Segregation through the lens of housing unit transition: What roles do the prior residents, the local micro-neighborhood, and the broader neighborhood play?[1]

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Abstract

This study focuses on segregation as it plays out at the micro-level of housing unit transition. Employing a unique sample that places housing units into micro-neighborhoods and census tracts, this study tests whether the characteristics of the previous residents of the unit, the local micro-neighborhood, or the broader tract better explain the race/ethnicity of the new residents in a housing unit. The results show that the racial/ethnic composition of the local micro-neighborhood has even stronger effects on the race/ethnicity of the new residents than does the racial/ethnic composition of the broader census tract. The results also reveal that even when accounting for the racial/ethnic composition of these two contexts, the race/ethnicity of the prior residents has a very strong effect on the race/ethnicity of the new residents. We consider possible explanations for this household-level effect.

Segregation through the lens of housing unit transition: What roles do the prior residents, the local micro-neighborhood, and the broader neighborhood play?

Understanding the level of segregation of residents based on race/ethnicity in the United States has important implications for a democratic society (Massey & Denton 1993). The consequences of this racial/ethnic segregation are severe, as minority groups often reside in areas that lack the economic and political resources of more wealthy areas (Bursik & Grasmick 1993, Logan & Molotch 1987). The existence of such segregation can imply differential access to various economic opportunities, as one study found that African-Americans in more segregated areas had significantly worse outcomes than blacks in less segregated areas along such dimensions as lower high school graduation rates, lower income, a greater likelihood of becoming single mothers, and a greater likelihood of being both out of the labor force and out of school (Cutler & Glaeser 1997). Indeed, there is considerable evidence of the existence of such racial/ethnic segregation in the United States (Cutler et al. 1999, Farley & Frey 1994, Massey & Denton 1987, 1993, Massey & Mullan 1984).

Given the importance of racial/ethnic segregation, numerous studies have focused on the question of how this segregation comes about, and several theoretical explanations propose to explain the generation of racial/ethnic segregation. While some scholars suggest that the preferences of households can generate segregation (Schelling 1978), other studies have suggested that minority groups face structural barriers to accessing more desirable neighborhoods beyond their differential economic resources (South & Crowder 1997a, b). Another large body of research has documented the role of explicit discrimination in the housing market for constraining the neighborhood options of some racial/ethnic minorities and increasing

segregation (Fischer & Massey 2004, Turner et al. 2000). Yet other research posits that social networks among residents can play an important role in fostering segregation (Michelson 1977).

Disentangling these theoretical models in understanding the generation of segregation requires focusing on how it is generated or reproduced at the level of the housing unit when a change occurs in the occupants of a unit. In principle, such an approach would allow exploring the geographical context that is important to residents when moving to a residence. Nonetheless, research has not fully disentangled this. For instance, although a series of studies tested whether the racial/ethnic composition of a very large area—areas with at least 100,000 persons—affected the likelihood of residents of a particular race/ethnicity moving into a unit (Rosenbaum 1994, 1995, 1996, Rosenbaum & Argeros 2005), it is unlikely that such a large geographic unit is really salient to residents making such mobility decisions. Arguably, a more appropriate context for such decisions is something like a census tract, given that it approximates a neighborhood. Whereas one study focused on the racial/ethnic transition of housing units while taking into account the racial/ethnic context of the census tract (Ellen 2000), even this study acknowledged that the racial/ethnic composition of an even smaller geographic unit may be important in this process. Indeed, studies using blocks or block groups (rather than tracts) as the unit of analysis find higher levels of segregation (Farley 2008), and Grannis (1998) suggested that block groups better approximated neighborhoods in Los Angeles and San Francisco when studying clustering by race/ethnicity. Perhaps even more important evidence that micro-neighborhoods may be salient geographic units for generating segregation is that nearly all studies asking residents their preference for the racial/ethnic composition of the "neighborhood" actually ask the respondent to comment on the racial/ethnic composition of the local *micro-neighborhood* (usually the nearest 10-12 housing units).

Whereas most theory and research into the question of the generation of racial/ethnic segregation has focused on the racial/ethnic composition of some geographic context for explaining the likelihood that the new residents will be of a particular race/ethnicity, fewer studies and theorizing have explicitly addressed the question of whether the race/ethnicity of the *prior residents* is important (after accounting for the racial/ethnic composition of the neighborhood and local micro-neighborhood). Prior research finding that residents were more likely to move into units in which members of their same race/ethnicity previously lived has therefore often attributed this to a contextual effect (Marullo 1985, Spain 1980). Furthermore, one study finding such a housing unit-level tendency for a household to replace another of the same race even when accounting for the racial/ethnic composition of the census tract noted that they could not rule out the possibility that this apparent household-level effect actually captured a micro-neighborhood effect (Ellen 2000). To the extent that this is actually an effect that occurs at the point of the transaction—rather than being a contextual effect of the micro-neighborhood or neighborhood—would imply important theoretical consequences, as we explore below.

The current study exploits a unique sample design to explore the question of the relative importance of the previous household's characteristics, the local micro-neighborhood, and the surrounding census tract, for predicting the race/ethnicity of the household that enters the unit four years later. The unique sample design employed here focusing on housing *units* over time is able to view the type of residents that move into a specific unit. In addition, the information on the prior residents in the housing unit as well as the micro-neighborhood and tract in which it is located allows assessing the relative importance of characteristics at these various levels of aggregation.

THEORETICAL BACKGROUND

Processes of Segregation

An extensive literature documents the considerable degree of racial/ethnic segregation that exists in U.S. society (Cutler et al. 1999, Farley & Frey 1994, Massey & Denton 1987, 1993, Massey & Mullan 1984). A concomitant literature has asked whether segregation is increasing or decreasing over time. Although there were still very high levels of racial/ethnic segregation between African-Americans and whites in 1990, modest declines occurred during the 1970s and 1980s (Farley & Frey 1994), though these trends varied across different areas of the country (Massey & Denton 1987). A more recent study disaggregated segregation into within and across metropolitan area components, and concluded that the segregation of African-Americans from whites decreased after 1960 largely because neighborhoods became more integrated, rather than any compositional shift in the metropolitan areas in which they reside (Fischer et al. 2004). On the other hand, there is evidence that the segregation of Latinos and Asians from whites has increased in recent years (Frey & Farley 1996, Massey & Denton 1987). One exhaustive study viewed segregation of African-Americans and whites in American cities from 1890 to 1990 and found three broad patterns: from 1890 to 1940 there was the development of high levels of segregation with the migration of blacks to urban areas; from 1940 to 1970 this migration continued with an increase in the physical areas of these segregated ghettos; since 1970 segregation has declined as African-Americans have moved into previously all-white areas of cities and suburbs (Cutler et al. 1999).

Given this considerable documentation of the existence of racial/ethnic segregation and empirical evidence of its change over time, a key question is *how* this segregation comes about and how it might change over time. At least five key theoretical frameworks have developed

attempting to answer these questions, along with a sixth that we suggest here: 1) the place stratification model; 2) preferences of households; 3) minorities' lack of economic resources; 4) discrimination and steering; 5) social networks; 6) household race/ethnicity as a signal.

First, the place stratification model posits that minority households are not necessarily able to translate income and wealth gains into access to largely white higher income neighborhoods (South & Crowder 1997a, b). This model contrasts with the classic assimilation model, which posited that households seamlessly translate economic gains into mobility into desirable neighborhoods. The place stratification model was formulated in response to the considerable empirical evidence of unequal access to neighborhoods in the residential housing market based on race/ethnicity. These housing constraints imply that higher income minorities will instead move into neighborhoods dominated by other members of their own racial/ethnic group (see also Wilson 1987). There is a voluminous literature showing evidence of constraints on the mobility decisions of minority households regarding both the racial/ethnic composition of the neighborhoods to which they move, as well as the economic resources of those neighborhoods (Crowder & South 2005, Massey & Denton 1993, Massey & Mullan 1984, Quillian 2003, Sampson & Sharkey 2008, South & Crowder 1998). This model therefore posits that the racial/ethnic composition of the neighborhood will explain the race/ethnicity of the new residents.

A second perspective argues that household preferences for living in geographic areas containing a large proportion of residents of their own race/ethnicity can give rise to segregation. Schelling's work (1978) was particularly influential in this tradition, arguing that as long as individuals have a preference for a degree of homogeneity—but no preference for a degree of heterogeneity—the outcome will be very high rates of segregation. Surveys of residents have

consistently found such preferences for homogeneity: one study found that whites preferred micro-neighborhoods of at least 80% whites; whereas African-Americans preferred at least 50% black (Clark 1991). Furthermore, whites are particularly likely to express avoidance of other groups (Clark 1992). Recent work suggests that whereas whites are less concerned about the Asian and Latino composition in the micro-neighborhood, white households-- particularly those with children under age 18—are still concerned about the presence of African-Americans (Emerson et al. 2001). In part, this may be because whites have an exaggerated sense of the crime rate in neighborhoods composed predominantly of African-Americans (Krysan 2002a, b). While there are differences in such attitudes among whites—for instance, one study found that whites with higher education and those who are younger were more open to residential integration (Farley et al. 1997)—it is nonetheless the case that the overall sentiment appears towards segregation. On the other hand, one simulation study suggested that if in fact individuals make finer-grained distinctions among neighborhoods based on racial composition—rather than the simple decision rules of the Schelling model—that preferences alone will not explain segregation (Bruch & Mare 2006). An implication of the preferences model is that the racial/ethnic composition of the neighborhood or the local micro-neighborhood should affect the race/ethnicity of the new residents.

