Skill-Based Contextual Sorting: How Parental Cognition and Residential Mobility Produce Unequal Environments for Children

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Abstract

Highly skilled parents deploy distinct strategies to cultivate their children's development, but little is known about how parental cognitive skills interact with metropolitan opportunity structures and residential mobility to shape a major domain of inequality in children's lives—the neighborhood. We integrate multiple literatures to develop hypotheses on parental skill-based sorting by neighborhood socioeconomic status and perceived school quality, which we test using an original follow-up of the Los Angeles Family and Neighborhood Survey. These data include over a decade's worth of residential histories for households with children that are linked to census, geographic information system, and educational administrative data. We construct discrete choice models of neighborhood selection that account for heterogeneity among household types, incorporate the unique spatial structure of Los Angeles County, and include a wide range of neighborhood factors. The results show that parents' cognitive skills interact with neighborhood socioeconomic status to predict residential selection after accounting for, and confirming, the expected influences of race, income, education, housing market conditions, and spatial proximity. Among upper/upper-middle class parents, cognitive skills predict sorting on average school test scores, rather than neighborhood socioeconomic status. Overall, we reveal skill-based contextual sorting as an overlooked driver of urban stratification.

Influential scholarship on socioeconomic stratification has increasingly examined how individual skills shape one's life chances. Cognitive skills, which are neither fixed nor genetically predetermined, have been linked to income levels, education, occupational attainment and criminal behavior, independent of race and class (Duncan and Magnuson 2011; Farkas 2003; Heckman and Mosso 2014; Heckman, Stixrud, and Urzua 2006; Jencks 1979). Combined with strong parent-child skill correlations (Anger and Heineck 2010; Sastry and Pebley 2010), this body of research has solidified cognitive skills as a key mechanism linking parents' and children's circumstances and fueled a burgeoning economic literature on the intergenerational process of skill development (Heckman 2006). Important sociological research has further shown how it is not genetics but the deployment of particular parenting tactics and investments by socioeconomically-advantaged and highly-skilled parents that enhance children's cognitive skill development, a process dubbed "concerted cultivation" (Bianchi, Robinson, and Milke 2006; Lareau 2011; McLanahan 2004; Schneider, Hastings, and LaBriola 2018).

Parenting tactics constitute only one part of the intergenerational transmission of skills, however. The quality of children's environmental conditions—childcare, schools, and neighborhoods—is arguably just as important. Yet in contrast to parenting tactics, the link between parental skills and environmental selection is often treated as a background factor to be controlled, rather than as a sorting process worthy of direct examination. Existing studies on neighborhood and school sorting, for example, implicate parents' race and class characteristics and rarely disentangle the role of parents' cognitive skills from these correlates. But just as cognitively skilled parents of all race and class backgrounds more frequently engage their children in enrichment activities, we argue that cognitively skilled parents disproportionately sort their children into neighborhood, school, and childcare environments they perceive as offering skills-promoting features and higher status.

Concretely, we propose that in an era of changing housing market and school enrollment dynamics, parents with higher cognitive skill levels, proxied by acquired knowledge, are more likely to sort into neighborhoods that are societally defined as high in status and desirability, even after accounting for the wide range of individual-level, household-level, and neighborhood-level characteristics emphasized in prior studies. We also propose that among socioeconomically advantaged parents, the highly skilled disproportionately sort not on neighborhood socioeconomic status specifically, but on a correlated neighborhood amenity they perceive – rightly or wrongly – to shape children's skill development: average K-12 school test scores.

We test these ideas by linking a dozen years of residential histories from an original third-wave follow-up of the Los Angeles Family and Neighborhood Survey (L.A.FANS). Combining census, geographic information system (GIS), and educational administrative data, we construct discrete choice models of neighborhood selection that account for heterogeneity among household types, incorporate Los Angeles County's unique spatial structure, and include a wide range of neighborhood factors beyond race and class composition, notably average public school test scores. Analogous to the way highly skilled parents propel children's skill development through parenting tactics and investments, we find that parental cognitive skills interact with opportunity structures to determine the quality of their children's residential environments. These micro-level processes plausibly ripple more broadly, constraining the set of residential and educational options available to less advantaged and less skilled city residents. By linking research on demography, education, and neighborhood stratification processes, our study reveals *skill-based contextual sorting* as an overlooked driver of urban inequality, with direct implications for the intergenerational transmission of status.

PARENTS' COGNITIVE SKILLS AND CHILDREN'S ENVIRONMENTS

Recent scholarship on the mechanisms driving socioeconomic stratification has taken an analytic turn toward the intergenerational transmission of skill development. Skills encompass "capacities to act… [shaping] expectations, constraints, and information" (Heckman and Mosso 2014: 691). The conceptual model connecting skills to socioeconomic inequality suggests: cognitive, linguistic, social, and emotional skills shape individuals' socioeconomic outcomes; genetic endowments, parenting tactics, and environmental conditions interact to form children's skills; and skill acquisition occurs in a cumulative and complementary fashion, rendering early childhood experiences especially important (Cunha and Heckman 2007; Heckman 2006).

Cognitive skills can be conceived of as either "fluid intelligence" (i.e., individuals' rate of learning growth) or "crystallized knowledge" (i.e., individuals' amount of acquired knowledge). These skills have received disproportionate scholarly interest among stratification scholars given their prediction of income, educational attainment, teen pregnancy, smoking, and crime (Duncan and Magnuson 2011; Farkas 2003; Heckman et al. 2006; Kautz et al. 2014). Moreover, strong correlations between parent and child cognitive skills (Anger and Heineck 2010; Sastry and Pebley 2010) implicate a key mechanism linking parents' and children's circumstances. Recent analyses suggest two channels of influence are important: parents' (a) engagement in particular childrearing tactics and investments and (b) selection of environments (e.g., childcare, schools, neighborhoods) conducive to cognitive skill development. Many studies have explored channel (a), documenting cognitively skilled parents' propensity to devote more time to child rearing and to particular child enrichment activities, such as reading and high-quality conversations. These practices support learning and exploration, bolstering children's skill development—part of the process sociologists call "concerted cultivation" (Bianchi et al. 2006; Lareau 2011; McLanahan 2004; Schneider et al. 2018).

Scholars have much less frequently probed channel (b): whether and how parents' cognitive skills shape selection into various environmental contexts that influence children's skill development. Unlike parenting tactics, the input of the neighborhood is often treated by skills scholars as "a statistical nuisance" (Sampson and Sharkey 2008: 1) to be controlled away, rather than as determined through a sociological sorting process worthy of examination. As a result, our growing understanding of how parents' cognitive skills yield skills-promoting parenting tactics is not matched by comparable knowledge of how these skills facilitate children's access to skills-promoting contexts.

Skills and Neighborhood Attainment in an Evolving Housing Market

Demographic and urban sociological research has taken the neighborhood sorting process as its object of analysis and thus serves as a useful framework in illuminating the skills-neighborhood link. Just as the classic status attainment model predicts the payoffs and penalties of individuals' race, social origins, and lifecycle stage to their income or occupational prestige, neighborhood attainment models estimate similar individual- and household-level factors' effects on neighborhood status, proxied by race and/or class composition (e.g., Alba and Logan 1993; Logan and Alba 1993; Pais 2017; Sampson 2012; Sampson and Sharkey 2008; South et al. 2016; South, Crowder, and Pais 2011). The model assumes all households aim to sort into the highest-status neighborhoods, typically perceived as the richest (e.g., Sampson and Sharkey 2008) and often whitest (e.g., South et al. 2011), that they can. Realizing this preference, however, is contingent on the constraints imposed by individual- and household-level characteristics and by the degree of race and class discrimination within the housing market (see Bruch and Mare 2012; Krysan and Crowder 2017; Quillian 2015).

This structural orientation has generated a vigorous debate on whether and why race- and class-based gaps in neighborhood socio-demographics remain after accounting for individuals' socioeconomic circumstances. Generally speaking, the spatial assimilation perspective attributes race and class disparities in neighborhood socio-demographics to group gaps in status attainment markers, such as wages, wealth, and educational attainment. Accounting for these factors should substantially attenuate these group-based differences (Massey and Denton 1985). The alternative perspective, place stratification, holds that sizable residual gaps in race and class groups' neighborhood socio-demographics will remain, net of these characteristics. Stratification scholars frequently implicate discriminatory barriers erected by real estate agent and broker steering, zoning regulations, or other institutional mechanisms in preserving these gaps (Logan and Molotch 1987; Trounstine 2018).

Cognitive skills rarely factor into this important debate. Yet the context of inequality is changing in ways that may amplify their effects. Although persistently high levels of residential segregation underscore the enduring racial and class stratification of housing markets, we argue that evolving opportunity structures are creating avenues along which cognitive skills shape the sorting of individuals into the highest status neighborhoods they can afford. Large public housing developments that historically concentrated poor, minority households in the "inner city" have been demolished (Goetz 2011), and the ascendant housing strategy at both the federal and local level—housing vouchers—empower low-income households with more residential choices. Moreover, the real estate industry has shifted from predominately small-scale operations relying on word-of-mouth referrals and covering narrow submarkets—conditions that facilitated discrimination—to large agencies that encompass broader geographies, employ internet-based marketing, and participate in fair housing training and minority recruitment (Anderson, Lewis, and Springer 2000; Ross and Turner 2005).

