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# Residential segregation: The mitigating effects of past military experience

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## 1. Introduction

A well-known theoretical premise in the social sciences is that minority-majority social contact will lead to higher levels of racial tolerance and integration (Allport, 1954; Robinson and Preston, 1976; Sigelman and Welch, 1993). The military is one of the most well-situated US environments in which to test social contact theory. It is the only large-scale institution in which African Americans have historically comprised a substantially larger percentage of the population than they do in the civilian population. It is also the only large-scale institution where blacks and whites come into frequent and prolonged contact with one another as both co-worker and neighbor. Despite this, surprisingly little research has tested the social contact hypothesis in the U.S. military setting; however, those that do generally find positive support (Rugh and Fischer, 2015; Moskos and Butler, 1996; Landis et al., 1984; Butler and Wilson, 1978; Stouffer et al., 1949; but see Nteta and Tarsi, 2015).

In this paper we draw on a nationally representative dataset to ask whether there are long term implications for race relations resulting from military service. Specifically, we examine whether white veterans are more likely than white non-veterans to reside in racially integrated neighborhoods. Residential racial segregation has been described as the “linchpin of US racial inequality today” (Massey and Denton, 1993). Given that the military is the single largest employer in the United States, it is of particular interest to examine whether military experience is associated with subsequent residential settlement patterns. Research in the residential segregation literature suggests this could be a possibility, as metropolitan areas that are the home to military bases have significantly lower levels of racial segregation (DeFina and Hannon, 2009; Farley and Frey, 1994; Friedman et al., 2013; Logan et al., 1996; Rugh and Massey, 2014; Wilkes and Iceland, 2004). However, the individual level mechanisms behind this are not well understood.

## 2. Background

### 2.1. Social contact theory and the military

Despite some progress over the past few decades, race/ethnicity continues to be the dominant characteristic structuring residential life in the United States. Racial residential segregation permeates other aspects of social life, resulting in a situation

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where meaningful interactions across race lines are relatively rare, particularly for white Americans (Sigelman et al., 1996). The experience of growing up in racial isolation tends to reinforce stereotypes and fuel racist beliefs, which may serve to perpetuate racial segregation as individuals make subsequent residential decisions. However, in situations where meaningful interaction *does* occur across groups, researchers have found that more positive interracial attitudes result, a process that has come to be known as the social contact hypothesis. Some of the earliest work on this took place in the World War II era military, finding that the more contact white and black soldiers experienced, the more favorable attitudes became toward racial integration (Stouffer et al., 1949). Allport (1954) further developed this concept, identifying the following four preconditions of contact that must be met for the social contact effect to work: (1) that the groups be of equal status, or a majority group working with high status minority group members; (2) that the situation in which contact takes place is voluntary; (3) that the groups are working closely together toward a set of common goals; and (4) that intergroup contact is supported by the institution (Barnard and Benn, 1988; Hewstone and Brown, 1986; Amir, 1969). Pettigrew and Tropp (2000) meta-analysis of over 500 studies examining the contact hypothesis found that even simple propinquity has a positive impact on racial attitudes, but optimal contact conditions that meet all or most of these conditions results in greater reductions in prejudice.

Most studies of social contact have focused on attitudinal changes (i.e. reductions in prejudice), but researchers have also examined the impact of interracial contact on behavioral outcomes such as the formation of cross-racial friendships (Emerson et al., 2002; Fischer, 2008; Moody, 2001; Stearns et al., 2009) and locational decisions (Rugh and Fischer, 2015). Behavioral outcomes represent a stronger test of the contact hypothesis because one presumably first has to have a reduction in prejudice before friendships will be established. These tests are also more likely to be longitudinal in nature, providing evidence that the impact of contact extend beyond the immediate term.

One critique that is commonly leveled against research examining the contact hypothesis is that many of the studies take place in contexts that may attract individuals who are more open-minded to begin with, thus their self-selection into cross-racial contexts makes it difficult to evaluate the efficacy of the hypothesis (Jackman and Crane, 1986). One solution to this is to limit analyses of interracial contact to those scenarios that are least likely to be elected into; however, doing so often violates item (2), above, which stipulates that voluntary contact best predicts the social contact hypothesis. Hence, an ideal condition of the theory is also its greatest challenge.

The military offers an appropriate platform for evaluating social contact theory according to the above preconditions. Military service in the contemporary era is voluntary; yet at the same time it offers so many enlistment incentives that interracial friendship is an unlikely motivator of service. Military service fits the remaining ideal criteria quite well. African Americans tend to stay with military service longer than whites do, and thus enjoy equal, and oftentimes higher, enlisted rank as a result (Moore, 2002). Furthermore, the primary goal of the military apparatus is to create a sense of unitary purpose in working toward the common defense. At the extreme, military personnel are expected to sacrifice their lives for one another in the line of duty. The nature of military service, when compared to civilian work, is aimed at promoting high levels of bonding on the job. Equality and valuing cultural diversity are core articulated components of the U.S. military ethos (Soeters and van der Meulen, 2007). Finally, as a total institution in the Goffmanian sense (1961), the degree of interracial contact in the military is extreme—not only on the job (Firestone, 1992), but at the mess hall, in the barracks, in on-base neighborhoods, etc.<sup>1</sup>

The military setting has additional advantages as a site for examining interracial social contact. The African American population has always been large (DMDC, 2011). Throughout the all-volunteer force history, African Americans have comprised a disproportionate percentage of military enlistees, at over 20% of the enlisted forces in the early nineties, compared to their civilian population of 13%.<sup>2</sup> This is particularly true of the U.S. Army, the largest of the military branches, where African American enlistees comprised over 30% of the troops throughout the seventies, eighties and early nineties. Although women are a minority in the military overall, African American women are overrepresented among female enlistees. For example, fifty percent of all female Army enlistees were African American in the mid-nineties. But since the Global War on Terror, African American accessions have been falling. Today, African Americans comprise 16% of the armed forces, which is still slightly overrepresented for their civilian population size. The Hispanic population is growing in the military, representing 12% of the total military population and 17% of all new recruits while comprising 17% of the overall US population.