A third perspective argues that segregation results from a more indirect cause: the relatively limited economic resources of racial/ethnic minorities. That is, racial/ethnic minorities lack the economic resources to move into more desirable high-income areas that are heavily populated by whites. To the extent that economic differences by race/ethnicity are structurally induced, this structure then gives rise to such racial/ethnic segregation. There is evidence that levels of income do indeed explain some of these levels of segregation (Massey & Fong 1990),

although the same study suggested that a household's level of education is particularly critical in explaining class stratification among African-Americans. This model implies that once taking into account the economic resources of the neighborhood and the new residents, the racial/ethnic composition of the neighborhood or local micro-neighborhood will have no effect on the race/ethnicity of the new residents.

A fourth perspective builds on the considerable evidence that discrimination plays a role in persistent segregation. Studies have documented the discrimination faced by racial/ethnic minorities in the housing sales and rental markets (Turner et al. 2000). One exhaustive report documented decreases between 1989 and 2000 in the level of discrimination experienced by Latinos and African Americans when seeking to a buy a home, but found upward trends of discrimination through geographic steering for African Americans and in the amount of help provided to Latinos for obtaining financing (Turner et al. 2000). This same study concluded that Latinos now experience even more discrimination in their rental housing search than do African American renters (Turner et al. 2000). There is even evidence that such discrimination occurs through phone contact, as an audit study found that speaking in Black English Vernacular resulted in reduced access to housing units (Fischer & Massey 2004). Real estate agents also play a crucial role as gatekeepers, as they can limit the range of perceived neighborhood options for persons based on the race/ethnicity of the potential mover by steering residents towards specific housing units and neighborhoods. This discrimination might play out at any one of different levels: if it is enacted by real estate agents through steering we should see that the racial/ethnic composition of the neighborhood or the local micro-neighborhood affects the race/ethnicity of the new residents. To the extent that the occupants of the unit enact such

discrimination we would expect to see a lower likelihood that a housing unit would transition from a white household to a minority household.

Another perspective focuses on the social networks of those involved in the housing market to explain persistent segregation. In this view, residents using personal contacts to find housing units will be pushed towards specific types of units and neighborhoods (Michelson 1977). Residents often turn to informal ties for information on neighborhoods that might be suitable, for specific apartment complexes that might be desirable, and even information on specific housing units that might be in the process of being vacated. To the extent that such ties tend to exhibit homophily on race/ethnicity, residents will frequently become aware of available housing units in neighborhoods populated mostly by fellow co-ethnics. An important implication is that to the extent that potential movers learn of specific units that fellow co-ethnics occupy and are now departing, we might see a particularly strong effect in which the race/ethnicity of the prior and new households is more similar for a specific unit than would be expected based simply on the race/ethnicity of the neighborhood.

A hypothesis that we put forward suggests that prospective residents use the race/ethnicity of the current residents in the unit as a signal that the neighborhood is appropriate for someone of their own race/ethnicity. In part, this builds on an information asymmetry explanation. The prospective new tenant possibly has only an estimate of the racial/ethnic composition of the local micro-neighborhood or the broader neighborhood, whereas the current residents should have a quite accurate assessment. On the other hand, the race/ethnicity of the prior residents is quite clear to the prospective residents if they meet them, or even if they see family pictures when touring the house. In such an instance, the presence of a household in the neighborhood of the same race/ethnicity as the prospective residents may be used as a signaling

device of the racial/ethnic composition of the neighborhood to the new residents. Beyond signaling the composition of the neighborhood, it may also be used as a cue to signal that the neighborhood is indeed hospitable to someone of their own race/ethnicity. Note that both this perspective and the prior one—the network perspective—imply that this household-level effect in which a household tends to be replaced by another of the same race/ethnicity would be observed for all racial/ethnic groups, whereas the discrimination perspective only posits that this relationship will be observed for possible transitions from white to minority households.

Measuring racial/ethnic transformation

Given the interest in understanding how segregation is created or replicated over time, there are various possible approaches to addressing this question. In the literature there exist at least four different strategies for studying the process of segregation: 1) ecological succession of neighborhoods (or census tracts); 2) multilevel models combining data on households and neighborhoods from different sources; 3) household-level models of mobility into other neighborhoods; 4) models of housing unit transition. We consider each of these in turn.

The ecological succession approach focuses on the neighborhood level, and studies how racial/ethnic transition occurs among census tracts or other similar geographic units (Lee & Wood 1991, Massey & Mullan 1984, Price-Spratlen & Guest 2002). These studies have produced numerous insights. For instance, there is evidence of considerable stability in neighborhood compositions over time: a study using the 1980 U.S. Census showed that the rank-order correlation for Census tracts in 21 metropolitan areas from 1970 to 1980 was .81 based on the percentage African-American (White 1987). One study found that during the 1960s, residential succession occurred far less frequently in Latino than in African-American tracts, and that an influx of Latinos was far less likely to be followed by white population loss

than was an influx of African-Americans (Massey & Mullan 1984). While this research design provides numerous insights into the extent to which neighborhoods racially/ethnically transform, it is unable to address the question of the extent to which individual household decisions are important for this process, or which context is important for explaining such mobility decisions.

A second approach focuses on how individual household mobility decisions might impact neighborhood segregation. Alba and Logan (Alba & Logan 1992, Alba et al. 2000, Logan et al. 1996) employed a novel technique when testing the hypotheses of the place stratification model that allowed them to overcome the data limitation of lacking neighborhood information on the specific neighborhood to which the residents moved. Their approach used information based on the characteristics of the tracts nested within a larger metropolitan area to get estimates of the characteristics of the neighborhoods that racial/ethnic minorities moved into. Their studies frequently found evidence for individual effects that were more consistent with assimilation theory for Latinos and Asians, but more consistent with the racial stratification theory for African-Americans (Logan et al. 1996). Despite its innovation, this approach only focused on the context of the broader neighborhood, and imposed some nontrivial assumptions to measure even this effect.[1]

More recent work has utilized information on the actual origination and destination tracts of the household to more directly assess these processes. Numerous studies have employed the Panel Study of Income Dynamics (PSID) to address these questions, focusing on the ability of residents of different race/ethnicity and different levels of economic resources to avoid residence in high poverty neighborhoods (Crowder & South 2005, Quillian 1999, 2003, South & Crowder 1997a, South et al. 1998). Studies have shown that African-Americans have considerably less ability than whites to move out of poor tracts, and are more likely to move into them (South &

Crowder 1997a). African-Americans also have less ability to move from the cities to the suburbs (South & Crowder 1997b). Research has concluded that the residential segregation of African Americans in urban housing markets explains the geographic concentration of poor blacks (Massey & Denton 1985) and that poor black neighborhoods are likely to have in-movers who are poor blacks (Massey et al. 1994). One study focusing on household *wealth* found that whereas it explained in part the racial/ethnic composition of the neighborhood to which residents moved, racial differences in household and parental wealth accounted for only a very small proportion of the pronounced racial/ethnic difference among those moving into neighborhoods containing more white residents (Crowder et al. 2006). A methodological challenge for studies focusing on such residential mobility decisions is that households can choose to move into neighborhoods throughout the metropolitan area in which they live, or even to leave the region entirely. Thus, modeling this choice process becomes quite challenging, particularly for understanding how it generates segregation. Furthermore, these studies only focus on the racial/ethnic composition of the neighborhood context, ignore the composition of the local micro-neighborhood, and are unable to take into account the race/ethnicity of the prior residents of a unit.

Whereas studies focusing on where residents move provide information that illuminates one component of the process of segregation, another body of research focuses on transition that occurs at the level of individual housing units. Given that this is precisely where racial/ethnic transition occurs, such studies provide considerable insight. Thus, showing that African-Americans are moving to highly African-American neighborhoods does not provide specific information on how racial/ethnic transition occurs. For instance, one study focused on the transition of individual units using the Annual Housing Survey from 1974-77 and found that

white to black transitions occurred in older, poorer quality, central city units (Marullo 1985). The same study found that black to white transitions occurred in better quality units in the suburbs (Marullo 1985). This study, as well as a study of households from 1967 to 1976 (Spain 1980) showed that exiting households were far more likely to be replaced by a household of the same race than one of another race. While such same-race transition may be suggestive of a general homophily preference, the inability to actually measure the racial/ethnic composition of the local neighborhood to determine the importance of this context precludes a more definitive assessment in these studies.

More recent research focusing on the racial/ethnic transition of housing units attempts to actually measure the racial/ethnic composition of the local context. A challenge for such studies is that there is little theoretical guidance of the proper level of aggregation for capturing such contextual effects. Some work has measured contextual effects in relatively large units of analysis: for instance, a series of papers by Rosenbaum and colleagues (Rosenbaum 1994, 1995, 1996, Rosenbaum & Argeros 2005) explored the transition of individual housing units in New York City using areas with at least 100,000 population as the context of interest. These studies have yielded key insights: not only was there evidence that in-movers tended to replace households of identical race/ethnicity, but also that whites avoided areas that were racially/ethnically mixed, or areas that were predominantly non-white or dominated by blacks (Rosenbaum & Argeros 2005). These same areas experienced much higher levels of Latino and African-American in-movement (Rosenbaum & Argeros 2005). Nonetheless, these geographic units are arguably far too large to appropriately capture the neighborhood context.