A simultaneous information explosion has saturated urban housing markets and transformed how Americans navigate them (Zumpano, Johnson, and Anderson 2003). Cognitive processing is increasingly incentivized or rewarded, especially in sprawling and fragmented metropolises, a dynamic few neighborhood attainment studies have explored. Given the advent of real-time, publicly available data on neighborhood quality and housing unit openings, the proliferation of digital tools facilitating connections with real estate brokers, financial institutions, and local authorities, and the link between cognitive skills and digital engagement (Tun and Lachman 2010), these skills conceivably shape both the intensity of individuals' preferences for neighborhoods with "ideal" conditions and their ability to overcome constraints to realize these preferences.

With regard to preferences, the information age renders the benefits of affluent neighborhoods more tangible by linking them to measurable quality indicators (e.g., school quality, crime, and housing value appreciation) via websites like NeighborhoodScout, Zillow, and Redfin. Those who more frequently, quickly, and efficiently process large amounts of often-complex information are likely most motivated to access these perceived amenities. Even if preferences for neighborhood status varied minimally by skills, cognitive skills plausibly enable individuals to overcome constraints to accessing units within highly coveted communities. The highly skilled may be more likely to track fluid neighborhood conditions, exhibit less difficulty finding high-value deals and navigating numerous institutional hurdles (e.g., housing applications, credit checks), and enjoy a first-mover advantage in acquiring dwellings in high-status neighborhoods – especially neighborhoods on the rise (see also Özüekren and van Kempen 2002). Social dynamics may also be implicated. Just as real estate agents and landlords have long engaged in race- and class-based steering, they may also reward perceived market knowledge and deft communication skills with access to desirable dwellings and neighborhoods, cognitive-based steering as it were.

In short, we argue that while deeply stratified by race and class, contemporary housing markets increasingly reward, and perhaps even discriminate based on, information processing as well. These dynamics amplify the role of cognitive skills in shaping neighborhood attainment and reinforce inequality. Exploring the link between skills and residential sorting is particularly important as urban stratification scholarship expands to encompass the mechanisms driving the persistence of not only concentrated disadvantage but also concentrated affluence (Howell 2019; Owens 2016; Reardon and Bischoff 2011). A concrete hypothesis follows:

Hypothesis 1: In contemporary housing markets, parents with higher cognitive skill levels are more likely to sort into neighborhoods that are societally defined as high in status/desirability, even after accounting for parents' and neighborhoods' socio-demographic characteristics.

Social Class, Parents' Cognitive Skills, and the Quality of Children's Schools

Although revealing *whether* parents' skills predict neighborhood socioeconomic status would enrich contemporary accounts of residential sorting, it would not clarify precisely *how* parents' skills, household socio-demographics, and opportunity structures interact to reproduce spatial inequality. The traditional neighborhood attainment model obscures these finer-grained dynamics by assuming homogenous household preferences for neighborhood status, conceptualized primarily in socio-demographic terms, and implicating structural constraints. The model cannot readily distinguish whether skills – or other individual-level and household-level factors – generate variation in the strength of parental preferences for a general notion of neighborhood desirability/quality, neighborhood race or class composition specifically, or correlated neighborhood amenities perceived as central to children's development, such as school quality (for similar critiques, see Bruch and Mare 2012; Goyette, Iceland, and Weininger 2014; Harris 1999; Owens 2016; Quillian 2015).

We argue that highly skilled parents with the economic means may disproportionately optimize for socially salient indicators of school quality, specifically, rather than neighborhood socioeconomic status, generally. Many studies suggest that highly educated and upper class parents use school test scores as proxies for neighborhoods' suitability for their children (e.g., Johnson 2014; Lareau and Goyette 2014). Further, the intergenerational skills literature reveals that cognitive skills predict knowledge of, and emphasis on, child-centered parenting tactics and investments, net of socioeconomic conditions (e.g., Bornstein et al. 1998). It follows that the most highly skilled group of advantaged parents may give greater weight to perceived child-optimizing neighborhood amenities, such as school test scores, over other neighborhood amenities desirable to high-income households (e.g., housing stock characteristics) than do their less-skilled peers. This disparity in prioritization could reflect, in part, a greater awareness among the most highly skilled parents that cognitive skill boosts in early ages foster an increased rate of skill growth later on (Cunha, Heckman, and Schennach 2010). Although school test scores do not necessarily equate with learning environments' quality (Schneider 2017), highly skilled parents – who themselves are likely to have high test scores – may be particularly likely to perceive a strong link between the two. In this way, skill-based sorting on the basis of school test scores may reflect socially shaped and self-fulfilling expectations.

Even if all advantaged parents exhibited comparable preferences for neighborhoods with high public school test scores, skill-based constraints could stratify their residential outcomes. The highly skilled may more deftly overcome informational and institutional barriers to accessing neighborhoods with the highest scoring schools (e.g., by finding, interpreting, and tracking information on school catchment zones and school test scores). Advantaged parents who are less cognitively skilled may infer school quality from correlated proxies, such as neighborhood and school socio-demographic composition, or rely on word-of-mouth, rather than research school test scores. The highly skilled may also more readily identify, and elicit support from, key residential and institutional gatekeepers who plausibly reward the most knowledgeable and engaged parents, again a sort of cognitive steering. Among disadvantaged parents, however, class-based constraints, rather than skill-based constraints or preferences, likely stymie their efforts to foster skill development via the housing market (Rhodes and DeLuca 2014). Lower-income parents' strongly held preferences for school quality, for example, are often trumped by housing affordability and quality needs (see Johnson 2016; Lareau and Goyette 2014; Rich and Jennings 2015 for in-depth discussions of how race and class stratify parents' school quality evaluations).

We thus argue that it is not just social class, but skills interacting with class, that predict which parents access neighborhoods with the highest scoring public schools. Whether or not scores accurately measure the most developmentally enriching environmental contexts for their children, highly skilled and advantaged parents' propensity to sort on this basis yields a process analogous to "opportunity hoarding"(Reeves 2017; Trounstine 2018).

Hypothesis 2: Among socioeconomically advantaged parents, those with higher cognitive skill levels are more likely to sort into neighborhoods with higher K-12 school test scores, even after accounting for parents' and neighborhoods' socio-demographic characteristics.

We test our theoretical framework's two main hypotheses by employing a novel dataset of Angelenos' residential histories spanning a dozen years. Los Angeles County is a theoretically important, but relatively underexplored, urban ecology that is spatially distinct from and more racially and ethnically diverse than geographies examined in prior residential mobility analyses (Sampson, Schachner, and Mare 2017). This race-ethnic diversity permits analysis of neighborhood sorting patterns among two rapidly growing but less frequently studied groups: Latinos and Asians. We also take seriously L.A.'s unique spatial structure by incorporating a network-based measure of spatial proximity into our models and, following Bruch and Swait (2019), by constructing more realistic choice sets that oversample neighborhood options from meaningful county sub regions.

Importantly, we incorporate a well-validated measure of cognitive skills and time-varying neighborhood-level measures of housing market conditions and school test scores. Moreover, our discrete choice framework captures heterogeneity in subgroups' residential patterns and disentangles sorting on multiple neighborhood features simultaneously. In contrast to many similar studies, we model both movers and stayers in our discrete choice analyses, providing a more nuanced portrait of residential decisions (Bruch and Mare 2012; Huang, South, and Spring 2017; Sampson and Sharkey 2008). The timeframe of our data, 2001-2012, spans an era of change in the region, including just before and after the Great Recession.

RESEARCH DESIGN AND MEASURES

This study is part of the Mixed Income Project (MIP)—a data collection effort aimed at examining neighborhood context, residential mobility, and income mixing in Los Angeles and Chicago. MIP evolved out of two anchor studies, L.A.FANS and the Project on Human Development in Chicago Neighborhoods (PHDCN). L.A.FANS wave 1 data collection was conducted in 2000-2002, with a probability sample design that selected 65 Los Angeles County neighborhoods (census tracts) and, within each tract, a sample of randomly selected households. Within the 3,085 households that completed household rosters, researchers attempted to interview one randomly selected adult (RSA) and, if present, one randomly selected child (RSC), the child's primary caregiver (who could, or could not be, the RSA), and a randomly selected sibling of the RSC. The RSC's mother was designated as the primary caregiver (PCG) unless she was not in the household or could not answer questions about the child. In these cases, the child's actual primary caregiver received the PCG designation. Ultimately, 1,957 PCGs completed a wave 1 interview, of whom 21 percent were white, 60 percent were Latino, 8 percent were black, and 7 percent were Asian American/Pacific Islander. The remainder were Native American or multiracial.

