Neighborhood Experiences and the Influence of Neighborhood Racial Composition in Residential Choice

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Abstract

This study asks if individuals learn neighborhood racial composition preferences based on prior experiences in racially mixed or racially homogeneous neighborhoods. In doing so, this study theorizes a mechanism that could induce, exacerbate, or attenuate within group and between group heterogeneity in these preferences. Neighborhood outcomes are modeled using conditional logistic regression, with individual residential histories from the Los Angeles Family and Neighborhood Survey and neighborhood compositions derived from the US Census serving as data. Models test whether, within black, Latino, and white groups, individuals originating in neighborhoods with different racial mixes use racial composition differently in their subsequent residential choices. Findings show that those who originate in neighborhoods with many Latinos are more likely to move to majority-Latino neighborhoods than those who originate in neighborhoods with few Latinos. This result implies that individuals moderate negative stereotypes of other racial groups in response to between group interaction within neighborhoods.

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1 Introduction

Neighborhood racial and ethnic composition influences both Americans' evaluations of neighborhood quality and desirability (Farley et al. 1979, 1997; Clark 1992; Krysan et al. 2009) and their residential mobility decisions (South and Crowder 1998; Quillian 1999; Crowder and South 2008). In particular, non-Hispanic whites favor neighborhoods with fewer minority residents, especially blacks, while non-Hispanic blacks tolerate neighborhoods with a broader range of racial compositions. Members of other racial and ethnic groups profess more tolerance of neighborhoods with greater racial and ethnic heterogeneity than whites do, although these preferences are also influenced by nativity (Charles 2006). These empirically observed, between group differences in neighborhood racial composition preferences are consistent with some degree of metropolitan level segregation (Bruch and Mare 2006; Schelling 1971).

Research using survey-based vignettes to study neighborhood racial composition preferences often considers the racial composition of individuals' actual neighborhoods as influential in their stated neighborhood preferences (Emerson et al. 2001; Charles 2000). However, the role of the racial composition of individuals' previous neighborhoods in *real* residential mobility decisions is rarely given this explicit treatment. Overlooking the effect of previous neighborhood experiences on subsequent neighborhood choices implies that individuals' residential histories have no bearing on their future neighborhood decisions. However, prior neighborhood contexts should provide substantial insight into prospective neighborhood choices. If individuals enter adulthood with fixed preferences for neighborhood racial composition and can obtain residence in the neighborhoods they prefer, then the racial composition of their previous neighborhoods should reflect their preferences and predict subsequent neighborhood choices. Alternately, race-based neighborhood preferences might change during adulthood, influenced by neighborhood experiences. Tolerance of racial or ethnic minorities may increase with greater inter-racial and inter-ethnic interaction (Allport 1954; Sigelman and Welch 1993; Wagner et al. 2006), or perceived competition between racial or ethnic groups may exacerbate prejudices (Blumer 1958; Quillian 1995).

This study uses data on residential mobility in Los Angeles, a multi-racial metropolis, to examine the degree to which individuals differ in their race-based neighborhood outcomes according to the composition of their most recent neighborhoods. To preview results, I find that, within racial groups, individuals' residential choices do differ according to their prior residential experiences. In particular, whites who originate in neighborhoods with larger proportions of blacks or Latinos appear to be less sensitive to the presence of these groups in their future neighborhoods. These results are consistent with either within-group, between-individual variation in fixed racial preferences or a process of learning predicted by inter-group contact theory. To reach these conclusions, this paper proceeds as follows: First I review theories of race-based preferences that predict an effect of past neighborhood racial composition on subsequent neighborhood outcomes. Second, I discuss the data and variables I use to investigate these theories. Third, I outline the methods, specifically conditional logistic regression, that I use to model patterns of neighborhood outcomes in the data. Fourth, I present results of my analyses. Finally, I conclude and briefly suggest new directions for research that explicitly examines how prior neighborhood experiences modify race-based residential preferences.

2 Racial Stereotypes and Race-Based Residential Preferences

Individuals who negatively stereotype members of other racial and ethnic groups as unintelligent or welfare dependent, to take two examples, prefer neighborhoods with fewer members of these groups (Farley et al. 1994; Bobo and Zubrinski 1996; Charles 2006; Krysan et al. 2009). Individual-level stereotypes of racial and ethnic "others" may overlap with or engender stereotypes about the neighborhoods these groups occupy. For example, whites overestimate the criminal tendencies of young black males, and correspondingly, levels of crime in neighborhoods with larger portions of young black males, controlling for actual crime rates (Quillian and Pager 2001). Similarly, data from Chicago show that neighborhood racial composition affects perceptions of physical neighborhood disorder, as indicated by graffiti and litter, above and beyond the systematic measures of disorder obtained by investigators (Sampson and Raudenbush 2004). Some neighborhood characteristics relevant to individuals' neighborhood choices may be more difficult for potential movers to observe directly. For these characteristics, individuals may use neighborhood racial composition to make inferences about the underlying characteristics of interest (Ellen 2000). For example, future neighborhood housing price trajectories are fundamentally unobservable. In this case, individuals may use racial composition to help infer price trajectories. Indeed, some whites take recent increases in a neighborhood's black population as a signal that housing prices will decline in the future, leading to choices to leave or avoid neighborhoods (Krysan 2002; Harris 1999). These inferences could be rooted in individuals' own prejudices (e.g., beliefs that blacks do not maintain their properties) or expectations concerning the prejudices of others (e.g., beliefs that others are prejudiced towards blacks and will avoid the neighborhood).

The above suggests a key hypothesis, which has received substantial attention and support in previous studies: individuals will avoid neighborhoods with larger proportions of negatively stereotyped racial and ethnic groups, as their presence induces perceptions of less desirable present and future neighborhood characteristics. This hypothesis is illustrated in part 1A of Figure 1. The hypothesis suggests that the probability that an individual will move into a neighborhood decreases as the representation of a negatively stereotyped out-group increases, all else being equal. In Los Angeles, to which the data employed in this study pertain, whites hold negative views of blacks and Latinos (Charles 2006, 2000; Bobo and Zubrinski 1996), and so will avoid neighborhoods with larger proportions of blacks and Latinos. Because blacks hold negative views of Latinos relative to whites and other blacks, I also expect blacks to avoid neighborhoods with large proportions of Latinos. Latinos, on the other hand, hold negative views of blacks relative to whites and other Latinos and should thus avoid neighborhoods with large proportions of blacks.

More than influencing perceptions of racial and ethnic out-groups, stereotypes may also influence individuals' perceptions of their own groups, with some individuals buying into negative stereotypes applied to them by others. For example, blacks in Los Angeles stereotype themselves more negatively than they do non-Hispanic whites and Asians (Bobo and Zubrinski 1996, p. 895). Thus I expect blacks, and possibly Latinos, to avoid neighborhoods that have very large proportions of own-group residents. The evidence does not suggest a similar own-group stereotyping behavior for whites and so I do not expect whites to avoid neighborhoods with large proportions of whites. On the other hand, while blacks and Latinos in Los Angeles generally hold positive views of whites, they simultaneously view whites as more likely to practice racial and ethnic discrimination (Charles 2006). Thus, I expect blacks and Latinos to be wary of neighborhoods with large proportions of white residents, as they anticipate explicitly hostile treatment or social estrangement in these neighborhoods (Krysan and Farley 2002). Taken together, the preceding two arguments suggest that minority groups will avoid neighborhoods with both large proportions of own-group and out-group residents. Thus, I hypothesize, as depicted in Figure 1 graph 2A, that those considering a trade-off between own-group and "positively" stereotyped out-group residents in potential destination neighborhoods will be most likely to move into neighborhoods with intermediate levels of own- and out-group residents.

2.1 Neighborhood Stereotyping and Dynamic Preferences

Of course most individuals within a stereotyped group will have characteristics and behaviors that deviate from that stereotype. Indeed, stereotypes of certain racial groups may not even match the aggregate or mean characteristics or behaviors for the group. As such, individuals may adjust or even abandon stereotypes based on representative or anecdotal information they receive about members of a stereotyped group. If race-based neighborhood preferences are in part based on stereotypes, then this suggests that race-based neighborhood preferences may change in response to experiences. The most relevant experiences may be garnered within individuals' own neighborhoods as they interact with neighbors of racial and ethnic out-groups. These interactions can be direct (e.g., conversations on front porches), or indirect (e.g., observations about the condition of a neighbor's property). If individuals modify their racial stereotypes and accompanying race-based neighborhood preferences according to neighborhood experiences, then statistical models of neighborhood choice will reveal an effect of past neighborhood racial composition on subsequent neighborhood choices. Two theories, inter-group contact theory and group threat theory, diverge in their predictions as to the direction of this effect.

Inter-group Contact Theory Inter-group contact theory suggests that interaction between members of different racial or ethnic groups, under the right conditions, induces individuals to adopt more tolerant views of the out-groups with whom they interact (Allport 1954; Pettigrew 1998). At the neighborhood level, a naive interpretation of the theory implies that individuals moderate negative racial stereotypes of out-groups given experiences in neighborhoods with significant representation of the out-group. For example, increasing neighborhood-level exposure between blacks and whites is associated with more moderate out-group stereotypes, especially on the part of whites (Sigelman and Welch 1993). Thus, inter-group contact theory implies that majority group members with experience living in neighborhoods with larger proportions of negatively stereotyped out-groups moderate their out-group stereotypes and do not object to the presence of the out-group in future neighborhoods. In contrast, those who have not lived in neighborhoods with large proportions of stereotyped out-groups have not had an opportunity to adjust their negative stereotypes, and remain unlikely to move into neighborhoods with too many out-group members. The graphs in row 3 of Figure 1 illustrate this hypothesized relationship. Those who have the least prior out-group exposure (graph 3A) exhibit a steep drop off in their probabilities of neighborhood in-migration as the proportion of out-group residents in the potential destination neighborhood increases. Those with the most prior out-group exposure (graph 3C) are less sensitive to the presence of out-group residents in potential destination neighborhoods, and their probability of in-migration does not respond as negatively to increases in out-group representation.