There is positive evidence for the operation of the social contact hypothesis in the US military, both historically and presently; however, it should be noted that this literature sometimes paints a universally sanguine picture and fails to account for variation across the military's differing branches and subunits (Burk and Espinoza, 2012). Testimony from Project Clear, when the US army first began to desegregate troops in Korea in 1951, showed evidence for positive attitude change among whites and blacks (Bogart, 1969). This process took place not only before the transition to the all-volunteer military, and thus under conscripted conditions, but also when societal desegregation itself was a newly-enforced experiment (a violation of the ideal conditions stipulated in the social contact hypothesis). Social science research has generally concluded that the post-draft era military (1973 forward) in particular has seen positive effects for race relations among members. Diversity and

<sup>1</sup> The contact hypothesis is sometimes tested against group threat theory. We do not do so here because conditions in the military are relatively racially egalitarian and resources are distributed according to rank, making racial group threat unlikely.

<sup>2</sup> This statistic and the foregoing military population statistics are drawn from the Department of Defense's annual population reports: <http://prhome.defense.gov/RFM/MPP/AP/POPREP.aspx>.

race relations programming is an explicitly endorsed policy in the all-volunteer military (Landis et al., 1984), and there is some evidence that race-relations among military members are improved relative to those among civilians.

In the nineties, both black and especially white soldiers rated race relations as notably better in the military than in civilian society (Moskos and Butler, 1996). High interracial marriage rates among servicemen and women, further lends support to the operation of the social contact hypothesis in the military beyond just attitudinal measures (Jacobson and Heaton, 2003; Romano, 2003). More recently, Rugh and Fischer (2015) examined the neighborhood racial compositions of VA loan recipients compared to those with conventional mortgages. They found that white veterans lived in neighborhoods that were significantly more diverse, while black and Hispanic veterans were less racially isolated than their counterparts with conventional loans.

Other research suggests indirect evidence for positive effects of intergroup relations. A number of health and family racial disparities are lessened in the military environment compared to in civilian life (Lundquist, 2004, 2006; Lundquist et al., 2013; Lundquist et al., 2014; Teachman, 2007), even though a number of other racial disparities persist (Burk and Espinoza, 2012). One study finds that Black enlistees report higher quality of life and overall satisfaction in the military compared to when they were civilians (Lundquist, 2008). While these studies do not necessarily implicate social contact as a cause of these outcomes, it is a promising contributing explanation.

The question is not just whether there is a positive social contact effect of military service on personnel, but also whether any such effect has long term impact post-service. Importantly, two studies examine the racial attitudes of veterans. The evidence is mixed. One study employs cross-sectional data of Vietnam era veterans from the General Social Survey and compares white veterans to white non-veterans in their racial attitudes and behaviors (Lawrence and Kane, 1996). Supporting the social contact hypothesis, white veterans were more likely than their civilian counterparts to report having Black friends over for dinner recently. But there was no significant difference between white veterans and nonveterans in their attitudes on race. A recent study, however, analyzing public opinion data from the Cooperative Congressional Election Study (2010–2012), finds that white veterans with post-1973 military service express more negative racial views<sup>3</sup> than white non-veterans (Nteta and Tarsi, 2015). This raises the issue of selectivity into the all-volunteer force (Bachman et al., 1987). Military enlistees disproportionately have only a high school degree and are from the rural South, factors associated with more conservative views among whites. Indeed a recent survey of veterans indicates that they are significantly more likely to vote Republican and to consider themselves more conservative than their non-military counterparts (Pew Hispanic, 2011). If service in the armed forces selects for more conservative, potentially less racially open whites to begin with, it is difficult to know how much larger the veteran-nonveteran gap in racial views may have been prior to military social contact. In this way, the background characteristics associated with majority groups who enlist in the military may serve to mitigate a major weakness of social contact theory, whereby groups who are already interested in interracial contact select themselves into the study sample. As such, the military is a compelling scenario in which to explore the applicability of the social contact hypothesis. To control for the type of baseline effects that previous veteran studies have been unable to account for, our study utilizes a control for the racial context in which individuals grew up.

## 2.2. Residential segregation and the military

"I lived in Navy housing all my life, and we didn't pick who we lived next door to." - Crockett 2000.

The military's lack of racial segregation is a significant departure from civilian life today, perhaps measured best in terms of residence. Despite some change following civil rights reform in the 1960s, the vast majority of black and white civilians continue to live in very separate worlds. For instance, the average neighborhood composition for whites in the census year closest to our study, 2000, was 81% white, 7% black, 8% Hispanic, and 3% Asian.<sup>4</sup> Neighborhood segregation carries over to local schools and community organizations; and shapes the acquisition of human, cultural and social capital (Massey and Denton, 1993). In contrast, all on-base military housing was explicitly racially integrated historically in response to high levels of segregation that negatively impacted troop comradery and readiness (United States Commission on Civil Rights, 1963). Thus in the early 1960s the military instituted a series of deliberate actions and policies to combat prejudice both on base and off base (details of this history are documented in Herschfield, 1985; Sutton, 1971; United States Commission on Civil Rights, 1963).

The institutional aspects of today's military may not be as all encompassing as they once were, but its legacy of desegregation both on and even off base seems to have stuck. It has been a consistent finding in the residential segregation literature that metropolitan areas with a strong military presence have the lowest levels of African American residential segregation in the United States (DeFina and Hannon, 2009; Farley and Frey, 1994), a trend which continues to this day even in

<sup>3</sup> As indicated by their answers to two questions in a scale: 1) "the Irish, Italians, Jews and many other minorities overcame prejudice and worked their way up. Blacks should do the same without any special favors." And 2) "generations of slavery and discrimination have created conditions that make it difficult for Blacks to work their way out of the lower class."