Wave 1 respondents received follow-up interviews between 2006 and 2008 (response rate 63%) if they still resided within L.A. County (85% of the contacted sample). Approximately 2,000 RSA and RSC respondents completed interviews during waves 1 and/or 2 of L.A.FANS, rendering them eligible for MIP between 2011-2013. A randomly selected subset of eligible respondents was contacted for a wave 3 interview. After excluding those selected respondents who left L.A. County or who were institutionalized, incapacitated, or deceased, 1,032 wave 3 interviews were ultimately completed (response rate 75%). 300 MIP respondents were PCGs at wave 1. Crucially, each data collection wave tracked a continuous record of respondents' residential locations over the interim years, enabling residential histories spanning approximately 2000 through 2013. For more details on L.A.FANS and MIP, see Sampson et al. (2017) and Sastry et al. (2006).

Because this study centers on skill-based residential sorting among parents, we examine neighborhood selection among respondents who were: designated as PCGs at wave 1, confirmed to have completed a survey and to have been L.A. County residents at all three data collection efforts, and for whom cognitive skill measures and network distance calculations between their origin and potential destination neighborhoods were available. Two-hundred eighty-four primary caregivers fit these specifications, and most have continuous census tract-coded residential history data from 2001 through 2012. See Appendix – "Analytic Sample" for more details.

Neighborhood-level Measures

Our outcome of interest is a binary measure indicating whether a given census tract within a choice set of plausible options was selected by a given household in a given year (1 indicates the tract was selected, 0 indicates it was not). We predict this outcome as a function of neighborhood-level covariates and their interactions with both household-level and individual-level characteristics. We include an annually estimated *tract status index*, constructed as the mean of a tract's standardized (1) median family income (logged) and (2) bachelor's degree or higher (%) – two common proxies for neighborhood status or desirability broadly defined.[1] We also include tract *racial composition* to test whether racial homophily confounds sorting by neighborhood socioeconomic status (Quillian 2015).

Our other core measure at the neighborhood level is an annual estimate of *K-12 school quality*. Consensus on calculating school quality at the neighborhood level remains elusive. Given our focus on how parents' neighborhood perceptions shape residential decisions, we start with a parsimonious, widely disseminated school quality measure – average test scores – that is available via the Internet and local newspapers. To generate a neighborhood-level measure, we use GIS to overlay county-provided school catchment boundaries from 2002 with 2000 census tract boundaries and weight each school's test scores based on the proportion of the tract's area its catchment zone covers. We run this merge separately for elementary, middle, and high schools and then average the three tract measures to create a yearly neighborhood school quality measure (see Appendix – "Operationalizing Neighborhood School Quality"). Although some children attend magnet, charter or private/parochial schools instead of their local catchment school, approximately 90% of L.A.FANS

[1] By combining the highly correlated measures (~0.8) together into one index, we mitigate multicollinearity concerns that would arise from including both variables in our models. The index is correlated 0.96 with each component variable, suggesting it is a strong neighborhood status proxy. The measure's construction also renders it easily interpreted, with a mean around zero and a standard deviation of approximately one.

panel children attended traditional public schools at wave 1 or 2. Catchment school quality is likely salient to the vast majority of parent respondents.[2]

We employ several neighborhood-level controls. A binary variable indicates whether the selected tract in a given year is the respondent's *origin tract*, the neighborhood of residence at *t* - 1 (1 indicates stayer in a given year, 0 indicates mover), enabling us to capture both movers' and stayers' residential decisions (see Bruch and Mare 2012). We interact this control with neighborhood school quality, measured during the year of the move, to test whether higher scores not only attract certain households but dissuade them from leaving. We also track *network distance* (i.e., road length in miles, rather than point-to-point distance) between neighborhood destination options and the origin tract using ArcGIS, given that familiarity and networks shape residential choices (Krysan and Crowder 2017). Traditional neighborhood-level controls used by prior sorting studies – *owner occupancy rate (%)* and *number of housing units (logged)* – are also included. The latter proxies housing availability (Bruch and Mare 2012; Gabriel and Spring 2019; Spring et al. 2017). For our discrete choice models, we convert all tract variables, except for origin tract and network distance, into standardized measures to facilitate comparisons of their effects with that of the tract status index variable.[3],[4]

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[2] Even parents of children who do not attend their catchment-assigned school likely consider metrics of quality in the local public schools given their impact on shared perceptions of neighborhood desirability, which influences housing price appreciation and sales potential.

[3] Yearly estimates for all ACS-derived tract-level variables are based on the middle year of each ACS timeframe (e.g., ACS 2005 – 2009 is used for 2007 estimates). We linearly interpolate values from decennial census 2000 and ACS 2005-2009 data for 2001-2006 estimates, given tract-level data availability gaps.

[4] Tract-level variables' missing data rates are trivial, except for network distance between origin and potential destination tracts (~1%) and school quality score (~7%). Network distance missing values are imputed based on the average distance between a tract within the respondent's L.A. County region of origin and a tract within the choice set tract's county region. Missing school quality values are imputed based on predicted values from a regression including tracts' housing and socio-demographic characteristics and year fixed effects. Model results are robust to excluding imputed values.

Parental Cognitive Skills and Individual/Household-level Measures

Our primary individual-level characteristic of interest is parents' cognitive skills, typically conceptualized in the skills and stratification literature as acquired knowledge (Heckman et al. 2006; Kautz et al. 2014). L.A.FANS collected skill measures only for PCG and child respondents. We use PCGs' wave 1 results from the Woodcock-Johnson *Passage Comprehension* assessment, conducted in either English or Spanish. The test captures individuals' ability to process written information, a theoretically important skill for evaluating neighborhood options, by asking test takers to identify missing key words from short passages of increasing complexity. We convert the national percentiles rankings generated by the test into sample-based tercile rankings to capture nonlinear effects. Wave 1 skill terciles are applied across all years because the data are considerably more complete, and cognitive skills tend to stabilize in adulthood (Roberts, Walton, and Viechtbauer 2006; Rönnlund, Sundström, and Nilsson 2015). Passage comprehension scores are highly correlated with scores generated by Woodcock-Johnson tests gauging other cognitive skill types.[5]

We include commonly employed predictors of neighborhood sorting as controls: *race-ethnicity*, *household income quintile*, and *bachelor's degree* or higher. The latter two are annually interpolated based on estimates from the three data collection efforts. Household income is standardized to year 1999 dollars and converted into a quintile ranking. To test our argument linking skills to

[5] Among L.A. FANS panel respondents who were children at wave 1 but aged into adulthood by wave 2 and retook Woodcock-Johnson tests at that time, passage comprehension module percentile rankings correlate 0.6-0.8 with broad reading, math reasoning, applied problems, and letter word identification rankings. Ideally, we would replicate our core results using these others skill measures and a composite skill measure that averages scores across modules. However, L.A.FANS only fielded the passage comprehension module to PCG respondents. Nonetheless, we believe this module captures important dimensions of the contemporary housing search, such as the accuracy, and perhaps frequency, of processing and contextualizing written information.

neighborhood school quality among advantaged parents (Hypothesis #2), we use the time-varying bachelor's degree and household income quintile variables to stratify the sample. The upper/middle-upper class sample includes primary caregivers who hold a bachelor's degree or reside within a household in the fourth or fifth income quintiles within a given year. The middle/working class sample includes all other primary caregivers.[6]

ANALYTIC STRATEGY

We employ discrete choice models to evaluate whether parents' cognitive skills interact with neighborhood status to produce residential sorting outcomes for the full sample, and whether these skills interact with neighborhood school quality, specifically, rather than status among advantaged parents. These models conceptualize selection as a process in which individuals examine a specific set of available options and select one with characteristics that most closely match their preferences and constraints. Interactions between characteristics of the choosers and of the choice options reveal heterogeneity among subgroups in preferences and/or constraints vis-à-vis particular option characteristics. (For recent examples of discrete choice models of neighborhood sorting, see Bruch and Swait 2019; Gabriel and Spring 2019; van Ham, Boschman, and Vogel 2018; Logan and Shin 2016; Quillian 2015; Spring, et al. 2017).

Our study's choice of interest is the tract destination at time *t* – a binary outcome – modeled as a function of multiple neighborhood-level characteristics and interactions of these characteristics with individual-/household-level characteristics. The data structure consists of various person-

[6] All individual/household-level measures contain complete data for the analytic sample except for household income (~15% is missing data for one or more waves). To estimate missing values, we use the imputed wave 3 household income values calculated by Sampson et al. (2017), which employ a wide range of covariates.

period-tract options, which capture a sample of neighborhood choices available to the individual in a given period, including the tract actually chosen, which is marked 1; all other choice set options are marked 0.