Inter-group contact theory also suggests that minority group members exposed to greater proportions of majority, out-group residents in their prior neighborhoods will moderate stereotypes of the majority's discriminatory tendencies. The graphs in row 4 of Figure 1 illustrate this hypothesized effect. Those with least out-group exposure (graph 4A) in their past neighborhoods maintain the strongest stereotypes of the out-group's discriminatory tendencies, and have very low probabilities of moving into neighborhoods with large proportions of the majority group. Those with greater prior exposure to the majority out-group (graph 4B) have less severe stereotypes of the majority group's discriminatory tendencies and have higher probabilities of moving into neighborhoods with moderate shares of the out-group. Finally, those with the greatest prior exposure to the majority group (graph 4C) are least wary of the majority group as potential neighbors and even have a slight preference for neighborhoods predominantly occupied by the majority group, although not necessarily for exclusively majority group neighborhoods.[1]

Group Threat Theory Group threat theory depicts prejudicial behaviors as responses to perceived threats posed by one racial or ethnic group to another group's historically determined prerogatives (Blumer 1958; Bobo 1999). These prerogatives accompany a hierarchical arrangement of racial groups, with one group perceived as dominant and other groups perceived as subordinate. At the neighborhood level, these prerogatives might entail preferential treatment by police or fire services, rights to slots in local schools, or exclusive access to neighborhood amenities like parks. When dominant group members perceive that out-group members threaten these privileges, the dominant group responds with prejudice.

In the case of neighborhood choice, group threat theory suggests that those exposed to neighborhoods occupied by stereotyped out-groups will develop more exaggerated prejudices. In terms of neighborhood preferences, exposure of a dominant group member to neighborhoods populated primarily by a subordinate group leads to stronger feelings of threat, and thus stronger aversion to the presence of the out-group in future neighborhoods.

The graphs in row 5 of Figure 1, illustrate this effect. In-migration probabilities drop off only mildly as out-group representation increases for those with the least prior exposure to the negatively stereotyped group (graph 5A). In contrast, those with the most prior exposure develop stronger negative prejudices and are very unlikely to move into neighborhoods with even small out-group representation (graph 5C). So, to take an example, the theory implies that whites who live in neighborhoods with large black populations will become more averse to black neighbors in future neighborhoods than whites who live in neighborhoods with smaller black populations. A similar process would operate for contact between minority groups. Blacks and Latinos are thought to sit at the bottom of a perceived Los Angeles racial hierarchy (Bobo and Zubrinski 1996), but rate their own groups more positively, in terms of stereotypes, than they rate each others' groups. Group threat theory suggests that the exposure of individual blacks to Latino neighborhoods increases their aversion to Latino neighbors, and vice versa.

Group threat theory also suggests that neighborhood-level exposure, on the part of minority group members, to dominant groups exacerbates perceptions of the majority's prejudicial tendencies, leading to greater aversion to neighborhoods populated by the dominant group. The graphs in row 6 of Figure 1 depict this hypothesized effect. Those with least prior exposure to the dominant group have a relatively weak preference for mixed neighborhoods (graph 6A), but those with most prior exposure have sharply declining in-migration probabilities as the representation of the dominant group in a potential destination neighborhood increases (graph 6C).

2.2 Unobserved Heterogeneity

Individuals' views of other racial and ethnic groups may not be as subject to change as the above theories suggest. Instead, individuals and neighborhoods may simply differ on unobserved, fixed variables that influence individuals' neighborhood outcomes. Importantly, individuals' race-based neighborhood preferences and their stereotypes of racial and ethnic out-groups have gone unobserved in this study. If individuals' race-related preferences guide residential decisions, but are unobserved by a researcher, within-group variation in these preferences could produce an effect of past neighborhood composition on future neighborhood choices, even if race-based preferences do not change with neighborhood experiences. For example, majority group members could evaluate neighborhoods occupied by out-group members according to an individually fixed threshold function, avoiding neighborhoods with out-group proportions that exceed a particular tolerance threshold. Given variation in the tolerance thresholds within the majority group, some majority group members will prefer neighborhoods with no more than a small proportion of the negatively stereotyped out-group, while others will tolerate neighborhoods with large proportions of the out-group. Evidence from the Detroit Area Study (Farley et al. 1978, 1993) and the Multi-City Study of Urban Inequality (Farley et al. 1997) provides some support for just such a situation among whites considering blacks as potential neighbors.[2] Assuming individuals are able to move to neighborhoods that match their preferences, individuals should subsequently "sort" themselves into neighborhoods according to their tolerance thresholds. In this case, a statistical model of neighborhood choice would reveal that only those originating in homogeneous, unintegrated neighborhoods avoid integrated destination neighborhoods, while those originating in integrated neighborhoods are relatively insensitive to neighborhood racial composition. This would reflect not a process of learning and stereotype adjustment, but the pre-existing, race-based preferences of individuals living in these different neighborhoods. Rows 7 and 8 of Figure 1 show how this translates into neighborhood in-migration probabilities for majority and minority group members, respectively. In both cases, those with pre-existing tolerance for a target out-group are more likely to have previously lived in neighborhoods with large proportions of the out-group. Thus prior out-group exposure serves as a proxy for pre-existing levels of tolerance; those with more prior exposure (column C) have greater pre-existing levels of tolerance and their in-migration probabilities are less sensitive to the proportion of out-group residents in potential destination neighborhoods.

2.3 Summary of Hypotheses

Taken together, the stylized graphs in Figure 1 summarize the hypothesized relationships between likelihood of neighborhood in-migration and the proportion of neighborhood residents who identify as members of racial or ethnic out-groups. Notably the fixed heterogeneity and inter-group contact theory predictions are indistinguishable: both predict decreasing aversion to an out-group with increasing past exposure to the out-group. This shows that the methods adopted in this study cannot disentangle contact-based "learning" effects from unobserved heterogeneity. However, there is a clear divide between the inter-group contact and group threat theories of dynamic preferences. Given contact with an out-group the former theory predicts decreasing dependence of neighborhood choices on racial composition, while the latter predicts increasing sensitivity to racial composition. I now turn to the data for evidence concerning these predictions.

3 Data and Variables

This study employs three data sets from Los Angeles to explore race-based neighborhood choices. I use data for a single metropolitan area, rather than national data, because using data from a single metropolitan area reduces the work of defining a set of neighborhoods into which individuals might move, an important point for the conditional logistic regression methods adopted here. Los Angeles is particularly compelling because it features a strong multi-cultural mix, with non-negligible populations of Latinos and Asians in addition to non-Hispanic whites and blacks. This mix is increasingly relevant given recent patterns of immigration to the United States. I characterize the attributes and residential histories of individuals in Los Angeles using data from the first and second waves of the Los Angeles Family and Neighborhood Survey (LAFANS) (Peterson et al. 2004). I characterize Los Angeles neighborhoods using data from the 2000 United States Census and data from the five year estimates for 2005-2009 from the American Community Survey (ACS).

3.1 Individual-Level Data: LAFANS

LAFANS is a panel study of neighborhoods and individuals in Los Angeles County. The first wave of data was collected between April 2000 and January 2002. The second wave of LAFANS was collected from 2006 through 2008 and followed up with respondents interviewed in the first wave. LAFANS respondents were drawn from a stratified sample of 65 Los Angeles neighborhoods, with neighborhoods stratified according to their neighborhood poverty characteristics to obtain an oversample of populations from very poor and poor census tracts. Once census tracts were selected, households within tracts, and then individuals over 18 years of age within households, were randomly selected. These individuals were designated as "randomly selected adult respondents," or RSAs. With appropriate weighting, RSAs are a representative sample of Los Angeles adults. In wave one, RSAs were administered an LAFANS adult questionnaire, which included an event history calendar that solicited residential histories of the respondents for the two years prior to the interview date. Of 3,085 RSAs originally identified in the LAFANS sample, 2,520 completed at least some portion of the wave one residential history calendar (see Sastry et al. 2006). In wave two, another residential history calendar covering the intervening years between the first and second wave interviews was administered to original LAFANS RSAs. Of the 2,520 RSAs who provided residential history in wave one, 1,150 responded to the residential history questionnaire at wave two. This substantial sample attrition (54.4%) is only partly explained by the fact that individuals moving outside of LA County were not administered the residential history survey in wave two, even if they were contacted and interviewed at wave two. Across the two waves, addresses within Los Angeles County are geocoded according to 1990 Census tract boundaries.

I take a discrete time approach and consider neighborhood choices by person-year intervals, with residential "choices" determined by respondents' reported addresses at the end of each person-year interval. I delineate the start and end dates of person-years based on the wave 1 interview date, counting from two-years prior to the wave one interview date.

Thus, person-year zero terminates at the date two years prior to the wave one interview, person-year two terminates at the date of the wave one interview, and person-year five terminates at a date three years after the wave one interview. This discrete-time calendar has no theoretical significance, but it is convenient for calculating sample weights, discussed below. Respondents generally contributed multiple person-years to the analysis, but vary in the number of person-years contributed because of differences between respondents in interview dates and because of missing geocodes and/or gaps in reported residential history. Of the 1,150 respondents who reported on residential history in both waves of LAFANS, 1,148 reported at least one person-year in which they started and ended the person-year in Los Angeles County, and thus had both origin and destination addresses that were geocoded. These respondents are included in the analysis that follows.[3] Sample statistics for these respondents are displayed in Table 2. The respondents contributed 8,903 person-years to the analysis.

I characterize moves based on whether each respondent ended a person-year interval in a different tract than the one in which he started the interval. By this definition, moves occur in $630/8,903 = 7.1\%$ of the person-years included in the analysis. This is many fewer moves than I expect based on data from other sources. For example the 2000 Current Population Survey indicates that approximately 18% of residents of the Western United States changed addresses in the year prior to the survey. The discrepancy between LAFANS and the CPS could be accounted for by four features of the LAFANS data: First, a large portion of the respondents who attrited from the sample from wave one to wave two likely did so because they moved, suggesting that the sample is selected for respondents who did not move between wave one and wave two. Second, respondents who were located in wave two, but had left Los Angeles County were not asked about their residential history in the intervening years. Third, I exclude person-years that involve a move, but begin or end outside of Los Angeles County because these addresses were not geocoded in LAFANS and thus their racial compositions cannot be characterized. Fourth, I do not count address changes within census tracts as moves. These features depress the proportion of person-years featuring moves.

For the conditional logistic regressions that follow, I expand the person-year residential histories described above to create a person-year-alternative formatted data file. In this format, each line of data represents a neighborhood in an individual's choice set within a single person-year observation of that individual. Each respondent contributes multiple lines to the data set because each respondent contributes several person-years, and within person-years, each individual contributes multiple lines because each individual has many neighborhoods to choose from in that year. The outcome variable for the models that follow, *choice*, is a dummy variable coded "1" for the line corresponding to the neighborhood in which the individual lived at the end of the person year, and "0" for all other lines. Each respondent has exactly one observed choice for each person-year contributed to the data set.