A possibly better measure of the neighborhood context is that of the local census tract. Only one study of which we are aware focused on the racial/ethnic transition of housing units

while taking into account the racial/ethnic context of the census tract in which the units were located (Ellen 2000). While this study of housing units in 34 metropolitan areas found that the context of the tract was important for understanding the race/ethnicity of the new household, it also found very strong effects based on the race/ethnicity of the prior residents: in only 11.5% of instances in which a white household moved out were they replaced by a household of a different race/ethnicity and in only 24.3% of the instances in which an African-American household left were they replaced by a household of a different race/ethnicity (Ellen 2000). Why these household level effects were still observed after accounting for the context of the census tracts was unclear, and Ellen speculated that this could be due to: 1) the local context of the smaller micro-neighborhood *within* the tract, or 2) that it may represent a true housing unit effect (e.g., due to such processes as steering, network effects, or as a signaling device of the racial/ethnic composition of the neighborhood to the new residents).

Although such research provides insight into the segregation process, the inability to take into account the micro-neighborhood context precludes a precise understanding of how structural characteristics of smaller geographic units of analysis may affect these individual-level choices that then impact the evolving structural characteristics of the neighborhood. It is not clear that tracts (or even larger geographic units) are the appropriate measure of such contextual effects. To the extent that households consider the racial/ethnic context of much smaller geographic units when making mobility decisions, such large units would not capture the context of importance for households. The voluminous literature focusing on the racial/ethnic preferences of residents that nearly always asks respondents about the desired composition of their *micro-neighborhood* (usually 10-12 nearby units) further suggests the important of such small geographic units (Clark 1991, 1992, Emerson et al. 2001, Farley et al. 1997, Krysan 2002a, b). If it is the case that the

context of a smaller geographic unit such as the local micro-neighborhood has stronger effects on household decisions of where to move than the context of the broader neighborhood (as measured by the census tract), studies using such large geographic units cannot appropriately capture this effect. To the extent that there is variability over the micro-neighborhoods *within* a tract, measuring these contextual effects at only the larger unit of analysis may preclude properly assessing these effects (Hipp 2007).

Summary

The present study explores whether the contexts of the micro-neighborhood and the broader neighborhood affect the race/ethnicity of the residents moving into these units. By accounting for both of these possibly important geographic contexts, this study is also better able to discern whether the race/ethnicity of the prior residents of the unit has an additional effect on the race/ethnicity of the new residents. This allows testing the predictions of the theories outlined above in understanding the process of segregation. The data are described next.

DATA AND METHODOLOGY

Data

The sub-sample of the American Housing Survey (AHS) employed in this study is uniquely suited to address these research questions. The AHS is a national sample of about 60,000 housing units conducted in odd-numbered years. It is the housing *units* that are followed over time. For this special neighborhood sub-sample conducted at three waves, the AHS initially randomly selected 663 housing units in 1985 from the full AHS that were located in either urban or suburban locations (the samples were augmented in 1989 and 1993 with new micro-neighborhoods). They then interviewed the ten closest neighbors of the initial respondent.[2] In

what follows, these eleven households are referred to as a "micro-neighborhood." We took into account the broader neighborhood by placing these households into their respective 1980 census tracts using special access to data at a Census Research Data Center.[3] Importantly, none of these "micro-neighborhoods" straddle two census tracts. This unique data set thus has households nested within micro-neighborhoods as the units of analysis, with additional information on the tract in which these micro-neighborhoods reside, allowing testing whether the structural characteristics of the local micro-neighborhood level or at the census tract matter more for residential housing transition. There is information on two move periods: information from 1985 predicts the new household's characteristics in 1989, and information from 1989 predicts the new household's characteristics in 1993. We focus only on households which experienced a change in residents, thus we have a total of 5,773 housing units over these two time periods.

Outcome measures

The outcome measures are three variables capturing the race/ethnicity of the new household in the residence at the next time point. These dichotomous measures indicate whether the new household is white, African-American, or Latino.

Household, micro-neighborhood- and tract-level predictors

The key predictors are measured at the household-level, the micro-neighborhood-level, and the tract-level at the current time point (to see what effect they have on the race/ethnicity of the new household at the next time point). The racial/ethnic composition was accounted for by creating measures of the percent African-American, Latino, and other race (with white as the reference category) in the micro-neighborhood (as a sum of responses to the AHS) or tract (which were summed responses to the U.S. Census). For the census tract, percent Asian was also included. We measured race/ethnicity with dichotomous indicators of whether the current

household was white, African-American, Latino, or other race. We measured racial/ethnic heterogeneity (EH) in a micro-neighborhood or tract *k* by an identity based on a Herfindahl index (Gibbs & Martin 1962: 670) of the racial/ethnic groupings just described, taking the following form:

$$\text{EH}_k = 1 - \sum_{1}^{j=J} G_j^{\,2} \tag{1}$$

where G represents the proportion of the population of ethnic group *j* out of *J* ethnic groups. Subtracting from 1 makes this a measure of heterogeneity.

To minimize the possibility of spurious findings, we accounted for several other characteristics of the micro-neighborhood and tract that might explain the type of residents who enter a neighborhood. To account for economic resources, measures of average household income in the micro-neighborhood and the median household income in the tract were constructed. Residential stability was measured as the length of residence of the prior residents, and the average length of residence in the micro-neighborhood or tract. Given that crime may affect residential in-mobility, a measure of the average perception of crime of residents in the micro-neighborhood was computed. The AHS asks respondents a series of three questions that were combined into a four-point scale: is crime a problem, is it so much of a problem that it's a bother, and is it such a bother that the respondent wishes to move. Given the desirability of quality schools, the completion rate of students in the local school district was computed from the Local Education Agency (School District) Universe Survey Longitudinal Data File: 1986-1997 (U.S. Department of Education 2001). Because the presence of toxic waste sites is likely undesirable (Mohai & Saha 2006, Pastor et al. 2001, Saha & Mohai 2005), a measure of the pounds of toxic waste emitted in an area was included, weighted by the inhalation toxicity.[4] As a possible disamenity, a measure of the number of employees of bars and liquor stores per 10,000 population in the tract was constructed, taken from the U.S. economic census.[5] To maintain temporal precedence, we used data from the 1982 economic census for the 1985 AHS sample and data from the 1987 economic census for the 1989 AHS sample.[6] As a possible amenity, the number of restaurant or recreation employees per 10,000 population in the tract was computed.

Finally, since this is a national sample of micro-neighborhoods, characteristics of the county were accounted for to minimize the possibility of spurious effects. Four measures were

thus aggregated to the county level using U.S. census data: the percent urban, the median income, the household inequality in the county (measured by the Gini coefficient), and the racial/ethnic heterogeneity (measured with the Herfindahl index as described above).[7] The summary statistics for the variables used in the analyses are shown in Table 1.

<<<Table 1 about here>>>

Methodology

The models were estimated as logit models with standard errors corrected for micro-neighborhood-level clustering using the Huber/White sandwich estimator.[8] For the model predicting that the household will be white at the next time point, the equation is:

$$\Pr(y_{ik(t+1)}) = \Gamma_{X\text{-}IK}X_{ik(t)} + \Gamma_{X\text{-}K}X_{k(t)} + \Gamma_{X\text{-}J}X_{j(t)} + \beta_{YR}YR \quad (3)$$

where $y_{ik(t+1)}$ is a dichotomous indicator that the household at the next time point is white for the *i*-th respondent of *I* respondents who are new in the *k*-th micro-neighborhood, $X_{ik(t)}$ is a vector of characteristics of the prior residents in the unit that have a $\Gamma_{X\text{-}IK}$ effect on the outcome, X_k is a matrix of micro-neighborhood-level predictors for micro-neighborhood *k*, $\Gamma_{X\text{-}K}$ shows the effect of these predictors on the outcome, X_j is a matrix of tract-level predictors for tract *j*, $\Gamma_{X\text{-}J}$ shows the effect of these predictors on the outcome, and YR indicates whether the observation comes from the first transition wave and has a β_{YR} effect on the outcome. This approach was adopted rather than a multinomial approach as it allows us to always measure the "resistance" effect of the current household's race/ethnicity on the probability of the race/ethnicity of a new household. That is, rather than including a measure of whether the household's race/ethnicity at the initial time point is the same as that at the follow-up time point (which should have a positive effect on the race/ethnicity of the new household) in each model we include indicators of the race/ethnicities (other than that of the new household) to determine which have a particularly

strong resistance effect on the race/ethnicity of the new household. All models were estimated in SAS 9.1. Although there was modest missing data, we accounted for it through a multiple imputation strategy (Rubin 1987). The results report standard errors corrected for this multiple imputation.

Since almost no tracts contain multiple micro-neighborhoods, it is not feasible to treat the census tract as an additional nesting level in the multilevel framework. Thus, effectively, $j=k$. While this precludes comparing the degree of variance existing at the micro-neighborhood-level and tract-level, it also alleviates concerns about improper estimation of standard errors as the tracts do not constitute an additional level of nesting since they are nearly coterminous with micro-neighborhoods. In this sample design, the tracts and the micro-neighborhoods arise from the initial sampling selection of a household and therefore no bias is introduced to the parameter estimates.[9]

Note that the population of interest in these models is housing units that have experienced a transition over the four-year period between waves. That is, given that a household transition has occurred, what household and neighborhood characteristics explain the characteristics of the new household in that unit? An alternative approach takes into account the housing units that did not experience a transition by estimating a selection model (Heckman 1979). We estimated such selection models and included the inverse Mills ratio in the models and found very similar results to the models presented here (results not shown).[10] While we only present the results for the variables of theoretical interest, the models control for the other neighborhood variables described above.

