons, the only explanatory variables we include in our models, we cannot eliminate the possibility that other omitted variables—e.g., education, income, occupation, shared workplace, etc.—may explain these patterns. We selected the present, two-sex modeling framework mainly for reasons of tractability, especially when it came to simulating the combined effects of assortative mating and residential choice. Accounting for additional explanatory variables, as well as untangling the preferential versus prejudicial aspects of assortative mating, requires a different modeling approach (e.g., Haandrikman and van Wissen, 2012; Lichter and Qian, 2019; Logan, Hoff, and Newton, 2008; Qian and Lichter, 2018).

On the residential choice side, we observe both ethnically homophilous outcomes and residential inertia. The sorting of couples into neighborhoods according to ethnicity and nativity follows a roughly homophilous pattern that aligns with a division of the population into Western and non-Western groups. Those with Swedish and Western ethnic backgrounds are more likely to move to neighborhoods with fewer non-Westerners and, conversely, more ethnic Swedes. Non-Western ethnic groups, in contrast, are more likely to move to neighborhoods with greater representation of non-Westerners. Meanwhile, we find typical signs of residential inertia. Couples are more likely to move to neighborhoods where one partner or the other lives prior to cohabitation, and are likewise more likely to move to neighborhoods that are near to one partner or the other's residential origins.

While our language may imply that observed, ethnically homophilous residential choices stem from the ethnic preferences of mobile couples, it is also possible that they result from systematic ethnic discrimination in the housing market or the operation of unobserved couple- and neighborhood-level variables—e.g., income, housing prices, education, etc. The question of ethnic preferences versus discrimination is particularly knotty, with few obvious solutions. Discrimination is notoriously difficult to detect and track. The other omitted variable issues are potentially more tractable within the present discrete choice modelling framework, but the assortative mating models are a limiting factor. Our simulation approach to synthesizing the AM and RC models demands that the two models share a common feedstock of explanatory variables. Because it is technically infeasible to include more variables in our two-sex models of assortative mating, this limits the number of variables we can include in our residential choice models. Shifting to a different modeling framework for analyzing assortative mating may have the added benefit of granting us greater flexibility when modeling residential choices.

Whatever the precise interpretations of the coefficients from our assortative mating and residential choice models, our simulation model suggests that the combined effects of these behavioral patterns support existing segregation. While the formation of cohabiting households tends to be desegregating, the degree to which these events are desegregating is largely attenuated by the four mechanisms presented in this paper: residential propinquity, residential inertia, ethnic homogamy, and ethnically homophilous residential choices.

A unique contribution of the paper is to theorize and analyze the effects of existing segregation, i.e., the spatial relationships between groups, on assortative mating and to work out how these existing spatial relationships constrain the possibility of residential integration. In line with our expectations, we find that residential propinquity contributes directly to segregation by preventing household-level mixing between groups. Residential inertia impedes integration by holding couples within the residential orbits of their neighborhood origins. This sustains existing neighborhood ethnic compositions and, consequently, segregation. We also demonstrate a clear interaction between these two factors: the effect of inertia on segregation is strongest when couples are formed between singles who live near to each other.

However, our research also highlights the continuing significance of ethnic preferences for segregation. In our simulations, ethnic sorting when couples make their residential choices plays the strongest role in sustaining segregation, on its own accounting for over half of the segregation sustaining effects of the mechanisms we have considered. This is consistent with findings from Schelling's segregation model and its many extensions (Schelling, 1971). As found in the United States, we also observe that ethnic homogamy in Sweden sustains segregation by curtailing household-level ethnic mixing. Uniquely, we have identified an interaction between these two mechanisms of household- and neighborhood-level mixing. Greater prevalence of ethnic homogamy enables ethnically homophilous residential choices that have strong segregating effects. Conversely, this suggests that if couples were more ethnically mixed, not only would their household-level mixing reduce segregation, but also their residential choices would contribute to more neighborhood-level mixing between ethnic groups.

This finding, however, points to a fundamental limitation of our study. Our models assume that couples' residential choices are determined entirely by their ethnicities, nativities, and residential locations, and that hypothetical new couples would exhibit the same residential choice behaviors as observationally identical couples in our data. This is a stretch. It is more likely that there are unobserved, heterogeneous ethnic preferences that jointly determine the likelihood of homogamy and the likelihood of moving to diverse neighborhoods. Those who we observe to cross ethnic boundaries when finding a partner may also be more willing to move to diverse neighborhoods, while those who partner with co-ethnics may have particularly strong preferences for own-group neighbors. This would imply that heterogamous couples we observe in the data are unusually tolerant, while the homogamous couples we observe are unusually intolerant. If we could randomly generate homogamous and heterogamous couples—as we do in our simulations—they may have less exaggerated choice behaviors than those we impute to them using our residential choice estimates. This implies that we may be overstating the segregating effects of ethnic homogamy, residential ethnic homophily, and their interactions.