Consensus on two data structure features remains elusive: (1) whether the choice set should include the tract chosen in the prior period (i.e., the origin tract) and (2) how the neighborhood choice set should be conceptualized and constructed. Following Bruch and Mare (2012), we include both stayers and movers in our analytic sample and use the binary origin tract indicator to gauge whether the household is mobile within a given year. As for the neighborhood choice set, residential mobility studies typically use a random sample of all tracts in a metropolitan area (Bruch and Mare 2012; van Ham et al. 2018; Quillian 2015; Spring et al. 2017), but we opt for a different tack that takes into account L.A.'s unique spatial structure. We first assign all county tracts to one of eight geographic regions – Central Los Angeles, San Fernando Valley, San Gabriel Valley, Gateway Cities, South Bay, Westside Cities, Santa Clarita Valley, and Antelope Valley – which, based on our analysis, tend to retain high proportions of residents over time (Figure 1). Similar to Bruch and Swait (2019) who examine "cognitively plausible" neighborhood choices among Angelenos, we use these regions to shape respondents' choice sets. For each person-year combination we construct a choice set of tract options, consisting of the tract selected; the person's tract of residence during the prior year (i.e., the origin tract); and 49 to 50 randomly-sampled tracts, drawing about half from the respondent's county region of residence in the prior year, and about half from the entire county. This approach yields a choice set of 50 to 51 tracts for all 3,317 person-periods and 284 unique primary caregivers, generating a total core analytic sample of 167,342 person-period-tract alternatives. See Appendix – "Modeling the Choice Set."

Figure 1 about here

We follow Quillian (2015) in translating this data structure into a formal discrete choice model of neighborhood selection consisting of two core components. The first, Equation 1, estimates U_{ijt}, which represents neighborhood *j*'s attractiveness to individual *i*, in year *t*. If we consider just two household characteristics (X_1, X_2) and two neighborhood features (Z_1, Z_2), and assume a probability distribution of the unobserved neighborhood characteristics influencing attractiveness, then the neighborhood attractiveness model's nonrandom portion is represented by:

$$\textbf{(1)}\ \hat{U}_{ijt} = \beta_1 Z_{1it} + \beta_2 Z_{2it} + \delta_{11} Z_{1it} X_{1it} + \delta_{21} Z_{2it} X_{1it} + \delta_{12} Z_{1it} X_{2it} + \delta_{22} Z_{2it},$$

where β_k represents the attractiveness of neighborhood *j*'s characteristic *k* at time *t* (Z_{kjt}) and δ_{km} represents the interaction effect of neighborhood *j*'s characteristic *k* at time *t* and individual *i*'s characteristic *m* (X_{mit}) on neighborhood attractiveness at time *t*.[7] Individuals' characteristics only influence neighborhood attractiveness through their interactions with neighborhood features. Assuming the errors follow an extreme value (Gumbel) distribution, a discrete choice conditional logit model generates a predicted probability of individual *i* selecting neighborhood *j* at time *t* (Equation 2):

$$\textbf{(2)}\ p_{ijt}(Z_{kjt}, X_{mit}, C_{(i)}) = \frac{\exp(\hat{U}_{ijt} - q_{ijt})}{\sum_{w=1}^{C(i)} \exp(\hat{U}_{ijt} - q_{iwt})}$$

$C_{(i)}$ represents the neighborhood choice set for individual *i*, and w is an index used to sum over elements of this set for the *i*th individual. We follow prior analyses in incorporating an offset term (q_{ijt}) into our models to differentially weight tract options based on the probability of the tract entering the choice set for a given person-year via the sampling procedures described above (see Appendix – "Modeling the Choice Set").

[7] We use the term "effect" to remain consistent with the discrete choice literature's language, while recognizing the limitations of our data and empirical strategy in identifying causal parameters.

The model's maximum likelihood procedures yield a predicted probability that each neighborhood within the individual's choice set will be selected based on a set of estimated coefficients indicating neighborhood characteristics' positive or negative effects on a neighborhood's attractiveness (main effects) and whether these effects are strengthened or attenuated by the individual/household characteristics (interaction effects). We convert these coefficients into odds ratios to facilitate interpretation. Odds ratios above 1 suggest the neighborhood characteristic increases the likelihood of residence directly or in interaction with an individual/household characteristic; odds ratios below 1 indicate a depressive effect. We discuss a common concern regarding the accuracy and interpretation of conditional logit models' results in the Appendix – "The Independence of Irrelevant Alternatives."

DESCRIPIVE RESULTS

Table 1A reveals that whites and Latinos constitute 28 and 47 percent of the weighted analytic sample, respectively, while Asians are 13 percent and blacks are 9 percent. This mix enables us to examine sorting patterns among all four major race-ethnic groups– a key benefit compared to prior neighborhood sorting analyses. The categorical classification of Woodcock-Johnson passage comprehension scores indicates a low skew compared to the national distribution: the sample's middle tercile spans national percentile ranks 10 – 30.

A simple correlation matrix (Table 1B) presents unconditional associations between primary caregivers' individual-level and household-level attributes measured at baseline and operationalized in continuous, rather than categorical, terms for passage comprehension and household income to maximize specificity. One might expect classic indicators of adult socioeconomic attainment – household income and bachelor's degree – to strongly correlate with cognitive skill levels, indicating skill effects on neighborhood outcomes are likely absorbed by socioeconomic effects. In fact, this is not the case. Passage comprehension score (measured in continuous terms) is only correlated about 0.30 with household income (logged) and 0.38 with possession of a bachelor's degree, meaning that substantial residual variation in skill levels remains net of these factors.

Table 1 about here

Chosen and nonchosen tract attributes (Table 2A) reveal that, on average, 94 percent of the sample remained within their origin tract during a given year. Chosen neighborhoods' race/ethnic distribution confirms L.A. County's distinctiveness relative to the rest of the country. The average share of Asian and especially Latino residents – approximately 13 and 50 percent – is strikingly high relative to other U.S. urban areas. Whites and blacks constitute an average of about 28 and 7 percent of chosen tracts, respectively.

Unconditional associations between individual/household-level and chosen tract-level attributes, as well as chosen tract-level attributes associations with each other, provide preliminary clues about the skills-neighborhood link (Tables 2B & 2C). Comparing the correlation between cognitive skills and *neighborhood*, rather than *household*, socioeconomic characteristics suggests cognitive skills may influence neighborhood outcomes directly and perhaps shape neighborhood attainment more than socioeconomic attainment. Passage comprehension scores are correlated 0.47 with the time-varying neighborhood status index, but only 0.30 with baseline household income (logged).

Table 2 about here

DISCRETE CHOICE MODELS

Congruent with the focus of previous neighborhood attainment studies, our first core analysis (Table 3, Model 1) gauges racial differences in tract status sorting while accounting for controls, including: the origin tract indicator, network-based spatial proximity between the origin tract and choice set options, housing availability and homeownership rates. As expected, households are far more likely than not to remain in place in a given year (OR = 2089.19, $p < 0.01$). When they do move, network distance is important; the further the neighborhood option is from the origin neighborhood, the less likely it is to be selected (OR = 0.80, $p < 0.01$). Housing markets also matter. Neighborhoods with more housing units are more likely to be selected by parents (OR = 1.67, $p < 0.01$), as are those with a higher owner occupancy rate (OR = 1.36, $p < 0.01$). Confirming the urban stratification literature's longstanding findings, Latino and black race/ethnicity interact with the tract status index to reduce the likelihood of sorting (ORs = 0.4, $p < 0.01$) net of non-racial tract-level controls and an age – tract status interaction control.

Table 3 about here

These racial interaction effects are only modestly attenuated after controlling for household income differences across racial groups (Table 3, Model 2: ORs = 0.5 – 0.6, $p < .01$). Also, in line with prior urban stratification analyses, class-based neighborhood sorting appears important, net of race. The second highest and highest income quintiles interact with tract status to increase the likelihood of selection, generating ORs of 2.23 and 3.26 ($p < 0.01$), respectively. Interestingly, educational background, proxied by bachelor's degree attainment, does not significantly predict sorting when controlling for race, income, and age.

Cognitive Skills and Neighborhood Status

After accounting for structural sorting patterns, do parents' cognitive skills also predict neighborhood attainment? Indeed they do, especially at the top end of the skills distribution. Model 3 in Table 3 preserves all covariates from the traditional neighborhood attainment model (Model 2) but adds interaction terms capturing heterogeneous sorting on neighborhood status by passage comprehension tercile. The top tercile passage comprehension-tract status interaction term is strongly significant, net of race-, class-, and education-based sorting patterns (OR = 1.86, $p < 0.01$). The racial and income quintile interaction terms' odds ratios attenuate very slightly when compared to the previous model, suggesting skills play a modest role, at best, in mediating race- and class-based neighborhood sorting patterns.

Model 4 extends beyond the traditional neighborhood attainment model by incorporating neighborhood-level racial composition controls and racial homophily interaction terms. Recent studies employing discrete choice models document significant racial homophily patterns that may partially account for the observed propensity of blacks, in particular, to sort into lower status neighborhoods (Quillian 2015). Our results reinforce this possibility. When racial homophily terms are included, they are significant among Latinos (OR = 1.92, $p < 0.01$) and among blacks (OR = 1.45, $p < 0.05$). Moreover, the racial interaction terms with tract status become non-significant. However, importantly, the top tercile passage comprehension-tract status interaction term attenuates only slightly, remaining significant net of race-, class-, and education-based status sorting and racial homophily patterns (OR = 1.70, $p < 0.05$).[8]

[8] By comparing Model 4 to an identical model that excludes skill interactions with tract status, racial homophily interaction terms are virtually identical in odds ratios and significance (results available upon request), suggesting that skill-based status sorting does not mediate racial residential homophily patterns.