A key neighborhood-level independent variable derived from the individual-level LAFANS data is the *origin tract* identifier, also referred to as D_{ij}. This variable identifies the neighborhood in which each respondent began a given person-year interval. This variable acknowledges that individuals are likely to remain in neighborhoods in which they already reside. This variable is dummy coded with "1" for the line corresponding to the neighborhood in which a respondent began a given person-year interval and "0" for all other lines. Each respondent has exactly one origin tract for each person-year contributed to the data set.

I use *respondent race* as a key individual-level, independent variable in my analysis. In accordance with theories of race-based residential choice, this variable reflects the possibility that respondents respond differently to particular neighborhood racial compositions depending on self-identified race. Table 2 summarizes the racial identification of respondents. LAFANS allowed respondents to identify with multiple racial groups, including a separate category for Latino, but also solicited respondents who selected multiple groups to indicate which racial group they "best" identified with. There are very few respondents who identified as Asian, Pacific Islander, or some other race and these respondents reported on very few moves. Thus, I limit the analysis to consider only non-Hispanic Black, Latino, and non-

Hispanic white racial groups, aggregating those respondents who identified as Asian, Pacific Islander, or other into the "white" category.[4] Compared to 2000 United States Census data for the racial composition of tracts in Los Angeles County presented in Table 1, respondents included in the sample are more likely to be Latino (55.3% vs. 40.9% in all of LA County) and less likely to be white, including "others" and Asians (34.8% sample vs. 49.0% in Los Angeles). Examining the breakdown, by race, of moves across all person years presented in Table 2, blacks (15.1%) and Latinos (59.2%) account for a disproportionate share of between tract moves, while whites contributed a disproportionately small share of moves (25.7%).

3.2 Neighborhood-Level Data: Census Summary and American Community Survey data

I derive data for Los Angeles neighborhoods, taken as 1990 Census tracts, from the 2000 United States Census and five-year ACS estimates, 2005-2009. I mapped these data onto 1990 Census tracts using a tract relationship file from the United States Census[5], assuming a homogeneous geographic distribution of populations within tracts. I used linear interpolation to estimate tract characteristics for the mid-points of years between the date of the 2000 Census and the mid-point of the ACS survey dates. Table 1 presents summary statistics for tract characteristics for the year 2000, based on the Census data.

The key, neighborhood-level explanatory variables in this analysis characterize *destination tract racial composition*. I characterize the composition of each neighborhood in a person's choice set by calculating the percentage (running from 0 to 100) of each tract's population that identifies as non-Hispanic Black, Latino, and non-Hispanic white for the year corresponding to the end date of the appropriate person-year interval. As I did with LAFANS respondents, I aggregate the population reporting as Asian, Pacific Islander, or "other race" into the non-Hispanic white category. In models of neighborhood choice, I consider both linear and quadratic terms for the percentage of each racial group in potential destination neighborhoods, omitting non-Hispanic white variables due to the intrinsic collinearity of neighborhood racial percentages. I include linear and quadratic terms because of my theoretical expectation that individuals will be averse to neighborhoods with very high or very low proportions of certain groups.

Origin tract composition variables, while derived from neighborhood-level data, are key individual-level variables because residential history becomes a property of individuals after they make their residential choices. I calculate tract composition as I did for the destination tract composition variable, with one difference: To capture neighborhood experiences, I assign origin tract composition according respondents' residential locations at the beginning of each person-year interval, one year prior to the data used for destination tract composition variables. I considered three different formulations of the origin composition variables; linear, quadratic, and a dummy variable specification with three categories.[6]

Individuals will be more likely to move to neighborhoods with larger numbers of housing vacancies (Bruch and Mare 2010). The number of vacancies will likely be proportional to the number of housing units in each neighborhood. Tracts with many housing units will have many available slots into which individuals can move, while tracts with few housing units will have very few slots into which individuals can move. Omitting a control for available housing units could bias results for the racial composition variables in models of choice, as tracts with many (or very few) housing units might systematically differ in their racial compositions. I assume that vacancy rates are roughly equivalent across neighborhoods, and include the *natural log of the number of housing units* to account for the number of housing availabilities for potential movers, assigned based on the end-date of the person-year interval.

I also include measures of *inter-tract distances* between respondents' origin tracts and potential destination tracts. Spatial clustering of tracts with similar racial compositions is a distinct aspect of racial segregation (Massey 1985). If individuals tend to move between neighborhoods that are near to each other, spatial clustering of racially similar neighborhoods could lead to an association between past neighborhood composition and destination neighborhood composition that is partly spurious. To calculate inter-tract distances, I used a tool from the Missouri Census Data Center to determine the population-weighted centroid of each 1990 Los Angeles County tract.[7] I calculated the distances using a formula based on a projection of a spherical earth onto a plane. This is an approximation of the actual distance between tracts, but should be sufficient for the relatively short distances between most tracts in Los Angeles County.[8] I dummy coded the distances based on the bottom quartile, top quartile, and inner-quartile range of distances moved by all LAFANS RSAs, in either wave one or wave two, who reported changing tracts. This yielded categories of 0 to 1.25 miles, 1.25 to 6.25 miles, and tracts over 6.25 miles from the origin tract. In analyses that account for inter-tract distances, I combined this distance variable with the D_{ij} variable described above to make a fourth category identifying the origin tract, which by construction is 0 miles from itself. For this combined origin tract/distance variable, I designated the 1.25 to 6.25 mile distance category as the omitted category.

4 Methods

To examine how the racial composition of past neighborhoods influences race-based neighborhood choice, I use conditional logit models of discrete choice (Ben-Akiva and Lerman 1985; McFadden 1978), following the example set by Mare and Bruch (2003) and further exposited in Bruch and Mare (2010). These statistical models are related to a model of behavior in which individuals choose a neighborhood that provides them with the greatest utility. I model this utility as a linear combination of neighborhood-level and individual-level characteristics. The neighborhood characteristics, indexed by j, include neighborhood racial composition, the natural log of the number of neighborhood housing units, and whether the neighborhood is an individual's starting (or origin) neighborhood, and if not, the distance of the neighborhood from the individual's starting neighborhood. Because the main effects of individual-level covariates are conditioned out in the models (hence the name conditional logit), individual characteristics can only be included in the model interactively with alternative specific covariates. I consider race and origin tract composition as the only individual-level predictors. Thus, the utility each individual i attaches to each neighborhood

j in each time period t is modeled as:

$$\begin{aligned} U_{ijt} &= F(\text{Race}_i, \text{Alternative Tract Racial Composition}_{jt}, \\ &\quad \text{Origin Tract Racial Composition}_{it}, ln(\text{units}_{jt}), D_{ijt}) \end{aligned} \tag{1}$$

Here D_{ijt} designates if the alternative neighborhood j is the same as the origin neighborhood for the ith individual, and is coded with the appropriate dummy variable identifying the distance between the alternative tract and origin tract centroids for those tracts that are not the origin tract.

I estimate the effects of the above variables on neighborhood utility by assuming that in addition to the above systematic (i.e., measured) component of utility, there is also an additive random utility component in the utility function. Assuming that this random utility component follows an IID Gumbel distribution, and assuming that individuals pick the neighborhood that maximizes the specified utility function, yields McFadden's conditional logit model. In the conditional logit model, the probability that individual i chooses neighborhood j in a specified neighborhood choice set $C(m)$ is given by:

$$p_{ijt} = \frac{e^{\beta x_{ijt}}}{\sum_{k \in C(m)} e^{\beta x_{ikt}}} \tag{2}$$

where β is a vector of parameters to be estimated and x_{ijt} and x_{ikt} are vectors of variables that include main effects of neighborhood specific variables and interactions between the neighborhood variables and individual variables. These models could be estimated as above, but I implement two further modifications in my analysis.

First, while different individuals in principle could have different neighborhood choice sets, I make the simplifying assumption that individuals can pick any neighborhood, designated by 1990 Census tract boundaries, in Los Angeles County. However, this yields over 1,500 possible destination neighborhoods, from which over one-thousand randomly selected adult respondents make choices in each of the years covered by the data. This results in several million tract decisions across all respondents' residential histories, and poses a significant challenge for speed in computation. McFadden (1978) and Ben-Akiva and Lerman (1985) show that consistent estimates of model parameters can be calculated using a reduced alternative choice set. If, within person-years, alternative tract j in year t is sampled with probability q_{ijt}, then neighborhood choice probabilities can be written as:

$$p_{ijt} = \frac{e^{\beta x_{ijt} - ln(q_{ijt})}}{\sum_{k \in C(m)} e^{\beta x_{ikt} - ln(q_{ikt})}} \quad (3)$$

Where the coefficient for q_{ijt} is constrained to equal 1.0.[9] To avoid losing important choice information, I choose q_{ijt} such that chosen tracts and origin tracts are always included and subsample the remaining alternative neighborhoods with a fixed probability (0.05):

1. $q_{ijt} = 1.0$ if the tract is chosen
2. $q_{ijt} = 1.0$ if the tract is the origin tract
3. $q_{ijt} = 0.05$ if the tract is neither the chosen tract nor the origin tract

Because nearly all of the alternative neighborhoods are neither the origin neighborhood nor the chosen neighborhood, this drastically reduces the number of person-year-alternatives used in the analysis and lowers the computational burden associated with maximizing the likelihood function.

Second, McFadden's original conditional logit model rests on the assumption of random sampling of individuals. However, LAFANS does not have a simple random design. Rather, LAFANS used a clustered, stratified sampling design, with 65 LA County census tracts randomly sampled from three strata of very poor, poor, and non-poor LA County tracts, with an oversample of poor and non-poor tracts. Because tracts were sampling units and also my discrete outcomes of interest, LAFANS constitutes a choice-based sample of respondents: respondents were included in the sample conditional on living in one of the 65 LAFANS neighborhoods among the hundreds of Los Angeles County neighborhoods. In this case, the estimates of the conditional logit parameters as outlined above would be inconsistent.