This significant shortcoming—namely selection on unobserved, individual-level preferences—might be addressed in two ways. One alternative would be to estimate joint empirical models of assortative mating and residential choice with random coefficients for ethnic homogamy and ethnic homophily, using a pre-specified mixing distribution to account for individual-level heterogeneity in ethnic preferences. A second alternative is to identify a source of exogenous variation that affects who partners with whom along ethnicity and nativity lines, but without affecting any individual's underlying ethnic preferences. This would allow us to estimate residential choice models whose coefficients could be generalized to randomly generated couples. It is outside the scope of the present paper to develop or implement either of these designs, but these are potential avenues for future research.

7. Conclusion

This study uniquely explores how ethnic homogamy and residential propinquity during union formation combine with ethnically homophilous and spatially delimited patterns of residential choice to reproduce residential segregation between ethnic groups. We have done so using a three-pronged approach applied to 1990–2010 data from Stockholm County. Our approach involves the estimation of two-sex models of union formation, conditional logit models of residential mobility for new couples, and simulations that synthesize the mating and mobility models. Our simulations anchor our analysis, as they allow us to connect the micro-level behaviors specified in our assortative mating and mobility models to macro-level changes in segregation.

Our results demonstrate that a lack of household-level mixing between ethnic groups reinforces segregation, complementing similar findings from the United States (Holloway et al., 2005; Wright et al., 2012). Our work represents a theoretical and empirical advance over this prior work because, rather than taking couples as given, we explicitly investigate the homogamy and propinquity mechanisms that give rise to homogamous and heterogamous unions, in addition to modelling the residential choices that couples make. This allows us to not only consider the independent effects of assortative mating and residential choices on segregation, but also their interactions. We have shown that if people were more willing or able to cross ethnic boundaries when making partner choices, there would be less segregation. This is in part because the ethnic mixing of partners in a household has an *ipso facto* effect on neighborhood-level mixing, but also because mixed couples make residential decisions that tend to support neighborhood diversity. In this sense, the choice to marry someone of the same racial or ethnic group not only symbolically reinforces distinctions between groups through the act of marriage itself, but also has the power to re-inscribe these distinctions in residential space.

More broadly, the results presented in this paper serve as another demonstration of the important linkages between the study of demographic processes and social stratification—here the ethnic stratification of neighborhoods (Mare & Maralani, 2006). Our study focused on a single demographic process, new household formation. But this single process is significant for subsequent demographic events. Couples often adopt or bear children to whom they bequeath social statuses and with whom they share their residential locations. The preferences and constraints that lead couples to marry homogamously and perpetuate residential segregation also shape the neighborhood circumstances experienced by their children, setting the stage for the intergenerational transmission of neighborhood context (Sharkey, 2008, 2015) and the intergenerational reproduction of residential segregation (Krysan & Crowder, 2017). The present paper represents one component in a larger research agenda exploring the implications of family demography and intergenerational transmission for short- and long-term changes in patterns of residential segregation.

Declaration of Competing Interest

None.

Appendix A. Supporting information

Supplementary materials associated with this article can be found in the online version at doi:10.1016/j.rssm.2023.100809.

References

Aldén, L., Hammarstedt, M., & Neuman, E. (2015). Ethnic segregation, tipping behavior, and native residential mobility. *International Migration Review, 49*(1), 36–69. http://dx.doi.org/10.1111/imre.12066

Andersson, G., & Philipov, D. (2002). Life-table representations of family dynamics in Sweden, Hungary, and 14 other FFS countries: A project of descriptions of demographic behavior. *Demographic Research, 7*(4), 67–144. http://dx.doi.org/10.4054/DemRes.2002.7.4

Bailey, M., Cao, R., Kuchler, T., Stroebel, J., & Wong, A. (2018). Social connectedness: Measurement, determinants, and effects. *Journal of Economic Perspectives, 32*(3), 259–280. http://dx.doi.org/10.1257/jep.32.3.259

Bayer, P. J., & McMillan, R. (2005). *Racial Sorting and Neighborhood Quality (Working Papers No. W11813; NBER Working Paper Series)*. National Bureau of Economic Research. ⟨http://ssrn.com/abstract=875689⟩.