RESULTS

New household is African-American

We begin by asking what explains whether the new household will be African-American. We see in the model in Table 2 that the race/ethnicity of the previous household, as well as the racial/ethnic composition of the micro-neighborhood and the tract all have significant effects on the likelihood that the new household will be African-American. It is notable that the race/ethnicity of the previous residents has a particularly strong effect: the odds of the new household being African-American are reduced 86% if the prior residents were white rather than African-American, and 91% if the prior residents were Latino. Thus, there are strong homophily effects in which households are replacing other households similar to themselves based on race/ethnicity, even when taking into account the characteristics of the local micro-neighborhood and the broader census tract.

<<<Table 2 about here>>>

To provide a more intuitive understanding of the size of these effects, we plotted predicted values for the likelihood that the new household will be African-American for various racial/ethnic compositions of the micro-neighborhood and tract, given the race/ethnicity of the previous residents (with all other variables in the model set to their mean values). We first plotted these predicted values for the average neighborhood experienced by an African-American in our sample: these are shown in the three bars on the left hand side of Figure 1, and we see that in this average neighborhood the predicted probability that the new household will be African-American is .87 if the prior residents were African-American, but just .48 if the prior residents were white and .37 if the prior residents were Latino.[11]

<<<Figure 1 about here>>>

How big are the effects if we hypothetically manipulate the racial/ethnic composition of the micro-neighborhood? In Figure 1 we see that whereas the predicted probability that an African-American household will replace a white household is .48 in the average tract, this falls to .23 with a one standard deviation increase in the percentage whites in the micro-neighborhood, and falls to .32 with a one standard deviation increase in the percentage Latinos in the micro-neighborhood. Conversely, this predicted probability rises to .69 with a one standard deviation increase in the percentage African-American in the micro-neighborhood.

On the other hand, the effects when hypothetically manipulating the racial/ethnic composition of the broader tract are almost non-existent. This occurs because the estimated positive effect of racial/ethnic heterogeneity in this model balances the negative effect of these various racial/ethnic groups, and therefore the effects on the probability that the new household will be African-American are greatly attenuated for tracts in this range of racial/ethnic compositions. For instance, whereas the probability of an African-American household replacing a white household is .48 in an average tract, this value only falls to .46 with a one standard deviation increase in the percentage white, to .44 with a one standard deviation increase in the percentage Latino, and actually *falls* to .36 with a one standard deviation increase in the percentage African-American. As a consequence of these minimal effects when changing the tract composition, a one standard deviation increase in the percentage of any racial/ethnic group in *both* the micro-neighborhood and the tract has similar-sized effects as when only the racial/ethnic composition of the micro-neighborhood is manipulated (shown on the right hand side of Figure 1).

These combined results suggest that racial segregation for African-Americans is largely being played out at the micro-neighborhood level and, particularly, at the level of housing units.

As a dramatic example of this, across all of the various neighborhood and household compositions described in Figure 1, whereas the predicted probability that the new household will be African-American ranges from .66 to .94 if the prior residents were black, there is only one instance (with a one standard deviation increase in the percentage black in the micro-neighborhood) in which the predicted probability is higher than this smallest value when the previous residents were white and none when the previous residents were Latino.

New household is white

We next turn to the models attempting to explain in which instances the new household will be white. We again see very strong race/ethnicity effects, particularly based on the race/ethnicity of the prior residents. The odds of the new household being white are reduced 81% if the prior residents were Latino rather than white, and 85% if the prior residents were African-American. We plotted the predicted probability of the new household being white for various neighborhood racial/ethnic compositions in Figure 2. In a neighborhood with a racial/ethnic composition somewhat more heterogeneous than that experienced by the average white household in this sample, the predicted probability that the new household will be white is .71 if the prior residents were white, but just .31 and .27 if the prior residents were Latino or African-American respectively.[12] Again, we see that the race/ethnicity of the prior residents has very strong effects on the race/ethnicity of the new household, even when controlling for the micro-neighborhood and tract racial/ethnic composition.

<<<Table 3 about here>>>

<<<Figure 2 about here>>>

The probability of a white household moving into a unit decreases with increasing proportions of minorities in the micro-neighborhood. Whereas the predicted probability of the

new household being white when the prior residents were Latino is .31 in an average neighborhood, this falls to .21 with a one standard deviation increase in the percentage Latinos in the micro-neighborhood, and to .18 with a one standard deviation increase in the percentage African-American. On the other hand, increasing the percentage white in the micro-neighborhood to nearly 100% increases this probability to .52.

Whereas the racial/ethnic composition of the surrounding tract had minimal effect on the probability of an African-American household moving into a unit, the effects are quite substantial in these models predicting that the new household will be white. The size of the effect is nearly as large as that when changing the racial/ethnic composition of the local micro-neighborhood. As a consequence, the effect of changing the racial/ethnic composition in *both* the local micro-neighborhood and the surrounding tract is quite substantial for the probability of a white household moving into a unit previously occupied by a Latino: a one standard deviation increase in the percentage African-American in both the micro-neighborhood and the tract reduces this predicted probability from .31 to .12, similar changes in the percentage Latino reduces it to .15, whereas similar changes in the percentage white increases it to .71. Nonetheless, it should again be highlighted how strong the effect is of the race/ethnicity of the prior residents: the predicted probability that the new residents will be white ranges from .42 to .93 for these various neighborhood racial/ethnic compositions if the prior residents were white. If the prior residents were Latino or African-American, the predicted probability is only as large as this smallest value when the micro-neighborhood or tract has a high percentage of whites.

New household is Latino

In the models predicting that the new household will be Latino, we again see strong effects for racial/ethnic composition and particularly strong effects for the race/ethnicity of the

prior residents. The odds of the new household being Latino are reduced 82% when the prior residents were white rather than Latino, and 87% when the prior residents were African-American. These dramatic effects are plotted visually in Figure 3, and we see in the left hand side of this Figure that in a neighborhood with the average racial/ethnic composition experienced by a Latino in this sample the predicted probability the new household will be Latino is .65 if the prior residents were Latino, but just .25 and .20 if the prior residents were white or African-American, respectively.[13]

<<<Table 4 about here>>>

<<<Figure 3 about here>>>

Similar to whites, we see that the racial/ethnic composition of both the micro-neighborhood and the surrounding tract have important effects on the possibility that the new household will be Latino. Whereas the predicted probability that the new household will be Latino is .25 when the prior residents were white in a neighborhood with the racial/ethnic composition experienced by an average Latino, this falls to .14 or .13 with a one standard deviation increase in the percentage white or African-American respectively in the micro-neighborhood. This predicted probability increases to .35 with a one standard deviation increase in the percentage Latino in the micro-neighborhood. The size of the effects is very similar when changing the racial/ethnic composition of the surrounding tract. As a consequence, there is a reinforcing effect in which the predicted probability of the new household being Latino is just .06 or .07 with a one standard deviation increase in the percentage white or African-American respectively in *both* the micro-neighborhood *and* the tract when the prior residents were white. However, an increase in the percentage Latino in *both* the micro-neighborhood *and* surrounding tract increases this predicted probability to .44. It appears that the race/ethnicity of the prior

residents has a particularly strong effect in explaining where Latinos will move, even when accounting for the characteristics of the local micro-neighborhood and the surrounding tract.

Other measures

Before concluding, we briefly highlight two other findings from our models. First, whereas there was no evidence that aggregated income in the broader tract explained the race/ethnicity of the new residents, there were effects at the level of the micro-neighborhood. In this localized effect, micro-neighborhoods with higher average income increased the probability that the new household would be white and decreased the probability that the new household would be Latino. There was no evidence, however, that the income level of the micro-neighborhood affects the probability that the new household will be African-American. This suggests minimal evidence for the economic resources theory that economic differences between racial/ethnic groups lead to segregation in neighborhoods.

Second, there was some evidence that the residential stability of the micro-neighborhood plays a role in segregation. Micro-neighborhoods with higher levels of residential stability were less likely to have African-American households move in and more likely to have white households move in. The fact that this localized stability keeps out African-American households is consistent with a discrimination effect in which such micro-neighborhoods can minimize the access of these households. However, there was no evidence that the stability of the broader tract affects the race/ethnicity of the new household in these models, suggesting that this is a very localized process.

CONCLUSION

The present study has explored how housing unit transition can lead to racial/ethnic change, or stasis, in neighborhoods. By employing a unique sample, this study compared the effect of three levels of analysis on the characteristics of the new residents: the race/ethnicity of the prior residents in the unit, and the racial/ethnic composition of the micro-neighborhood and the census tract. Accounting for the context of the neighborhood (as measured by the tract) as well as the local micro-neighborhood allows parsing out the effect of the race/ethnicity of the prior residents when studying residential transition.

One important finding was the evidence that the racial/ethnic composition of the local micro-neighborhood is just as important, if not more important, than the racial/ethnic composition of the broader census tract for understanding the race/ethnicity of the new residents in a housing unit. Prior work has generally failed to test for the importance of such micro-neighborhood effects, though studies have acknowledged this possibility (Ellen 2000). Thus, we find that whereas African-Americans are generally moving into racially mixed neighborhoods, they tend to enter micro-neighborhoods with a disproportionate number of African-Americans. This suggests the need for future research to account for the context of such smaller geographic units when studying segregation. This reinforces the evidence from recent scholarship that flexibly measuring segregation may be a more appropriate strategy for capturing these processes (Reardon et al. 2008).

