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HAPPY IN THE HOOD? THE IMPACT OF RESIDENTIAL SEGREGATION ON SELF-REPORTED HAPPINESS*

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ABSTRACT. Previous research consistently finds that racially based residential segregation is associated with poor economic, health, and social outcomes. The purpose of this paper is to explore the relationship between residential segregation and self-reported happiness. Using panel data from the National Survey of Families and Households (NSFH), we begin by estimating ordinary least squares (OLS) regressions of happiness on a measure of MSA-level segregation, controlling for a rich set of individual, neighborhood, regional, and state characteristics. The OLS results suggest that increased segregation is associated with a reduction in happiness among blacks. To deal more appropriately with the potential endogeneity of location choice, we extend the methodology to fully exploit the panel structure of the NSFH and incorporate individual fixed effects into the happiness equation. Contrary to the OLS results, our fixed effects estimates imply that blacks are happier in more segregated metropolitan areas. The paper discusses the implications of these results within the context of current integration policies.

1. INTRODUCTION

Segregation along racial lines remains a defining feature of the U.S. metropolitan areas. Although the degree of black-white segregation has abated substantially since its peak in the mid-20th century, over half of blacks would still have to change neighborhoods to achieve perfect racial integration, and one-fifth continue to reside in hypersegregated neighborhoods (Glaeser and Vigdor, 2012). The geographic separation of blacks, and the resulting uneven distribution of resources and amenities within metropolitan areas, continues to shape public policy debates about the persistence of racial inequality in the U.S. Indeed, decades of research have been dedicated to understanding the impact of racial segregation on residents' health and well-being. In their seminal work, Massey and Denton (1993) argue that residential segregation is likely to influence individual outcomes by creating a "structural niche within which a deleterious set of attitudes and behaviors . . . has arisen and flourished" (p. 8). In other words, by exposing its residents to high levels of crime and social disorganization, and containing fewer positive role models

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and external resources, segregated metropolitan areas have institutionalized a culture that has negative consequences for blacks' educational attainment, marriage and labor market behavior, and health.

Using panel data from the National Survey of Families and Households (NSFH), this paper contributes new evidence on the implications of residential segregation for blacks' health and well-being. In particular, we draw on the first two waves of the NSFH to examine the impact of metropolitan statistical area (MSA) segregation on a measure of self-reported happiness. Our empirical investigation proceeds in two steps. We begin by estimating ordinary least squares (OLS) regressions of happiness on the black–white dissimilarity index, a standard measure of MSA residential segregation. Our OLS results show that increases in segregation are associated with *reductions* in self-reported happiness among blacks. Although we control for a rich set of individual and contextual characteristics, we remain concerned that the OLS estimates suffer from an important source of bias. Specifically, there may be unobserved (endogenous) location preferences and human capital characteristics that are correlated with individual happiness and an area's level of segregation. To deal with this empirical challenge, we exploit the panel structure of the NSFH and introduce individual fixed effects into the model. The primary advantage of a fixed effects model is that it identifies the impact of segregation through a comparison of happiness levels when the same person is exposed to different magnitudes of residential segregation. In contrast to the OLS results, our fixed effects estimates imply that blacks' happiness *increases* with higher degrees of segregation.

Our paper makes several contributions to the segregation literature. First, although definitions of happiness typically focus on the cognitive dimensions of how people feel about their lives, the well-known connection between self-reported happiness and physical health suggests that results from this study may be relevant to the broader relationship between segregation and health (Diener and Seligman, 2004; Kahneman and Deaton, 2010). Second, our work provides insight into individual preferences for varying degrees of residential segregation across metropolitan areas. Indeed, measures of self-reported happiness are viewed as complementary to traditional choice-based well-being measures (e.g., employment and income), and there is a growing body of research exploring the ways in which happiness is influenced by a range of environmental phenomena. Implicit in this research is that observed behavior alone may not fully capture the well-being effects of contextual forces. Data on self-reported happiness are therefore seen as a useful supplement to choice-based welfare analysis because it is a direct measure of well-being. Finally, we develop and estimate an empirical model that attempts to isolate the effect of MSA-level segregation on individual happiness independent of neighborhood- and state-level demographic, economic, and political forces that are correlated with metropolitan segregation and individual happiness. Although previous segregation studies generally control for characteristics of the MSA, it is not common to make statistical adjustments at other levels of geographic aggregation. Therefore, the estimates derived in previous work may suffer from an omitted variables problem stemming from unobservables at the neighborhood and state levels. Indeed, our OLS and fixed effects analysis shows that including the full set of multilevel controls results in a large increase in the estimated effect of segregation on blacks' happiness.

Given that our estimates reflect the impact of MSA segregation over and above its effect on the neighborhood environment, we posit that the increase in happiness occurs through a number of metropolitan-level mechanisms. First, it is plausible that blacks residing in segregated areas develop an extensive set of social ties that buffer against the negative health and economic outcomes. Indeed, the development of social capital has been shown to transcend neighborhood boundaries, and it is capable of mediating negative health conditions (Edmondson, 2003; Haines, Beggs, and Hurlbert, 2011). In addition, it is possible that such happiness benefits extend to blacks residing in the less segregated neighborhoods of segregated MSAs if they develop social ties with individuals in other parts of the region. This may occur, for example, if more segregated metropolitan regions contain such amenities as civic and social clubs or religious institutions that are designed to ameliorate the effects of geographic and social isolation. A related mechanism focuses on the increased political power experienced by those in segregated regions—sometimes created by explicit redistricting efforts to achieve majority minority districts—which may lead to the election of policymakers that deliver well-being enhancing goods and services (e.g., LaVeist, 1993; Cascio and Washington, 2014). Specifically, greater black empowerment may catalyze institutional changes across the MSA, from which even less segregated blacks could benefit. A final mechanism deals with the negative impact of discrimination that may exist in mixed race or predominately white regions. Indeed, this is one explanation for the reluctance of blacks to "pioneer" into white residential areas; those that do risk exposure to racism and stigma that may ultimately reduce well-being.

This paper proceeds as follows. Section 2 reviews the literature on the individual and environmental determinants of happiness; it also provides a conceptual framework for understanding the mechanisms through which segregation may influence happiness. Section 3 introduces the NSFH analysis sample and measures, while Section 4 discusses the empirical strategy and presents the OLS and fixed effects results. Section 5 concludes with a discussion of policy implications.

2. RELEVANT LITERATURE AND CONCEPTUAL FRAMEWORK

Previous Research on the Micro- and Macrodeterminants of Happiness

In order to determine how the MSA-level segregation might affect individuals' happiness, it is important to understand what other characteristics affect a person's happiness. A large body of work examines the individual and environmental determinants of happiness. At the individual level, perhaps the most heavily studied relationships are those between income and employment status and happiness (e.g., Stevenson and Wolfers, 2008). A related stream of research explores the correlates of work place and job satisfaction, focusing on differences between men and women (Sousa-Poza and Sousa-Poza, 2003; Diener and Seligman, 2004). Finally, there is a large literature exploring the effect of noneconomic characteristics on happiness. For example, Steptoe, Deaton, and Stone (2015) show a U-shaped relationship between age and happiness, while Herbst (2011) finds that women generally have higher happiness levels than men. Although the literature is in agreement that married and more highly educated individuals are happier than their single and less educated counterparts, there is disagreement over the relationship between children and happiness (Stanca, 2012; Herbst and Ifcher, 2014). Finally, a range of health conditions and personality traits are known to be strongly correlated with reported happiness (Easterlin, 2003; Graham, 2008).

In addition, there is an expanding body of work on the impact of environmental conditions, broadly defined, on happiness. For example, Di Tella, MacCulloch, and Oswald (2003) and Wolfers (2003) find strong relationships between reported happiness and such economic indicators as gross domestic product and the unemployment rate. Other work shows a similarly robust role for inflation and income equality (Alesina et al., 2004). A variety of tax policies have also been studied, including income taxes (Akay et al., 2012), gasoline prices and taxes (Boyd-Swan and Herbst, 2012), cigarette taxes (Gruber and Mullainathan, 2005), and the Earned Income Tax Credit (Boyd-Swan et al., 2013). Finally, the happiness effects of social policy reforms, including those to the U.S. and

Canadian welfare and child care subsidy systems have been examined (Herbst, 2013; Herbst and Tekin, 2014).

More relevant to the present study is the growing body of research on the neighborhood-level determinants of happiness. For example, two papers examine the relative income hypothesis, that is, whether reported happiness depends on the income of one's neighbors (Luttmer, 2005; Firebaugh and Schroeder, 2009). Using the NSFH, Luttmer (2005) finds that higher earnings among those in the same local area are associated with reductions in self-reported happiness. Conversely, Firebaugh and Schroeder (2009) use happiness data from the General Social Survey (GSS) matched with income at the census block level, and find that reported happiness rises with neighbors' income. Also important is Ludwig et al.'s (2012) study of the impact of the Moving to Opportunity (MTO) program on subjective well-being.[1] The authors find that adults who moved to lower poverty neighborhoods experienced improved mental health and happiness 10–15 years after random assignment.[2]

In addition to the neighborhood environment, researchers have examined the effect of city-level characteristics on reported happiness. For example, a recent paper by Glaeser, Gottlieb, and Ziv (2014) finds that a variety of demographic and economic characteristics are correlated with happiness, including population levels and growth rates, the stock of human capital, and such disamenities as precipitation levels and average winter temperatures. Interestingly, this paper—which estimates ordinary least squares (OLS) happiness regressions (with area and period effects)—uncovers a negative association between residential segregation and happiness among blacks. This result is consistent with our OLS estimates but is inconsistent with our individual fixed effects estimates, which, as we discuss in Section 4, reveals a positive relationship between segregation and blacks' happiness.