Behtoui, A. (2010). Marriage pattern of immigrants in Sweden. *Journal of Comparative Family Studies, 41*(3), 415–435.

Bischoff, K., & Tach, L. (2020). School choice, neighborhood change, and racial imbalance between public elementary schools and surrounding neighborhoods. *Sociological Science, 7*, 75–99. http://dx.doi.org/10.15195/v7.a4

Blaauboer, M. (2011). The impact of childhood experiences and family members outside the household on residential environment choices. *Urban Studies, 48*(8), 1635–1650. http://dx.doi.org/10.1177/0042098010377473

Blau, P. (1977). *Inequality and Heterogeneity: A Primitive Theory of Social Structure*. Free Press.

Blau, P. M., Beeker, C., & Fitzpatrick, K. M. (1984). Intersecting social affiliations and intermarriage. *Social Forces, 62*(3), 585–606. http://dx.doi.org/10.2307/2578701

Blau, P. M., Blum, T. C., & Schwartz, J. E. (1982). Heterogeneity and intermarriage. *American Sociological Review, 47*(1), 45–62. http://dx.doi.org/10.2307/2095041

Bloome, D. (2014). Racial inequality trends and the intergenerational persistence of income and family structure. *American Sociological Review, 79*(6), 1196–1225. http://dx.doi.org/10.1177/0003122414554947

Bossard, J. H. S. (1932). Residential propinquity as a factor in marriage selection. *American Journal of Sociology, 38*(2), 219–224.

Bracher, M., & Santow, G. (1998). Economic independence and union formation in Sweden. *Population Studies, 52*(3), 275–294. http://dx.doi.org/10.1080/0032472031000150466

Bråmå, Å. (2006). “White Flight”? The production and reproduction of immigrant concentration areas in Swedish cities, 1990-2000. *Urban Studies, 43*(7), 1127–1146. http://dx.doi.org/10.1080/00420980500406736

Brandén, M., & Haandrikman, K. (2019). Who moves to whom? Gender differences in the distance moved to a shared residence. *European Journal of Population, 35*(3), 435–458. http://dx.doi.org/10.1007/s10680-018-9490-4

Bruch, E. E. (2014). How population structure shapes neighborhood segregation. *American Journal of Sociology, 119*(5), 1221–1278. http://dx.doi.org/10.1086/675411

Bruch, E. E., & Mare, R. D. (2006). Neighborhood choice and neighborhood change. *American Journal of Sociology, 112*, 667–709.

Bruch, E. E., & Mare, R. D. (2009). Preferences and pathways to segregation: Reply to Van De Rijt, Siegel, and Macy. *American Journal of Sociology, 114*, 1181–1198.

Bruch, E. E., & Mare, R. D. (2012). Methodological issues in the analysis of residential preferences, residential mobility, and neighborhood change. *Sociological Methodology, 42*(1), 103–154. http://dx.doi.org/10.1177/0081175012444105

Bruch, E. E., & Newman, M. (2019). Structure of online dating markets in U.S. cities. *Sociological Science, 6*, 219–234. http://dx.doi.org/10.15195/v6.a9

Carol, S. (2013). Intermarriage attitudes among minority and majority groups in western Europe: The role of attachment to the religious in-group. *International Migration, 51*(3), 67–83. http://dx.doi.org/10.1111/imig.12090

Carol, S. (2016). Like will to like? Partner choice among muslim migrants and natives in western Europe. *Journal of Ethnic and Migration Studies, 42*(2), 261–276. http://dx.doi.org/10.1080/1369183X.2014.963037

Catton, W. R., Jr., & Smircich, R. J. (1964). A comparison of mathematical models for the effect of residential propinquity on mate selection. *American Sociological Review, 29*(4), 522–529. http://dx.doi.org/10.2307/2091201

Celikaksoy, A., Nekby, L., & Rashid, S. (2010). Assortative mating by ethnic background and education among individuals with an immigrant background in Sweden. *Zeitschrift Für Familienforschung, 22*(1), 65–88.