A solution to the choice-based sampling problem is to use a modified likelihood function (Ben-Akiva and Lerman 1985) that incorporates weights, called Manski-Lerman weights, to account for the potentially disproportionate distribution of the population across choices. However, these weights are designed for a cross-sectional survey of respondents and their choices. I adapt the original Manski-Lerman scheme to the panel data at hand as follows. Given a design with G sampling strata I weight person-year sets of observations by $\frac{W_{gt}}{H_{gt}}$, where W_{gt} is the proportion of the whole (Los Angeles) population in sampling stratum g at time t and H_{gt} is the proportion of the randomly selected LAFANS adults in sampling stratum g at time t. By construction, the population proportions in the numerator and denominator of the weights sum to one, that is $\sum_{g=1}^{G} W_{gt} = 1$ and $\sum_{g=1}^{G} H_{gt} = 1$ for each time t. This gives more weight to cases that are underrepresented by the sampling scheme compared to the population, while giving less weight to cases overrepresented by the sampling scheme.[10] I apply these sampling weights for the first two-person years in the analysis, up to the date of the first interview. After the first interview, individuals do not need to remain in the 65 LAFANS neighborhoods in order to be included in the sample. In this sense, the sample is decreasingly choice-based over time as respondents migrate out of their original neighborhoods. Indeed, the proportion of the LAFANS RSAs living in each LAFANS strata trends towards the proportion of the Los Angeles population living in these strata (results not shown). That is, the Manski-Lerman weights converge towards one over time. I make a simplifying assumption that all residential history after the wave one interview is not choice-based, meaning I assign a weight of one for all person-year observations occurring after the wave one interview.[11]

5 Results

5.1 Summary Statistics: Racial Composition of Origin and Destination Neighborhoods

Table 3 summarizes the racial composition of origin and destination neighborhoods across all person years, broken down by respondent race. Panel A presents the composition of destination tracts, Panel B presents the composition of origin tracts, and Panel C presents the composition of origin and destination tracts for respondents who undertook moves. First, all panels evince continuing segregation in Los Angeles County. Comparing Panel A and Panel B to the figures for Los Angeles County in Table 1, members of each racial group both originate in and move to neighborhoods that contain larger proportions of their own racial group, on average, than are present in Los Angeles County as a whole. Whites choose neighborhoods that are more white, on average, than the population of Los Angeles County (66.3% vs. 49.0%), blacks move to neighborhoods that are more black (21.3% vs. 10.0%) and Latinos choose neighborhoods that are more Latino (70.0% vs. 40.9%).

Panel C provides further suggestive evidence of differences between racial groups in race-based neighborhood choices for individuals moving from one neighborhood to another. Whites and Latinos move to neighborhoods with fewer Latinos and more whites than the neighborhoods in which they originate. This suggests a small degree of assimilation for Latinos and minority avoidance for whites. Blacks move to neighborhoods with slightly more whites as well, but also to neighborhoods with more blacks than the neighborhoods in which they originate. However, these results provide little insight into how past neighborhood experiences affect subsequent neighborhood location decisions. For further insight, I turn to the results of conditional logit models of neighborhood choices.

5.2 Conditional Logit Models of Race-based Neighborhood Choice

5.2.1 Model Specification and Model Fit

Table 4 shows specifications and fit statistics for a series of conditional logit models of residential choice for randomly selected adults identified in the first wave of LAFANS. I estimated each model using Stata's "clogit" command (StataCorp 2007), treating all person-years as independent observations.[12] All models include an adjustment for sampling of alternatives, the log of the number of tract housing units, a dummy variable identifying origin tracts for each person year, and the interaction between the housing units and origin tract identifier. I constrain the coefficient for the natural log of the number of tract housing units to be one for tracts that are not the origin tract. I implement this constraint because I have a strong theoretical expectation that neighborhood in-migration probabilities will be directly proportional to the number of housing units in non-origin tracts, which residents can only "choose" by undertaking a move.[13] The models presented in Panel A include no racial composition or individual-level race variables and serve as a baseline for considering model fit. According to likelihood ratio χ^2 tests ($p < .001$) and BIC statistics, adding variables for distances between tracts significantly improves model fit.[14] This implies that the distance required for a move does have a significant effect on neighborhood utilities.

Panel B presents fit statistics for models that include individual-level race and neighborhood-level racial composition variables, but not inter-tract distance dummies. The destination tract racial composition variables include both linear and quadratic terms for neighborhood percentage black and percentage Latino, omitting percentage white because of the intrinsic collinearity between the full set of linear racial composition terms. Adding destination neighborhood racial composition terms (Model 1.1), interactions between respondent race and destination composition (Model 1.2), and interactions between destination composition and the origin tract identifier (Model 1.3), generally improves model fit according to likelihood ratio χ^2 tests ($p < .001$) and BIC statistics. This implies that racial composition is a significant predictor of neighborhood choice, that the influence of neighborhood racial composition differs between racial groups, and that individuals use racial composition differently in choosing a neighborhood, depending on whether they already live in the neighborhood in question.

I consider four different models that include interactive effects of origin and destination neighborhood racial composition. These models all address the question of whether individuals from neighborhoods with different racial mixes use racial composition differently in guiding their subsequent neighborhood choices. Across all origin-by-destination interactive models, I only interact terms involving the same racial group (e.g. origin percent black by destination percent black), because I do not expect that exposure, for example, to Latino neighborhoods will affect individuals' views of blacks in future neighborhoods, and vice versa.[15] Model 1.4 characterizes origin neighborhoods by dummy variables indicating if the origin neighborhood is up to 15%, greater than 15 up to 30%, and greater than 30% black or Latino. Model 1.5 includes interactions between linear terms for origin tract percent black and Latino and both the linear and quadratic terms for racial composition across all neighborhoods in individuals choice-sets. Model 1.6 and 1.7 extend Model 1.5, adding interactions with quadratic terms for origin neighborhood composition (1.6) and interactions between destination composition, linear origin terms and respondent race (1.7). While χ^2 tests suggest that each of these interactions included in Model 1.6 and 1.7 improve model fit over a model (1.3) that ignores interactions, the BIC statistics suggest this improvement is not achieved parsimoniously. Moreover, individual coefficients associated with these additional interaction terms (not shown) are only marginally significant ($p<.10$). Overall, I prefer model 1.5 among models ignoring inter-tract distances. Thus the racial composition of individuals' prior neighborhoods is influential in subsequent neighborhood choices, and a simple linear specification of origin neighborhood composition captures this influence. The evidence is not clear that the influence of prior neighborhood racial composition is non-linear, or that the influence of prior neighborhood racial composition differs by respondent race.

The models presented in Panel C of Table 4 parallel the models presented in Panel B, but include dummies characterizing the distance between respondents' origin tracts and potential destination tracts. These models test whether racial composition is influential in neighborhood choice, controlling for the distance required for a move. While adding interaction terms between origin neighborhood composition dummies and destination neighborhood composition terms in Model 2.4 improves model fit according to the likelihood ratio tests ($p < .001$), according to BIC statistics this model does not improve fit in a parsimonious way. However, according to both BIC and likelihood ratio tests ($p < .001$), Model 2.5, which interacts a linear origin-neighborhood term with destination composition terms, improves fit, even compared to the extremely parsimonious Model 0.2, that ignores racial composition altogether. Model 2.6 and 2.7 do not fair so well. Thus, as in Panel B, I prefer a model that interacts linear origin composition terms with destination racial composition terms (Model 2.5). These results suggest that even accounting for spatial clustering of neighborhoods with similar racial compositions, neighborhood racial composition remains influential in neighborhood choices, and prior experiences alter the influence of destination neighborhood racial composition in these choices. In the discussion that follows, I focus on model 2.5. For the sake of comparison, I also discuss Model 2.3, which excludes origin-by-destination interactions, but retains the other race and racial composition terms.

5.2.2 Results for selected models of neighborhood choice

Table 5 presents conditional logistic regression coefficients for Model 2.3 and Model 2.5 discussed above. To evaluate the theories of race-based residential preferences, I focus my discussion on the individual-level race and neighborhood-level racial composition coefficients. These results describe actual mobility behaviors, *not necessarily neighborhood preferences.* I tentatively interpret models as reflections of preferences, but must acknowledge that some individuals may face constraints that prevent them from moving to neighborhoods that match their preferences, or that other variables associated with race and racial composition variables drive these apparent race-based mobility behaviors.

Because of the difficulty in interpreting the quadratic terms from the conditional logit models,[16] I instead examine predicted in-migration probabilities calculated based on the coefficients presented in Table 5. Figures 2 and 3 reveal predicted probabilities of neighborhood in-migration across potential destination neighborhoods with various neighborhood racial compositions. I present two graph "sets" to show neighborhood in-migration probabilities for neighborhoods that vary systematically in their black and Latino composition. Each sub-graph in a set is based on a choice set of 81 simulated neighborhoods delineated by one percentage point increments in the racial percentage indicated on the x-axis. The sub-graphs correspond to different originating neighborhood compositions and different destination neighborhood racial trade-offs, as indicated in each sub-graph heading. Each line in a sub-graph traces the in-migration probabilities for hypothetical individuals of races indicated in the graph legend. The sub-heading indicates the model from which the graph is derived and the composition of the originating neighborhood, where applicable. Consider the left column of graphs in the "Neighborhood % Black" graph set presented in Figure 2. The first graph in the left hand column corresponds to Model 2.3 regression results. It shows how in-migration probabilities change as neighborhood percent black increases at the cost of neighborhood percent Latino, holding the neighborhood percent white constant. Across all graph sets, the racial composition variables not listed on the x-axis or as a reference group are held at 10%. Model 2.3 omits origin neighborhood composition terms, so there is no influence of past neighborhood composition. The next graph down in the left hand column is derived from Model 2.5, which includes the origin-by-destination composition interactions. Again the lines trace in-migration probabilities as the neighborhood percent black increases and neighborhood percent Latino decreases, holding the percent white constant. However, in this case the in-migration probabilities correspond to a situation in which the potential in-migrators have originated in neighborhoods that are 5% black. Subsequent sub-graphs in the left hand column of Figure 2 consider in-migration probabilities for hypothetical movers originating in neighborhoods that are 25% black and 50% black. For all cases in this black graph set, I hold the percent Latino in origin neighborhoods constant at 40%, which closely approximates the Los Angeles County representation for Latinos. The Latino (Figure 3) graph sets follows a similar logic, although when considering variation in origin neighborhood Latino composition, I hold the percent black in originating neighborhoods at 10%, again roughly corresponding to the representation of blacks across Los Angeles County.

5.2.3 Conditional Logit Results: Neighborhood Percentage Black

Figure 2 provides evidence about how individuals' neighborhood decisions respond to neighborhood percent black. The second column of graphs, with neighborhood percent white as the reference, shows how increasing the neighborhood percent black at the cost of neighborhood percent white affects in-migration probabilities. In general, whites avoid neighborhoods with large proportions of blacks. Although the coefficients for both the linear and quadratic terms in Model 2.3 and 2.5 are not statistically significant, the overall affect of percent black appears to be significant for white respondents, as models with the quadratic coefficient constrained to zero yield a linear coefficient that is negative and significant for the linear percent black term. Thus, as the percentage of blacks in prospective neighborhoods increases from zero percent, the probability of white in-migration declines towards zero. These results, while not suggesting strong aversion to black neighborhoods, are qualitatively similar to other empirical results for Los Angeles, which found that whites are least averse to neighborhoods with almost no blacks, and become less inclined to enter neighborhoods as the neighborhood percentage black increases (Zubrinsky and Bobo 1996).