Opportunity Structures Related to Segregation and Happiness

Blacks living in MSAs with varying levels of segregation face different opportunity structures related to labor market conditions, health production, and social capital. These attributes serve as potential mechanisms through which residential segregation may influence self-reported happiness. Together, these mechanisms imply that the nature of the segregation-happiness link is theoretically ambiguous, and therefore is ultimately an empirical issue.

Economic opportunity. Previous studies overwhelmingly support the notion that residential segregation has harmful effects on a variety of economic outcomes. Blacks tend to have worse educational outcomes in metropolitan regions that are more segregated; for instance, high school graduation rates are lower (Culter and Glaeser, 1997), and the black-white SAT-score gap is wider (Card and Rothstein, 2007). In addition, segregation leads to negative effects on employment and income: segregated blacks are less likely to be employed and have lower earnings (Cutler and Glaeser, 1997). Cutler and Glaeser (1997) estimate that a 1 standard deviation (*SD*) decrease in residential segregation would

[1]The MTO demonstration is a multicity housing mobility program that offered individuals in high-poverty, segregated neighborhoods the chance to move into housing located in less economically distressed neighborhoods.

[2]The happiness effects are sizeable: a 1 *SD* reduction in neighborhood poverty eliminates the happiness "gap" between individuals whose income differs by $13,000. Thus, although the MTO results may not be generalizable to an economically heterogeneous population, the findings strongly suggest that the neighborhood context has important consequences for reported happiness.

narrow the black-white gap in most economic outcomes by one-third. Previous research attributes these negative employment effects to the spatial separation of inner city blacks from suburban employment opportunities (Farley, 1987).

More recent research finds that segregation is related to a variety of other economic outcomes. Rugh and Massey (2010) show that home foreclosure rates during the Great Recession were substantially higher in segregated regions. The authors' instrumental variables estimates imply that a 10 percentage point increase in black segregation (as defined by the dissimilarity index) produced a 46 percent increase in the home foreclosure rate during between 2004 and 2008.[3] Furthermore, in a paper exploring county-level determinants of intergenerational mobility, Chetty et al. (2014) find that low-mobility areas tend to have high levels of residential segregation. In fact, the authors find that segregation is among the most important contextual determinants of mobility, along with school quality, the degree of social capital, and family structure.

Mental and physical health. As mentioned above, there is a strong relationship between health and happiness; thus insofar as segregation influences individual mental and physical health, such changes are a plausible mechanism through which segregation may affect happiness. Research on segregation and health has proliferated in recent years, with most studies finding that segregated blacks experience worse outcomes across a variety of health domains. Blacks in highly segregated regions have lower birth weight than their less segregated counterparts (Ellen, Cutler, and Dickens, 2000), and they are more likely to be obese (Chang, 2006; Corral et al., 2011) and have higher rates of hypertension (Kershaw et al., 2011). In addition, Subramanian, Acevedo-Garcia, and Osypuk (2005) find that blacks living in MSAs with greater concentrations of blacks are more likely to self-report poor overall health.

Residential segregation may be associated with other attributes that play a role in blacks' poor health outcomes. Low-income minority neighborhoods are often food deserts with little or no access to supermarkets, while containing high concentrations of fast-food establishments (Kwate, 2008; Walker, Keane, and Burke, 2010). In addition, crime rates are higher in low-income areas, and segregated blacks are more likely to fear for their safety (Sampson, Raudenbush, and Earls, 1997; Ross and Mirowsky, 2001). These attributes contribute to lower participation in outdoor activities and exercise, which in turn is associated with increases in obesity and other chronic health conditions (Bennett et al., 2007). Such negative health outcomes may be exacerbated by the uneven supply of medical facilities, parks, and open spaces across metropolitan regions (Williams and Collins, 2001). Finally, air quality tends to be poorer in low-income minority areas, which may explain the higher incidence of childhood asthma in these areas (Williams, Sternthal, and Wright, 2009).

It should be noted that in some cases, segregation is linked to better health outcomes. For example, Nuru-Jeter and LaVeiste (2011) find that residential segregation actually buffers the deleterious health effects of regional disadvantage. In particular, the authors find that the relationship between income inequality and mortality is mediated by the high levels of social cohesion that exist in segregated black communities (Nuru-Jeter and LaVeiste, 2011). Such evidence accords with other research establishing a connection between social capital and health. For example, Kawachi et al. (1996) find that the presence of strong social networks mediates the relationship between diagnoses for coronary heart disease and later survival rates. Specifically, men with coronary heart disease have higher

[3]The authors conclude that the home foreclosure crisis was exacerbated by a racialized lending process in which subprime loans were concentrated in highly segregated neighborhoods.

survival rates if their social network is robust. Such evidence implies that social capital serves as a potential buffer against the negative effects of segregation.

Social capital. Residential segregation is often synonymous with social and economic isolation, particularly within urban communities (Wilson, 1987). One approach for ameliorating the negative consequences of social isolation is to alter residents' social ties through poverty deconcentration policy (Kleit and Carnegie, 2002). One argument for deconcentrating poverty is that altering the environment may improve economic outcomes as well as the social and cultural milieu (Wilson, 1987). Therefore, blacks living in more integrated metropolitan regions may experience an increase in happiness because they have access to more diverse and beneficial ties and opportunities.

On the other hand, some research uncovers benefits associated with segregation that speak to the social cohesion present in these communities (e.g., Stack, 1974). Scholars also note the potential for increased political power among segregated minorities (Bledsoe et al., 1995). This work is broadly supportive of the finding that blacks in general may value social capital more than whites. Indeed, Lee and Campbell (1999) find that blacks tend to interact more regularly with neighbors than whites. Moreover, Putnam (2007) shows that racially and ethnically diverse residential areas are associated with lower levels of social capital. Even more provocative, he finds that residents in diverse areas experience declines in trust toward their own-group members. Putnam contends that this is due to the misconception that creating social bridges—or connecting with people from different groups—is analogous to creating social bonds—or connecting with those in our own group; establishing relationships between different socioeconomic groups often involves more barriers.

Along these lines, theories of inter-racial group conflict suggest that diversity alone is not sufficient for making integration work. Although Allport's (1954) contact theory posits that exposure to different racial and ethnic groups reduces feelings of prejudice, other studies argue that the theory holds for individuals at comparable income levels (Wittig and Grant-Thompson, 1998). Given the persistence of large black-white income gaps, contact alone might not resolve intergroup conflict. Even if one assumes that blacks residing in mixed race neighborhoods are more likely to have incomes comparable to their white neighbors, theories related to self-esteem suggest that intergroup conflict may persist. Indeed, Tajfel and Turner (1979) argue that individuals either build up their own racial group or denigrate another group to establish superiority.

The Role of Location Preferences in Sustaining Segregation

Although it is logical to view self-reported happiness as an outcome associated with residential segregation, it is also possible that happiness merely reflects preferences for different residential environments; fair housing laws, changes in demographics, and targeted integration efforts have made considerable progress toward desegregating locales (Glaeser and Vigdor, 2012). Yet many blacks continue to live in highly segregated neighborhoods, many of which contain deleterious conditions. The racial proxy hypothesis posits that these negative traits are what sustain segregation, in that whites and blacks associate certain undesirable characteristics with minority residential areas (Ellen, 2000). In particular, Ellen (2000) contends that assumptions about a neighborhood's trajectory, in which there is a growing presence of minorities, increases segregation. Although some empirical work is supportive of the racial proxy hypothesis, there is evidence that whites' residential preferences are driven in part by the racial and ethnic composition of the neighborhood, controlling for economic and social conditions (Swaroop and Krysan, 2011), thus lending support for the race *per se* hypothesis in which whites' desire to live in racially homogeneous areas sustains segregation (Lewis, Emerson, and Klineberg, 2011).[4]

The consensus in the literature is that whites prefer to live in areas that are 80 percent white, while blacks prefer a 50-50 split, even though black respondents express a desire to *move* into predominately black areas (e.g., Krysan and Farley, 2002). The authors conclude: "These results show a desire for integration coupled with an aversion to pioneering . . . " (Krysan and Farley, 2002, p. 950). One potential explanation for the discrepancy between blacks' residential preferences and where they actually reside is the perceived backlash from their white neighbors. Indeed, Krysan and Farley (2002) find that approximately half of black respondents in their sample cited a fear of white hostility as the primary reason for their unwillingness to move into predominately white areas. In addition, it appears that the broader environmental context matters in developing certain race-related attitudes. For example, McDermott (2011) finds that racial attitudes vary for residents in segregated black neighborhoods in cities with lower percentages of blacks as compared to those living in segregated black neighborhoods in cities with higher percentages of blacks. Specifically, living in a segregated black neighborhood in a city with a large black population is associated with supporting affirmative action policies and rejecting antiblack stereotypes more so than living in black neighborhoods within cities containing balanced populations. Thus, the environmental context and its overlapping spatial units are important for studying racial attitudes (Baybeck, 2006; McDermott, 2011). We apply this logic to our empirical framework given the possibility that MSA-level segregation might produce dynamics that influence happiness above and beyond those operating at the neighborhood level.