Chan, T. W., & Ermisch, J. (2015). Proximity of couples to parents: Influences of gender, labor market, and family. *Demography, 52*(2), 379–399. http://dx.doi.org/10.1007/s13524-015-0379-0

Chetty, R., & Hendren, N. (2018). The Impacts of Neighborhoods on Intergenerational Mobility I: Childhood Exposure Effects. *The Quarterly Journal of Economics, 133*(3), 1107–1162. http://dx.doi.org/10.1093/qje/qjy007

Chetty, R., Hendren, N., Jones, M. R., & Porter, S. R. (2020). Race and Economic Opportunity in the United States: An Intergenerational Perspective*. *The Quarterly Journal of Economics, 135*(2), 711–783. http://dx.doi.org/10.1093/qje/qjz042

Chetty, R., Hendren, N., & Katz, L. F. (2016). The Effects of Exposure to Better Neighborhoods on Children: New Evidence from the Moving to Opportunity Experiment. *American Economic Review, 106*(4), 855–902. http://dx.doi.org/10.1257/aer.20150572

Choi, K. H., & Tienda, M. (2017). Marriage-Market Constraints and Mate-Selection Behavior: Racial, Ethnic, and Gender Differences in Intermarriage. *Journal of Marriage and Family, 79*(2), 301–317. http://dx.doi.org/10.1111/jomf.12346

Coleman, J. S. (1986). Social Theory, Social Research, and a Theory of Action. *American Journal of Sociology, 91*(6), 1309–1335 (JSTOR).

Coleman, J. S., Blum, Z. D., Sørensen, A. B., & Rossi, P. H. (1972). White and black careers during the first decade of labor force experience. Part I: Occupational status. *Social Science Research, 1*(3), 243–270. http://dx.doi.org/10.1016/0049-089X(72)90076-2

Crowder, K., & Downey, L. (2010). Interneighborhood Migration, Race, and Environmental Hazards: Modeling Microlevel Processes of Environmental Inequality. *American Journal of Sociology, 115*(4), 1110–1149. http://dx.doi.org/10.1086/649576

Dahl, M. S., & Sorenson, O. (2010a). The Migration of Technical Workers. *Journal of Urban Economics, 67*(1), 33–45. http://dx.doi.org/10.1016/j.jue.2009.09.009

Dahl, M. S., & Sorenson, O. (2010b). The Social Attachment to Place. *Social Forces, 89*(2), 633–658. http://dx.doi.org/10.1353/sof.2010.0078

Dribe, M., & Lundh, C. (2008). Intermarriage and Immigrant Integration in Sweden: An Exploratory Analysis. *Acta Sociologica, 51*(4), 329–354. http://dx.doi.org/10.1177/0001699308097377

Dribe, M., & Lundh, C. (2011). Cultural Dissimilarity and Intermarriage. A Longitudinal Study of Immigrants in Sweden 1990–2005. *International Migration Review, 45*(2), 297–324. http://dx.doi.org/10.1111/j.1747-7379.2011.00849.x

Ellis, M., Holloway, S. R., Wright, R., & East, M. (2007). The Effects of Mixed-Race Households on Residential Segregation. *Urban Geography, 28*(6), 554–577. http://dx.doi.org/10.2747/0272-3638.28.6.554

Ellis, M., Holloway, S. R., Wright, R., & Fowler, C. S. (2011). Agents of Change: Mixed-Race Households and the Dynamics of Neighborhood Segregation in the United States. *Annals of the Association of American Geographers, 102*(3), 549–570. http://dx.doi.org/10.1080/00045608.2011.627057

Ellis, M., Wright, R., & Parks, V. (2004). Work Together, Live Apart? Geographies of Racial and Ethnic Segregation at Home and at Work. *Annals of the Association of American Geographers, 94*(3), 620–637.

Elwert, A. (2020). Opposites Attract: Assortative Mating and Immigrant–Native Intermarriage in Contemporary Sweden. *European Journal of Population, 36*(4), 675–709. http://dx.doi.org/10.1007/s10680-019-09546-9

Farley, R., Fielding, E. L., & Krysan, M. (1997). The Residential Preferences of Blacks and Whites: A Four-Metropolis Analysis. *Housing Policy Debate, 8*(4), 763–800.

Feng, Z., Boyle, P., van Ham, M., & Raab, G. (2010). Neighbourhood Ethnic Mix and the Formation of Mixed-Ethnic Unions in Britain. In J. Stillwell, & M. van Ham (Eds.), *Ethnicity and Integration: Understanding Population Trends and Processes: Volume 3* (pp. 83–103). Springer Netherlands. http://dx.doi.org/10.1007/978-90-481-9103-1_5.