<sup>4</sup> These values are p\* exposure/isolate indices for all MSAs in 2000 calculated by Logan and colleagues from tract level US Census data. Data were downloaded from: <http://www.s4.brown.edu/us2010/Data/data.htm#WP>.

the face of lower overall levels of segregation.<sup>5</sup> Recognizing this fact, researchers examining trends in segregation routinely control for ‘military specialization’ in models examining segregation and changes in segregation over time and exclude military tracts from the calculation of segregation statistics (see for example, [Friedman et al., 2013](#); [Logan et al., 2004](#); [Wilkes and Iceland, 2004](#)). In light of the negative outcomes associated with racial segregation that affect blacks and their families at all income levels, its absence in the military likely translates to a more equitable distribution of resources and networks, as well as to greater overall social cohesion among the races in the military community.

This paper builds on the observation of higher than average levels of racial integration in the military and the evidence that military service is associated with improved interracial attitudes to examine whether the positive effects of this experience have impacts beyond the years of service. Specifically, we hypothesize that non-Hispanic whites with previous military experience will live in more integrated neighborhoods (net of other characteristics) than those with no military experience. As a recent collection of research on the life course perspectives of veterans makes clear, very little research has been done on the geographic mobility patterns of veterans ([Bailey, 2013](#)). We do know that older veterans are more likely to settle in geographical regions with proximity to a Veterans Administration health facility ([McCarthy et al., 2007](#)). We also know that veterans of all ages have higher than average residential mobility rates compared to nonveterans, and tend to move to larger metro areas upon separation from service ([Bailey, 2011](#); [Plane et al., 2005](#)). However, with the exception of recent research by [Rugh and Fischer \(2015\)](#) examining veteran homebuyers, we have no information on the racial composition of their residential settlement patterns.<sup>6</sup> Our study builds on this research to examine neighborhood outcomes for a nationally representative cohort of young adults that includes both renters and homeowners.

There are other factors that can impact neighborhood choice that are important to consider. People with higher levels of education are more likely to be employed and earn higher levels of income in their jobs than those with less education. Based on this we might expect more educated individuals to have less racial diversity and a higher percent white in their neighborhoods. However, education is also a liberalizing force for many. Research on racial attitudes finds that those with higher levels of education express more positive racial attitudes ([Krysan, 2011](#); [Schuman et al., 1998](#)). Furthermore, the diversity that individuals experience in college might translate positively into the social ties that are made as adults ([Emerson et al., 2002](#)). While more veterans than civilians have some college attainment, many more civilians have a college degree and far fewer have only a high school degree. For this reason, we expect that whites with a college degree or higher will live in neighborhoods that are more diverse and have a lower percentage white than those with lower levels of education.

Life stage factors also prominently shape residential choices. [Fischer et al.’s \(2004\)](#) study of the various dimensions of segregation found that marital status was an important predictor of location. The presence of children furthermore impacts neighborhood choice. Prior research shows that racial composition has both conscious and subconscious effects on the perceptions of neighborhood quality ([Krysan et al., 2009](#)). For example, [Ellen \(2001\)](#) finds that white families with children are particularly sensitive to racial composition of a neighborhood compared to whites in general due to concerns about crime and school quality (see also [Goyette et al., 2014](#)). Thus, we expect that those who are married and who have children in the home will live in less diverse neighborhoods.

The final major individual level factor shaping residential decisions is homeownership. White homeowners tend to live in more racially homogeneous areas than white renters. Furthermore, the neighborhoods in which whites purchase homes tend to appreciate more than homes in areas of minority concentration ([Flippen, 2004](#)). These areas also tend to have higher quality schools and other amenities that serve to attract and retain residents. Given that home equity represents the single biggest asset for most middle class families ([Vornovitsky et al., 2014](#); [Oliver and Shapiro, 2006](#)), locational choice is key. For these reasons we expect that homeownership will be associated with residence in less diverse neighborhoods for whites.

Beyond the individual level, metropolitan level factors can also impact residential choices such as the size and demographic composition of the population, the economic base, and the age of the housing stock ([Farley and Frey, 1994](#); [Iceland, 2004](#); [Logan et al., 2004](#); [Massey and Denton, 1993](#); [South, Crowder, Pais, 2011](#)). Larger metropolitan areas, particularly those with higher percentages of minorities, tend to have higher levels of segregation ([Crowder, 2000](#); [Farley and Frey, 1994](#); [Logan et al., 2004](#); [South et al., 2011](#)). This finding is consistent with [Blalock’s \(1967\)](#) theory of group threat—that majority group’s efforts at self-segregation will be greater as their proportionate representation decreases. Population also plays a role as spatial differentiation is facilitated by greater size ([Wirth, 1938](#)). Therefore we anticipate that whites will live in less diverse neighborhoods when residing in larger metropolitan areas and those with higher percentages of minorities will have higher concentrations of minorities at the neighborhood level for blacks. However, this dynamic may to some extent be an artifact of entrenched patterns of segregation from the past. The presence of newer housing may afford the opportunity for new residential patterns to emerge. For instance, [South and Crowder \(1998\)](#) found that blacks had more white neighbors in metropolitan areas with higher percentages of new housing.

Building upon the neighborhood attainment literature using the lens of the contact hypothesis, the current study makes several unique contributions. Most prominently, we examine whether the experience of racial diversity within the military

<sup>5</sup> For instance, Jacksonville, NC had a black-white dissimilarity score of 27.5 in 2010 and Fayetteville, NC’s score was 30.7 compared to non-military associated cities, like Asheville for example, with a dissimilarity level of 66.2 (CensusScope, 2011).