We illustrate the magnitude of cognitive skill – neighborhood status interaction terms for the full analytic sample (Model 4, Table 3) by stratifying top and bottom skill tercile parents and comparing each subgroup's (a) predicted conditional probability of residing within tracts at various points in the neighborhood status distribution to (b) the probability of selecting a random tract from their choice sets. Higher ratios indicate a disproportionate likelihood of selecting a certain tract type over other options (see Logan and Shin 2016 for more detail on this type of simulation). Figure 2 suggests that, all else equal, top skill tercile respondents are 0.5 to 0.7 times as likely to select a tract within the two lowest neighborhood status quintiles as they are to select a random tract in their choice sets. This ratio approaches 1 within the middle tract status quintile and then ascends toward 1.5 between the fourth and fifth quintiles, indicating high scorers are nearly 50 percent more likely to select a tract within the highest status quintile as they are to select any given tract in their choice set. Conversely, bottom-tercile parents are much more likely to select a neighborhood within the two lowest quintiles and much less likely to select a neighborhood within the two highest affluence quintiles than they are to select a random tract within their choice sets.[9]

Figure 2 about here

Similar results are generated using models that are nearly identical to Table 3, Model 4 but specified on a sample excluding long-term stationary residents (i.e., 10+ years in the same tract) or on a sample of person-years in which parents moved tracts. In both samples, the tract status - top skill tercile interaction odds ratio attenuates slightly compared to Table 3, Model 4. In the former

[9] Large relative differences in predicted versus random selection probabilities reflect small absolute differences, given the tendency of residents to remain stationary—another dimension of how inequality is reproduced (Huang, South, and Spring 2017; Sampson and Sharkey 2008). Yet simulation models suggest even small group-based divergences in mobility and location propensities can generate major group-based disparities at the population level (Bruch and Mare 2006; Schelling 1971).

model, the interaction reduces to 1.60 (from 1.70). In the mover-only model, the same interaction reduces from 1.70 to 1.67 (Online Supplement Table A1). Employing the full analytic sample (movers and stayers) and operationalizing parents' cognitive skill scores in continuous, rather than categorical, terms yields a significant skill – tract status index interaction exceeding 1 (OR = 1.19, p < 0.01) (Online Supplement Table A2). Overall, our findings support Hypothesis #1: parents' cognitive skills influence neighborhood attainment processes, net of age-, race-, class-, and education-based neighborhood status sorting and racial homophily.[10]

Falsification checks based on theoretical expectations reinforce these findings. The parental skills-neighborhood status link is *not* significant among parents who still reside with their own parents as of waves 1 or 2 and among parents who no longer have children under 18 in their household by wave 2. By contrast, among parents whose households contain elementary school-aged children (i.e., under 12) in both waves 1 and 2, the skill-neighborhood status interactions strengthen in magnitude. Both the middle skill tercile (OR = 1.53, $p < 0.05$) and top skill tercile (OR = 1.95, $p < 0.01$) are significant, suggesting neighborhood status is particularly salient to highly skilled parents of *young* children (Goyette et al. 2014) (Online Supplement Table A3).

Class, Skills, and Neighborhood School Quality

We now evaluate our second hypothesis testing whether, among upper/middle-upper class class parents, cognitive skills are associated with sorting on K-12 school quality, specifically, rather than neighborhood status generally. Model 1 in Table 4 employs Model 4 in Table 3 as a base but specifies the analytic sample to only include parents who are bachelor's degree holders or within the

[10] Additional robustness check models included excluding the offset term and incorporating interactions for origin tract and: household income, skills, and neighborhood status. Model results are not substantively changed compared to Table 3, Model 4.

top two income quintiles in a given year. We interact neighborhood school quality with parents' cognitive skill tercile, as well as with age, household income (logged), and origin tract as controls. Model 1 supports Hypothesis #2. Advantaged parents within the top skill tercile are much more likely to sort into neighborhoods with higher-quality schools (OR = 5.60, p < 0.01), as are those within the middle skill tercile (OR = 4.96, p < 0.01).[11] Significant skills-school quality interactions are replicated in a similar model specification limited only to bachelor's degree holders (results available upon request). We also confirm the same patterns do not hold among less advantaged parents: The Model 1, Table 4 specification applied to a sample of parents *without* a bachelor's degree and in the bottom three income quintiles in a given year generates a non-significant cognitive skill-neighborhood school quality interaction (Model 2, Table 4).

Table 4 about here

Does the observed skills-neighborhood school quality link among advantaged parents primarily reflect skill-based variation in *preferences* for, or *constraints* to, accessing neighborhoods with high-quality schools? A preferences account suggests that among upper/middle-upper class class parents, the highly skilled prioritize child-optimizing neighborhood amenities, such as schools with high test scores, compared to other neighborhood features than do the less skilled. A constraints perspective might hold that the highly skilled more deftly overcome informational and institutional barriers and ingratiate themselves to, or are less discriminated against by, key residential and educational gatekeepers than the less skilled.

[11] Parents plausibly use schools' socio-demographic properties, rather than test scores, to infer school quality, especially given the well-established link between the two (Rich 2018). Because our models control for sorting on neighborhood racial and economic status, we partially account for this possibility, though future research probing this concern is necessary.

Our discrete choice models cannot cleanly clarify whether preferences, constraints, or both underlie skill-based sorting on neighborhood school quality among advantaged parents (see Quillian 2015's discussion of this preferences versus constraints concern). Although the skill-based parenting and concerted cultivation literatures suggest skill-based preferences rather than constraints may predominate in neighborhood selection among advantaged parents, to our knowledge, a definitive resolution remains elusive. Thus, we opt to exploit descriptive data bearing on this question.

Figure 3A reveals the proportion of L.A.FANS primary caregivers who participated in wave 1, regardless of MIP inclusion, and who moved residences within the prior five years, that reported in wave 1 that proximity to good schools motivated their neighborhood choice. Congruent with concerted cultivation studies, upper/middle-upper class parents are much more likely, overall, to report access to good schools for their kids as a mobility driver than are other parents.

Do cognitive skills shape school-based preferences, net of socioeconomic status? Congruent with Hypothesis #2, our descriptive data suggest they might. Advantaged parents within the top and middle skill terciles are about 1.5 times more likely to cite school quality as a mobility driver as similarly advantaged bottom tercile parents – a pattern not replicated among middle/working parents. These descriptive results reinforce the class heterogeneity in skill-based neighborhood school quality sorting revealed by our discrete choice models and implicate class- and skill-based disparities in preferences for school quality as a potential driver. Yet skill-based constraints are not ruled out. Panel B reveals that, conditional on expressing a school-based preference, a large class-based difference in median tract school quality index remains (~130 points). Future research is needed to examine whether parental skills mediate this residual class gap.

Figure 3 about here

Our analyses thus far do not solidify whether skills themselves stratify school-centric residential preferences and sorting, or if skill and class correlates, such as parents' educational expectations and investment in their children, confound observed skill effects. Leveraging L.A.FANS data on how many years of education parents expect their children to receive (to proxy expectations) and on the number of extracurricular activities in which their children are involved (to proxy investment), we confirm each construct is positively correlated with parents' cognitive skill levels (~0.3) (Table 5A). [12]

We then interact these variables with tract status and tract school quality and add them into our most complete discrete choice models from Tables 3 and 4. The partial model output in Table 5B reveals that while extracurricular investment interactions are strongly significant in each model ($p < 0.01$), the cognitive skill interactions with neighborhood status and school quality remain significant. Parents' educational expectations and especially extracurricular investments may thus account partially – but likely not fully – for class- and skill-based stratification in neighborhood preferences and, in turn, contextual sorting.

Table 5 about here

DISCUSSION & CONCLUSION

The burgeoning literature exploring the intergenerational process of skill development highlights the role of parenting tactics but not contextual selection. The rich urban stratification literature, for its part, takes contextual selection as its object of analysis, yet its structural orientation obscures cognitive skills' role. We believe cognitive processes contribute to urban stratification and the

[12] For more details on how we constructed these measures, see Appendix – "Educational Expectations & Extracurricular Investments."

intergenerational transmission of context. Neighborhoods shaped parents' skill development as children, and these skill levels predict their own children's neighborhood conditions. Evolving housing market dynamics and school choice systems may amplify skill-based sorting processes, and these processes plausibly shape the residential and educational opportunities available to less advantaged and less skilled city residents.

To assess our theoretical framework, we integrate Angelenos' socio-demographic characteristics, cognitive skills, and residential histories, with census, GIS, and administrative data on L.A. County neighborhoods' spatial locations, housing markets, socio-demographics, and school quality. Neighborhood attainment-oriented discrete choice models show that cognitive skills interact with evolving opportunity structures to independently shape neighborhood status sorting, even after confirming the key roles played by race and class, housing markets, and spatial proximity. Among advantaged parents, cognitive skills are associated with sorting on public school test scores, specifically, rather than neighborhood status generally, net of interactions between skills and neighborhood status and a wide range of controls. Skill-stratified preferences for neighborhood school quality, or perceived signals of quality, may drive this pattern.