Fossett, M. (2006). Ethnic Preferences, Social Distance Dynamics, and Residential Segregation: Theoretical Explorations Using Simulation Analysis. *The Journal of Mathematical Sociology, 30*(3–4), 185–273. http://dx.doi.org/10.1080/00222500500544052

Fossett, M. A., & Kiecolt, K. J. (1991). A Methodological Review of the Sex Ratio: Alternatives for Comparative Research. *Journal of Marriage and Family, 53*(4), 941–957. http://dx.doi.org/10.2307/352999

Gabriel, R. (2015). A Middle Ground? Residential Mobility and Attainment of Mixed-Race Couples. *Demography, 53*(1), 165–188. http://dx.doi.org/10.1007/s13524-015-0445-7

Gabriel, R., & Spring, A. (2019). Neighborhood Diversity, Neighborhood Affluence: An Analysis of the Neighborhood Destination Choices of Mixed-Race Couples With Children. *Demography, 56*(3), 1051–1073. http://dx.doi.org/10.1007/s13524-019-00779-1

Giménez de La Prada, A. (2021). *Local Social Exposure and Inter-Neighborhood Mobility* [Dissertation, Linköping University]. 〈http://urn.kb.se/resolve?urn=urn:nbn:se:liu:diva-175573〉.

Haandrikman, K. (2011). Spatial homogamy: The geographical dimensions of partner choice. *Tijdschrift Voor Economische Enōsis Sociale Geografie, 102*(1), 100–110. http://dx.doi.org/10.1111/j.1467-9663.2010.00642.x

Haandrikman, K. (2019). Partner choice in Sweden: How distance still matters. *Environment and Planning A: Economy and Space, 51*(2), 440–460. http://dx.doi.org/10.1177/0308518×18786726

Haandrikman, K., & van Wissen, L. J. G. (2012). Explaining the Flight of Cupid's Arrow: A Spatial Random Utility Model of Partner Choice. *European Journal of Population, 28*(4), 417–439.

Haerpfer, Christian, Ronald Inglehart, Alejandro Moreno, Christian Welzel, Kseniya Kizilova, Jaime Diez-Medrano, Marta Lagos, Pippa Norris, Eduard Ponarin, and Bi Puranen. 2020. "World Values Survey Wave 7 (2017–2020) Cross-National Data-Set."

Harris, D. R., & Ono, H. (2005). How many interracial marriages would there be if all groups were of equal size in all places? A new look at national estimates of interracial marriage. *Social Science Research, 34*(1), 236–251. http://dx.doi.org/10.1016/j.ssresearch.2004.01.002

Hedström, P. (2005). *Dissecting the Social: On the Principles of Analytical Sociology*. Cambridge University Press,.

Holloway, S. R., Ellis, M., Wright, R., & Hudson, M. (2005). Partnering 'out' and Fitting. In *Residential Segregation and the Neighbourhood Contexts of Mixed-Race Households. Population, Space and Place, 11* pp. 299–324). 〈https://doi.org/10.1002/psp.378〉.

Huckfeldt, R. R. (1983). Social contexts, social networks, and urban neighborhoods: Environmental constraints on friendship choice. *American Journal of Sociology, 89*(3), 651–669.

Huijnk, W., Verkuyten, M., & Coenders, M. (2010). Intermarriage attitude among ethnic minority and majority groups in the netherlands: The role of family relations and immigrant characteristics. *Journal of Comparative Family Studies, 41*(3), 389–414. http://dx.doi.org/10.3138/jcfs.41.3.389

Jarvis, B. F. (2019). Estimating multinomial logit models with samples of alternatives. *Sociological Methodology, 49*(1), 341–348. http://dx.doi.org/10.1177/0081175018793460

Jones, M., & Pebley, A. R. (2014). Redefining neighborhoods using common destinations: Social characteristics of activity spaces and home census tracts compared. *Demography, 51*(3), 727–752. http://dx.doi.org/10.1007/s13524-014-0283-z

Kalmijn, M. (1993). Trends in black/white intermarriage. *Social Forces, 72*(1), 119–146. http://dx.doi.org/10.2307/2580162

Kalmijn, M. (1998). Intermarriage and homogamy: Causes, patterns, trends. *Annual Review of Sociology, 24*, 395–421.

Kalmijn, M., & Flap, H. (2001). Assortative meeting and mating: Unintended consequences of organized settings for partner choices. *Social Forces, 79*(4), 1289–1312. http://dx.doi.org/10.1353/sof.2001.0044

Kalmijn, M., & van Tubergen, F. (2006). Ethnic intermarriage in the Netherlands: Confirmations and refutations of accepted insights. *European Journal of Population / Revue Européenne Dêlelõtt Démographie, 22*(4), 371–397. http://dx.doi.org/10.1007/s10680-006-9105-3

Kalmijn, M., & van Tubergen, F. (2010). A comparative perspective on intermarriage: Explaining differences among national-origin groups in the United States. *Demography, 47*(2), 459–479. http://dx.doi.org/10.1353/dem.0.0103

Kennedy, R. J. R. (1943). Premarital residential propinquity and ethnic endogamy. *American Journal of Sociology, 48*(5), 580–584.