The remainder of the graphs in the right hand column of Figure 2 show how in-migration probabilities respond to past exposure to neighborhoods with different proportions of black residents. The coefficient for the interaction between percent black in origin and destination neighborhoods is positive and marginally significant ($p < 0.10$), and significant at the 0.05 level when the coefficient for the percent black quadratic term is constrained to 0. This suggests that whites become slightly more tolerant of blacks as neighbors with increasing past exposure to blacks. This manifests, in Figure 2, as a reduced likelihood of moving into entirely white neighborhoods for whites originating in neighborhoods with large black populations, rather than a decreased aversion to neighborhoods with large proportions of blacks. Regardless of past neighborhood exposure, when neighborhood black representation increases beyond 20% at the expense of white neighborhood representation, whites become increasingly unlikely to enter the neighborhood. However, these small differences in whites' tendencies to move into wholly white neighborhoods given exposure to blacks may have substantial implications for black-white segregation: Whites exposed to neighborhoods with larger proportions of blacks are less likely to move to entirely white neighborhoods, and appear to be indifferent to black neighborhood representation between 0% and 30%. This range matches the black racial composition of Los Angeles County as a whole. The story differs slightly for whites considering a tradeoff between Latino and black neighbors, shown in the left hand column of Figure 2. Whites are more likely to move to largely Latino neighborhoods rather than largely black neighborhoods, regardless of prior exposure to black neighbors. This suggests that whites' views of potential black neighbors relative to potential Latino neighbors are not strongly affected by prior exposure to black neighborhoods. In other words, it appears that differences in whites' preferences for black neighborhoods according to past exposure is overcome by their views of Latinos.

Taken together, these results suggest that whites do stereotype blacks as undesirable neighbors, but their views of blacks relative to whites become more tolerant with greater past exposure to blacks. These results are consistent with either inter-group contact theory or sorting of individuals into neighborhoods according to heterogeneous, pre-existing tolerances of black neighbors. These results are not consistent with a group threat response to neighborhoods with large proportions of blacks.

Without considering past neighborhood composition, Latinos are less sensitive than whites to trade-offs between black and white neighbors in prospective neighborhoods, based on the significant coefficient for the interaction between Latino group identification and percent black in potential destination neighborhoods. They are less likely to move into majority black neighborhoods than majority white neighborhoods, but the probability of in-migration does not reach zero at any point. With past neighborhood composition taken into consideration, Latinos originating in neighborhoods with low proportions of blacks appear more likely to move into neighborhoods with low percentages of blacks and high percentages of whites. Those originating in majority black neighborhoods tend to move to neighborhood with intermediate ranges of black representation when whites are the reference group. However, as with whites, the coefficients for this effect are only marginally significant, and the in-migration probabilities barely change when considering trade-offs between Latinos and blacks in prospective neighborhoods.

At baseline (Model 2.3), these results fall in line with race-based neighborhood stereotyping, with Latinos avoiding neighborhoods with very large proportions of blacks, whether considering them in trade-off with Latino or white neighbors. Taking past neighborhood composition into account (Model 2.5), these results are inconsistent with a group threat response: Latinos originating in neighborhoods with larger shares of blacks are slightly more, not less, likely to move to neighborhoods with larger proportions of blacks. These results provide some support for inter-group contact theory, but are also consistent with some pre-existing variation among Latinos in their preferences for neighborhood percentage black. Alternately, Latinos originating in neighborhoods with low percentages of blacks may differ from those originating in neighborhoods with larger shares of blacks on some other, non-race-related dimension. For example, those originating in low-percentage black neighborhoods may have spent longer periods of time in the United States, and may have accrued greater amounts of social and financial resources needed to obtain residence in neighborhoods with larger shares of non-black residents.

Examining the top graphs in Figure 2 corresponding to Model 2.3, blacks are more likely to move to neighborhoods with larger proportions of black as opposed to white or Latino neighbors, although they appear to avoid neighborhoods with very large shares of blacks. These results are consistent with neighborhood stereotyping, in which blacks have negative stereotypes of largely black, largely white, and largely Latino neighborhoods. However, the fact that blacks appear to respond to black-Latino and black-white neighbor trade-offs so similarly suggests that a hypothesis of ethnocentrism among blacks (Clark 1992) may contain a kernel of truth as well. In the graphs presenting results from Model 2.5, Blacks' black composition dependent in-migration probabilities do not change substantially when accounting for origin neighborhood racial composition, whether Latinos or whites are the "trade-off" group. These results are not consistent with either a contact based or group threat based learning process by which blacks who live in largely white areas moderate or exacerbate their expectations of racial antagonism. Nor is it consistent with a great degree of heterogeneity in race-based neighborhood preferences among blacks. Instead, blacks who originate in both largely white and largely black neighborhoods are most likely to move to neighborhoods that are approximately 50% black. These results accord with past research suggesting that blacks prefer neighborhoods that are approximately 50% black, but not homogeneously black neighborhoods (Zubrinsky and Bobo 1996). Thus, blacks are most likely to move to neighborhoods with black representation far exceeding the representation of blacks in Los Angeles County as a whole. This implies that even if whites were to become insensitive to percent black in potential destination neighborhoods, blacks may continue to remain segregated from whites in Los Angeles County.

5.2.4 Conditional Logit Results: Neighborhood Percentage Latino

Figure 3 shows predicted neighborhood in-migration probabilities as functions of neighborhood percentage Latino based on coefficients listed in Table 5. The logic of these graphs is the same as before, except in this case each sub-graph shows how in-migration probabilities respond as the percent Latino increases at the expense of the reference category listed in the sub-graph heading. Meanwhile, moving down the graphs, sub-graphs show how in-migration probabilities change as individuals originate in neighborhoods with larger shares of Latino residents.

The right-hand column of graphs in Figure 3 shows how potential movers view the trade-off between Latino neighbors and white neighbors. Without considering the racial composition of individuals' previous neighborhoods (Model 2.3), black and white movers appear to be nearly indifferent to the Latino representation in prospective neighborhoods, while Latinos are slightly more likely to move to neighborhoods with large proportions of Latino as opposed to white neighbors. The picture changes substantially when I account for prior experiences (Model 2.5). Black and white movers originating in neighborhoods with very low proportions of Latinos are substantially less likely to move into a neighborhood as the proportion of Latinos increases, with blacks originating in neighborhoods with low proportions of Latinos appearing particularly averse to Latino neighbors. In contrast, blacks and whites moving from neighborhoods with intermediate proportions of Latino residents are less likely to avoid Latino neighborhoods, and blacks and whites originating in largely Latino neighborhoods are more likely to move to a neighborhood as the proportion of Latino residents *increases*. Latinos follow a similar pattern of neighborhood choice behavior that changes with prior neighborhood composition, although at each level of prior exposure, compared to whites and blacks, they are more likely to move to neighborhoods with larger proportions of Latinos.

These results are consistent with the neighborhood stereotyping hypothesis. In Los Angeles Latinos are negatively stereotyped compared to whites (Charles 2006; Zubrinsky and Bobo 1996). Thus non-Latinos avoid neighborhoods with larger shares of Latino as opposed to white residents. The pattern of lessening resistance to entry into Latino neighborhoods with increased exposure to Latino neighborhoods accords with the contact hypothesis. This pattern is also consistent with sorting according to an unobserved "tolerance" variable that varies within both the black and white populations. These findings are not consistent with a group-threat hypothesis, which would suggest increasing resistance, on the part of outgroups, to Latino neighborhoods given past exposure. The results for Latinos, whereby they are most likely to move to neighborhoods with nearly the maximum proportion of Latinos, suggests that Latinos do not hold strong negative stereotypes of own-group dominated neighborhoods. This diverges from the phenomenon observed with blacks, who are mildly averse to neighborhoods with very large proportions of black neighbors. Likewise it deviates from my expectations: based on neighborhood stereotyping I expected Latinos to be at least mildly averse to neighborhoods with large proportions of Latinos relative to whites.

The left-hand column of graphs in Figure 3 shows how potential movers view the trade-off between black and Latino neighbors. Without considering origin neighborhood composition, Latinos and whites are very similar in tending to move to neighborhoods with larger proportions of Latino residents over neighborhoods with large shares of blacks. However, blacks are more likely to move to neighborhoods with intermediate shares of blacks and Latinos. This implies that blacks either have stronger negative stereotypes of Latinos compared to whites, or they have stronger in-group preference. The subsequent graphs in Figure 3, along with the significant coefficient for the interaction between percent Latino in origin and potential destination neighborhoods shown in Table 5 reveal within-group variation in Latino composition-based choice behaviors. For all groups, greater exposure to Latinos in origin neighborhoods leads to increased likelihood of migrating to neighborhoods with larger proportions of Latinos, although blacks still lag behind Latinos and whites. In fact, blacks exposed to neighborhoods with very low proportions of Latinos, rather than preferring black-Latino mixed neighborhoods, are more likely to move to neighborhoods with large shares of blacks. This finding further suggests that blacks hold negative stereotypes of Latinos relative to blacks conditional on not previously living with Latinos. Increased prior exposure to Latinos leads blacks to move to neighborhoods with non-trivial proportions of Latino residents. These results are somewhat consistent with inter-group contact theory, although they are unusual in that they suggest, rather than induced tolerance, an increased *preference* among whites and blacks for neighborhoods with more Latinos, and a mild aversion to neighborhoods with no Latinos.

6 Conclusions

The findings of this study provide some support for prior evidence of race-based stereotyping of neighborhoods in Los Angeles (Zubrinsky and Bobo 1996; Charles 2006; Bobo and

Zubrinski 1996) with whites considered the most desirable neighbors and Latinos and blacks considered to be less desirable neighbors. However, this perception does not seem to be universally held by all racial groups or even within racial groups: there is a considerable amount of heterogeneity in racial composition-dependent neighborhood mobility contingent on the racial composition of individuals' prior neighborhoods. It is not possible to determine, using the present study design, if this heterogeneity reflects unobserved race-based preferences that preceded the observed residential history or if this heterogeneity is induced by neighborhood experiences. Future analysis using the extensive residential histories available in LAFANS Wave 2 data should allow for longitudinal models that explicitly adjudicate between a process related to learning at the individual level and a process based on fixed, but heterogenous race-based preferences. In particular, observations of multiple moves within individuals opens up the possibility of using, for example, mixed-logit approaches to estimating neighborhood choice probabilities. Alternately, with multiple observations within individuals, it may be possible to conceive of sequences of neighborhood choices, whereby individuals choose from a set of possible neighborhood sequences, with within individual variation in the influence of racial composition variables for each neighborhood in the sequence.