<sup>6</sup> Recent research has used a life-course perspective to examine neighborhood attainment, particularly for young adults, finding that in early adulthood there is a strong tendency for neighborhood conditions to be replicated especially for whites (eg. [Britton and Goldsmith, 2013](#); [Sharkey, 2013](#); [Swisher, 2013](#); [Wagmiller, 2012](#)).

has benefits that extend beyond service in terms of the subsequent neighborhood choices of veterans in young adulthood. Given the singularity of residence and the potentially high stakes of the decision of where to locate (particularly for homeowners), neighborhood choice represents one of the stronger tests of the contact hypothesis. In the course of looking at this relationship, we consider several competing explanations for neighborhood choices including the respondents' prior neighborhood conditions, attainment of various life stage markers such as marriage, children, and homeownership, and the broader metropolitan context in which the respondent lives. This aspect of our research contributes to a growing area of research examining residential outcomes at different stages of the life course (eg. [Britton and Goldsmith, 2013](#); [Sharkey, 2013](#); [Swisher et al., 2013](#); [Wagmiller, 2013](#)). Thus to the extent that military service helps to shape this important choice beyond the impact of other factors, our findings represent an important contribution to the literature about the ways that military service can impact individuals over the life course. Our paper also adds to a long tradition of research on the effects of military racial contact, being the first to extend the focus to the residential settlement patterns of all veterans, both renters and homeowners alike.

### 3. Data and methods

To explore the impact of military service on adult neighborhood outcomes, we used the restricted version of the National Educational Longitudinal Study (NELS) and data from the 2000 Census.<sup>7</sup> The baseline NELS is comprised of a nationally representative sample of 8th graders who were surveyed in the spring of 1988. A follow-up sample of students from this baseline study was interviewed in four subsequent survey waves in 1990, 1992, 1994, and 2000. We focus here on the residential choices of non-Hispanic whites from the fourth follow-up study conducted in 2000 in which most respondents were age 26. The decision to focus on whites was two fold. First, there are simply not very many black veterans in the sample, which severely limits our ability to conduct a meaningful analysis ( $N = 50$ ). Secondly, prior research shows that whites are the most likely to experience changes in racial attitudes as a result of interracial contact. In addition, our focus on whites is consistent with past research ([Lawrence and Kane, 1996](#); [Nteta and Tarsi, 2015](#)).

We further restrict our analytic sample to those who were not living with their parents at the time of the fourth follow-up since such individuals likely are not making the primary decision about the residential location of their dwelling. The restricted data includes ZIP codes for the 4th follow-up respondents, which we merge with the 2000 Census.<sup>8</sup> We use MI in STATA to multiply impute missing data on variables other than the dependent variables or the key independent variable, veteran status.

#### 3.1. Dependent variables

We examine the racial composition (% non-Hispanic white, % black, % Hispanic) and the overall racial diversity of the ZIP code in which respondents resided in 2000. Racial diversity is measured as the entropy of the ZIP code, calculated with the following formula:<sup>9</sup>

$$Entropy = \sum_{i=1}^n p_i \log\left(\frac{1}{p_i}\right)$$

where  $p_i$  is the percent of each racial/ethnic group in the ZIP code summed over  $n$  racial/ethnic groups in the ZIP code ([Theil and Finizza, 1971](#)). The maximum value is  $\log(n)$ , representing maximum diversity. The minimum value is 0, representing no diversity (i.e. only one group is present). While the use of census tracts is more common in neighborhood research, ZIP code level measures have been used in prior studies to approximate neighborhoods (eg. [Britton and Goldsmith, 2013](#); [Emerson et al., 2001](#)). [Table 1](#) shows the average diversity of the neighborhoods for civilians and veterans in the first row. Civilians lived in slightly less diverse neighborhoods compared to veterans (0.58 versus 0.60). The largest variation was in the percent same group, which was 76.5% for veterans and 79% for civilians. Relative to civilians, white veterans had a slightly higher percentage of blacks and Hispanics in their neighborhoods.

#### 3.2. Individual level factors

Our key independent variable is veteran status, which we construct from two questions asked in the 4th follow-up: whether the individual has served in the armed forces and whether they are currently serving. We code respondents who

<sup>7</sup> In accordance with the Institute of Educational Sciences restricted-use data license for NELS, all N's in this analysis are rounded to the nearest 10.

<sup>8</sup> The true units of measure in this analysis are ZIP Code Tabulation Areas (ZCTAs), which are generalized areal representations of United States Postal Service (USPS) ZIP Code service areas created by the U.S. Census Bureau for the 2000 Census—we simply use the term “ZIP code” for ease of presentation.

<sup>9</sup> In the event that a group's percentage is 0 that element is dropped from the summation and the entropy score is based on the remaining non-zero groups.

**Table 1**

Descriptive statistics for non-Hispanic white respondents in the NELS.

	Civilian		Veteran <sup>a,b</sup>	
	Mean	SD	Mean	SD
Neighborhood characteristics, 2000				
Diversity (entropy)	0.563	0.313	0.604*	0.317
% NH White	0.796	0.185	0.764**	0.205
% Black	0.080	0.125	0.092	0.137
% Hispanic	0.071	0.104	0.091**	0.137
Individual characteristics				
Male	0.446	0.497	0.866***	0.341
Married	0.477	0.499	0.487	0.501
Children in Hhold	0.600	0.933	0.714*	0.998
Homeowner	0.377	0.485	0.336	0.474
Parents' SES	0.832	3.936	1.034	4.973
Education				
<HS	0.037	0.189	0.004**	0.067
HS only	0.146	0.353	0.300***	0.459
Some college	0.411	0.491	0.606***	0.490
College degree or higher	0.393	0.488	0.078***	0.269
MSA characteristics, 2000				
Diversity (entropy)	0.722	0.288	0.733	0.271
% Armed forces	0.007	0.020	0.013***	0.032
% Enrolled in college	0.092	0.048	0.087	0.043
% Built 1990s	0.172	0.074	0.193***	0.085
Total population (Logged)	13.550	1.886	13.349	1.713
Northeast	0.165	0.371	0.086***	0.280
Midwest	0.299	0.458	0.346	0.476
South	0.261	0.439	0.264	0.442
West	0.124	0.330	0.156	0.364
Neighborhood characteristics, 1990				
% White	0.901	0.127	0.895	0.147
CBSA diversity	0.722	0.287	0.733	0.271
Other diversity questions from NELS				
% Same Race in neighborhood grew up	0.845	0.210	0.818	0.241
N	6560		270	

\*\*\*p &lt; 0.001, \*\*p &lt; 0.010, \*p &lt; 0.050.