Krysan, M., & Bader, M. (2007). Perceiving the metropolis: Seeing the city through a prism of race. *Social Forces, 86*(2), 699–727.

Krysan, M., & Bader, M. D. M. (2009). Racial blind spots: Black-White-Latino differences in community knowledge. *Social Problems, 56*(4), 677–701. http://dx.doi.org/10.1525/sp.2009.56.4.677

Krysan, M., Couper, M. P., Farley, R., & Forman, T. A. (2009). Does race matter in neighborhood preferences? Results from a video experiment. *American Journal of Sociology, 115*(2), 527–559. http://dx.doi.org/10.1086/599248

Krysan, M., & Crowder, K. (2017). *Cycle of Segregation: Social Processes and Residential Stratification*. Russell Sage Foundation; JSTOR,. 〈https://doi.org/10.7758/9781610448697〉.

Kye, B., & Mare, R. D. (2012). Intergenerational effects of shifts in women's educational distribution in South Korea: Transmission, differential fertility, and assortative mating. *Social Science Research, 41*(6), 1495–1514. http://dx.doi.org/10.1016/j.ssresearch.2012.05.011

Lee, B. A., Reardon, S. F., Firebaugh, G., Farrell, C. R., Matthews, S. A., & O'Sullivan, D. (2008). Beyond the census tract: Patterns and determinants of racial segregation at multiple geographic scales. *American Sociological Review, 73*(5), 766–791. http://dx.doi.org/10.1177/000312240807300504

Leibbrand, C., & Crowder, K. (2018). Migration, mobility, and neighborhood attainment: Using the PSID to understand the processes of racial stratification. *The ANNALS of the American Academy of Political and Social Science, 680*(1), 172–192. http://dx.doi.org/10.1177/0002716218797981

Lewis, K. (2016). Preferences in the early stages of mate choice. *Social Forces, 95*(1), 283–320. http://dx.doi.org/10.1093/sf/sow036

Lewis, S. K., & Oppenheimer, V. K. (2000). Educational assortative mating across marriage markets: Nonhispanic whites in the United States. *Demography, 37*(1), 29–40. http://dx.doi.org/10.2307/2648094

Lichter, D. T., LeClere, F. B., & McLaughlin, D. K. (1991). Local marriage markets and the marital behavior of black and white women. *American Journal of Sociology, 96*(4), 843–867.

Lichter, D. T., & Qian, Z. (2019). The study of assortative mating: Theory, data, and analysis. In R. Schoen (Ed.), *Analytical Family Demography* (pp. 303–337). Springer. http://dx.doi.org/10.1007/978-3-319-93227-9_13.

Lievens, J. (1998). Interethnic marriage: bringing in the context through multilevel modelling. *European Journal of Population / Revue Européenne Dêlelõtt Démographie, 14*(2), 117–155. http://dx.doi.org/10.1023/A:1006075325546

Logan, J. A., Hoff, P. D., & Newton, M. A. (2008). Two-sided estimation of mate preferences for similarities in age, education, and religion. *Journal of the American Statistical Association, 103*(482), 559–569. http://dx.doi.org/10.1198/016214507000000996

Lucassen, L., & Laarman, C. (2009). Immigration, intermarriage and the changing face of Europe in the post war period. *The History of the Family, 14*(1), 52–68. http://dx.doi.org/10.1016/j.hisfam.2008.12.001

Ludwig, J., Duncan, G. J., Gennetian, L. A., Katz, L. F., Kessler, R. C., Kling, J. R., & Sanbonmatsu, L. (2013). Long-Term neighborhood effects on low-income families: Evidence from moving to opportunity. *American Economic Review, 103*(3), 226–231. http://dx.doi.org/10.1257/aer.103.3.226

Manduca, R., & Sampson, R. J. (2019). Punishing and toxic neighborhood environments independently predict the intergenerational social mobility of black and white children. *Proceedings of the National Academy of Sciences, 116*(16), 7772–7777. http://dx.doi.org/10.1073/pnas.1820464116

Mare, R. D., & Maralani, V. (2006). The intergenerational effects of changes in women's educational attainments. *American Sociological Review, 71*(4), 542–564. http://dx.doi.org/10.1177/000312240607100402

Massey, D. S. (2016). Residential segregation is the linchpin of racial stratification. *City & Community, 15*(1), 4–7. http://dx.doi.org/10.1111/cico.12145

Massey, D. S., & Denton, N. A. (1993). *American Apartheid: Segregation and the Making of the Underclass*. Harvard University Press,.