3. DATA AND MEASURES

The happiness data for this analysis come from the National Survey of Families and Households (NSFH), a nationally representative sample of individuals ages 16 and older who are living in households and whose primary language is English or Spanish.[5] The first wave of the NSFH was administered in 1987 and 1988, generating a sample of 13,007 adults through face-to-face interviews and self-administered questionnaires. A second round of data collection was initiated between 1992 and 1994, in which 10,005 respondents from the first wave were re-interviewed.[6] The NSFH oversampled minority and single-parent families, as well as stepfamilies, recently married couples, and cohabitating couples. In addition to its large sample size, this survey is advantageous for our purposes because it can be merged with information at a variety of geographic levels, including the MSA and census tract level.

To create the analysis sample, we pooled observations from the first two waves, creating a two-period panel of NSFH respondents. Following convention in the racial segregation literature, we retained white and black respondents residing in metropolitan areas (e.g., Cutler and Glaeser, 1997). The boundaries of metropolitan areas coincide with the U.S. Census Bureau's definition of Metropolitan Statistical Areas (MSA), defined as high population density regions that include major cities and their adjacent urbanized areas. In addition, we retained only those respondents with nonmissing information on

[4]Indeed, decades of residential preferences research find similar race-based results for explaining the persistence of segregation (e.g., Ihlanfeldt and Scafidi, 2004).

[5]Detailed information on the NSFH can be found in Sweet, Bumpass, and Call (1988) and Sweet and Bumpass (1996).

[6]A third wave of the NSFH was initiated in 2001. This wave was excluded from the analysis because NSFH administrators substantially changed the criteria for inclusion in the sample.

the happiness questionnaire item. Our analytic sample includes 13,534 observations, of which 10,680 are white and 2,854 are black.

Our primary outcome variable is based on a standard questionnaire item tapping self-reported happiness. The NSFH happiness question was preceded by the following statement: "Next are some questions about how you see yourself and your life." The interviewer then asked: "First, taking all things together, how would you say things are these days?" Respondents provided an answer on a seven-point scale, where one is defined as "very unhappy" and seven as "very happy." Our main analyses are based on the full ordered categorization of happiness, although we conduct a number of sensitivity tests in which the item is dichotomized in a variety of ways. Results from these alternative measures are qualitatively similar to those reported here. This item measures global subjective well-being or happiness, in that it reflects an averaging of quality-of-life evaluations over multiple domains (Kahneman, Wakker, and Sarin, 1997; Kahneman and Deaton, 2010). It is important to note that the NSFH measure is similar to that found in widely used surveys. For example, since 1972 the General Social Survey has asked respondents: "Taken all together, how would you say things are these days—would you say that you are very happy, pretty happy, or not too happy?"

In light of the growing prominence of happiness research, happiness measures are undergoing increased scrutiny (e.g., Krueger and Schkade, 2008). It appears that self-reported happiness is highly correlated with an array of physical attributes, including laughing, smiling, and other expressions of positive affect (Layard, 2005). Similarly, happy individuals are rated as such by family and friends, and they reportedly smile and display more positive emotions during social interactions (Kahneman and Alan, 2006; Helliwell, 2007). Indicators of physical health, including self-reported overall health status, sleep quality, and clinical measures of depression and anxiety, are also highly correlated with reported happiness (Diener, Lucas, and Scollon, 2006). It is also noteworthy that happiness responds in predictable ways to changing life events—for example, by peaking in the year of a marriage or birth of a child—even though genes account for a significant fraction of one's happiness endowment.

In auxiliary analyses, we examine a measure of respondents' self-esteem. In particular, we draw on the following statements presented to NSFH respondents: "I feel that I'm a person of worth, at least on an equal plane with others," "On the whole, I am satisfied with myself," and "I am able to do things as well as other people." Answers to each statement range from one ("strongly agree") to five ("strongly disagree"). These statements are combined to create an index of self-esteem by summing over the individual response categories. The measure ranges from three to 15, with larger values indicating higher levels of self-esteem.

The key explanatory variable in this analysis is a measure of the degree of black residential segregation in each MSA. Specifically, we capture segregation through the Dissimilarity Index (*DI*), which measures the level of residential unevenness between two groups (in this case, between white and black residents) within a metropolitan area. Formally, the *DI* is defined as

$$DI = \frac{\sum t_i \, |p_i - P|}{2TP(1-P)}, \tag{1}$$

where t is the total population in the ith neighborhood, T is the total population in the MSA, p is the fraction black in the ith neighborhood, and P is the fraction black in the MSA.[7] The *DI* represents the percentage of blacks who would have to move to a different

[7]We used data from the 1990 U.S. Decennial Census (Summary Tape File 3A) to calculate the DI. These data were provided via CD-ROM by Geolytics, Inc. The DI measure—along with a number of census

neighborhood in order to achieve an even racial distribution within the MSA. It ranges from zero to one, with higher values indicating increased segregation. Our proxy for neighborhoods is the census tract, defined as a geographic area containing about 3,000–5,000 individuals assumed to be relatively homogenous with respect to economic and social characteristics. It is important to note that the *DI* varies at the MSA level, and therefore reflects the degree of segregation for an entire metropolitan area. Fortunately, the NSFH sample is sufficiently diverse geographically, with respondents living in 84 MSA's in the first wave and 208 MSA's in the second wave.[8] In addition, most studies evaluating the health effects of segregation implicitly assume a linear relationship between the *DI* and health (e.g., Cutler and Glaeser, 1997; Ellen, Cutler, and Dickens, 2000). Our main analysis adopts this convention by entering the continuous *DI* measure in the regressions.[9]

Table 1 presents summary statistics for the full NSFH sample as well as for the subsets of white and black respondents. Whites score slightly higher than blacks on the measure of self-reported happiness—indicating a 0.12-point "happiness gap"—a difference that is nevertheless highly statistically significant. The black-white happiness gap is particularly evident at the top end of the happiness distribution. For example, approximately 51 percent of white respondents are in the top two categories of self-reported happiness, compared to 45 percent among black respondents. Interestingly, blacks score slightly higher than whites on the index of self-esteem, although the difference is not statistically significant. The mean value of the *DI* is 0.66, indicating that two-thirds of the typical MSA's black population would need to relocate to a different census tract to achieve an even racial distribution in the urban area. There is substantial variation in the *DI* across MSAs, with the index taking a minimum value of 0.28 and maximum of 0.86. Table 1 also shows that white respondents are more likely to be married and less likely to be (single) never married. White respondents are also less likely to be high school dropouts and more likely to have at least a bachelor's degree. Furthermore, household income is over 1.5 times greater, on average, among white respondents.

4. EMPIRICAL IMPLEMENTATION

Basic Model and Results

Using individual-level survey data on subjective well-being merged with MSA-level information on residential segregation, we begin the empirical analysis by establishing the baseline relationship between the *DI* and self-reported happiness. In particular, we estimate versions of the following pooled cross-sectional happiness equation:

$$\begin{aligned} Y^*_{icmst} &= \varphi_t + \mu_t + \beta_1 black_{icmst} + \beta_2 (DI_m \times black_{icmst}) + \beta_3 (DI_m \times white_{icmst}) \\ &\quad + \mathbf{X}'\psi + \mathbf{E}'\gamma + \varepsilon_{icmst}, \end{aligned} \tag{2}$$

tract characteristics—was then merged with the analysis sample by NSFH administrators through a restricted-use data agreement.

[8]We calculate an alternative version of the DI outlined in (1) based on county-level population counts. Results based on this measure, which are available upon request, are similar to those reported here.

[9]We experiment with alternative parameterizations of the DI that test for a nonlinear relationship between segregation and happiness. For example, we array MSAs according to their DI level and then create dummy variables capturing MSAs at or below the 25th percentile, between the 26th and 50th percentiles, between the 51st and 75th percentiles, and at or above the 76th percentile of the DI distribution. Quartile distribution breaks are admittedly ad hoc, so we experimented with quintile and decile breaks as well. Results from this approach did not reveal strong evidence of nonlinearities, so we report only the estimates for the continuous DI measure.