That said, the results did provide evidence concerning the group threat theory of endogenous response to neighborhood context. I found no evidence for a threat response to racial or ethnic out-groups given prior, neighborhood-level exposure to out-groups. Those exposed to out-groups were generally slightly more, not less, likely to move to neighborhoods with larger shares of out-groups. However, this result is rendered problematic when considering that unobserved heterogeneity and learning effects may work in concert. This would suggest that rather than comparing neighborhood in-migration probabilities for individuals originating, for example, in largely Latino neighborhoods to those originating in largely white neighborhoods, it would be more appropriate to compare in-migration probabilities for individuals who were *equally likely* to originate in largely Latino neighborhoods, but some of whom actually originated in largely white neighborhoods. This relates to the "initial conditions" problem in estimating state dependence effects, enunciated by Heckman (1981).

Given the limited set of explanatory variables I considered in this study, there remains a distinct possibility that, consistent with the racial proxy hypothesis (Harris 2001, 1999), some non-racial aspects of neighborhoods, like crime rates and quality of local public services, work in interaction with individuals' socio-economic constraints to generate the patterns of mobility I have described here. For example, whiter neighborhoods may also be higher income neighborhoods. Individuals entering these neighborhoods can only do so if they have sufficient economic resources. A tendency to move into white neighborhoods could reflect a universal desire to live in affluent neighborhoods coupled with individual-level discrepancies in affluence, rather than a *per se* preference for white neighborhoods. I attempted to address this by implementing a model that incorporated an interaction between family income and neighborhood median income which yielded results substantively similar to the results discussed above. However, this approach may have misspecified the actual set of constraints faced by individuals in the housing market and the relevant non-racial characteristics of neighborhoods. A stronger approach would give more explicit consideration of housing costs for potential renters and homebuyers, as well as other non-racial individual and neighborhood level factors that affect the housing search and housing choice process.

There are two other key drawbacks to the current approach. First, neighborhoods do not exist in isolation, but are embedded in networks of other nearby neighborhoods. These networks may be clustered by racial composition. While the models attempt to control for distances between origin and destination tracts, this only obliquely addresses the problem. It is a real possibility that community characteristics common to distinct sets of neighborhoods act to influence neighborhood choice. These community characteristics might be common within school catchments, administrative districts, townships, etc. Future analysis might explicitly consider these layers of geographic nesting, perhaps using nested conditional logit models (Bruch and Mare 2010; McFadden 1978). Second, while I make arguments about the importance of stereotypes in neighborhood choice, I presented no data to explicitly account for how individual LAFANS respondents view racial or ethnic out-groups or their neighborhoods. While this sort of data is available in other data-sets (for example the Multi-City Study of Urban Inequality) these data-sets are cross-sectional and do not provide the same characterizations of residential histories. This problem may be partially corrected in LAFANS Wave 2, which includes an instrument to gauge respondents' views of hypothetical neighborhoods with varying racial compositions. This instrument is very similar to instruments deployed in the Detroit Area Study and the Multi-City Study of Urban Inequality. The pairing of residential history data with race-based preferences data could be a valuable tool in understanding the influence of stated preferences in determining neighborhood location decisions.

Despite these drawbacks, this study offers substantive evidence of within racial group heterogeneity in race-based neighborhood choices, and perhaps race-based neighborhood preferences, whether that heterogeneity is induced by neighborhood experiences or is fixed prior to the observed residential histories. In particular, whites who have previous experiences living in neighborhoods with large portions of Latinos or large proportions of blacks are less averse to neighborhoods with large proportions of Latinos and blacks, respectively. This conforms with predictions of inter-group contact theory and predictions based on heterogeneity in race-based preferences. Additionally, Latinos who originate in blacker neighborhoods are slightly more likely to move to neighborhoods with intermediate shares of black residents compared to Latinos who originate in largely white neighborhoods. Results for blacks show that blacks are more likely to select black over Latino neighborhoods as long as they do not have much prior exposure to Latino neighborhoods. This suggests that blacks moderate their stereotyping of Latino neighborhoods relative to black neighborhoods and white neighborhoods when they originate in largely Latino neighborhoods. An alternative explanation hinges on prior differences in preferences between blacks who have lived in largely Latino neighborhoods and blacks who have previously avoided Latino neighborhoods.

These results may have implications for understandings of metropolitan level segregation. First, they provide some indication of a metropolitan-level ordering of racial groups (and their neighborhoods) into a racial hierarchy, with whites viewed as the most desirable neighbors relative to out-groups. Second, these results also reveal the tenuousness of this hierarchy. In particular, the hierarchy itself may be predicated on a degree of racial, residential isolation: race-based neighborhood avoidance behaviors were generally more moderate or egalitarian among those who lived in neighborhoods with non-negligible proportions of racial out-groups. Whether this is a result of intra-generational modifications of race-based residential preferences or a result of heterogeneity in an unobserved "tolerance" variable, these results suggest that dynamic models of segregation (Schelling 1971; Bruch and Mare 2006) that assign monolithic preference sets to individuals based on racial group membership misrepresent the actual process of neighborhood choice. Instead, these models should consider the effects of preference endogeneity (e.g., inter-group contact effects) or preference heterogeneity (e.g., variation in tolerance thresholds) on segregation outcomes. In fact, within group variation in preferences may be a byproduct of preferences that evolve based on neighborhood experiences. Dynamic, agent-based models would be the ideal way to explore this possibility. Indeed, agent-based models could reveal how a process of preference modification according to neighborhood context can jointly determine both a stable preference distribution, and a stable geographic distribution of racial and ethnic groups.

Notes

[1]This contact effect could be complemented by changes in minority groups' positive stereotypes of the majority (e.g. perceptions of affluence). That is, neighborhood-level exposure to an "advantaged" majority group may lead individuals to adopt more nuanced views of the majority's social position, resulting in less categorical judgements about the resource advantages enjoyed by neighborhoods occupied by the majority.

[2]I attribute this observation to Yu Xie, who presented preliminary findings in support of this point in an informal presentation made at the University of California Los Angeles on February 10th, 2011.

[3]To examine how prior neighborhood context affects subsequent residential decisions, I rely on having, for each person-year, a record of each respondent's tract of residence at both the beginning and end of the interval. However, residents beginning or ending intervals outside of Los Angeles County did not have their addresses geo-coded. I drop person-years for which respondents started or ended the person-year interval outside of Los Angeles. Likewise, I also dropped any person-year observations for which a Los Angeles County address was provided, but the address could not be properly geocoded. Because some residential histories had respondents living within LA county only at the end of the full two-year residential history period, this meant entirely dropping some adult respondents from the analysis.

[4]I ran models with Asian respondents identified separately from whites and, predictably given the small number of Asian respondents, found few differences between white and Asian respondents in mobility behaviors.

[5]http://www.census.gov/geo/www/relate/rel_tract.html

[6]The categories distinguished, for neighborhood proportion black and neighborhood proportion latino (white remaining the omitted group), whether less than 15%, 15% or more but less than 30%, or 30% or more of residents of the origin tract identified with the target group. These categories are arbitrary, but ensure that a substantial number of neighborhoods fell within each category and roughly coincide with previous studies that suggest whites avoid neighborhoods with greater than 15 or 20 % black residents.

[7]http://mcdc.missouri.edu/websas/geocorr90.shtml

[8]Calculating distances in this manner assumes that distance measured "as the crow flies" is most influential in neighborhood choice, but it is possible that some other distance, such as the distance along a street network (Grannis 1998), is more relevant.

[9]I use the Stata statistical software's clogit command to execute these models, designating $-ln(q_{ijt})$ as an offset.

[10]I applied these weights in Stata using the "iweights" weighting feature.

[11]It is not immediately clear that applying a weight of one is appropriate for observations taken after the choice-based sample was culled, nor is it clear that the modified Manski-Lerman weights can be applied to residential choices made after respondents were selected into the sample. For comparison's sake, I also implemented models using the Manski-Lerman weighting scheme for all person-years before and after the wave 1 interview. The results of those models are substantively the same as the results presented here.

[12]Because most respondents contribute multiple person years, it seems natural to apply clustering approaches to estimating the standard errors in this case. However, I do not adjust standard errors for clustering because doing so would render the fitness tests I present here

more problematic.

[13]Estimating models with this coefficient unconstrained yielded estimated parameter values that were not significantly different from one.

[14]Because of the application of Manski-Lerman weights, these tests are not ideal, but I perform them for lack of more valid tests of model fit.

[15]I also fit a fully interactive model (not shown) that interacted all racial composition terms for destination and origin neighborhoods, but these models did not significantly improve model fit given the large number of degrees of freedom used up in the process.

[16]The linear racial composition coefficients represent effects of one percentage point increases in the given racial percentage at the cost of one percentage point decreases in the tract percent white. A negative quadratic coefficient in combination with a positive coefficient for the corresponding linear variable implies avoidance of neighborhoods with a very large or very low proportion of the given racial group. Increasingly negative coefficients for the quadratic terms suggest a tendency to move into neighborhoods in a narrower range of racial compositions. This could mean moving into neighborhoods with very low or very high proportions of residents identifying with the given racial group. The "location" of the range is determined by the coefficient of the linear term.

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Table 1: Summary Statistics, Racial Composition of Los Angeles Neighborhoods.[a]

	% Black		% Latino		% White[b]	
Tract Composition	N	%	N	%	N	%
0-10%	1,227	75.1	291	17.8	196	12.0
10-20%	151	9.2	280	17.1	172	10.5
20-30%	80	4.9	194	11.9	154	9.4
30-40%	49	3.0	154	9.4	114	7.0
40-50%	43	2.6	161	9.9	128	7.8
50-60%	34	2.1	149	9.1	109	6.7
60-70%	15	0.9	116	7.1	137	8.4
70-80%	17	1.0	142	8.7	177	10.8
80-90%	11	0.7	96	5.9	252	15.4
90-100%	8	0.5	52	3.2	196	12.0
Total	1,635	100.0	1,635	100.0	1,635	100.0
Mean %	10.5		37.7		51.8	
Pop. Weighted Mean %[c]	10.0		40.9		49.0	

Source: 2000 US Census Data Summary File 1.
[a] Based on 1990 US Census tract boundaries. Includes all tracts assigned to Los Angeles Family and Neighborhood Survey sampling strata and containing non-zero population according to 2000 US Census.
[b] Includes non-Hispanic whites, Asians & Pacific Islanders and those who identified as "other" race.
[c] Mean weighted by 2000 tract population.