McFadden, D. (1978). Modeling the Choice of Residential Location. In A. Karlqvist, L. Lundqvist, F. Snickers, & J. W. Weibull (Eds.), *Spatial Interaction Theory and Planning Models* (Vol. 3, pp. 75–96). North-Holland Publishing Company. 〈http://elsa.berkeley.edu/reprints/mcfadden/location.pdf〉.

Morgan, B. S. (1981). A contribution to the debate on homogamy, propinquity, and segregation. *Journal of Marriage and Family, 43*(4), 909–921. http://dx.doi.org/10.2307/351347

Muttarak, R., & Heath, A. (2010). Who intermarries in Britain? Explaining ethnic diversity in intermarriage patterns. *The British Journal of Sociology, 61*(2), 275–305. http://dx.doi.org/10.1111/j.1468-4446.2010.01313.x

Neal, D. A., & Johnson, W. R. (1996). The role of premarket factors in black-white wage differences. *Journal of Political Economy, 104*(5), 869–895.

Östh, J., Clark, W. A. V., & Malmberg, B. (2015). Measuring the scale of segregation using k-nearest neighbor aggregates. *Geographical Analysis, 47*(1), 34–49. http://dx.doi.org/10.1111/gean.12053

Owens, A. (2016). Inequality in children's contexts income segregation of households with and without children. *American Sociological Review, 81*(3), 549–574. http://dx.doi.org/10.1177/0003122416642430