Our results suggest neighborhood sorting occurs not only the basis of race and class but also on the basis of cognitive skills, a mechanism we call *skill-based contextual sorting*. This model has important implications for the urban stratification and intergenerational transmission of skills literatures. As Krysan and Crowder (2017) argue, urban stratification's structural focus on economic resources, racial residential preferences, and housing discrimination may obscure key processes underlying neighborhood sorting. Race and class continue to profoundly shape housing markets, but their firm grip may be slowly weakening, and the roles played by information and networks are undoubtedly expanding. Results of a recent policy experiment reinforce this intuition. In Seattle and

King County, modest investments in reducing informational barriers among housing voucher recipients (via customized housing search assistance, paired with short-term financial support and landlord engagement) dramatically increased the likelihood they selected neighborhoods with high upward mobility rates (Bergman et al. 2019). As neighborhood-level data on measures ranging from upward mobility to K-12 school quality proliferate, the perceived neighborhood status hierarchy may no longer be determined solely based on race and class composition. These dynamics plausibly open the door to skill-based stratification, especially among advantaged parents who can readily access or prefer this kind of information and who can overcome the financial constraints required to act on it. Amidst the increasing residential separation of the affluent (Owens 2016; Reardon and Bischoff 2011), understanding precisely how elites preserve spatial advantages may illuminate key mechanisms by which disadvantaged families' residential options are constrained.

These processes have further implications for the intergenerational transmission of skills literature, which should supplement its focus on parenting tactics with a deeper analysis of how skills shape, and are shaped by, environmental conditions to which children are exposed. The neighborhood appears to be an important domain for skills development, but contextual sorting vis-à-vis other domains (e.g., childcare, schools) are also likely salient. Skills scholars should examine what environmental domains, and what features of them, interact with parental skills to produce sorting.

We acknowledge the limitations of our study. L.A.FANS encompasses a relatively small group of parents within one urban ecology during one temporal era. Future studies should leverage larger samples with more diverse household structures and lifecycle phases, spanning longer time periods and broader geographies. Data on non-traditional public schools could also prove useful. Further theorizing is required to determine what additional skills (e.g., quantitative, noncognitive, or socioemotional capacities) and neighborhood features (e.g., environmental toxicity, crime levels) should be incorporated into ever-richer neighborhood sorting models. Examining whether these finer-grained sorting processes help explain race- and class-based gaps in neighborhood quality, and whether race and class moderate these processes would meaningfully enrich urban stratification models. Such analyses also promise to improve non-experimental estimates of neighborhood effects on individuals' outcomes (van Ham et al. 2018).

Our study could not definitively resolve whether sorting patterns reflect skill-based differences in preferences or constraints vis-à-vis neighborhood characteristics and whether skill-based sorting on neighborhoods' school test scores among advantaged parents reflects differential prioritization of school quality or merely differential perceptions of school test scores as a proxy for it. The challenges of disentangling preferences from constraints and clarifying their sources are endemic to all decision-making research. Stratifying respondents not only on socio-demographics, but also on skills and combining stated preferences (neighborhood vignettes) with revealed preferences (residential mobility histories) may help. Additional research that closely documents how cognitive skills versus other correlated factors like educational expectations shape the contemporary housing search is also necessary.

Our results are nonetheless robust in identifying skill-based contextual sorting as an emerging axis along which urban inequality is unfolding. This development is important to explore, especially in an era of liberalized, choice-oriented urban policy marked by school choice regimes and housing voucher programs. Reducing constraints to individuals' residential and school-enrollment decisions in such an era, while intended to equalize socioeconomic opportunities across race and class lines, could well amplify skill-based stratification instead.

WORKS CITED

Alba, Richard D. and John R. Logan. 1993. "Minority Proximity to Whites in Suburbs: An Individual-Level Analysis of Segregation." *American Journal of Sociology* 98(6):1388–1427.

Anderson, Randy I., Danielle Lewis, and Thomas Springer. 2000. "Operating Efficiencies in Real Estate: A Critical Review of the Literature." *Journal of Real Estate Literature* 8(1).

Anger, Silke and Guido Heineck. 2010. "Do Smart Parents Raise Smart Children? The Intergenerational Transmission of Cognitive Abilities." *Journal of Population Economics* 23(3):1105–32.

Bergman, Peter, Raj Chetty, Stefanie DeLuca, Nathaniel Hendren, Lawrence F. Katz, and Christopher Palmer. 2019. *Creating Moves to Opportunity: Experimental Evidence on Barriers to Neighborhood Choice*. 26164. Cambridge, MA: National Bureau of Economic Research.

Bianchi, Suzanne M., John Robinson, and Melissa A. Milke. 2006. *Changing Rhythms of American Life*. New York, NY: Russell Sage Foundation.

Bornstein, Marc H., Maurice O. Haynes, and Kathleen M. Painter. 1998. "Sources of Child Vocabulary Competence: A Multivariate Model." *Journal of Child Language* 25(2):367–393.

Bruch, Elizabeth E. and Robert D. Mare. 2006. "Neighborhood Choice and Neighborhood Change." *American Journal of Sociology* 112(3):667–709.

Bruch, Elizabeth E. and Robert D. Mare. 2012. "Methodological Issues in the Analysis of Residential Preferences, Residential Mobility, and Neighborhood Change." *Sociological Methodology* 42(1):103–54.

Bruch, Elizabeth and Joffre Swait. 2019. "Choice Set Formation in Residential Mobility and Its Implications for Segregation Dynamics." *Demography*.

Cunha, Flavio and James Heckman. 2007. "The Technology of Skill Formation." *American Economic Review* 97(2):31–47.

Cunha, Flavio, James J. Heckman, and Susanne M. Schennach. 2010. "Estimating the Technology of Cognitive and Noncognitive Skill Formation." *Econometrica* 78(3):883–931.

Duncan, Greg J. and Katherine Magnuson. 2011. "The Nature and Impact of Early Achievement Skills, Attention Skills, and Behavior Problems." in *Whither Opportunity? Rising Inequality, Schools, and Children's Life Chances*, edited by G. J. Duncan and R. J. Murnane. New York, NY: Russell Sage Foundation.

Farkas, George. 2003. "Cognitive Skills and Noncognitive Traits and Behaviors in Stratification Processes." *Annual Review of Sociology* 29(1):541–62.

Gabriel, Ryan and Amy Spring. 2019. "Neighborhood Diversity, Neighborhood Affluence: An Analysis of the Neighborhood Destination Choices of Mixed-Race Couples With Children." *Demography* 56(3):1051–73.

Goetz, Edward. 2011. "Gentrification in Black and White: The Racial Impact of Public Housing Demolition in American Cities." *Urban Studies* 48(8):1581–1604.

Goyette, Kimberly, John Iceland, and Elliot Weininger. 2014. "Moving for the Kids: Examining the Influence of Children on White Residential Segregation." *City & Community* 13(2):158–78.

van Ham, Maarten, Sanne Boschman, and Matt Vogel. 2018. "Incorporating Neighborhood Choice in a Model of Neighborhood Effects on Income." *Demography* 55(3):1069–90.

Harris, David R. 1999. "'Property Values Drop When Blacks Move in, Because...': Racial and Socioeconomic Determinants of Neighborhood Desirability." *American Sociological Review* 64(3):461.

Heckman, James J. 2006. "Skill Formation and the Economics of Investing in Disadvantaged Children." *Science* 312(5782):1900–1902.

Heckman, James J. and Stefano Mosso. 2014. "The Economics of Human Development and Social Mobility." *Annual Review of Economics* 6(1):689–733.

Heckman, James J., Jora Stixrud, and Sergio Urzua. 2006. "The Effects of Cognitive and Noncognitive Abilities on Labor Market Outcomes and Social Behavior." *Journal of Labor Economics* 24(3):411–482.

Herrnstein, Richard J. and Charles Murray. 1994. *The Bell Curve: Intelligence and Class Structure in American Life*. New York: Free Press.

Howell, Junia. 2019. "The Truly Advantaged: Examining the Effects of Privileged Places on Educational Attainment." *The Sociological Quarterly* 1–19.

Huang, Ying, Scott J. South, and Amy Spring. 2017. "Racial Differences in Neighborhood Attainment: The Contributions of Interneighborhood Migration and In Situ Change." *Demography* 54(5):1819–43.

Jencks, Christopher. 1979. *Who Gets Ahead?* New York, NY: Basic Books.

Johnson, Heather Beth. 2014. *The American Dream and the Power of Wealth: Choosing Schools and Inheriting Inequality in the Land of Opportunity*. 2nd ed. New York: Routledge.

Kautz, Tim, James J. Heckman, Ron Diris, Bas Ter Weel, and Lex Borghans. 2014. *Fostering and Measuring Skills: Improving Cognitive and Non-Cognitive Skills to Promote Lifetime Success*. Cambridge, MA: National Bureau of Economic Research.

Krysan, Maria and Kyle Crowder. 2017. *Cycle of Segregation: Social Processes and Residential Stratification*. New York, NY: Russell Sage Foundation.

Lareau, Annette. 2011. *Unequal Childhoods: Class, Race, and Family Life*. 2nd ed. Berkeley, CA: University of California Press.