TABLE 1: Select Summary Statistics for the NSFH Analysis Sample

Variable	Full	Whites	Blacks
Primary dependent and independent variables			
Self-reported happiness (range: 1–7)	5.33	5.35	5.23
	(1.36)	(1.33)	(1.45)
Self-esteem index (range: 3–15)	12.28	12.27	12.34
	(1.87)	(1.84)	(2.01)
Dissimilarity index (MSA)	0.664	0.660	0.677
	(0.124)	(0.124)	(0.123)
Demographic covariates			
Age (years)	44.54	44.84	43.48
	(16.74)	(16.94)	(15.97)
Female (%)	0.604	0.590	0.652
	(0.489)	(0.492)	(0.476)
Married (%)	0.533	0.589	0.333
	(0.499)	(0.492)	(0.471)
Single, never married (%)	0.171	0.139	0.285
	(0.377)	(0.346)	(0.452)
Widowed (%)	0.104	0.100	0.117
	(0.305)	(0.300)	(0.321)
Separated (%)	0.044	0.028	0.100
	(0.205)	(0.165)	(0.301)
Divorced (%)	0.149	0.144	0.164
	(0.356)	(0.351)	(0.371)
Less than high school (%)	0.175	0.146	0.280
	(0.380)	(0.353)	(0.449)
High school (%)	0.364	0.363	0.366
	(0.481)	(0.481)	(0.482)
Some college (%)	0.243	0.243	0.245
	(0.429)	(0.429)	(0.430)
Bachelor's degree (%)	0.218	0.248	0.109
	(0.413)	(0.432)	(0.312)
Children ages 0–18 (no.)	0.885	0.819	1.123
	(1.171)	(1.109)	(1.342)
Homeowner (%)	0.614	0.668	0.419
	(0.487)	(0.471)	(0.494)
Respondent employed (%)	0.618	0.628	0.580
	(0.486)	(0.483)	(0.494)
Spouse employed (%)	0.364	0.406	0.214
	(0.481)	(0.491)	(0.410)
Household income ($)	39,649	43,239	25,590
	(43,103)	(45,511)	(27,830)
Good/excellent health (%)	0.780	0.794	0.729
	(0.415)	(0.405)	(0.445)

Notes: Calculations are based on the National Survey of Families and Households for wave 1 (1987–1988) and wave 2 (1992–1994). Standard deviations are reported in parentheses.

where i indexes individuals, c indexes census tracts, m indexes MSAs, s indexes states, t indexes the month and year of survey administration, and Y^* is a continuous latent representation of the ith respondent's self-reported happiness, Y. We standardize the happiness index to have a mean of zero and a *SD* of unity, and we estimate (2) using ordinary least squares regression (OLS).[10] Given that the first two waves of the NSFH are administered over a period of five years, we incorporate a set of year dummy variables, φ_t, to account for unobserved temporal shocks that may influence happiness. We also add a set of month-of-interview dummy variables, μ_t, to account for seasonal patterns in happiness.

The variable *black* is a binary indicator that equals unity if a given respondent is African American. The coefficient on *black*, β_1, captures the average difference in self-reported happiness between black and white respondents (i.e., the estimated black-white happiness gap). The coefficient of primary interest is β_2 on the interaction of the dissimilarity index, *DI*, with *black*. Given that the model omits the main effect on *DI*, β_2 can be interpreted as the *SD* change in blacks' self-reported happiness as the MSA-level *DI* increases from zero (complete racial integration) to one (complete racial segregation). Of secondary importance is the parameter β_3 on an interaction between the *DI* and a binary indicator for white respondents. This coefficient is interpreted as the *SD* change in whites' happiness as the MSA-level *DI* increases from zero to one. In results not reported here, we estimate a version of Equation (2) that includes the main effect on *DI* in addition to the interaction term $DI_{mt} \times black_{icmst}$. The coefficient on *DI* in such a model measures the effect of residential segregation on white respondents (similarly captured by β_3 in the model above), while that on the interaction measures the differential effect of segregation on black respondents relative to their white counterparts. Given that the main effect is rarely statistically significant (and always small in magnitude)—which we will confirm by presenting β_3—we construct the estimating equation in a way that allows us to focus on the implications of residential segregation for black respondents.

The matrix given by **X'** includes a number of observable determinants of happiness, such as gender, age (and age-squared), marital status, educational attainment, the presence of children in various age groups, the number of children ages 0–18, own and spouse's employment status, (log of) total household income, and homeownership status.[11] We further enrich the individual-level controls by adding a binary indicator that equals unity if a given respondent reports being in "good" or "excellent" health. Adding such a control is potentially important for at least two reasons. First, it is plausible that shocks to physical and mental health may catalyze changes in reported happiness. Second, several studies find that residential segregation itself has adverse effects on a variety of health indicators (e.g., Ellen, 2000; Robert and Ruel, 2006). Therefore, assuming that health and happiness are positively correlated, failing to control for respondent health could impart a downward bias on β_2 and β_3.

[10]We experiment with other parameterizations of the happiness variable. First, we estimate the model on the full distribution of ordered responses using an ordered probit. The results are very similar to the OLS estimates using the standardized happiness measure. This is not surprising since the ordered probit produces estimates that standardize the happiness measure conditional on the right-hand side controls. Our standardized OLS results are not conditioned on the controls. Second, we create separate binary indicators that equal unity for those who are "very unhappy" and "very happy," representing the bottom and top ends of the happiness distribution, respectively. These outcomes are modeled using linear probability models (OLS). Results from these models are similar to those discussed in the text.

[11]It is important to note that the measure of spouse's employment status is not without its imperfections. The primary issue is that NSFH administrators changed the manner in which information on spousal employment was collected in between the first and second waves. In the first wave, spouses of respondents, if present, completed a self-administered questionnaire that asked about the number of hours worked last week in the primary job. In the second wave, respondents answered a question about the number of hours the spouse worked last week. Given these changes, the OLS and fixed effects models were re-estimated without the control for spousal employment. The results are very similar to those reported in the paper.

In addition to individual-level characteristics, the model accounts for a rich set of environmental characteristics (**E'**) that may be correlated with MSA segregation and individual happiness. A complete list of these environmental controls is found in Table A1. As highlighted in Section 2, reported happiness is determined by a complex set of contextual factors that operate at multiple levels of geographic aggregation. Thus, incorporating variables that represent these levels should allow us to estimate the independent effect of MSA-level segregation conditional on environmental characteristics at other levels of geographic aggregation (Subramanian et al., 2005).

Specifically, we posit that the effect of the environment operates at three levels, which can be stated formally as

$$\mathbf{E}' = \mathbf{N}'\gamma + \mathbf{M}'\gamma + \mathbf{S}'\gamma, \tag{3}$$

where **N'** denotes a set of neighborhood-level characteristics, **M'** is a set of MSA-level characteristics, and **S'** is a set of state-level characteristics. Note that the variable of interest in (2)—the interaction of *black* with *DI*—varies at the MSA level. It is therefore important to control for other MSA characteristics that may be correlated with segregation. Following Cutler and Glaeser (1997) and Ellen, Cutler, and Dickens (2000), our MSA controls include the (log of) total population, (log of) median household income, (log of) median housing value, unemployment rate, percent black, percent (ages 25 and over) with a bachelor's degree, and percent married. In addition, the model includes an analogous set of controls at the neighborhood or census tract level, including the (log of) total population, (log of) median household income, (log of) median housing value, percent employed, percent black, percent (ages 25 and over) with a bachelor's degree, and percent married. It is well-established that neighborhood characteristics are correlated with a variety of adult health behaviors and outcomes including smoking, depression and anxiety, self-reported health, chronic disease, and mortality (e.g., Diez Roux, 2001; Ellen, Mijanovich, and Dillman, 2001). Given that such characteristics are also likely to be correlated with conditions at the MSA level, we are concerned that omitting neighborhood controls will bias the effect of segregation. In other words, failing to control adequately for the neighborhood environment may lead to a form of omitted variable bias because MSA segregation may be determined in part by forces at work at the neighborhood level.

To account for state-level heterogeneity that may be correlated with happiness, it would be ideal to include state fixed effects in (2). However, like most studies in the segregation literature, we omit state fixed effects because the NSFH contains very few respondents residing in two or more MSAs within the same state.[12] Adding state fixed effects would leave us with insufficient identifying variation in the *DI* measure. This is of particular concern in the individual fixed effects model, which is described below.[13] Therefore, we incorporate several observable controls to account for economic, policy, and political differences across states that may explain variation in MSA segregation as

[12] An exception is a recent paper by Glaeser et al. (2014) who (similar to what is done in the current paper) estimate regressions of individual-level happiness on MSA-level characteristics. In some models, the authors include state fixed effects, presumably to account for unobserved state heterogeneity. Although the current paper is precluded from adding state fixed effects, it is clear from the Glaeser et al. (2014) paper that some attempt should be made to control for state characteristics when estimating the effect of city-level factors.

[13] As detailed below, the estimated effect of segregation in the individual fixed effects model is identified off respondents who from one residential location to another in between survey waves. Including state fixed effects in such a model would constrain the identifying variation to only those moves from one MSA to another *within* the same state. Although we have experimented with this model, the standard errors are significantly larger than those reported in the paper (i.e., based on models that include the observable state controls discussed in the text).