Table 2: Sample Characteristics of Adult Respondents by Race, for Randomly Selected Adult Respondents, LAFANS Wave 1 and Wave 2, 1998-2008.[a]

	Respondent Race							
	Latino		White[b]		Black		Total	
	N	%	N	%	N	%	N	%
Respondents								
All Years	635	55.3	400	34.8	113	9.8	1,148	100.0
Person Years								
Year 1	575	54.8	367	35.0	108	10.3	1,050	100.0
Year 2	610	55.3	381	34.5	113	10.2	1,104	100.0
Year 3	622	55.7	388	34.7	107	9.6	1,117	100.0
Year 4	620	56.0	384	34.7	104	9.4	1,108	100.0
Year 5	618	56.1	380	34.5	104	9.4	1,102	100.0
Year 6	619	56.0	379	34.3	107	9.7	1,105	100.0
Year 7	618	55.9	381	34.5	107	9.7	1,106	100.0
Year 8	540	57.3	309	32.8	94	10.0	943	100.0
Year 9	157	62.8	69	27.6	24	9.6	250	100.0
Year 10	14	77.8	2	11.1	2	11.1	18	100.0
Total	4,993	56.1	3,040	34.2	870	9.8	8,903	100.0
Between Tract Moves								
Year 1	39	47.0	27	32.5	17	20.5	83	100.0
Year 2	65	64.4	22	21.8	14	13.9	101	100.0
Year 3	55	59.8	22	23.9	15	16.3	92	100.0
Year 4	38	58.5	20	30.8	7	10.8	65	100.0
Year 5	40	56.3	16	22.5	15	21.1	71	100.0
Year 6	42	61.8	19	27.9	7	10.3	68	100.0
Year 7	42	57.5	19	26.0	12	16.4	73	100.0
Year 8	39	67.2	13	22.4	6	10.3	58	100.0
Year 9	11	64.7	4	23.5	2	11.8	17	100.0
Year 10	2	100.0	0	0.0	0	0.0	2	100.0
Total	373	59.2	162	25.7	95	15.1	630	100.0

[a] Sample included person-year residential decisions of randomly selected adults with valid/non-missing values on race and residential history variables
[b] Includes non-Hispanic whites, Asians & Pacific Islanders and those who identified as "other" race.

Table 3: Summary Statistics for Respondents' Neighborhoods, by Respondent Race. LAFANS Wave 1 and Wave 2, 1998-2008.[a]

	Respondent Race							
	Latino		White		Black		Total	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
A. All Destination Tracts								
Tract Racial Composition								
% Black	8.1	10.4	5.1	5.9	21.3	16.2	8.4	10.9
% Latino	70.0	21.7	28.5	23.6	53.3	23.1	54.2	29.5
% White	21.9	21.6	66.3	25.5	25.4	27.4	37.4	31.5
N	4,993		3,040		870		8,903	
B. All Origin Tracts								
Tract Racial Composition								
% Black	8.1	10.5	5.2	5.9	21.3	15.9	8.4	10.9
% Latino	70.0	21.6	28.3	23.6	53.3	22.9	54.1	29.5
% White	21.9	21.6	66.5	25.4	25.4	27.3	37.5	31.5
N	4,993		3,040		870		8,903	
C. Destination Tract Different from Origin Tract								
Origin Tract Racial Composition								
% Black	9.3	12.4	6.2	7.0	21.0	16.2	10.3	12.9
% Latino	67.7	21.6	32.9	24.9	53.0	20.9	56.6	26.8
% White	23.0	20.8	60.9	26.7	25.9	23.6	33.2	28.1
Destination Tract Racial Composition								
% Black	10.3	13.0	5.8	8.3	24.4	19.9	11.3	14.5
% Latino	64.6	22.7	30.7	22.4	47.8	22.1	53.3	26.8
% White	25.1	22.8	63.4	25.1	27.7	24.5	35.4	28.8
Distance from Origin Tract to Destination (Proportion of N)								
0-1.25 mi.	0.236	–	0.154	–	0.126	–	0.198	–
1.25-6.25 mi.	0.485	–	0.500	–	0.547	–	0.498	–
>6.25 mi.	0.279	–	0.346	–	0.326	–	0.303	–
N	373		162		95		630	

[a] Sample includes all person-years featuring valid origin and destination tracts for LAFANS respondents interviewed in Wave 1 and Wave 2.

[b] Includes non-Hispanic whites, Asians & Pacific Islanders and those who identified as "other."

Table 4: Specification and Fit statistics for Conditional Logit Models of Neighborhood Choice, Los Angeles County Adults, 2000-2002 LAFANS, N=737,099.[a]

	Independent Variables[b]								Fit Statistics		
		Racial Composition Variables									
Model	Dist. Vars	Dest. Comp.	Race X Dest. Comp.	Origin Dummy X Dest. Comp.	Orig. Comp. Dummy X Dest. Comp.	Orig. Comp. Lin. X Dest. Comp.	Orig. Comp. Quad. X Dest. Comp.	Race X Orig. Comp. Lin. X Dest. Comp.	Model *df*	Log-Likelihood	BIC
A. Models without Racial Composition Variables											
0.1									2	-6857.43	13741.87
0.2	X								4	-6014.47	12082.99
B. Models with Racial Composition: No Distance dummies[c]											
1.1		X							6	-6842.43	13765.92
1.2		X	X						14	-6722.22	13633.58
1.3		X	X	X					18	-6664.67	13572.53
1.4		X	X	X	X				26	-6559.10	13469.47
1.5		X	X	X		X			22	-6515.42	13328.08
1.6		X	X	X		X	X		26	-6491.84	13334.95
1.7		X	X	X		X		X	30	-6490.87	13387.06
C. Models with Racial Composition: With Distance dummies[c]											
2.1	X	X							8	-6004.88	12117.85
2.2	X	X	X						16	-5928.46	12073.09
2.3	X	X	X	X					20	-5908.11	12086.42
2.4	X	X	X	X	X				28	-5873.68	12125.64
2.5	X	X	X	X		X			24	-5867.75	12059.76
2.6	X	X	X	X		X	X		28	-5858.66	12095.60
2.7	X	X	X	X		X		X	32	-5850.19	12132.72

[a] Sample includes all person-years featuring valid origin and destination tracts for LAFANS adult respondents interviewed in both Wave 1 and Wave 2.

[b] Models also included controls for the log of the number of neighborhood housing units interacted with a dummy variable identifying respondents origin tracts, and a correction for sampling.

[c] Origin composition interactions only included for like race compositions: e.g. percent black in past neighborhood interacted with percent black in potential destination neighborhood.

Table 5: Racial Composition Coefficients for select conditional logit models of neighborhood choice, LAFANS Wave 1 and Wave 2 1998-2008.[a]

	Model 2.3		Model 2.5	
Variables	b	b/se	b	b/se
Race & Racial Composition (White Composition terms omitted in all cases)				
% Black	-0.018	-1.10	-0.026	-1.50
% Black Sq.[b]	-0.212	-0.66	-0.150	-0.45
% Latino	0.021	2.05	0.009	0.62
% Latino Sq.[b]	-0.328	-2.99	-0.599	-3.61
Race X Destination Racial Composition Interactions				
Black X . . .				
% Black	0.099	4.04	0.089	3.45
% Black Sq.[b]	-0.676	-1.67	-0.523	-1.22
% Latino	-0.033	-1.56	-0.049	-2.17
% Latino Sq.[b]	0.415	1.95	0.534	2.37
Latino X . . .				
% Black	0.037	2.00	0.033	1.69
% Black Sq.[b]	-0.210	-0.59	-0.126	-0.34
% Latino	0.030	2.40	0.016	1.04
% Latino Sq.[b]	0.004	0.03	0.135	0.90
Origin Dummy X Destination Racial Comp. Interactions				
% Black	-0.019	-1.55	-0.014	-1.09
% Black Sq.[b]	0.346	1.40	0.162	0.58
% Latino	-0.041	-4.58	-0.033	-3.86
% Latino Sq.[b]	0.360	4.11	0.291	3.46
Origin Comp. X Destination Comp. Interactions				
Origin % Black X % Black[b]			0.981	1.93
Origin % Black X % Black Sq.[b]			-0.011	-1.48
Origin % Latino X % Latino[b]			1.002	4.02
Origin % Latino X % Latino Sq.[b]			-0.003	-1.08
Non-Racial Variables				
Origin Dummy (Tract 0 mi away from origin)	18.517	23.70	17.898	23.24
ln(tract housing units)[c]	1.000	–	1.000	–
Origin Dummy X ln(tract housing units)	-1.260	-12.72	-1.235	-12.64
Tract 0-1.25 mi. away from origin	1.842	16.67	1.689	15.11
Tract 1.25-6.25 mi. away from origin	–	–	–	–
Tract >6.25 mi. away from origin	-2.910	-30.78	-2.767	-28.72
Model *df*	20		24	
N	737099		737099	
Log-Likelihood	-5908.1		-5867.8	

[a] Sample includes all person-years featuring valid origin and destination tracts for LAFANS respondents interviewed in Wave 1 and Wave 2.
[b] Coefficient multiplied by 1,000 for presentation.
[c] Coefficient constrained to 1.
Note: Models include a correction for sub-sampling of alternatives.