<sup>a</sup> Non-active duty veterans only.<sup>b</sup> Two-tailed t-tests used to determine significance of difference in means.Data Source: [National Educational Longitudinal Study, 1988](#) (fourth follow-up).

have served in the military but are non-active as 'veterans', which represents about 4% of our non-Hispanic white sample. Those who indicate they are currently serving are coded as 'active duty'.<sup>10</sup> Because those who are currently serving are necessarily exposed to more diverse communities, whether in military quarters or in the more racially integrated communities outside of military bases, we have chosen to exclude them from our study. We wish to examine the independent residential behaviors of individuals who are no longer subject to military policies. This reduces our sample size by about 130 respondents.

Residential choices are shaped by a variety of factors as described above, including life stage and education. The descriptive statistics for the variables used in our analysis are reported separately for civilians and veterans in [Table 1](#). All of our respondents are approximately 26 years of age as of the 4th follow-up so we do not report age here. Whereas a little under half of the civilians are male (46%), males account for the vast majority of veterans (87%). We also control for life-stage and economic characteristics that might influence locational decisions. Individuals who are married, own homes, and especially those with children in the household are often more sensitive to neighborhood racial composition. Veterans are similarly married as civilians (41% versus 42%), but slightly more report the presence of children in their household (64% versus 53%). For both groups, about a third own their homes (33% of civilians versus 30% of veterans).

It is possible that childhood exposure to other groups can significantly influence neighborhood residential decisions later in life. To address this possibility, we control for childhood neighborhood racial composition using the racial composition of the ZIP code from the first wave survey.<sup>11</sup> Veteran and civilian whites lived in neighborhoods in the 8th grade that were almost identical in the percent white, 90.1% for civilians versus 89.5% for veterans. Childhood socioeconomic status from the

<sup>10</sup> Unfortunately we cannot discern the length of service from our data, which would be another aspect to examine since presumably those who served longer in the military would have experienced more interracial contact.

<sup>11</sup> First wave ZIP codes were missing for ~370 (5%) of the analytic sample so for these cases data are imputed with a variety of variables, including the estimated percent same race in the neighborhood growing up from the fourth wave survey.

baseline survey is also included as a control variable, a factor that may influence both the propensity to go into the military as well as potentially neighborhood selection in adulthood.

### 3.3. Metropolitan level controls

The metropolitan context can impact neighborhood location beyond individual level factors discussed above. In addition to the racial composition of the metropolitan area of residence, we also include several factors that have been found in prior research to be related to levels of metropolitan segregation such as the size of the metropolitan area, racial diversity, percent employed in the military, the percent enrolled in college, and the percent of housing that is new. Veterans are somewhat more concentrated in the South and West, while civilians have greater concentrations in the Northeast.

### 3.4. Analytic strategy

We examine the effects of veteran status and other key factors on neighborhood choice in early adulthood using a nested model approach. Our models adjust for clustering at the primary sampling unit level, which is the original method of stratification used to draw the sample. The logic in using this as our clustering unit, rather than where the respondents currently live stems from NELS origins as a school-based sample. Thus, respondents who were originally in the same school together may share unobserved characteristics that make them similar to one another. We have run the models without this clustering, as well as with clustering at the metropolitan level, finding similar results.<sup>12</sup> Further, to account for the complex sampling design of the NELS, in particular the use of probability-based subsamples in follow-up surveys, we tried running our models both with and without panel weights. Finding substantively similar parameter estimates for both sets of models, we chose to present the findings from the models without weights as they are more efficient and the standard errors are more reliable (see [Winship and Radbill, 1994](#)).<sup>13</sup> Our models contain a variety of controls that should address issues of selection into the military, but as a check on the robustness of our results we also run propensity score models to directly estimate the effect of veteran status relative to civilians most similar to veterans whom did not serve.

### 3.5. Findings

The results from our model predicting neighborhood percent non-Hispanic white are shown in [Table 2](#). The first model shows the effect of military service, which is negative and significant for veterans. Veterans are predicted to have 3.2% fewer non-Hispanic whites in their neighborhood than those who have not served. The second model adds educational attainment, which increases the negative effect of veteran status ( $B = -0.048$ ). Higher levels of education are associated with lower percentages of non-Hispanic white in the ZIP code of residence, which is consistent with our second hypothesis that education would be associated with less racial isolation. This finding lends support to theories relating to the liberating effects of education and could also be interpreted as further positive long-term evidence for the contact hypothesis since college campuses tend to be one of the more diverse settings experienced by many non-Hispanic whites ([Fischer, 2008](#)).

Our next model adds family and household factors to the model. Consistent with prior research, we find that those who are married reside in neighborhoods with a higher percent white ( $B = 0.027$ ). The presence of children in the home is further associated with an increase in neighborhood percent white of 0.006 per child. Net of marital status and children, homeowners are predicted to have 3.7% higher percent white in their neighborhoods compared to non-homeowners. These findings lend support to the importance of life stage and long-term investment on locational decisions.<sup>14</sup> This model also includes controls for family and childhood neighborhood characteristics. The percent white in the neighborhood in the baseline survey year is strongly related to the percent white in the neighborhood in early adulthood ( $B = 0.626$ ), which is consistent with other research showing a high degree of intergenerational transmission of neighborhood conditions ([Sharkey, 2008; 2013](#)). However, net of these factors, veteran status continues to be significantly related to fewer white neighbors.