TABLE 2: OLS Estimates of the Relationship between Residential Segregation and Self-Reported Happiness

Variable	(1)	(2)	(3)
Black	0.162*	0.231***	0.123
	(0.091)	(0.076)	(0.078)
(*DI* × *black*)	−0.465***	−0.326**	0.090
	(0.150)	(0.132)	(0.123)
(*DI* × *white*)	−0.093	−0.123*	0.103
	(0.086)	(0.073)	(0.092)
Time controls	Yes	Yes	Yes
Demographic controls	No	Yes	Yes
Neighborhood-level controls	No	No	Yes
MSA-level controls	No	No	Yes
State-level controls	No	No	Yes
No. of observations	13,534	13,534	13,534

Notes: Each cell reports the coefficient and standard error (in parentheses) on (*DI* × *black*) and (*DI* × *white*) in Equation (3). Standard errors are adjusted for clustering within MSAs. See the text for a description of the variables included in each model. ***, **, and * indicate statistical significance at the 0.01, 0.05, and 0.10 levels, respectively.

well as individual happiness: per capita income, unemployment rate, population density, maximum welfare benefit (for a three-person family), a dummy variable that equals unity for states with a Republican governor, and the fraction voting Republican in the previous presidential election.[14] As discussed in Section 2, previous studies find that reported happiness is quite responsive to state-level labor market conditions (e.g., Wolfers, 2003; Alesina et al., 2004). In addition, the generosity of states' tax and transfer programs are found to be correlated with happiness (e.g., Di Tella et al., 2003; Boyd-Swan et al., 2013; Herbst, 2013). Finally, we incorporate the governor and election variables to account for the role of states' political environment as well as the attitudes and preferences of the electorate in making policy decisions that may influence the degree of segregation within metropolitan areas. Indeed, Besley and Case (2003) show that state-level political institutions and actors have important implications for a range of social and economic policy outcomes.

Finally, it is important to note that the coefficient β_2 is identified through a cross-sectional comparison of self-reported happiness between individuals residing in MSAs at different points in the *DI* distribution. Although cross-sectional analyses are quite common in the segregation–health literature, estimates derived from this data structure are likely to be inconsistent because of the presence of unobserved individual or MSA characteristics that are related to happiness. We return to this issue in the next section.

Results from Equation (2) are presented in Table 2. For brevity's sake, we present only the coefficient (and standard error) on *black*, (*DI* × *black*), and (*DI* × *white*).[15] The standard errors are adjusted for arbitrary heteroskedasticity as well as MSA-level clustering. The model becomes more richly specified moving from column (1) to column (3). Specifically, column (1) includes only the controls for year- and

[14]With the exception of household income, rates of item nonresponse are not high in the NSFH. We retain observations with missing data on the demographic and census tract-level covariates by imputing a value of zero for the missing and including in the regressions separate dummy variables that equal unity if a given respondent has missing data on the covariates.

[15]Full results are available from the authors upon request.

month-of-interview; column (2) adds the demographic controls; and column (3) includes the census tract, MSA, and state covariates.

Looking at the full model (column 3), the coefficient on *black* implies that black respondents score about 0.12 *SD*s higher than whites on the happiness scale, although this estimate is not statistically significant. In addition, the interaction term $DI \times black$ reveals that happiness among blacks increases qualitatively as MSA segregation levels increase. Column (3) shows that blacks' happiness increases 0.09 *SD*s moving from MSAs with complete integration to those with complete segregation. Comparing the columns, it appears that adding controls causes the coefficient on $DI \times black$ to become larger in magnitude (i.e., switching from a negative to a positive effect). Such a pattern suggests that the OLS results are biased toward finding a negative relationship between residential segregation and happiness among blacks. We attempt to deal with this issue more convincingly in the next section. Consistent with previous work on the segregation-health link, we find that whites' well-being is not influenced by the level of segregation. Indeed, the coefficient on $DI \times white$ reveals that whites' happiness rises an imprecisely estimated 0.10 *SD*s (column 3) moving from the least to the most segregated MSAs.[16]

Extended Model

An important concern with OLS estimates when studying the segregation-health relationship is the possibility of unobserved (endogenous) location choices. Assuming there is some degree of skill- or occupation-based sorting across metropolitan areas, it is conceivable that a correlation exists between a city's level of segregation and the human capital characteristics of its residents. Another driver of endogenous location choices focuses on personality traits and preferences that lead individuals to reside in metropolitan areas that vary along such dimensions as the availability of cultural and social amenities, cost of living, public safety, diversity, climate, and other qualities. If individuals' human capital and personality characteristics are correlated with happiness, then β_2 will suffer from omitted variables bias as long as Equation (2) does not sufficiently control for these factors.

To deal with this challenge, we extend the methodology to exploit the panel structure of the NSFH sample and incorporate individual fixed effects into the happiness equation. Formally, the fixed effects model is specified as follows:

$$\begin{aligned} Y^*_{icmst} &= \alpha_i + \varphi_t + \mu_t + \beta_1 (DI_m \times black_{icmst}) + \beta_2 (DI_m \times white_{icmst}) \\ &\quad + \mathbf{X}'\psi + \mathbf{E}'\gamma + \varepsilon_{icmst}, \end{aligned} \tag{4}$$

where α is a parameter vector capturing a full set of individual-specific effects. The primary advantage of the fixed effects is that they control for all unobserved time-invariant individual characteristics that predict happiness and that might be correlated with the degree of segregation across MSAs. The identification of β_1, the coefficient on the interaction between *black* and *DI*, does not come from a cross-sectional comparison of individuals residing in different MSAs.[17] Rather, our estimates are derived from a comparison of the

[16] In line with some previous segregation studies, we test the null hypothesis of the equality of the two race-by-DI interaction coefficients (i.e., Ho: $\beta_2 = \beta_3$). The *P* value on this test in the full OLS specification (column (3)) is 0.92. In addition, we estimate a version of the OLS model in which *black*, *DI*, and $black \times DI$ are entered. Once again, the *P* value associated with the coefficient on the interaction term $black \times DI$ is 0.92.

[17] Note that Equation (3) does not include the dummy variable for *black*. The fixed effects obviate the need for time-invariant characteristics.

same individual who resides in a different MSA in each wave, and thus is exposed to different degrees of residential segregation. It may be useful to interpret β_1 as a type of local average treatment effect (LATE) because it provides an estimate of the impact of segregation for the subset of cross-MSA movers. As with any LATE, one should not interpret β_1 as the average effect of segregation over the entire NSFH sample.

The primary limitation of the fixed effects model is that it does not account for sources of time-varying unobserved heterogeneity. It is possible, for example, that tastes and preferences evolve over time—leading individuals to demand different qualities of a city environment—or that individuals' stock of human or health capital changes over time in a way that alters residential decision making. If left unaccounted for such characteristics may still lead to biased estimates of β_1 and β_2. Equation (4) accounts for several key determinants of happiness that may be correlated with changes in residential location. In particular, we incorporate controls for own and spouse's employment status, marital status, and the number of people residing in the household.[18] We also control for whether the respondent is a homeowner, and we continue to incorporate the set of census tract- and MSA-level controls to proxy for neighborhood and city quality (e.g., median household income and housing values). Our choice of controls is guided by a report from Schachter (2001), which provides descriptive information on the reasons for residential moves using self-reports from the Current Population Survey. According to the report, a plurality of moves occurs for employment-related reasons, accounting for 37 percent of long-distance relocations. A close second reason for moving is family-related reasons (27 percent), such as changes in marital status or family size. The third dominant reason is housing-related (24 percent), including changes in homeownership status or a desire to move to a higher quality neighborhood.

Table 3 provides additional insight into the characteristics of movers and nonmovers. Specifically, it compares the individual-level characteristics of cross-MSA movers and nonmovers separately for white and black respondents. All of the variables pertain to characteristics in wave one of the NSFH (i.e., premove). The mobility rate for the full sample is 0.098, indicating that approximately 10 percent of respondents ($N = 648$) moved to a different metropolitan area in between waves one and two of the NSFH. The cross-MSA mobility rates for white and black respondents are 0.109 ($N = 572$) and 0.054 ($N = 76$), respectively. It appears that movers of both races tend to be younger, are more likely to be never-married, and have fewer children than nonmovers. In addition, movers have higher levels of education and are somewhat more likely to be employed, but they are less likely to be homeowners. The spouses of movers, if present, are also slightly more likely to be employed. Finally, movers of both races are more likely to self-report higher level of health than their nonmover counterparts. Together, such results suggest that movers have higher levels of human capital and are less tethered to a particular place (given the lower home ownership rate and smaller number of children present) than nonmovers. Interestingly, white movers have lower household incomes, on average, than white nonmovers, whereas the opposite is true for blacks (although the black difference is not statistically significant).

Table 4 presents results from the fixed effects model. Column (1) includes only the month- and year-of-interview controls as well as the individual fixed effects; column (2) adds the time-varying demographic characteristics; and column (3) adds the census

[18]Another concern is that some individuals, particularly young individuals, might move for education purposes. Although the baseline model includes controls for educational attainment, we conduct a robustness check in which individuals younger than 25 years old are omitted from the analysis. The OLS and fixed effects results are similar to those reported in the paper. For example, the effect size on $DI \times black$ in the OLS model is 0.15 *SD*s, and it is 1.3 *SD*s in the fixed effects model.