A second key finding that is perhaps even more important, was that the race/ethnicity of the prior residents had a strong effect on the race/ethnicity of the new residents. Although much prior research has focused on the possibility that households will move into neighborhoods that contain a high proportion of residents of their own race/ethnicity, few studies have considered

the possibility that the race/ethnicity of the prior residents *of the unit* might be important. We emphasize that we observed such an effect even when accounting for the racial/ethnic composition of the micro-neighborhood and the broader neighborhood. This finding may well suggest that the social networks of residents are important for finding new housing units. That is, while it has been theorized that information traveling through networks provides information about desirable neighborhoods when considering residential mobility, it is likely that such networks also provide information about specific units. That is, a household leaving a unit may provide information to network contacts about the unit.

A second possible explanation of this homophily effect based on the race/ethnicity of the prior residents is that new residents use the race/ethnicity of the prior residents as a cue about the appropriateness of the neighborhood for someone of their own race/ethnicity. That is, whereas a prospective new tenant likely only has an estimate of the racial/ethnic composition of the micro-neighborhood or the broader neighborhood, the race/ethnicity of the prior residents is quite clear. The presence of a white household in the neighborhood, for instance, may be used as a cue to signal that the neighborhood is indeed hospitable to a prospective white household.

Is this a discrimination effect we are observing? On the one hand, the evidence that a housing unit with a white household is particularly unlikely to transition to a minority household is consistent with the notion of possible discrimination. On the other hand, the evidence that a housing unit with a minority household is also unlikely to transition to a white household does not fit with the discrimination hypothesis.

These speculations about why we observed this important effect in which the race/ethnicity of the prior residents strongly predicted the race/ethnicity of the new residents point out an important direction for future research. There is limited theorizing about this

relationship, no doubt in part due to the inability of prior research to appropriately detect this effect. Our findings suggest an important avenue for future studies in attempting to tease out exactly why such a relationship is so strongly present.

Although this study has provided important new insights for understanding residential segregation, certain limitations should be acknowledged. Whereas an innovation of this study was taking into account both the racial/ethnic composition of the local micro-neighborhood and the broader neighborhood of the census tract, it need not be the case that either of these necessarily captures the ideal level of aggregation. Given that Grannis (1998) found that block groups often most closely approximated neighborhoods, future work might want to test such an effect of this mid-sized unit on residential in-mobility. Such a level of aggregation was simply not possible with this data source. This study also was limited to studying residential mobility over two four-year periods: although it is unlikely that these processes occur in a more fine grained temporal fashion, it may well be that longer periods of time are necessary to more thoroughly understand these processes. Data limitations precluded such tests in this study, but suggest a direction for future research.

Despite these caveats, this study has provided insight into the process of segregation by viewing residential transition at the micro-level of housing units. Taken together, these findings imply that many of these processes work at the level of micro-neighborhoods and might not always be detected using data aggregated to larger units, highlighting the importance of taking into account this smaller micro-context. This is not completely surprising, and arguably was anticipated by the numerous prior studies of neighborhood racial/ethnic preferences that presented respondents with descriptions of the racial/ethnic composition of the local *micro-neighborhood* (Clark 1991, 1992, Emerson et al. 2001, Farley et al. 1997, Krysan 2002a, b). Our

findings also highlight that the race/ethnicity of the prior residents has a surprisingly strong effect on the race/ethnicity of the new residents and suggest a need for future research to explore more explicitly why this occurs.

Endnotes

[1] One limitation is that this approach cannot handle cross-level interactions. That is, if different types of residents respond in systematically different ways to a context, this approach cannot take this into account. A second limitation is that it cannot disentangle the extent to which such change occurs due to the household level, micro-neighborhood level, or neighborhood level.

[2] In the American Housing Survey, sample units were selected from the 1980 Census Sample Housing Unit Record File. A Housing Unit Coverage Study was performed to locate units missed by the 1980 census, and an additional sample was selected from the units located by this study (such as non-residential to residential units, new mobile home parks, etc). Building permits are also sampled to represent newly constructed housing since the 1980 census (For a more complete description of the AHS sampling design, see Hadden & Leger 1995).

[3] For the AHS wave in 1989, census tract data for 1990 was used to create the structural measures. For the 1985 wave, an estimate was created by taking the mean of the census tract measures in 1980 and 1990. Given that the geographic information on the AHS respondents placed them into 1980 census tracts, the merged data were apportioned to 1980 tract boundaries based on population by using information from the MABLE/GEOCORR website at the University of Missouri (http://mcdc2.missouri.edu/websas/geocorr90.shtml).

[4] The data for the quantity of certain chemicals released into the environment was obtained from the Toxic Release Inventory (TRI), obtained at http://www.rtknet.org/triabout.html. We multiplied the pounds of the chemical released by an inhalation toxicity score constructed by the Risk Screening Environmental Indicators (RSEI) study conducted by the United States Environmental Protection Agency (United States Environmental Protection Agency 2004). We

geocoded each site and drew one-mile buffers around it as an approximation of the geographic dispersion of its impact.

[5] Since establishments with more patrons will generally have a greater number of employees, using a measure of the number of employees better captures the effect on the neighborhood rather than a simple count of the number of establishments.

[6] This economic census data is reported for zip codes. We used the Master Area Reference File (Census of Population and Housing 1980) to apportion these data into constituent 1980 census tracts based on the proportion of the zip code population contained within a given tract.

[7] Overall inequality in the county was calculated based on the Gini coefficient, defined as:

$$G = \frac{2}{\mu n^2} \sum_{i=1}^{n} i x_i - \frac{n+1}{n}$$

where x_i is the household's value of income, μ is the mean income value, the households are arranged in ascending values indexed by i, up to n households in the county. We account for the binning of income with the prln04.exe program provided by Francois Nielsen at http://www.unc.edu/~nielsen/data/data.htm.

[8] Multilevel models using a logit link in SAS for these dichotomous outcomes were also estimated. The results were very similar to those presented here, as the estimates for the constructs of interest were in the same direction with similar significance levels. Furthermore, there was very minimal evidence of clustering for these outcomes in these models. While estimating multilevel models with a logit link in SAS currently requires using the penalized quasi-likelihood approach, which has known limitations (Agresti et al. 2000, Guo & Zhao 2000, Neuhaus & Segal 2001), software constraints at the Census Data Center required employing this particular software rather than the HLM software program, which utilizes more desirable

techniques for estimating multilevel logit models. Because of this, the fact that this population-average model requires fewer assumptions about the distribution of the random effects (Heagerty & Zeger 2000, Raudenbush & Bryk 2002: 304), and given that the results of the two approaches were so similar, we present the logistic models with corrected standard errors here.

[9] There was no evidence of estimation problems in these models. There was no evidence of collinearity among these predictors, as all variance inflation factors were below 10—a commonly specified cutoff value. Additionally, ancillary models dropping individual measures showed no evidence that the results are dependent on the particular specification, as the results were robust. As expected, there was no evidence of influential cases or outliers for these models with dichotomous outcomes.

[10] A challenge with Heckman selection models is that it is often difficult to posit variables that might affect the selection process but not the outcome of interest. In such an instance, identification is quite weak, and the resulting multicollinearity makes the estimates quite unstable (Stolzenberg & Relles 1997). Stolzenberg and Relles thus concluded that unless selection is quite severe, the model ignoring selection will perform better due to greater efficiency.

[11] The average neighborhood for an African-American in our sample is 66.8% African-American, 25.7% white, 5.2% Latino, and 2.3% other race. We used these values for the average micro-neighborhood and tract of an African-American (with the exception that we split the percentage other race for tracts equally into Asian and other race). For a one standard deviation increase in these measures, we used the standard deviation values from Table 1. We used these different values for micro-neighborhoods and tracts given that the differing sized aggregations imply that the different standard deviations for these two units represent true

differences in the amount of reasonable change in these measures. That is, tracts tend to have a smaller dispersion on these racial/ethnic composition measures since they are larger and more heterogeneous than the smaller unit of micro-neighborhood.

[12] We do not plot the effects for the *average* neighborhood composition, since this would be a neighborhood which is 87.1% white. The average neighborhood composition would not provide much information on the effect of increasing the percentage white (since one standard deviation is 28.5% in tracts and 32% in micro-neighborhoods). The neighborhood would become completely homogeneous white with just a small increase in percent white, which does not allow properly viewing the magnitude of this effect. Instead, we plot the effects for a neighborhood that is slightly more heterogeneous in composition: one that is 74.3% white, 10.4% Latino, 10.3% African-American, and 5% other race. These plots provide more information about the relative effect of the change in racial/ethnic composition than those using the composition of the average tract.

[13] The average neighborhood for a Latino in our sample is 46.8% Latino, 41.4% white, 8.4% African-American, and 3.4% other race. We used these values for the average micro-neighborhood and tract of a Latino (with the exception that we split the percentage other race for tracts equally into Asian and other race).

References

Agresti, Alan, James G. Booth, James P. Hobert, and Brian Caffo. 2000. "Random-Effects Modeling of Categorical Response Data." *Sociological Methodology* 30:27-80.

Alba, Richard D., and John R. Logan. 1992. "Analyzing Locational Attainments: Constructing Individual-Level Regression Models Using Aggregate Data." *Sociological Methods & Research* 20(3):367-397.

Alba, Richard D., John R. Logan, and Brian J. Stults. 2000. "The Changing Neighborhood Contexts of the Immigrant Metropolis." *Social Forces* 79(2):587-621.

Bruch, Elizabeth E., and Robert D. Mare. 2006. "Neighborhood Choice and Neighborhood Change." *American Journal of Sociology*:667-709.