The final model adds metropolitan level controls. The overall diversity of the metropolitan area has a strong and negative relationship to the percent non-Hispanic white ( $B = -0.334$ ). Living in a metropolitan area with a larger military presence, higher percentages of college students, and more new housing are also associated with fewer non-Hispanic whites in the neighborhoods of non-Hispanic whites, though these effects are more modest in magnitude than the effect of diversity. These findings are consistent with prior research which suggests that the presence of more meritocratic institutions in the metropolitan area (such as the military and higher education) are associated with higher levels of neighborhood integration for whites. More integrated residential patterns are also facilitated by new housing stock, which offers an opportunity for less segregated housing patterns to emerge since much of the current segregation in cities today is rooted in entrenched patterns

<sup>12</sup> We have run multi-level models with metropolitan level clustering for these analyses and had very similar analytic findings. However, there is not substantial metropolitan clustering among the fourth wave follow-up respondents, thus this modeling strategy is not appropriate for the data.

<sup>13</sup> The results for the models with panel weights included are available from the authors upon request, pending approval of the NCES as restricted data is utilized for these models.

<sup>14</sup> We also tested specifically whether the presence of young children in the household (under age 18) was related to neighborhood composition, but since this variable was not significant in any of our models we removed it for parsimony.

**Table 2**

OLS regression models predicting neighborhood % white for non-Hispanic whites, 2000 (N = 6830).

	Model 1	Model 2	Model 3	Model 4	Model 5
Military status					
Veteran	−0.032* (0.013)	−0.048*** (0.013)	−0.046*** (0.013)	−0.040*** (0.011)	−0.025* (0.010)
Education <sup>a</sup>					
Some college		−0.042*** (0.006)	−0.035*** (0.006)	−0.027*** (0.005)	−0.010* (0.005)
College degree or higher		−0.080*** (0.007)	−0.064*** (0.007)	−0.053*** (0.006)	−0.018*** (0.005)
Individual demographics					
Male		−0.002 (0.005)	0.005 (0.005)	0.004 (0.004)	0.004 (0.003)
Married			0.027*** (0.005)	0.025*** (0.004)	0.015*** (0.004)
Children in hold			0.004 (0.003)	0.006** (0.002)	0.001 (0.002)
Homeowner			0.038*** (0.006)	0.037*** (0.005)	0.024*** (0.004)
Family/Nhood background					
Parent's SES in childhood				−0.001 (0.000)	0.000 (0.000)
% Same Race childhood				0.626*** (0.026)	0.392*** (0.022)
Metropolitan controls					
% Armed forces					−0.314** (0.109)
% Enrolled in college					−0.045 (0.028)
% Built 1990s					−0.061* (0.030)
Total population (Logged)					0.010*** (0.001)
Midwest					0.007 (0.005)
South					−0.008 (0.007)
West					−0.026*** (0.006)
CBSA diversity					−0.334*** (0.011)
Constant	0.789*** (0.002)	0.846*** (0.006)	0.793*** (0.007)	0.233*** (0.025)	0.558*** (0.025)
R <sup>2</sup>	0.0011	0.0260	0.0484	0.2353	0.4200

\*\*\*p&lt;0.001, \*\*p&lt;0.010, \*p&lt;0.050, (standard errors in parentheses clustered by school).

<sup>a</sup> High school diploma or less excluded as reference category.Data Source: [National Educational Longitudinal Study, 1988](#) (fourth follow-up).

of segregation from the post-WWII housing boom. The size of the metropolitan area, on the other hand, is positively associated with percent white suggesting a tendency for whites to be slightly more racially isolated in larger metro areas ( $B = 0.010$ ). The addition of these factors slightly decreases the coefficient for veteran status, but it remains significant ( $B = -0.025$ ). The effect of education, marriage, and homeownership are also diminished with the addition of metropolitan controls but retain statistical significance.

Table 3 shows the results of the models predicting diversity in the neighborhoods of non-Hispanic white young adults. Consistent with our hypothesis, veterans choose to live in significantly more diverse neighborhoods compared to civilians ( $B = 0.041$ ). Neighborhood diversity is also higher for those with higher levels of education, with an estimated increase in diversity of 0.093 for some college and 0.186 for those with a college degree or higher compared to those with a high school diploma or less. Veterans are predicted to live in neighborhoods with a diversity score that is 0.078 points higher than civilians once education is controlled.

Just as we found that life stage factors are related to the percent white in the neighborhoods of young adults, we similarly find these factors to be related to neighborhood diversity. We find that respondents who are married, have children in the household, and/or are homeowners have significantly lower predicted neighborhood diversity. Beyond current circumstance, childhood SES and neighborhood background are also associated with neighborhood outcomes in young adulthood. Interestingly, respondents with higher SES parents in the 8th grade choose slightly more diverse neighborhoods ( $B = 0.003$ ), while the percent white in the neighborhood in the 8th grade is associated with significantly less diverse neighborhood in adulthood net of other factors ( $B = -0.885$ ).

**Table 3**

OLS regression models predicting neighborhood diversity for non-Hispanic whites, 2000 (N = 6830).

	Model 1	Model 2	Model 3	Model 4	Model 5
Military status					
Veteran	0.041* (0.019)	0.078*** (0.020)	0.073*** (0.020)	0.065*** (0.020)	0.033* (0.015)
Education <sup>a</sup>					
Some college		0.093*** (0.010)	0.080*** (0.010)	0.068*** (0.009)	0.032*** (0.007)
College degree or higher		0.186*** (0.011)	0.151*** (0.012)	0.136*** (0.010)	0.061*** (0.009)
Individual demographics					
Male		0.009 (0.008)	−0.006 (0.008)	−0.005 (0.007)	−0.007 (0.005)
Married			−0.049*** (0.008)	−0.046*** (0.008)	−0.026*** (0.006)
Children in Hhold			−0.011* (0.005)	−0.015*** (0.004)	−0.002 (0.003)
Homeowner			−0.078*** (0.011)	−0.075*** (0.009)	−0.048*** (0.007)
Family/Nhood background					
Parent's SES in childhood				0.003*** (0.001)	0.000 (0.001)
% Same race childhood				−0.885*** (0.051)	−0.393*** (0.033)
Metropolitan controls					
% Armed forces					0.628*** (0.150)
% Enrolled in college					0.226*** (0.054)
% Built 1990s					0.294*** (0.047)
Total population (Logged)					−0.013*** (0.003)
Midwest					−0.026** (0.009)
South					0.011 (0.012)
West					0.058*** (0.009)
CBSA diversity					0.660*** (0.017)
Constant	0.563*** (0.008)	0.447*** (0.011)	0.534*** (0.013)	1.338*** (0.048)	0.541*** (0.044)
R <sup>2</sup>	0.0006	0.0483	0.0790	0.2120	0.4972

\*\*\*p&lt;0.001, \*\*p&lt;0.010, \*p&lt;0.050; (standard errors in parentheses clustered by school).