TABLE 3: Comparison of Cross-MSA Movers and Nonmovers in Wave One of the NSFH, by Race

	Whites		Blacks	
	Movers	Nonmovers	Movers	Nonmovers
Age (years)	34.32	42.40*	33.66	41.08*
	(13.41)	(16.03)	(11.54)	(15.26)
Female (%)	0.554	0.603*	0.579	0.666
	(0.498)	(0.489)	(0.497)	(0.472)
Married (%)	0.526	0.595*	0.303	0.340
	(0.500)	(0.491)	(0.463)	(0.474)
Single, never married (%)	0.275	0.156*	0.395	0.301*
	(0.447)	(0.362)	(0.492)	(0.459)
Widowed (%)	0.033	0.085*	0.040	0.100*
	(0.179)	(0.279)	(0.196)	(0.299)
Separated (%)	0.044	0.027*	0.092	0.101
	(0.205)	(0.162)	(0.291)	(0.301)
Divorced (%)	0.122	0.138	0.171	0.159
	(0.328)	(0.345)	(0.379)	(0.365)
Less than high school (%)	0.054	0.140*	0.118	0.278*
	(0.227)	(0.348)	(0.325)	(0.448)
High school (%)	0.297	0.377*	0.263	0.378*
	(0.457)	(0.485)	(0.443)	(0.485)
Some college (%)	0.313	0.242*	0.434	0.239*
	(0.464)	(0.428)	(0.499)	(0.426)
Bachelor's degree (%)	0.336	0.241*	0.184	0.106*
	(0.473)	(0.428)	(0.390)	(0.308)
Children ages 0–18 (no.)	0.768	0.864*	0.868	1.188*
	(1.095)	(1.096)	(1.237)	(1.322)
Homeowner (%)	0.426	0.657*	0.316	0.408
	(0.495)	(0.475)	(0.468)	(0.492)
Respondent employed (%)	0.677	0.657	0.689	0.614
	(0.468)	(0.475)	(0.466)	(0.487)
Spouse employed (%)	0.390	0.379	0.197	0.167
	(0.488)	(0.485)	(0.401)	(0.373)
Household income ($)	34,768	40,876*	26,445	23,427
	(29,279)	(49,167)	(22,249)	(29,810)
Good/excellent health (%)	0.871	0.826*	0.817	0.753
	(0.335)	(0.379)	(0.390)	(0.431)

Notes: Calculations are based on the National Survey of Families and Households for wave 1 (1987–1988). Standard deviations are reported in parentheses. *Indicates that the within-race difference (in a given characteristic) between movers and nonmovers is statistically significant at the 0.10 level.

tract, MSA, and state characteristics. In all models, the sign on the interaction terms, $DI \times black$ and $DI \times white$ is positive, suggesting that black and white respondents are increasingly happy in MSAs with higher levels of residential segregation. It is noteworthy that adding the full set of controls (column 3 versus column 1) causes the magnitude of the happiness effect to increase (i.e., become more positive) for both sets of respondents. The increased magnitude of the segregation-happiness relationship in the fixed effects model is consistent with the pattern established by the OLS results in Table 2. Looking at the full model in column (3), we find that blacks' happiness increases 1.11 *SD*s moving from MSAs with complete integration to those with complete segregation. This effect

TABLE 4: Fixed Effects Estimates of the Relationship between Residential Segregation and Self-Reported Happiness

Variable	(1)	(2)	(3)
DI × *black*	0.303	0.653	1.111**
	(0.478)	(0.511)	(0.563)
DI × *white*	0.135	0.005	0.335
	(0.231)	(0.222)	(0.292)
Time controls	Yes	Yes	Yes
Demographic controls	No	Yes	Yes
Neighborhood-level controls	No	No	Yes
MSA-level controls	No	No	Yes
State-level controls	No	No	Yes
No. of observations	13,534	13,534	13,534
No. of black mover-wave combinations	152	152	152
No. of black movers	76	76	76
No. of white mover-wave combinations	1,144	1,144	1,144
No. of white movers	572	572	572

Notes: Each cell reports the coefficient and standard error (in parentheses) on (*DI* × *black*) and (*DI* × *white*) in Equation (4). Standard errors are adjusted for clustering within MSAs. See the text for a description of the variables included in each model. ** indicates statistical significance at the 0.05 level.

is statistically significant at the 5 percent level. Happiness among white respondents increases considerably less, by 0.34 *SD*s, an effect that is not statistically significant.[19]

To ensure the robustness of the main fixed effects results, we estimate a number of supplementary models that omit clusters of control variables as well as test an alternative segregation measure. The first row in Table A2 presents the baseline fixed effect estimates (column 3 of Table 4). The first specification check omits the individual-level control for health status. Recall that the main specification includes this variable given its potential correlation with mobility decisions. However, it is possible that health is one of the mechanisms through which segregation influences happiness. Thus, controlling for health could mask a piece of the overall relationship between segregation and happiness. As shown in the second row, removing the health variable from the model does little to change the baseline estimate.

As previously discussed, this paper controls for a rich set demographic, economic, and political characteristics at geographic units of aggregation below (i.e., the census tract level) and above (i.e., the state level) the MSA. Doing so is important because these characteristics are likely to be correlated with MSA-level segregation and individual well-being. Indeed, a comparison of columns (2) and (3) in Table 4 reveals that including these supplementary controls (in addition to the MSA controls) leads to a sizable increase in the coefficient on *DI* × *black*. It is therefore important to examine which contextual controls exert the greatest influence on the estimates. In the next five rows, we experiment with alternative models that remove clusters of census tract- and state-level variables: percent black in the census tract, all of the census tract controls, state political controls (i.e., Republican governor and percent voting Republican), state population density, and all of the state controls, respectively. In each case, the magnitude of the coefficient on *DI* × *black* is similar to the baseline estimate, which remains statistically significant.

[19]Once again, we test the null hypothesis of the equality of the race-by-DI interaction coefficients, in this case β_1 and β_2. The *P* value from this test in the full fixed effects model is 0.13. We also estimate a version of the fixed effects model in which *DI* and *DI* × *black* are entered. The *P* value associated with the coefficient on the interaction term *DI* × *black* is 0.13.

The analyses reported above always include the MSA-level controls in the model. To evaluate the influence of these variables, we estimate a model that omits the full set of MSA characteristics. As shown in the eighth row, the coefficient on $DI \times black$ remains similar to that in the baseline model. To further assess the role of these controls, we estimate a series of models that include each MSA-level variable separately. We then compare the coefficient on $DI \times black$ in each model with its counterpart in the model that includes only the demographic controls (i.e., column 2 in Table 4). Results from this exercise, which are available upon request, show that MSA median household income has the greatest influence on the results: including this control causes the coefficient to increase 17 percent, although it remains statistically insignificant. The unemployment rate, percent with a bachelor's degree, total population, and percent married produce small increases in the coefficient. Conversely, adding the variables for percent black and median housing value lead to small reductions in the coefficient.

In a related set of analyses, we estimate fixed effects models that interact the contextual controls with the *black* and *white* indicator variables. Specifically, we examine separate models that interact the MSA and race variables with and without the (noninteracted) census tract- and state-level variables included. Although this approach might be useful for picking up the differential effect of the contextual controls, it introduces a severe multicollinearity problem.[20] Thus, it is not surprising that the standard errors in these alternative models are twice as large as that in the baseline model. Fortunately, the coefficients on $DI \times black$ are of a comparable magnitude to the baseline estimate.[21]

Finally, we estimate a fixed effects model that replaces the dissimilarity index with the isolation index, which measures the likelihood that a resident will have exposure to only residents of their same race in their neighborhood (Massey and Denton, 1988). Given that these indices are highly correlated, it is reassuring that results based on the isolation index are similar to those reported above. As shown in the ninth row, the coefficient on the interaction between black and the isolation index implies that blacks' happiness increases 1.0 *SD* moving from MSAs where they are less likely to come across other black residents to those where they are completely isolated from whites. This coefficient is statistically significant at the five percent level. The corresponding coefficient for whites implies an increase in happiness of 0.31 *SD*s, a result that is not statistically significant.

Interpretation

The fixed effects model demonstrates that blacks' happiness increases 1.11 *SD*s moving from MSAs with complete integration to those with complete segregation. It remains to be seen, however, whether this relationship is economically important. One was to assess this is by calculating the income equivalence of the increase in happiness due to an increase in residential segregation. Specifically, we ask: how much income would the average black individual require in order to achieve a comparable level of well-being from the estimated increase in neighborhood segregation?

We calculate the income equivalence of a 0.12-unit (or 12 percentage point) increase in the *DI* using the fixed effect estimate on $DI \times black$ in column (3) of Table 4. We use a 0.12-unit rise in the *DI* because it is the sample *SD* of the dissimilarity index for blacks, as shown in Table 1. We then estimate a fixed effects regression of the standardized

[20]For example, the correlation between $DI \times black$ and $MSA\ population \times black$ is 0.98. In fact, six of the seven MSA controls interacted with *black* have a correlation with $DI \times black$ that exceeds 0.90.