Bursik, Robert J., and Harold G. Grasmick. 1993. *Neighborhoods and Crime*. Lexington.

Census of Population and Housing. 1980. "ZIP Code Equivalency File (MARF 5)." Washington: The Bureau. Housed at the Odum Institute for Research in the Social Sciences at UNC-Chapel Hill.

Clark, William A. V. 1991. "Residential Preferences and Neighborhood Racial Segregation: A Test of the Schelling Segregation Model." *Demography* 28(1):1-19.

—. 1992. "Residential Preferences and Residential Choices in a Multiethnic Context." *Demography* 29(3):451-466.

Crowder, K., S. J. South, and E. Chavez. 2006. "Wealth, race, and inter-neighborhood migration." *American Sociological Review* 71(1):72-94.

Crowder, Kyle D., and Scott J. South. 2005. "Race, Class, and Changing Patterns of Migration between Poor and Nonpoor Neighborhoods." *American Journal of Sociology* 110(6):1715-1763.

Cutler, David M., and Edward L. Glaeser. 1997. "Are Ghettos Good or Bad?" *The Quarterly Journal of Economics* 112(3):827-872.

Cutler, David M., Edward L. Glaeser, and Jacob L. Vigdor. 1999. "The Rise and Decline of the American Ghetto." *The Journal of Political Economy* 107(3):455-506.

Ellen, Ingrid Gould. 2000. *Sharing America's neighborhoods : the prospects for stable racial integration*. Harvard.

Emerson, Michael O., George Yancey, and Karen J. Chai. 2001. "Does Race Matter in Residential Segregation? Exploring the Preferences of White Americans." *American Sociological Review*:2001.

Farley, Reynolds. 2008. "Racial Residential Segregation: Census 2000 Findings." edited by The University of Michigan The University of Michigan, Inter University Consortium for Political and Social Research.

Farley, Reynolds, Elaine L. Fielding, and Maria Krysan. 1997. "The Residential Preferences of Blacks and Whites: A Four-Metropolis Analysis." *Housing Policy Debate* 8(4):763-800.

Farley, Reynolds, and William H. Frey. 1994. "Changes in the Segregation of Whites from Blacks during the 1980s: Small Steps toward a More Integrated Society." *American Sociological Review* 59(1):23-45.

Fischer, Claude S., Gretchen Stockmayer, Jon Stiles, and Michael Hout. 2004. "Distinguishing the Geographic Levels and Social Dimensions of US Metropolitan Segregation, 1960-2000." *Demography* 41(1):37-59.

Fischer, Mary J., and Douglas S. Massey. 2004. "The Ecology of Racial Discrimination." *City and Community* 3(3):221-241.

Frey, William H., and Reynolds Farley. 1996. "Latino, Asian, and Black Segregation in U.S. Metropolitan Areas: Are Multi-ethnic Metros Different?" *Demography* 33(1):35-50.
Gibbs, Jack P., and Walter T. Martin. 1962. "Urbanization, Technology, and the Division of Labor: International Patterns." *American Sociological Review* 27(5):667-677.
Grannis, Rick. 1998. "The Importance of Trivial Streets: Residential Streets and Residential Segregation." *American Journal of Sociology* 103(6):1530-1564.
Guo, Guang, and Hongxin Zhao. 2000. "Multilevel Modeling for Binary Data." *Annual Review of Sociology* 26:441-462.
Hadden, Louise, and Mireille Leger. 1995. *Codebook for the American Housing Survey*. Abt Associates.
Heagerty, Patrick J., and Scott L. Zeger. 2000. "Marginalized Multilevel Models and Likelihood Inference." *Statistical Science* 15(1):1-26.
Heckman, James J. 1979. "Sample Selection Bias as a Specification Error." *Econometrica* 47(1):153-161.
Hipp, John R. 2007. "Block, Tract, and Levels of Aggregation: Neighborhood Structure and Crime and Disorder as a Case in Point." *American Sociological Review* 72(5):659-680.
Krysan, Maria. 2002a. "Community Undesirability in Black and White: Examining Racial Residential Preferences through Community Perceptions." *Social Problems* 49(4):521-543.
—. 2002b. "Whites Who Say They'd Flee: Who are They, and Why Would They Leave?" *Demography* 39(4):675-696.
Lee, Barrett A., and Peter B. Wood. 1991. "Is Neighborhood Racial Succession Place-Specific?" *Demography* 28(1):21-40.
Logan, John R., Richard D. Alba, and Shu Yin Leung. 1996. "Minority Access to White Suburbs: A Multiregional Comparison." *Social Forces* 74(3):851-881.
Logan, John R., and Harvey L. Molotch. 1987. *Urban Fortunes: The Political Economy of Place*. University of California.
Marullo, Sam. 1985. "Targets for Racial Invasion and Reinvasion: Housing Units Where Racial Turnovers Occurred, 1974-77." *Social Forces* 63(3):748-774.
Massey, Douglas S. , and Nancy A. Denton. 1985. "Spatial Assimilation as a Socioeconomic Outcome." *American Sociological Review* 50(1):94-106.
Massey, Douglas S., and Nancy A. Denton. 1987. "Trends in the Residential Segregation of Blacks, Hispanics, and Asians: 1970-1980." *American Sociological Review* 52(6):802-825.
—. 1993. *American Apartheid: Segregation and the Making of the Underclass*. Harvard.
Massey, Douglas S., and Eric Fong. 1990. "Segregation and Neighborhood Quality: Blacks, Hispanics, and Asians in the San Francisco Metropolitan Area." *Social Forces* 69(1):15-32.
Massey, Douglas S., Andrew B. Gross, and Kumiko Shibuya. 1994. "Migration, Segregation, and the Geographic Concentration of Poverty." *American Sociological Review* 59(3):425-445.
Massey, Douglas S., and Brendan P. Mullan. 1984. "Processes of Hispanic and Black Spatial Assimilation." *American Journal of Sociology* 89(4):836-873.
Michelson, William H. 1977. *Environmental Choice, Human Behavior, and Residential Satisfaction*. Oxford.

Mohai, Paul, and Robin Saha. 2006. "Reassessing Racial and Socioeconomic Disparities in Environmental Justice Research." *Demography* 43(2):383-399.

Neuhaus, John M., and Mark R. Segal. 2001. "An Assessment of Approximate Maximum Likelihood Estimators in Generalized Linear Models." Pp. 11-22 in *Modelling Longitudinal and Spatially Correlated Data*, edited by Timothy G. Gregoire, David R. Brillinger, Peter J. Diggle, Estelle Russek-Cohen, William G. Warren, and Russell D. Wolfinger. Springer.

Pastor, Manuel Jr., Jim Sadd, and John Hipp. 2001. "Which Came First? Toxic Facilities, Minority Move-in, and Environmental Justice." *Journal of Urban Affairs* 23(1):1-21.

Price-Spratlen, Townsand, and Avery M. Guest. 2002. "Race and Population Change: A Longitudinal Look at Cleveland Neighborhoods." *Sociological Forum* 17(1):105-136.

Quillian, Lincoln. 1999. "Migration Patterns and the Growth of High-Poverty Neighborhoods, 1970-1990." *American Journal of Sociology* 105(1):1-37.

—. 2003. "How Long are Exposures to Poor Neighborhoods? The Long-Term Dynamics of Entry and Exit from Poor Neighborhoods." *Population Research and Policy Review* 22(3):221-249.

Raudenbush, Stephen W., and Anthony S. Bryk. 2002. *Hierarchical Linear Models: Applications and Data Analysis*, 2 ed. Sage.

Reardon, Sean F., Stephen A. Matthews, David O'Sullivan, Barrett A. Lee, Glenn Firebaugh, Chad R. Farrell, and K. Bischoff. 2008. "The Geographical Scale of Metropolitan Racial Segregation." *Demography* 45(3):489-514.

Rosenbaum, Emily. 1994. "The Constraints on Minority Housing Choices, New York City 1978-1987." *Social Forces* 72(3):725-747.

—. 1995. "The making of a ghetto: Spatially concentrated poverty in New York City in the 1980s." *Population Research and Policy Review* 14(1):1-27.

—. 1996. "Racial/ethnic differences in home ownership and housing quality, 1991." *Social Problems* 43(4):403-426.

Rosenbaum, Emily, and Grigoris Argeros. 2005. "Holding the Line: Housing Turnover and the Persistence of Racial/Ethnic Segregation in New York City." *Journal of Urban Affairs* 27(3):261-281.

Rubin, Donald B. 1987. *Multiple Imputation for Nonresponse in Surveys*. Wiley.

Saha, Robin, and Paul Mohai. 2005. "Historical Context and Hazardous Waste Facility Siting: Understanding Temporal Patterns in Michigan." *Social Problems* 52(4):618-648.

Sampson, Robert J., and Patrick Sharkey. 2008. "Neighborhood Selection and the Reproduction of Concentrated Racial Inequality." *Demography* Forthcoming.

Schelling, Thomas C. 1978. *Micromotives and Macrobehavior*. W.W. Norton & Co.

South, Scott J., and Kyle D. Crowder. 1997a. "Escaping Distressed Neighborhoods: Individual, Community, and Metropolitan Influences." *American Journal of Sociology* 102(4):1040-1084.

—. 1997b. "Residential Mobility Between Cities and Suburbs: Race, Suburbanization, and Back-to-the-City Moves." *Demography* 34(4):525-538.

—. 1998. "Housing Discrimination and Residential Mobility: Impacts for Blacks and Whites." *Population Research and Policy Review* 17(4):369-387.