<sup>a</sup> High school diploma or less excluded as reference category.Data Source: [National Educational Longitudinal Study, 1988](#)

Beyond the individual and household, metropolitan factors significantly shape neighborhood outcomes. As we saw in the previous model, larger metropolitan areas are associated with less neighborhood diversity for whites net of other factors (−0.013). On the other hand, the overall diversity of the metropolitan area is strongly and positively related to neighborhood composition (B = 0.660). The percent armed forces in the metropolitan area, the percent enrolled in college, and the percent of housing built in the 1990s are also positively related to neighborhood diversity for respondents, which is in line with our theoretical expectations. Once these metropolitan characteristics are controlled for, veteran status is still significant at a slightly lower magnitude (B = 0.033). These findings provide evidence for a long-term impact of military service on the residential choices of veterans. Comparing these findings to [Table 2](#), our findings are roughly the inverse for neighborhood percent white.

We estimated additional models predicting the percent black and Hispanic to get a sense for the other racial groups that comprise the neighborhood diversity findings (see [Appendix A](#)). Veteran's status and higher levels of education are associated with a slightly higher percent black in the neighborhood in the models with only individual level controls, but the coefficient for veterans' status becomes non-significant in the full model that includes metropolitan level factors. The results for percent Hispanic are similar to those predicting percent black—with a small but significant positive effect of veterans' status on percent Hispanic with individual controls that diminishes to non-significance once metropolitan controls are introduced.

To test the robustness of our results, we performed a sensitivity analysis using propensity score matching to compare a subset of civilians who were most like our veterans prior to their choice of military service to then estimate the effect of veteran's status relative to this group. The propensity score matching estimates of the average effect of veteran's status on

neighborhood diversity was 0.0663 compared to an estimate of 0.041 from the baseline model. The other outcomes are also significant. The fact that the impact of veteran's status is even stronger in the matched sample than it is in our baseline models suggest that our results may in fact underestimate the veteran effect (See [Appendix A](#)).

On the whole, we find that young white veterans live in neighborhoods that are significantly more diverse and have a lower percentage non-Hispanic white than their civilian counterparts. The results for the models predicting percent black and Hispanic in the neighborhood were not as strong for veterans, reinforcing that it is overall diversity and not co-residence with a particular group that is driving our findings (See [Appendix B](#)). Being married as well as homeownership reduced the impact of veteran's status to some extent, but it remained significant. The neighborhood racial composition of where the respondent lived in the 8th grade was strongly correlated with neighborhood choice in adulthood as well. The overall racial diversity of the metropolitan area had a positive impact on white's choice of more diverse neighborhoods, as did having a greater percentage of the housing stock built in the past 10 years prior to the study (in line with the housing availability perspective).

#### 4. Discussion

This paper has examined the neighborhood diversity of veterans compared to civilian young adults to test a basic premise of the contact hypothesis: that prolonged interracial contact will have a positive effect on long-term intergroup relationships. We find that young non-Hispanic white veterans are settling in neighborhoods with fewer whites and greater racial diversity than their civilian counterparts. These effects remain even after controlling for a host of individual, household, and metropolitan level characteristics. It should also be noted that our sample of veterans is relatively small (less than 5% of the 4th follow-up non-Hispanic white respondents), making it difficult to attain enough statistical power to pick up an effect. Thus, the significance of the relationship we evaluate is likely to be underestimated. Other recent research looking at veteran homebuyers finds similarly compelling effects of military service on locational outcomes ([Rugh and Fischer, 2015](#)). While the effect sizes may appear to be small, they are similar in magnitude to effects of education on neighborhood outcomes. Furthermore, the decline in racial isolation for white veterans puts them close to a decade ahead of declines in racial isolation observed at the national level for the white population (Logan and Stults, 2011).

Most tests of the contact hypothesis focus on outcomes that are more immediately related to exposure to diversity, such as the effect of residing on a diverse college campus on interracial attitudes. Of tests that have a longitudinal component, the outcomes being measured are usually friendship diversity or racial attitudes. Locational decision-making is a strong test of the contact hypothesis due to the fact that a) individuals (typically) only have one residence at a time, b) the semi-permanence of such decisions (eg. even if one is renting mobility is not completely fluid), and c) the wide variety of ways in which where one lives affects their day to day life and interactions. For these reasons, it is particularly noteworthy that we are seeing a longer-term impact of being a veteran on the choice of neighborhoods that are less-white and with greater overall diversity.<sup>15</sup>

This paper is a first step in assessing the impact of military service on residential integration as a possible long-term effect of intensive social contact setting. But there are some possible alternatives to explain why white veterans settle in less race-homogenous neighborhoods. Thinking back to findings showing that older veterans sometimes settle in areas to better access VA healthcare, it may be that younger veterans are settling near military bases because they prefer military communities or retain some base-access benefits.<sup>16</sup> Thus, their own greater neighborhood diversity may simply reflect the greater diversity of military communities. To test for this, we assessed proximity to a military base in the resettlement patterns of veterans by interacting veteran status with the percent of armed forces representation in their metropolitan area. The interaction was non-significant in all models.

Another factor potentially influencing our findings is the fact that interracial marriage is more common in the military. If more white veterans than civilians are married to non-white partners with multiracial children, they may undergo a differing decision-making process as regards the preferred racial composition of their neighborhoods. Unfortunately the NELS does not include information on the race of the respondent's spouse or children, but future research using other data should investigate this possibility.