Lareau, Annette and Kimberly Goyette, eds. 2014. *Choosing Homes, Choosing Schools*. New York, NY: Russell Sage Foundation.

Logan, John R. and Richard D. Alba. 1993. "Locational Returns to Human Capital: Minority Access to Suburban Community Resources." *Demography* 30(2):243.

Logan, John R. and Harvey Molotch. 1987. *Urban Fortunes: The Political Economy of Place*. Berkeley and Los Angeles: University of California Press.

Logan, John R. and Hyoung-jin Shin. 2016. "Birds of a Feather: Social Bases of Neighborhood Formation in Newark, New Jersey, 1880." *Demography* 53(4):1085–1108.

Massey, Douglas S. and Nancy A. Denton. 1985. "Spatial Assimilation as a Socioeconomic Outcome." *American Sociological Review* 50(1):94.

McLanahan, Sara. 2004. "Diverging Destinies: How Children Are Faring Under the Second Demographic Transition." *Demography* 41(4):607–27.

Owens, Ann. 2016. "Inequality in Children's Contexts: Income Segregation of Households with and without Children." *American Sociological Review* 81(3):549–574.

Özüekren, A. Sule and Ronald van Kempen. 2002. "Housing Careers of Minority Ethnic Groups: Experiences, Explanations and Prospects." *Housing Studies* 17(3):365–79.

Pais, Jeremy. 2017. "Intergenerational Neighborhood Attainment and the Legacy of Racial Residential Segregation: A Causal Mediation Analysis." *Demography* 54(4):1221–50.

Quillian, Lincoln. 2015. "A Comparison of Traditional and Discrete-Choice Approaches to the Analysis of Residential Mobility and Locational Attainment." *The ANNALS of the American Academy of Political and Social Science* 660(1):240–60.

Reardon, Sean F. and Kendra Bischoff. 2011. "Income Inequality and Income Segregation." *American Journal of Sociology* 116(4):1092–1153.

Reeves, Richard R. 2017. *Dream Hoarders: How the American Upper Middle Class Is Leaving Everyone Else in the Dust, Why That Is a Problem, and What to Do About It*. Washington, D.C.: Brookings Institution Press.

Rhodes, Anna and Stefanie DeLuca. 2014. "Residential Mobility and School Choice Among Poor Families." in *Choosing Homes, Choosing Schools*, edited by A. Lareau and K. Goyette. New York, NY: Russell Sage Foundation.

Rich, Peter. 2018. "Race, Resources, and Test-Scores: What Schooling Characteristics Motivate the Housing Choices of White and Black Parents?" Unpublished Manuscript.

Rich, Peter M. and Jennifer L. Jennings. 2015. "Choice, Information, and Constrained Options: School Transfers in a Stratified Educational System." *American Sociological Review* 80(5):1069–1098.

Roberts, Brent W., Kate E. Walton, and Wolfgang Viechtbauer. 2006. "Patterns of Mean-Level Change in Personality Traits across the Life Course: A Meta-Analysis of Longitudinal Studies." *Psychological Bulletin* 132(1):1–25.

Rönnlund, Michael, Anna Sundström, and Lars-Göran Nilsson. 2015. "Interindividual Differences in General Cognitive Ability from Age 18 to Age 65 Years Are Extremely Stable and Strongly Associated with Working Memory Capacity." *Intelligence* 53:59–64.

Ross, Stephen L. and Margery Austin Turner. 2005. "Housing Discrimination in Metropolitan America: Explaining Changes between 1989 and 2000." *Social Problems* 52(2):152–180.

Sampson, Robert J. 2012. *Great American City: Chicago and the Enduring Neighborhood Effect*. Chicago, Ill.: University of Chicago Press.

Sampson, Robert J., Jared N. Schachner, and Robert D. Mare. 2017. "Urban Income Inequality and the Great Recession in Sunbelt Form: Disentangling Individual and Neighborhood-Level Change in Los Angeles." *RSF: The Russell Sage Foundation Journal of the Social Sciences* 3(2):102–28.

Sampson, Robert J. and Patrick Sharkey. 2008. "Neighborhood Selection and the Social Reproduction of Concentrated Racial Inequality." *Demography* 45(1):1–29.

Sastry, Narayan, Bonnie Ghosh-Dastidar, John Adams, and Anne R. Pebley. 2006. "The Design of a Multilevel Survey of Children, Families, and Communities: The Los Angeles Family and Neighborhood Survey." *Social Science Research* 35(4):1000–1024.

Sastry, Narayan and Anne R. Pebley. 2010. "Family and Neighborhood Sources of Socioeconomic Inequality in Children's Achievement." *Demography* 47(3):777–800.

Schelling, Thomas C. 1971. "Dynamic Models of Segregation." *Journal of Mathematical Sociology* 1(2):143–86.

Schneider, Daniel, Orestes P. Hastings, and Joe LaBriola. 2018. "Income Inequality and Class Divides in Parental Investments." *American Sociological Review* 83(3):475–507.

Schneider, Jack. 2017. *Beyond Test Scores: A Better Way to Measure School Quality*. Cambridge, MA: Harvard University Press.

South, Scott J., Kyle Crowder, and Jeremy Pais. 2011. "Metropolitan Structure and Neighborhood Attainment: Exploring Intermetropolitan Variation in Racial Residential Segregation." *Demography* 48(4):1263–92.

South, Scott J., Ying Huang, Amy Spring, and Kyle Crowder. 2016. "Neighborhood Attainment over the Adult Life Course." *American Sociological Review* 81(6):1276–1304.

Spring, Amy, Elizabeth Ackert, Kyle Crowder, and Scott J. South. 2017. "Influence of Proximity to Kin on Residential Mobility and Destination Choice: Examining Local Movers in Metropolitan Areas." *Demography* 54(4):1277–1304.

Trounstine, Jessica. 2018. *Segregation by Design: Local Politics and Inequality in American Cities*. New York, NY: Cambridge University Press.

Tun, Patricia A. and Margie E. Lachman. 2010. "The Association between Computer Use and Cognition across Adulthood: Use It so You Won't Lose It?" *Psychology and Aging* 25(3):560–68.

Zumpano, Leonard V., Ken H. Johnson, and Randy I. Anderson. 2003. "Internet Use and Real Estate Brokerage Market Intermediation." *Journal of Housing Economics* 12(2):134–50.

TABLE 1
Descriptive Statistics and Correlations:
LA FANS-MIP Longitudinal Study, Primary Caregivers (N = 284)

A. Person-level attributes (measured at baseline)

Variable	Mean	S.D.	Min	Max
Age	35.19	7.86	19	67
Race/ethnicity				
White	0.28	0.45	0	1
Latino	0.47	0.50	0	1
African-American/Black	0.09	0.28	0	1
Asian/Pacific Islander	0.13	0.34	0	1
Other	0.03	0.18	0	1
Socioeconomic Status/Education				
Household income (1999 constant $)				
< $16,000	0.18	0.39	0	1
$16,000 – 27,999	0.21	0.41	0	1
$28,000 – 41,999	0.21	0.41	0	1
$42,000 – $65,999	0.20	0.40	0	1
$66,000+	0.20	0.40	0	1
Bachelor's degree or higher	0.19	0.39	0	1
Cognitive Skills				
W-J passage comp. national rank				
< 10 percentile	.34	0.47	0	1
10 – 30 percentile	.34	0.47	0	1
> 30 percentile	.32	0.47	0	1

B. Correlation matrix of person-level attributes (measured at baseline)

	Passage comprehension	Household income (log)	Bachelor's degree +
Passage comprehension	*	0.3032	0.3811
Household income (log)	0.3032	*	0.3788
Bachelor's degree +	0.3811	0.3788	*
White	0.3491	0.1769	0.1362
Latino	-0.2545	-0.3392	-0.3019
African-American/Black	-0.0098	0.0335	0.0020
Asian/Pacific Islander	-0.1388	0.2018	0.2479

Notes

[a] Means are weighted, reflective of all nonmissing observations, and measured at wave 1. Baseline values of bachelor's degree or higher and household income (log) represent educational attainment and estimated annual income for the earliest year available, usually 2000 or 2001.

[b] Correlation values capture weighted unconditional correlations based on continuous rather than categorical values of observations without missing data and/or with imputed data on the two variables in question. However, correlation values are similar when categorical values of passage comprehension and household income variables are applied (results available upon request).