South, Scott J., Kyle D. Crowder, and Katherine Trent. 1998. "Children's Residential Mobility and Neighborhood Environment Following Parental Divorce and Remarriage." *Social Forces* 77(2):667-693.

Spain, Daphne. 1980. "Black-To-White Successions in Central-City Housing." *Urban Affairs Review* 15(4):381-396.
Stolzenberg, Ross M., and Daniel A. Relles. 1997. "Tools for Intuition about Sample Selection Bias and Its Correction." *American Sociological Review* 62(3):494-507.
Turner, Margery A., Stephen Ross, George C. Galster, and John Yinger. 2000. "Discrimination in metropolitan housing markets: National results from Phase I HDS 2000." U.S. Department of Housing and Urban Development.
U.S. Department of Education. 2001. "Local Education Agency (School District) Universe Survey Longitudinal Data File: 1986-1997." National Center for Education Statistics.
United States Environmental Protection Agency. 2004. "EPA's Risk-Screening Environmental Indicators (RSEI) Chronic Human Health Methodology." Pp. 102.
White, Michael J. 1987. *American Neighborhoods and Residential Differentiation.* Russell Sage Foundation.
Wilson, William J. 1987. *The Truly Disadvantaged: The Inner City, the Underclass, and Public Policy*. University of Chicago Press.

Tables and Figures

Table 1. Summary statistics of variables used in analyses. American Housing Survey (AHS) special neighborhood sub-sample: 1985, 1989, 1993

	Household measures		Micro-neighborhood measures		Tract measures	
	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev
White	0.743	0.437	0.725	0.320	0.712	0.285
African-American	0.124	0.329	0.127	0.257	0.135	0.234
Latino	--	--	0.094	0.188	0.114	0.176
Other race	--	--	0.032	0.071	0.007	0.014
Asian					0.035	0.060
Racial/ethnic heterogeneity			0.236	0.228	0.283	0.193
Household income			3.048	1.975	3.973	2.082
Residential stability	1.165	1.104	1.612	0.634	0.098	0.031
Bars and liquor store employees per capita					4.556	1.569
Restaurant and recreation employees per capita					9.034	1.822
Perceived crime			0.602	0.519		
School graduation rates					0.750	0.174
Toxic sites					6.170	5.892
County % urban	85.766	18.602				
County median income	3.361	0.849				
County income inequality	38.415	3.849				
County ethnic heterogeneity	37.218	20.122				

Note: Sample size is 5,773 households at two timepoints

Table 2. Outcome is an African-American household at the next timepoint (4 years later). Using characteristics of the current household, the micro-neighborhood, and the census tract as predictors. American Housing Survey special neighborhood sub-sample, 1985-89, 1989-93

	Household measures	**Micro-neighborhood measures**	**Tract measures**
White	-1.979 **	-3.557 **	-0.890 *
	-(11.03)	-(8.59)	-(1.98)
Latino	-2.407 **	-3.559 **	-3.180 **
	-(8.36)	-(5.18)	-(4.45)
Asian			-6.130 **
			-(3.39)
Other race	(a)	-8.332 **	-4.090
	(a)	-(6.44)	-(0.90)
Ethnic heterogeneity		0.067	2.530 **
		(0.15)	(4.29)
Income		-0.078	0.045
		-(1.47)	(0.70)
Residential stability	0.141 *	-0.458 **	0.001
	(2.10)	-(3.65)	(0.04)

*** p < .01(two-tail test), * p < .05 (two-tail test), † p < .05 (one-tail test). T-values in parentheses. N = 5,773 household time points. Logit models with standard errors corrected for block-level clustering. All models include micro-neighborhood measure of perceived crime, tract measures of bar and liquor store employees per capita, restaurant and entertainment employees per capita, the graduation rate of local schools, and the amount of toxic waste emitted. They also include county measures of percent urban, median household income, household inequality (Gini), and racial/ethnic heterogeneity.*

(a): coefficient suppressed by U.S. Census screener to avoid disclosure.

Table 3. Outcome is a white household at the next timepoint (4 years later). Using characteristics of the current household, the micro-neighborhood, and the census tract as predictors. American Housing Survey special neighborhood sub-sample, 1985-89, 1989-93

	Household measures	**Micro-neighborhood measures**	**Tract measures**
African-American	-1.878 **	-2.840 **	-1.230 **
	-(9.89)	-(6.95)	-(2.97)
Latino	-1.684 **	-3.054 **	-1.010 *
	-(10.21)	-(7.13)	-(2.47)
Asian			-2.950 *
			-(2.38)
Other race	(a)	-4.864 **	2.200
	(a)	-(5.06)	(0.87)
Ethnic heterogeneity		0.309	-1.150 *
		(0.98)	-(2.50)
Income		0.086 **	-0.026
		(2.79)	-(0.79)
Residential stability	-0.070	0.225 **	-0.036 †
	-(1.61)	(2.63)	-(1.82)

*** p < .01(two-tail test), * p < .05 (two-tail test), † p < .05 (one-tail test). T-values in parentheses. N = 5,773 household time points. Logit models with standard errors corrected for block-level clustering. All models include micro-neighborhood measure of perceived crime, tract measures of bar and liquor store employees per capita, restaurant and entertainment employees per capita, the graduation rate of local schools, and the amount of toxic waste emitted. They also include county measures of percent urban, median household income, household inequality (Gini), and racial/ethnic heterogeneity.*

(a): coefficient suppressed by U.S. Census screener to avoid disclosure.

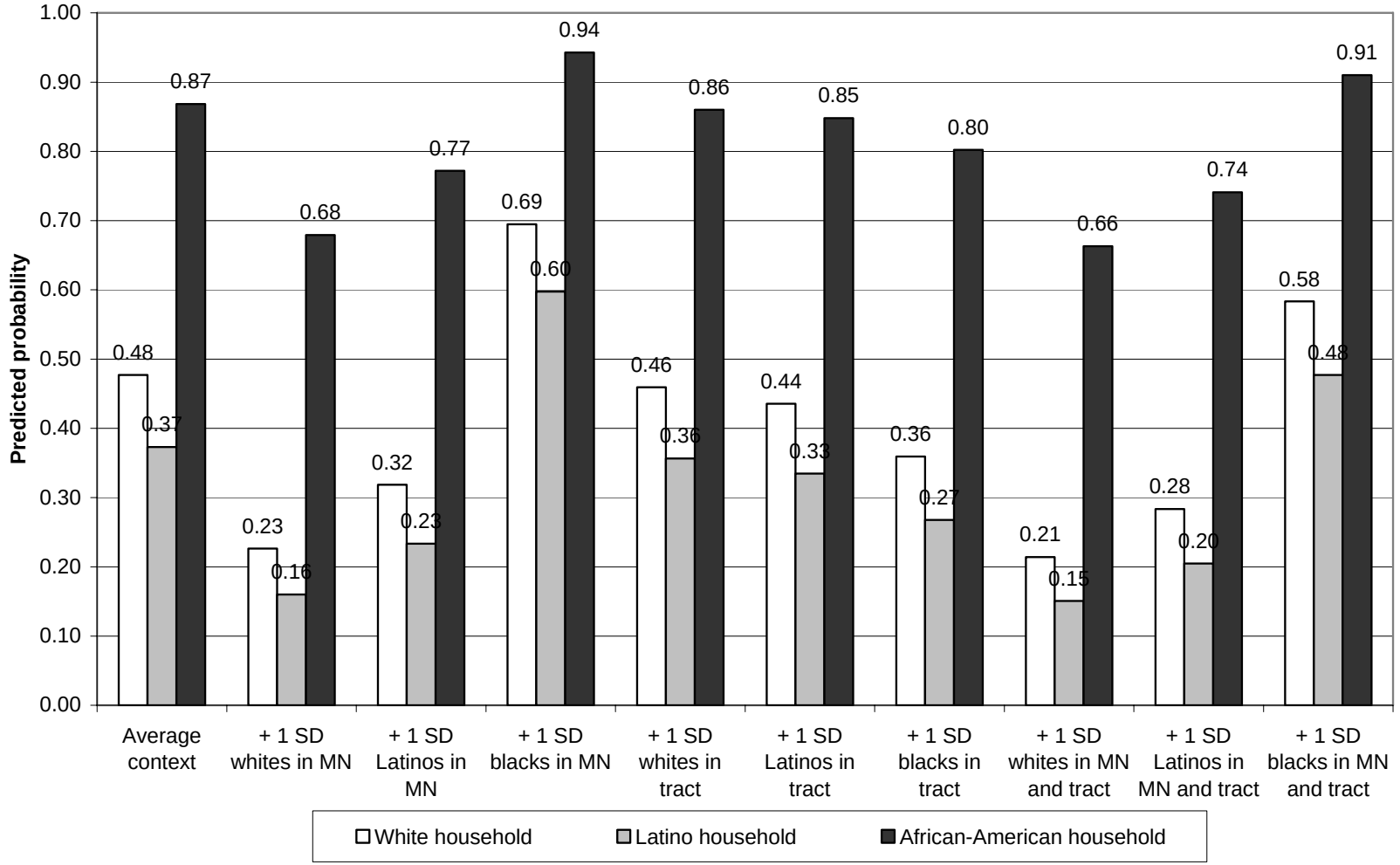
Table 4. Outcome is a Latino household at the next timepoint (4 years later). Using characteristics of the current household, the micro-neighborhood, and the census tract as predictors. American Housing Survey special neighborhood sub-sample, 1985-89, 1989-93