It may also be that veterans prefer more diverse neighborhoods because those were the types of neighborhoods they grew up in, which [Table 1](#) indicates might be the case. This could be related to childhood differences in SES or could also relate to the intergenerational transmission of military service, whereby children of soldiers are themselves likely to enlist in the military. Children who grow up in the military are exposed to the same sorts of racial integration and diversity in their neighborhoods and schools as their parent's experience, and thus their future settlement behavior could be a compelling suggestion of even longer term impacts of the social contact hypothesis ([Burland and Lundquist, 2013](#)). To get at the pre-service neighborhood effect we interacted veteran status with the percentage of same race exposures as a child. While we

<sup>15</sup> It is important to note that our measure of neighborhood racial composition represents one snap shot in time, which is in reasonable proximity to the survey year but not necessarily when the respondent moved to the neighborhood. Given the limitations of both the NELS and Census it is not possible to neighborhood racial transition.

<sup>16</sup> We have base information for the 100 largest cities and so we were able to examine whether veterans were any more likely to live in base metros than civilians. We found that similar percentages live in base communities, thus we do not think there is a strong bias for young veterans towards these communities.

do not have a measurement for parents' veteran status, this at least allows us to see how much our main effect is driven by pre-service experiences. However, this interaction term was not significant in any of our models.

These concerns are generally related to the problem of selection—that those who serve in the military may be systematically different from those who do not serve and that these differences may drive the results that we find. Thus in addition to the tests above, we also employed propensity score matching to create a sample of civilians who are similar to the veterans on a number of factors except that they did not serve in the military. Using this method, we generally find a stronger effect of veteran status on neighborhood diversity, which suggests that our results may in fact underestimate the effects of military service on locational outcomes.

Understanding veterans' racial resettlement patterns is important for a number of reasons. In a society where racial residential segregation remains largely intractable for some marginalized groups, it is important to ask where we can find an exception to the rule and then ask why. In this paper we have addressed the first part of that question, showing that white US veterans do not behave similarly to the average white civilian. This is a positive trend that has gone largely unnoticed. The possible long-term desegregation effect of military service should be examined more closely to understand its cause(s) and to potentially draw lessons for larger society on what conditions might lead to similar trends among civilian society. Given the Pentagon's recent budget cuts and ongoing personnel reductions, the military may soon be reduced to its lowest number since the 1940s (Department of Defense 2014). While many applaud this downsizing along with an end to long running global conflicts, now is the time to gather data on resettlement patterns to better understand whether desegregation can be attributed in any degree to the military as one of its more positive long lasting legacies.

## Appendix A. ATT and baseline.

	Diversity		% White		% Black		% Hispanic	
	B	SE	B	SE	B	SE	B	SE
Veteran baseline model	0.041	0.019*	−0.032	0.013*	0.012	0.009	0.020*	0.009
Veteran treatment effect	0.066	0.025**	−0.045	0.015**	0.012	0.010	0.030	0.010

Data Source: National Educational Longitudinal Study, 1988.

\*\*\*p < 0.001, \*\*p < 0.010, \*p < 0.050; (standard errors in parentheses clustered by school).

ATET variables: BYSES, male, pwhite90, totpop.

Effect of veteran is somewhat stronger once we control for selection into veteran status.

## Appendix B. OLS regression models predicting neighborhood % Black and % Hispanic for non-Hispanic whites, 2000 (N = 6830).

	% Black		% Hispanic	
	Model 1	Model 2	Model 3	Model 4
Military status				
Veteran	0.015 (0.008)	0.008 (0.007)	0.020* (0.008)	0.014 (0.008)
Education <sup>a</sup>				
Some college	0.003 (0.003)	0.005 (0.003)	0.013*** (0.003)	0.000 (0.003)
College degree or higher	0.010* (0.004)	0.010* (0.004)	0.015*** (0.004)	−0.006 (0.004)
Individual demographics				
Male	−0.004 (0.003)	−0.004 (0.003)	0.001 (0.003)	−0.000 (0.002)
Married	−0.005 (0.003)	−0.007* (0.003)	−0.011*** (0.003)	−0.004 (0.003)
Children in Hhold	−0.005** (0.002)	−0.004* (0.002)	−0.001 (0.002)	(0.001)
Homeowner	0.002 (0.003)	−0.001 (0.003)	−0.020*** (0.003)	−0.013*** (0.003)
Family/Nhood background				
Parent's SES in childhood	−0.000 (0.000)	−0.001* (0.000)	0.001* (0.000)	0.000 (0.000)
% Same race childhood	−0.393*** (0.026)	−0.326*** (0.026)	−0.169*** (0.020)	−0.053*** (0.016)
Metropolitan controls				
% Armed forces		0.523*** (0.100)		−0.347*** (0.056)

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(continued)

	% Black		% Hispanic	
	Model 1	Model 2	Model 3	Model 4
% Enrolled in college		–0.06 (0.031)		–0.003 (0.026)
% Built 1990s		0.130*** (0.024)		0.038 (0.023)
Total population (Logged)		–0.007*** (0.001)		–0.004*** (0.001)
Midwest		–0.014*** (0.004)		0.005 (0.003)
South		–0.010* (0.005)		0.012** (0.004)
West		–0.081*** (0.005)		0.060*** (0.006)
CBSA diversity		0.088*** (0.008)		0.177*** (0.008)
Constant	0.436*** (0.024)	0.403*** (0.033)	0.225*** (0.020)	0.042 (0.022)
R <sup>2</sup>	0.1671	0.2407	0.0671	0.2625

Data Source: National Educational Longitudinal Study, 1988 (fourth follow-up)

\*\*\*p &lt; 0.001, \*\*p &lt; 0.010, \*p &lt; 0.050; (standard errors in parentheses clustered by school).

<sup>a</sup> High school diploma or less excluded as reference category.

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