Pais, J., South, S. J., & Crowder, K. (2012). Metropolitan heterogeneity and minority neighborhood attainment: Spatial assimilation or place stratification? *Social Problems, 59*(2), 258–281.
Peach, C. (1974). Homogamy, propinquity and segregation: A re-evaluation. *American Sociological Review, 39*(5), 636–641. http://dx.doi.org/10.2307/2094310
Peach, C. (1980). Ethnic segregation and intermarriage. *Annals of the Association of American Geographers, 70*(3), 371–381.
Pettigrew, T. F. (1979). Racial change and social policy. *The Annals of the American Academy of Political and Social Science, 441*(1), 114–131. http://dx.doi.org/10.1177/000271627944100109
Qian, Z. (1997). Breaking the Racial barriers: Variations in interracial marriage between 1980 and 1990. *Demography, 34*(2), 263–276. http://dx.doi.org/10.2307/2061704
Qian, Z., & Lichter, D. T. (2007). Social boundaries and marital assimilation: Interpreting trends in racial and ethnic intermarriage. *American Sociological Review, 72*(1), 68–94. http://dx.doi.org/10.1177/000312240707200104
Qian, Z., & Lichter, D. T. (2018). Marriage markets and intermarriage: Exchange in first marriages and remarriages. *Demography, 55*(3), 849–875. http://dx.doi.org/10.1007/s13524-018-0671-x
Qian, Z., & Preston, S. H. (1993). Changes in American Marriage, 1972 to 1987: Availability and forces of attraction by age and education. *American Sociological Review, 58*(4), 482–495. http://dx.doi.org/10.2307/2096072
Quillian, L. (1999). Migration patterns and the growth of high-poverty neighborhoods, 1970-1990. *The American Journal of Sociology, 105*(1), 1–37.
Quillian, L. (2012). Segregation and poverty concentration the role of three segregations. *American Sociological Review, 77*(3), 354–379. http://dx.doi.org/10.1177/0003122412447793
Quillian, L. (2015). A comparison of traditional and discrete-choice approaches to the analysis of residential mobility and locational attainment. *The Annals of the American Academy of Political and Social Science, 660*(1), 240–260. http://dx.doi.org/10.1177/0002716215577770
Ramsøy, N. R. (1966). Assortative mating and the structure of cities. *American Sociological Review, 31*(6), 773–786. http://dx.doi.org/10.2307/2091657
Reardon, S. F., & Firebaugh, G. (2002). Measures of multigroup segregation. *Sociological Methodology, 32*(1), 33–67. http://dx.doi.org/10.1111/1467-9531.00110
Reardon, S. F., Matthews, S. A., O'Sullivan, D., Lee, B. A., Firebaugh, G., Farrell, C. R., & Bischoff, K. (2008). The geographic scale of metropolitan racial segregation. *Demography, 45*(3), 489–514.
Schelling, T. C. (1971). Dynamic models of segregation. *The Journal of Mathematical Sociology, 1*(2), 143–186.
Schoen, R. (1981). The harmonic mean as the basis of a realistic two-sex marriage model. *Demography, 18*(2), 201–216. http://dx.doi.org/10.2307/2061093
Schoen, R., & Kluegel, J. R. (1988). The widening gap in black and white marriage rates: The impact of population composition and differential marriage propensities. *American Sociological Review, 53*(6), 895–907. http://dx.doi.org/10.2307/2095898
Schwartz, C. R. (2013). Trends and Variation in Assortative Mating: Causes and Consequences. *Annual Review of Sociology, 39*(1), 451–470. http://dx.doi.org/10.1146/annurev-soc-071312-145544
Sharkey, P. (2008). The Intergenerational Transmission of Context. *American Journal of Sociology, 113*(4), 931–969. http://dx.doi.org/10.1086/522804
Sharkey, P. (2015). Geographic Migration of Black and White Families Over Four Generations. *Demography, 52*(1), 209–231.
South, S. J., & Crowder, K. D. (1999). Neighborhood Effects on Family Formation: Concentrated Poverty and Beyond. *American Sociological Review, 64*(1), 113–132. http://dx.doi.org/10.2307/2657281
South, S. J., & Crowder, K. D. (2000). The Declining Significance of Neighborhoods? Marital Transitions in Community Context*. *Social Forces, 78*(3), 1067–1099. http://dx.doi.org/10.1093/sf/78.3.1067
South, S. J., Huang, Y., Spring, A., & Crowder, K. (2016). Neighborhood Attainment over the Adult Life Course. *American Sociological Review, 81*(6), 1276–1304. http://dx.doi.org/10.1177/0003122416673029
Van De Rijt, A., Siegel, D., & Macy, M. (2009). Neighborhood Chance and Neighborhood Change: A Comment on Bruch and Mare. *American Journal of Sociology, 114*(4), 1166–1180. http://dx.doi.org/10.1086/588795
van Tubergen, F., & Maas, I. (2007). Ethnic intermarriage among immigrants in the Netherlands: An analysis of population data. *Social Science Research, 36*(3), 1065–1086. http://dx.doi.org/10.1016/j.ssresearch.2006.09.003
White, M. J. (1983). The Measurement of Spatial Segregation. *American Journal of Sociology, 88*(5), 1008–1018. ⟨http://www.jstor.org/stable/2779449⟩.
White, M. J., & Sassler, S. (2000). Judging not only by color: Ethnicity, nativity, and neighborhood attainment. *Social Science Quarterly, 81*(4), 997–1013.
Wodtke, G. T., Harding, D. J., & Elwert, F. (2011). Neighborhood effects in temporal perspective: The impact of long-term exposure to concentrated disadvantage on high school graduation. *American Sociological Review, 76*(5), 713–736. http://dx.doi.org/10.1177/0003122411420816
Wong, D. W. S., & Shaw, S.-L. (2011). Measuring segregation: An activity space approach. *Journal of Geographical Systems, 13*(2), 127–145. http://dx.doi.org/10.1007/s10109-010-0112-x
Wright, R., Ellis, M., & Holloway, S. (2011). Where black-white couples live. *Urban Geography, 32*(1), 1–22. http://dx.doi.org/10.2747/0272-3638.32.1.1
Wright, R., Holloway, S., & Ellis, M. (2012). Gender and the neighborhood location of mixed-race couples. *Demography, 50*(2), 393–420. http://dx.doi.org/10.1007/s13524-012-0158-0
Xia, P., Ribeiro, B., Chen, C., Liu, B., & Towsley, D. (2013). A study of user behavior on an online dating site. *Proceedings of the 2013 IEEE/ACM International Conference on Advances in Social Networks Analysis and Mining*, 243–247. http://dx.doi.org/10.1145/2492517.2492659
Xie, Y., & Zhou, X. (2012). Modeling individual-level heterogeneity in racial residential segregation. *Proceedings of the National Academy of Sciences, 109*(29), 11646–11651. http://dx.doi.org/10.1073/pnas.1202218109
Yang, T.-C., Park, K., & Matthews, S. A. (2020). Racial/ethnic segregation and health disparities: Future directions and opportunities. *Sociology Compass, 14*(6), Article e12794. http://dx.doi.org/10.1111/soc4.12794
Zhang, Q., Phang, C. W., & Zhang, C. (2022). From the side of both relationship initiator and responder: The importance of look and geographical distance in online dating. *Information & Management, 59*(2), Article 103593. http://dx.doi.org/10.1016/j.im.2022.103593