[21]For example, in the model that includes the MSA-level controls interacted with *black* and *white* (and omits the census tract- and state-level controls), the coefficient on $DI \times black$ is 0.862 while its standard error increases to 1.083.

happiness index on total household income and household income squared, incorporating the full set of individual and environmental controls but removing $DI \times white$ and $DI \times black$, on the subset of black respondents. The coefficients on income and income squared are used to calculate the change in happiness due to a \$1.00 increase in household income from the black sample median. This marginal effect on income is compared to that on $DI \times black$ to produce a monetary valuation of the estimated effect of segregation on reported happiness.[22]

A 0.12-unit increase in the *DI* for blacks produces an increase in happiness equivalent to a \$355 rise in annual household income. Expressed in real 2013 dollars, the income equivalence is \$727 of annual income. One way to assess the relative importance of this figure is to compare it to blacks' reported household income in the NSFH. The happiness gain of \$727 corresponds to 1.9 percent of blacks' median (annual) household income. Another way to benchmark the segregation effect is to calculate the income equivalence associated with the dramatic decline in metropolitan segregation over the last four decades. Glaeser and Vigdor (2012) report that the *DI* reached a high of 0.80 in the late 1960s before declining to 0.55 in 2010, a drop of 0.25 units. A decline of this magnitude implies that blacks' witnessed a reduction in happiness equivalent to \$722 in lost annual household income (\$1,481 in constant 2013 terms). This corresponds to about four percent of blacks' median income in the NSFH.

Subgroup Analyses

In Table 5, we explore the possibility of differential effects of residential segregation across subgroups of black and white respondents. In particular, we estimate Equation (4) on stratified subsamples defined by gender, age group, educational attainment, and employment status. Column (1) presents the coefficient on $DI \times black$, while column (2) presents the coefficient on $DI \times white.$ In addition to the fixed effects, all subgroups analyses contain the full set of individual and environmental controls. While Table 5 points to several interesting results, it is important to note that some of the standard errors (and estimates) are probably inflated by the small number of black movers available for identification.

It appears that there are important differences in the response to increased segregation between black men and women. The happiness boost among black men (2.6 *SD*s) is twice as large as it is among black women (1.3 *SD*s), although the estimates for both sexes are statistically significant. The estimates for white men and women, on the other hand, are never large in magnitude or statistically significant. We also find evidence that younger blacks (ages 16–45) and older blacks (ages 46 and over) experience a statistically significant increase in happiness from rising segregation. However, it is important to note that the coefficient on $DI \times black$ for older blacks (3.5 *SD*s)—while not as statistically significant ($P < 0.10$)—is larger in magnitude than that for younger blacks (1.6 *SD*s; $P < 0.05$). The lower statistical significance for the group of older blacks is explained by the larger standard error, which is driven by lower cross-MSA mobility rates between NSFH data collection waves. Given that the identifying variation in Equation (4) comes

[22]The coefficients on income and income squared are, respectively, 0.00000364 and −0.00000000000559. Median household income for the black sub-sample in the NSFH is \$18,284 (averaged over both waves), as shown in Table 1. A \$1 increase in household income generates a 0.000003844 (0.00000364 − (2 × (−0.00000000000559) × 18284)) unit increase in happiness. To produce the annual income equivalent of a 0.12-unit rise in segregation, the following was calculated: 0.123 * (0.0111/ 0.000003844) = \$355.18.

TABLE 5: Subgroup Analyses from the Fixed Effects Model

Variable	(1) *DI* × *black*	(2) *DI* × *white*	(3) No. of Obs.	(4) Black Movers	(5) White Movers
Women	1.248*	0.750	8,210	44	317
	(0.722)	(0.482)			
Men	2.564**	0.032	5,324	32	255
	(0.984)	(0.429)			
Ages 16–45	1.624**	0.379	8,199	66	481
	(0.650)	(0.370)			
Ages 46 and over	3.514*	1.599**	5,331	10	91
	(2.026)	(0.759)			
High school degree or less	2.249**	1.120*	7,218	29	201
	(0.902)	(0.624)			
Some college or more	0.656	−0.275	6,292	47	371
	(0.513)	(0.364)			
Not employed	−0.838	−0.348	5,138	25	188
	(1.933)	(1.205)			
Employed	0.887	0.375	8,329	51	384
	(0.588)	(0.390)			

Notes: Each cell reports the coefficient and standard error (in parentheses) on ($DI \times black$) and ($DI \times white$) in Equation (4). Each row represents a different model, estimated on the subgroup indicated in the table. Standard errors are adjusted for clustering within MSAs. See the text for a description of the variables included in each model. ** and * indicate statistical significance at the 0.05 and 0.10 levels, respectfully.

from within-person (cross-MSA) differences in segregation, fewer moves for a given group provide less identifying variation, and thus larger standard errors.

The analyses by education level reveal that lower skilled blacks—defined as those with a high school degree or less—receive greater happiness gains moving to more segregated MSAs compared to higher skilled blacks—defined as those with at least some college (2.3 *SD*s compared to 0.7 *SD*s). A plausible explanation for the low-skilled happiness boost is that such individuals derive greater social capital benefits from—or are more reliant on—their neighbors in predominately minority areas, whereas high-skilled individuals have access to a broader set of social networks, and thus are less influenced by the racial composition of their neighbors. The final set of analyses estimates Equation (4) separately on nonworking and working respondents.[23] Although it appears that employed blacks witness an increase in happiness (0.9 *SD*s) and unemployed blacks witness a reduction in happiness (−0.8 *SD*s) due to rising segregation, both estimates are relatively small in magnitude and neither is statistically significant. White respondents, irrespective of their employment status, again do not appear to be influenced by increased segregation.

[23]It is important to note that the employment subgroup analyses are based on subsets of individuals who worked in either wave (in the case of the employed subgroup analysis) or who did not work in either wave (in the case of the nonworking subgroup analysis). Given that the fixed effects are included in these models, the same results would have been obtained had the sample been conditioned on individuals working or not working in *both* waves. The fixed effects model generates coefficients using only those individuals for whom information on a given covariate is observed in both waves. In our analysis, individuals who change employment statuses in between waves are not used to calculate the fixed effects estimates because they are observed in the data for only a single time period. On the other hand, for those who do not change employment statuses in between waves, inclusion of the fixed effects obviate the need to control for employment. Our analysis is therefore equivalent to conditioning the sample on those working or not working in both waves; doing so is tantamount to incorporating an individual fixed effect where employment is concerned.

TABLE 6: OLS and Fixed Effects Estimates of the Relationship between Residential Segregation and Self-Esteem

Variable	(1) OLS	(2) OLS	(3) FE	(4) FE
Black	−0.081	−0.159	–	–
	(0.324)	(0.276)		
DI × *black*	−0.023	0.188	6.693**	7.653***
	(0.429)	(0.453)	(2.911)	(2.889)
DI × *white*	−0.254	−0.528**	−1.212**	−1.209
	(0.188)	(0.204)	(0.583)	(0.832)
Time controls	Yes	Yes	Yes	Yes
Demographic controls	No	Yes	No	Yes
Neighborhood-level controls	No	Yes	No	Yes
MSA-level controls	No	Yes	No	Yes
State-level controls	No	Yes	No	Yes
No. of observations	10,468	10,468	10,468	10,468

Notes: OLS, ordinary least squares; FE, fixed effects. Each cell reports the coefficient and standard error (in parentheses) on *black,* (*DI* × *black*), and (*DI* × *white*) in Equations (2) and (4). Standard errors are adjusted for clustering within MSAs. See the text for the description of the variables included in each model. *** and ** indicate statistical significance at the 0.01 and 0.05 levels, respectfully.

Alternative Well-Being Outcome: Self-Esteem Index

As an auxiliary analysis, Table 6 presents OLS and fixed effects results for an alternative measure of subjective well-being: self-esteem. Recall that the self-esteem index is constructed by summing the scores to three items in the NSFH: "I feel that I'm a person of worth, at least on an equal plane with others," "On the whole, I am satisfied with myself," and "I am able to do things as well as other people." Answers to each item range from one ("strongly agree") to five ("strongly disagree"). Given that self-reported happiness is reasonably highly correlated with the self-esteem index ($r = 0.26$), the estimates in Table 6 are a useful robustness check on the main results, in addition to being interesting in their own right. Columns (1) and (2) present the OLS results, while columns (3) and (4) present the fixed effects results. Columns (2) and (4) are regarded as the main results within each estimator, as these columns contain the full set of controls.

Two findings in Table 6 are noteworthy. First, as we move from the OLS to the fixed effects results, we observe a pattern unfold similar to that for the happiness results. As the model becomes more richly specified, the sign on the coefficient *DI* × *black* flips from negative (suggesting that blacks' well-being is decreasing in MSA-level segregation) to positive (suggesting that blacks' well-being is increasing in segregation). Indeed, as of the full fixed effects model (column 4), it appears that black scores on the self-esteem scale increase over seven points moving from MSAs with the least segregation to those with complete segregation.[24] Second, unlike the happiness models, whites' self-esteem is influenced by the level of MSA segregation. In particular, rising segregation is estimated to lower self-esteem among white respondents, an effect that generally increases in

[24]Although happiness and self-esteem are moderately correlated, as discussed in the text, there is nonetheless a large amount of nonoverlapping variation between the variables. Therefore, in addition to serving as a (confirmatory) robustness check on the happiness results, these self-esteem results offer another interpretation. It is plausible that a form of cream skimming occurs in segregated cities, whereby blacks residing in less segregated (i.e., higher income) neighborhoods of segregated cities experience a self-esteem boost relative to their counterparts residing in less segregated cities. In other words, the black self-esteem estimate reflects an increase in relative, as opposed to absolute, well-being, a phenomenon that appears to exist in the income-happiness link as well (e.g., Luttmer, 2005). We thank an anonymous referee for pointing out this potential explanation.

magnitude moving from the OLS to the fixed effect models. The estimate on $DI \times white$ in column (4) suggests that whites' scores on the self-esteem scale are lower by 1.2 points in fully segregated metropolitan areas as compared to the least segregated ones.