TABLE 2

Descriptive Statistics and Correlations: Time-Varying Person and Tract Attributes of Analytic Sample

A. Person-year-tract attributes (time-varying), *N* = 167,342

	Chosen Tracts		Nonchosen Tracts	
Variable	Mean	S.D.	Mean	S.D.
Origin tract	0.94	0.24	0.001	0.04
Network distance from origin (mi)	0.41	2.60	19.22	16.58
# housing units (logged)	7.55	0.39	7.29	0.52
% Owner-occupied	52.02	24.06	51.16	26.42
% White (ref)	27.74	24.70	29.98	27.16
% Black	6.85	8.79	8.76	14.23
% Latino	50.12	28.04	46.15	29.31
% Asian	12.75	13.03	12.44	15.16
Tract status index	-0.12	0.84	-0.02	0.92
Tract school quality index	701.29	89.74	699.58	95.31
N (person-year-tracts)	3,317		164,025	

B. Correlation matrix of person, person-year, and chosen tract attributes, *N* = 3,317

Person and Person-Year Attributes	Tract Status Index	Tract School Quality Index
Passage comprehension	0.4723	0.3777
Household income (log) (time-varying)	0.6185	0.5110
Bachelor's degree+ (time-varying)	0.4179	0.3351
White	0.3864	0.3122
Latino	-0.4687	-0.4172
African-American/Black	-0.0932	-0.1057
Asian/Pacific Islander	0.2547	0.2686

C. Correlation matrix of chosen tract attributes (time-varying), *N* = 3,317

Tract Variables	Tract Status Index	Tract School Quality Index
Tract Status Index	*	0.7792
Tract School Quality Index	0.7792	*
% Owner-occupied	0.5006	0.3917
% White	0.8725	0.7024
% Black	-0.2475	-0.3602
% Latino	-0.8568	-0.7115
% Asian	0.2996	0.3860

Notes

[a] Means are weighted and reflective of all nonmissing observations between the years of 2001 and 2012.

[b] Correlation values capture weighted unconditional correlations based on continuous rather than categorical values of observations without missing data and/or with imputed data.

TABLE 3

Sorting Effects of Respondent Attributes and Structural Tract Characteristics on Residential Choice, Conditional Logit Models
(Person $N = 284$; Person-Years $N = 3{,}317$, Person-Year-Tract Alternatives $N = 167{,}342$)

	Model 1		Model 2		Model 3		Model 4	
Variables	O.R.	S.E.	O.R.	S.E.	O.R.	S.E.	O.R.	S.E.
Destination tract attributes								
Origin tract	2089.187**	544.022	2037.944**	532.409	2023.873**	533.073	1914.149**	496.557
Network distance in miles from origin	0.798**	0.030	0.799**	0.030	0.799**	0.030	0.801**	0.030
# housing units (log)	1.671**	0.196	1.749**	0.209	1.757**	0.211	1.891**	0.233
% Owner-occupied	1.359**	0.155	1.402**	0.157	1.411**	0.157	1.433**	0.169
Tract status index	1.404	0.636	0.899	0.438	0.829	0.394	0.572	0.353
% Latino							0.871	0.217
% Black							0.845	0.092
% Asian							1.112	0.104
Interaction of individual & tract attributes								
Age X Tract status index	0.998	0.010	0.988	0.011	0.981	0.011	0.987	0.011
Latino X Tract status index	0.409**	0.058	0.557**	0.080	0.623**	0.096	1.071	0.285
Black X Tract status index	0.448**	0.102	0.505**	0.118	0.605*	0.154	0.653	0.162
Asian X Tract status index	1.609	0.545	1.406	0.415	1.897*	0.573	1.901	0.682
Latino X Tract % Latino							1.923**	0.470
Black X Tract % Black							1.449*	0.251
Asian X Tract % Asian							1.138	0.312
Household income Q2 X Tract status index			1.157	0.234	1.208	0.237	1.229	0.255
Household income Q3 X Tract status index			1.306	0.276	1.208	0.263	1.269	0.298
Household income Q4 X Tract status index			2.232**	0.505	2.040**	0.463	2.111**	0.494
Household income Q5 X Tract status index			3.258**	1.005	2.775**	0.832	2.979**	0.977
Bachelor's degree X Tract status index			1.157	0.292	1.079	0.264	1.056	0.306
Med. passage comp. X Tract status index					1.275	0.224	1.208	0.220
High passage comp. X Tract status index					1.856**	0.420	1.702*	0.357

[a] Models include standardized measures of all census-derived tract-level variables, analytic weights based on L.A.FANS/MIP sampling procedures and attrition, and the offset term, $-\ln(q_{ijt})$, for sampling the choice set.
[b] Standard errors are clustered by persons.
[c] $*p < .05$, $**p < .01$ (two-tailed test).

TABLE 4

Sorting Effects of Respondent Attributes, Structural Tract Characteristics, and Tract School Quality on Residential Choice by Educational Attainment, Conditional Logit Models

	Model 1 Upper/ Upper-Middle Class		Model 2 Middle/ Working Class	
Variables	O.R.	S.E.	O.R.	S.E.
Destination tract attributes				
Origin tract	1172.966**	380.330	2438.635**	1041.378
Origin tract X tract school quality index	1.126	0.189	0.837	0.154
Network distance in miles from origin	0.748**	0.040	0.835**	0.039
# housing units	2.802**	0.566	1.370*	0.186
% Owner-occupied	2.021**	0.389	1.066	0.152
% Latino	0.901	0.295	1.175	0.336
% Black	0.607	0.166	1.132	0.187
% Asian	1.043	0.112	1.168	0.166
Tract status index	0.712	0.657	1.788	1.256
Tract school quality index	1.804	1.636	0.654	0.490
Interaction of individual & tract attributes				
Age X Tract status index	1.010	0.023	0.968	0.017
Age X Tract school quality	0.953	0.025	1.032*	0.015
Latino X % Latino	1.845**	0.427	1.783**	0.304
Black X % Black	1.447	0.353	1.718*	0.444
Asian X % Asian	1.254	0.367	2.316**	0.289
Household income (log) X Tract status index	1.773**	0.315	1.052	0.275
Household income (log) X Tract school quality	1.181	0.189	1.271	0.330
Med. passage comp. X Tract status index	0.457*	0.147	1.392	0.503
High passage comp. X Tract status index	0.441	0.190	2.026	0.843
Med. passage comp. X Tract school quality	4.962**	2.202	0.675	0.225
High passage comp. X Tract school quality	5.599**	2.316	0.668	0.251
Observations				
Number of persons	165		201	
Number of person-years	1,476		1,841	
Number of person-year-tract alternatives	74,522		92,820	

Notes

[a] Upper class defined as primary caregivers with a bachelor's degree *or* within the top two income quintiles of household income. Middle/working class defined as primary caregivers without a bachelor's degree and in bottom three income quintiles of household income.

[b] Models include standardized measures of the tract school quality index, all census-derived tract-level variables. and the continuous household income (logged) variable; analytic weights are based on L.A.FANS/MIP sampling procedures and attrition; and the offset term, $-\ln(q_{ijt})$, for sampling the choice set.

[c] Standard errors are clustered by persons.

[d] $*p < .05$, $**p < .01$ (two-tailed test).

TABLE 5

Potential Mechanisms Underlying Residential Sorting Effects of Respondent Skills, Structural Tract Characteristics, & Tract School Quality

A. Correlation matrix of person, person-year, and tract attributes, N = 3,317

	Passage Comprehension	Educational Expectations	Extracurricular Investment
Passage comprehension	*	0.2724	0.2868
Educational expectations	0.2724	*	0.3984
Extracurricular investment	0.2868	0.3984	*
Household income (log) (time-varying)	0.3944	0.2666	0.4411
Bachelor's degree (time-varying)	0.3834	0.2448	0.2308
White	0.3603	0.0399	0.2506
Latino	-0.2703	-0.1242	-0.4562
African-American/Black	-0.0026	-0.0563	0.0281
Asian/Pacific Islander	-0.1371	0.1633	0.2162
Tract status index (time-varying)	0.4723	0.3616	0.5431
Tract school quality index (time-varying)	0.3777	0.3134	0.5146

B. Partial output from conditional logit models

	Table 4, Model 1 Upper Class Sample		Table 4, Model 1 with Mediators		Table 3, Model 4 Full Sample		Table 3, Model 4 with Mediators	
Variables	O.R.	S.E.	O.R.	S.E.	O.R.	S.E.	O.R.	S.E.
Med. passage comp. X Tract status index	0.457*	0.147	0.449*	0.152	1.208	0.220	1.093	0.197
High passage comp. X Tract status index	0.441	0.190	0.412	0.187	1.702*	0.357	1.523*	0.297
Med. passage comp. X Tract school quality	4.962**	2.202	4.877**	2.264				
High passage comp. X Tract school quality	5.599**	2.316	5.944**	3.918				
Educ. expectations X Tract status index							1.008	0.033
Extracurric. invest. X Tract status index							1.305**	0.085
Educ. expectations X Tract school quality			0.941	0.153				
Extracurric. invest. X Tract school quality			1.500**	0.312				
Observations								
Number of persons	165		165		284		284	
Number of person-years	1,476		1,476		3,317		3,317	
Number of person-year-tract alternatives	74,522		74,522		167,342		167,342	

Notes

[a] For more details on educational expectations and extracurricular investment variable operationalizations, descriptive statistics, and imputation procedures for missing values, see Appendix – "Educational Expectations and Extracurricular Investments." Full output for all Panel B models is available upon request.

[b] Models include: standardized measures of all census-derived tract-level variables, the tract school quality index, the educational expectations and extracurricular investment variables, and the continuous household income variable; analytic weights based on L.A.FANS/MIP sampling procedures and attrition; and the offset term, $-\ln(q_{ijt})$, for sampling the choice set.
[c] Standard errors are clustered by persons.
[d] $*p < .05$, $**p < .01$ (two-tailed test).