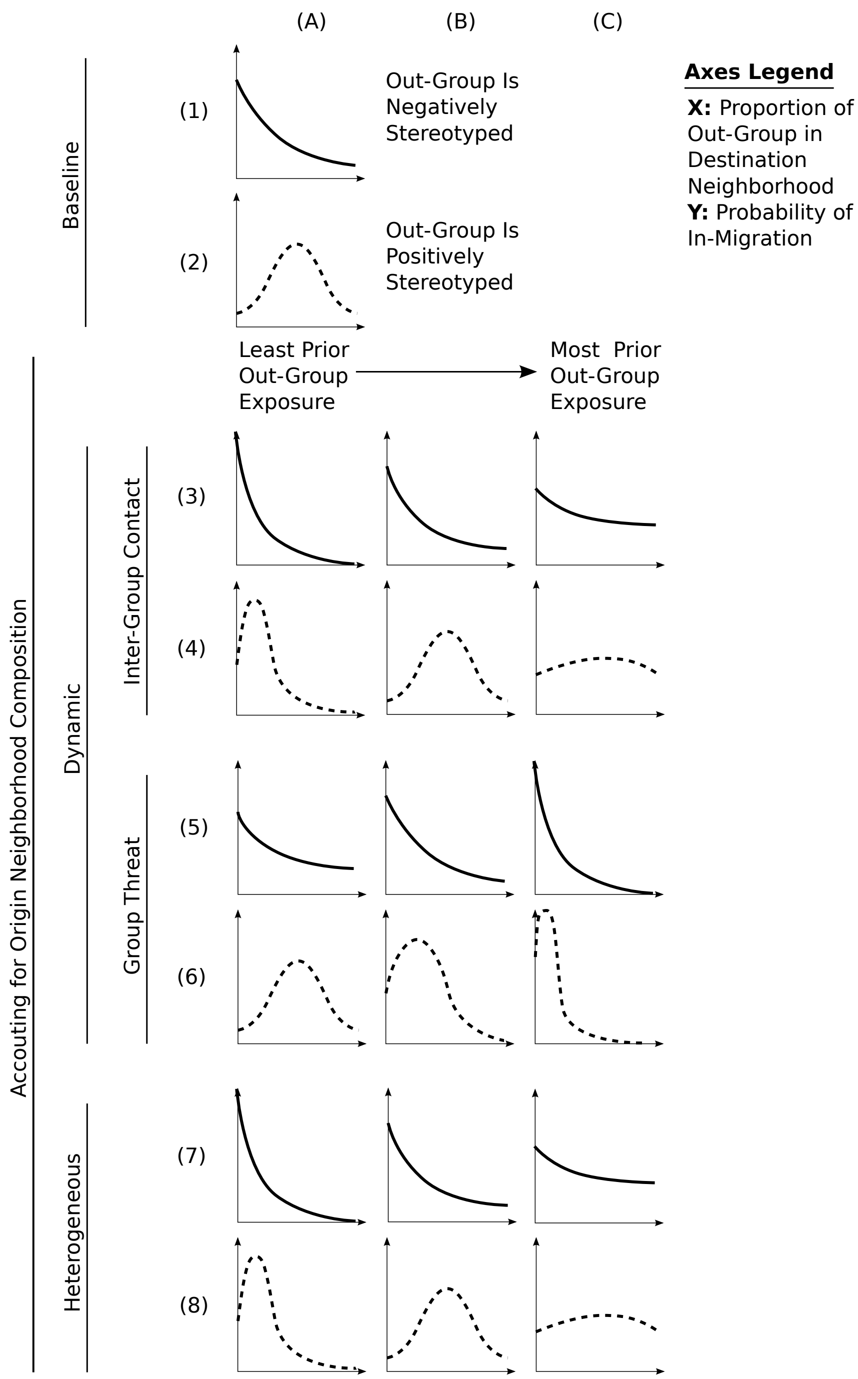

Figure 1: Race-Based Neighborhood Stereotyping: Hypothesized In-Migration Probability Curves. Each graph plots hypothesized neighborhood in-migration probabilities as a function of out-group representation. The "dynamic" and "heterogeneous" graph sets show in-migration probabilities for individuals originating in neighborhoods with progressively larger shares of out-groups. Solid lines trace in-migration probabilities for members of positively stereotyped groups, dotted lines trace in-migration probabilities for members of negatively stereotyped groups.

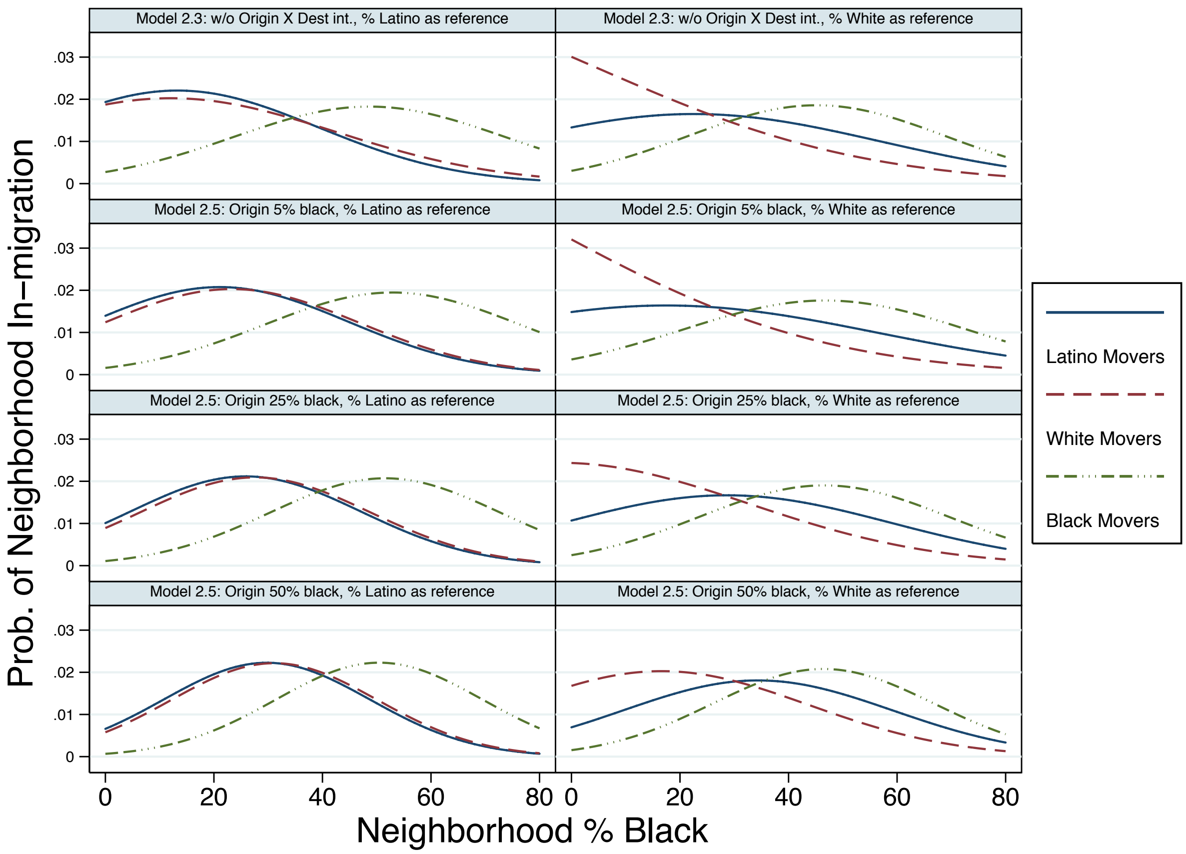

Figure 2: Probability of Neighborhood In-Migration vs. Neighborhood Percentage Black. *Source: Wave 1 and Wave 2 LAFANS, 1998-2008.* Each line traces in-migration probabilities for movers of races listed in the legend. Within sub-graphs, the neighborhood choice set is made up of 81 neighborhoods. These neighborhoods differ by one percentage point increments in the neighborhood percent Black, which comes at the expense of a one percentage point decrement in the neighborhood racial percentage of the "reference" group listed in the sub-graph header. Non-black groups and groups not listed as the reference are held at 10% in the potential destination neighborhoods. For origin neighborhoods, percent Latino is held at 40%.

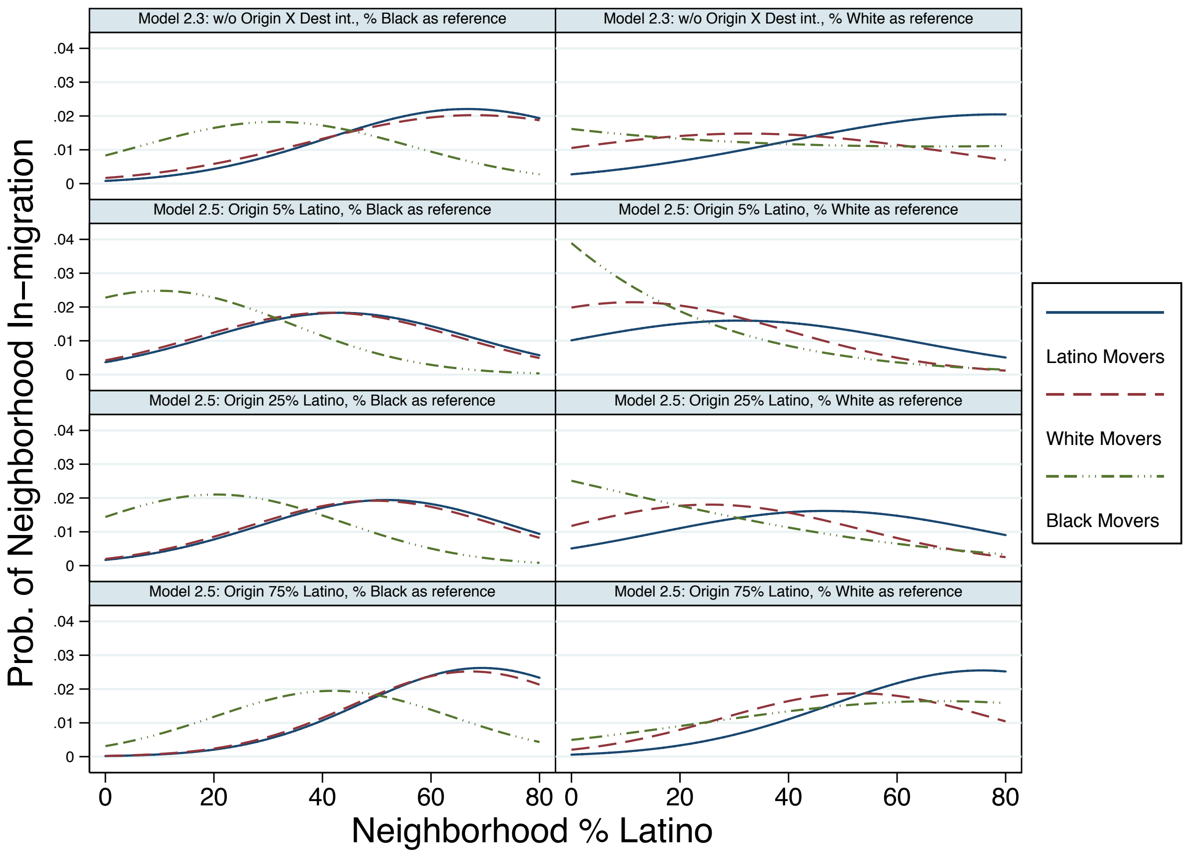

Figure 3: Probability of Neighborhood In-Migration vs. Neighborhood Percentage Latino. *Source: Wave 1 and Wave 2 LAFANS, 1998-2008.* Each line traces in-migration probabilities for movers of the races listed in the legend. Within graphs, the neighborhood choice set is made up of 81 neighborhoods. These neighborhoods differ by one percentage point increments in the neighborhood percent Latino, which comes at the expense of a one percentage point decrement in the neighborhood racial percentage of the "reference" group listed in each sub-graph header. Non-Latino groups and groups not listed as the reference are held at 10% in the potential destination neighborhoods. For origin neighborhoods, percent black is held at 10%.