	Household measures	**Micro-neighborhood measures**	**Tract measures**
African-American	-2.018 **	-3.161 **	-2.880 **
	-(7.40)	-(5.17)	-(5.21)
White	-1.712 **	-2.295 **	-2.710 **
	-(10.63)	-(5.00)	-(5.37)
Asian			-3.530 **
			-(2.79)
Other race	(a)	-9.277 **	-3.290
	(a)	-(8.35)	-(1.09)
Ethnic heterogeneity		1.390 **	0.840
		(3.37)	(1.43)
Income		-0.138 **	0.005
		-(3.11)	(0.10)
Residential stability	0.013	-0.037	0.021
	(0.21)	-(0.29)	(0.88)

*** p < .01(two-tail test), * p < .05 (two-tail test), † p < .05 (one-tail test). T-values in parentheses. N = 5,773 household time points. Logit models with standard errors corrected for block-level clustering. All models include micro-neighborhood measure of perceived crime, tract measures of bar and liquor store employees per capita, restaurant and entertainment employees per capita, the graduation rate of local schools, and the amount of toxic waste emitted. They also include county measures of percent urban, median household income, household inequality (Gini), and racial/ethnic heterogeneity.*

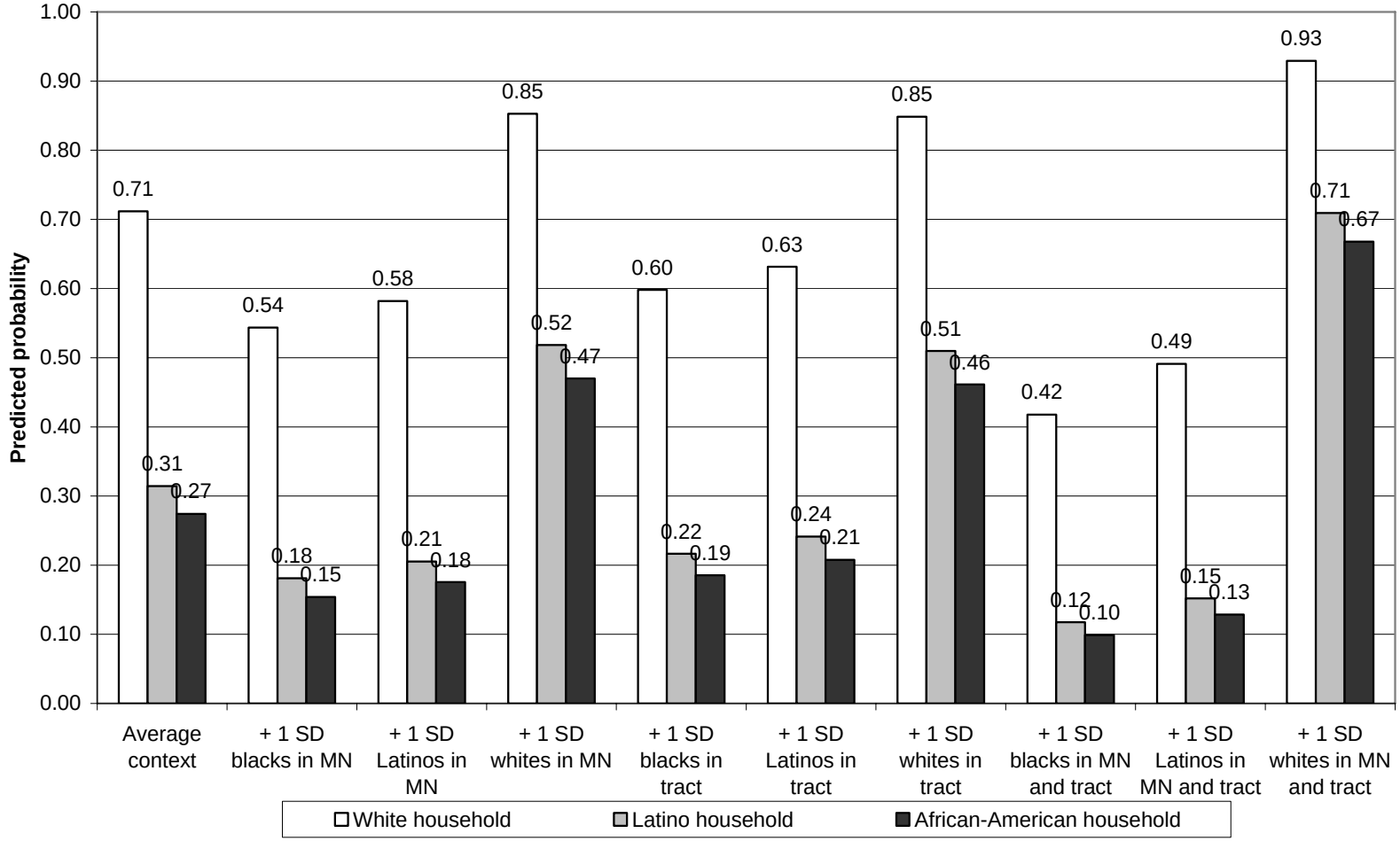
(a): coefficient suppressed by U.S. Census screener to avoid disclosure.

Figure 1. Probability that the new household is African-American for various racial/ethnic compositions of the micro-neighborhood and tract, and race/ethnicity of prior residents



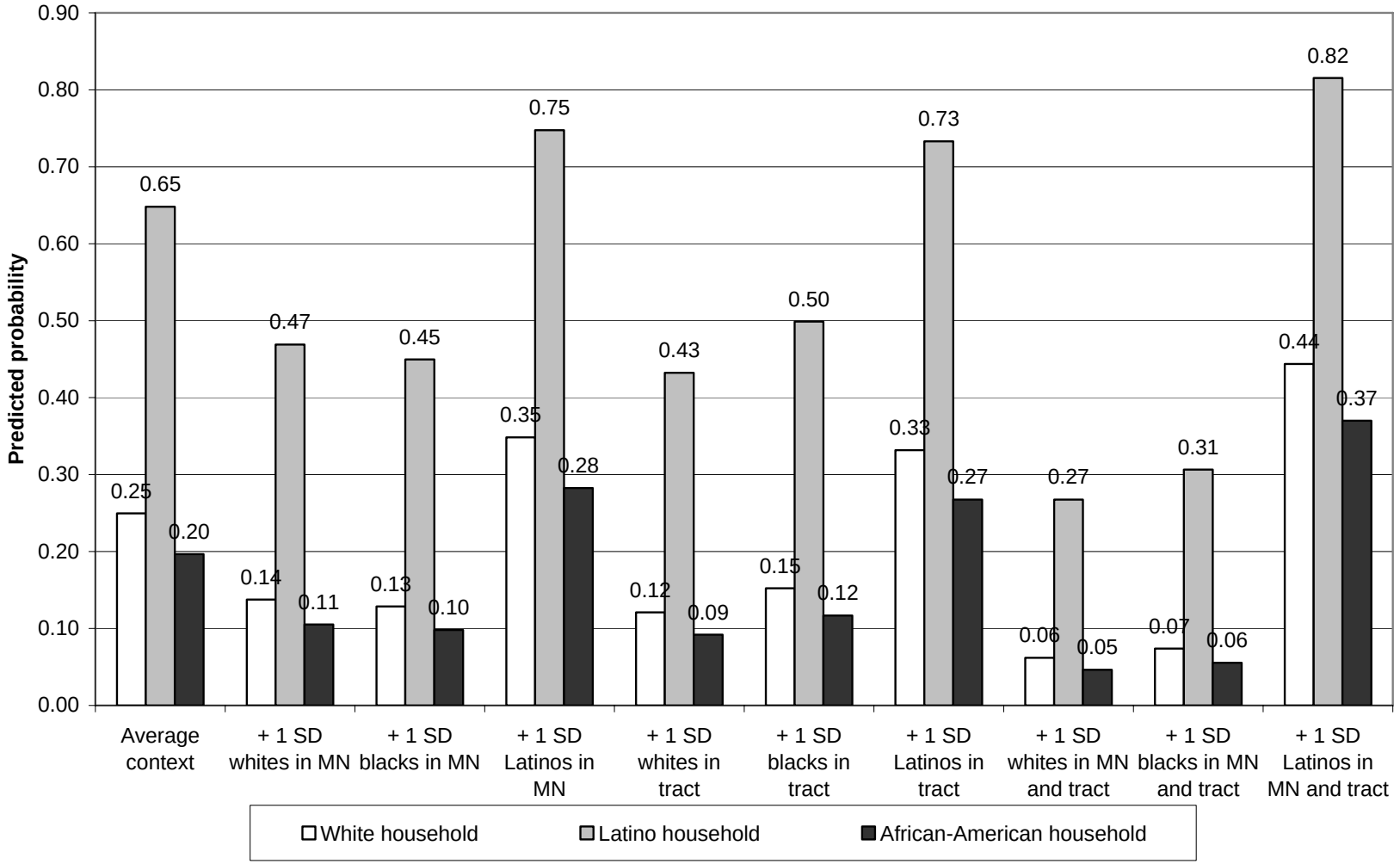
MN = micro-neighborhood

Figure 2. Probability that the new household is white for various racial/ethnic compositions of the micro-neighborhood and tract, and race/ethnicity of prior residents



MN = Micro-neighborhood

Figure 3. Probability that the new household is Latino for various racial/ethnic compositions of the micro-neighborhood and tract, and race/ethnicity of prior residents



MN = micro-neighborhood