5. CONCLUSION

Racial segregation is a longstanding problem in the U.S., exacerbated by discriminatory practices and attitudes as well as an unequal distribution of resources across metropolitan areas. Residential preferences research suggests that the differential location preferences of whites and blacks are an important explanation for the continued presence of segregation in metropolitan areas. There has been considerable research on the implications of this geographic separation for the well-being of whites and blacks. The general consensus in the literature is that whites are not affected by living in areas with varying degrees of segregation. Blacks, on the other hand, appear to be negatively impacted by segregation, particularly with respect to health and economic outcomes.

This paper examines the impact of MSA-level residential segregation on self-reported happiness. Prior studies link happiness with a variety of health outcomes and illustrate the potential of happiness measures to capture global well-being. Furthermore, such measures provide insight into residential preferences across racial groups in a way that is not confounded by self-reported biases. Using rich panel data from the NSFH, our baseline OLS model reveals qualitatively similar results to some recent health-related research on segregation, specifically showing that blacks are worse off in more segregated areas. However, once we extend the model to take advantage of the panel data, the results indicate that blacks in increasingly segregated MSAs are actually happier than their counterparts in less segregated MSAs. The rise in blacks' happiness appears to be concentrated among males, those who are older, and those who are less skilled. Furthermore, results from auxiliary models show that blacks' self-esteem is also higher in increasingly segregated areas.

Our results do not suggest that segregation is healthier for residents, nor do they dismiss the negative opportunity structures present in segregated regions. Rather, they provide evidence of positive elements present in more segregated areas that may be overlooked in current discourse over the relative advantages of economic and racial diversity. Although it may appear counterintuitive that less integrated areas are associated with increases in blacks' happiness, the presence of strong political and social capital within these regions could be a key mechanism driving this relationship. It is plausible that blacks residing in segregated regions develop productive social ties that buffer against the negative health and economic outcomes. What is more, such benefits may even apply to blacks residing in the integrated neighborhoods of highly segregated metropolitan areas. Indeed, by isolating the effect of MSA-level segregation, our work sheds light on the forces at work beyond those operating at the neighborhood level, such as the presence of regional cultures and attitudes about race (McDermott, 2011).

Our findings accord with those from residential preferences research that blacks might be more comfortable living in segregated areas despite the presence of other negative conditions, including poor economic opportunities and worse health outcomes. Recent work by Reardon, Fox, and Townsend (2015) finds that middle-class black households tend to live in neighborhoods with a greater proportion of blacks. The reason for the hesitancy of blacks to "pioneer" into predominately white residential areas may be supported by results in this paper: blacks might be less happy in integrated regions because of persistent discrimination and diminished social capital. It is also possible that blacks experience a variety of negative mental health effects from the stigma of being a minority in more integrated regions, a topic about which little is known (Nuru-Jeter and LaVeist, 2011).

The increase in blacks' happiness should not be dismissed as insignificant in light of the challenges associated with residing in segregated areas. Indeed, it might be indicative of a phenomenon that has the potential to mitigate a variety of well-documented negative consequences of blacks' geographic isolation. Moreover, our results provide insight into what might be lacking in less segregated metropolitan regions. To that end, this work has potentially important policy implications. Poverty deconcentration and housing mobility policies aimed at desegregating communities might consider providing individuals with support services that ease the transition into diverse residential areas, with a particular emphasis on intergroup conflict resolution. This would include creating opportunities for social integration as well as physical integration (Lucio and Barrett, 2010). An alternative approach is to work with residents in segregated communities to develop programs and amenities that improve neighborhoods and that will ultimately attract diversity more organically.

A few caveats about the paper's methodology and results are in order. First, neighborhood segregation measured at the MSA level has limitations in that it does not shed light on the geographic clustering of people of different races within a given MSA. Despite the potential drawbacks of the MSA-level dissimilarity index, its widespread use is beneficial for comparing findings across studies. Second, despite a good faith effort at including variables in the fixed effects model that account for changes in residential location between waves, reasons for cross-MSA mobility are varied and complex. Therefore, it is possible that the analyses omit one or more determinants of mobility that may be correlated with self-reported happiness. To the extent that such omitted factors are correlated with MSA segregation, the fixed effects estimates reported here may still be contaminated. Therefore, the relationship between segregation and happiness should not be interpreted as causal. Rather, we report a compelling association between these variables that should be explored in subsequent empirical work. Finally, it is important to recognize that the NSFH was implemented in the late-1980s and early-1990s, when residential segregation was more pronounced than it is today. Although there have been significant demographic and attitudinal changes over the past several decades, segregation nevertheless persists and policies continue apace to deconcentrate poverty and diversify metropolitan regions.

APPENDIX

TABLE A1: Summary Statistics for the Neighborhood-, MSA-, and State-Level Covariates

Variable	Full	Whites	Blacks
Neighborhood-level covariates			
Population (no.)	5,363	5,520	4,799
	(3,310)	(3,494)	(2,455)
Median household income ($)	33,079	35,654	23,875
	(14,334)	(14,030)	(11,311)
Median housing value ($)	102,295	110,431	73,216
	(81,164)	(84,454)	(59,660)
Employed (%)	0.616	0.635	0.548
	(0.106)	(0.092)	(0.122)
Black (%)	0.178	0.072	0.556
	(0.279)	(0.131)	(0.336)
Bachelor's degree (%)	0.215	0.236	0.139
	(0.157)	(0.159)	(0.122)

(Continued)

TABLE A1: Continued

Variable	Full	Whites	Blacks
Married (%)	0.516	0.553	0.383
	(0.143)	(0.119)	(0.143)
MSA-level covariates			
Population (no.)	3,647,804	3,473,719	4,269,996
	(4,989,682)	(4,827,414)	(5,486,641)
Median household income ($)	31,325	31,348	31,243
	(5,620)	(5,508)	(6,001)
Median housing value ($)	91,575	91,513	91,799
	(50,900)	(50,864)	(51,034)
Unemployed (%)	0.071	0.070	0.075
	(0.018)	(0.018)	(0.017)
Black (%)	0.139	0.123	0.194
	(0.093)	(0.086)	(0.097)
Bachelor's degree (%)	0.208	0.209	0.206
	(0.053)	(0.054)	(0.053)
Married (%)	0.505	0.509	0.491
	(0.038)	(0.038)	(0.033)
State-level covariates			
Population density	276.48	253.02	360.32
	(629.97)	(458.56)	(1,027.12)
Per capita income ($1,000's)	18.75	18.77	18.66
	(3.58)	(3.52)	(3.78)
Unemployed (%)	0.064	0.064	0.065
	(0.017)	(0.016)	(0.018)
Republican governor (%)	0.456	0.479	0.374
	(0.498)	(0.499)	(0.484)
Republican presidential voters (%)	0.507	0.506	0.511
	(0.112)	(0.113)	(0.109)
Welfare benefit ($)	389.56	397.61	360.79
	(138.53)	(136.93)	(140.41)

Notes: Calculations are based on the National Survey of Families and Households for wave 1 (1987–1988) and wave 2 (1992–1994). *Standard deviation*s are reported in parentheses.

TABLE A2: Robustness Checks on the Fixed Effects Model

Specification	(1) *DI* × *black*	(2) *DI* × *white*
(1) Baseline model	1.111**	0.335
	(0.563)	(0.292)
(2) Remove self-reported health	1.017*	0.378
	(0.555)	(0.299)
(3) Remove census tract percent black	0.996*	0.331
	(0.557)	(0.292)
(4) Remove all census tract controls	0.979*	0.388
	(0.570)	(0.294)
(5) Remove the state political controls	1.049*	0.295
	(0.569)	(0.296)
(6) Remove state population density	1.020*	0.313
	(0.580)	(0.295)

(Continued)

TABLE A2: Continued

Specification	**(1) *DI* × *black***	**(2) *DI* × *white***
(7) Remove all state controls	0.967*	0.248
	(0.586)	(0.302)
(8) Remove all MSA controls	1.059**	0.182
	(0.528)	(0.217)
(9) Use the Isolation Index	1.021**	0.312
	(0.493)	(0.260)

Notes: Each cell reports the coefficient and standard error (in parentheses) on (*DI* × *black*) and (*DI* × *white*) in Equation (4). Standard errors are adjusted for clustering within MSAs. See the text for a description of the variables included in each model. ** and * indicate statistical significance at the 0.05 and 0.10 levels, respectfully.

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