

2020-03

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Jessica T. Simes. 2020. "The Ecology of Race and Punishment across Cities." *City & Community*, Volume 19, Issue 1, pp. 169 - 190. <https://doi.org/10.1111/cico.12425>
<https://hdl.handle.net/2144/40373>

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The Ecology of Race and Punishment Across Cities

Abstract

In an era of mass incarceration in the United States, neighborhood context plays a significant role in demographic patterns of imprisonment. This paper examines the pre-prison neighborhood environment of racial and ethnic groups within the Massachusetts prison admission population. The data include over 12,000 prison records of individuals sentenced to state prison for a criminal offense between 2009 and 2014. Findings indicate significant spatial variation across racial groups: the most disadvantaged pre-prison neighborhoods exist in small cities outside of Boston. Whites and Hispanics who enter prison from small cities, suburbs and rural towns in Massachusetts lived in significantly more concentrated disadvantage than their counterparts in Boston. However, black men and women coming from Boston and small cities lived in the greatest concentrated disadvantage among the black admission population. Black and Hispanic incarcerated people live in significantly higher levels of concentrated disadvantage as compared to the average neighborhood of white incarcerated people. Results indicate the prison population is drawn from a diverse set of communities, and suggest that an understanding of the full picture of differences in neighborhood context may play an important role in understanding community-level conditions of mass incarceration and inform interventions aimed at ameliorating the deleterious effects of imprisonment.

Keywords: neighborhoods; small cities; imprisonment

Research on the neighborhood conditions of mass incarceration has identified in large cities the intimate link between incarceration rates, crime and poverty-related conditions of neighborhood disadvantage (Cadora et al. 2003; Clear 2007; Fagan et al. 2003; Sampson and Loeffler 2010; Sampson 2012; Travis et al. 2014: Chapter 10). Although this research has been important in describing neighborhood inequality and punishment, by focusing attention on individual cities, this literature presents a picture of neighborhoods or cities as isolated from each other and detached from the broader penal landscape crosscutting them. This perspective is at odds with prominent arguments about the relationship between poverty, racial inequality, and social control, which focus on the degree of demographic concentration across highly disparate geographic segments of the United States. Thus, the literature on place and punishment has left small cities, suburbs and rural areas virtually unexplored and underexamined as part of mass incarceration and its persistence.

One consequence of this limited spatial view is that we do not fully understand the degree to which pre-incarceration neighborhoods vary across racial and ethnic groups involved in the criminal justice system. In particular, we know little about how pre-incarceration neighborhoods differ for subgroups across cities. Scholars have examined the racial-spatial divide in exposure to crime (Peterson and Krivo 2010), and the fundamentally divided social world that whites and non-whites occupy in the United States. But among a disadvantaged population such as incarcerated people, how does neighborhood disadvantage vary? Despite evidence of significant spatial variation in incarceration (Subramanian, Henrichson, and Kang-Brown 2015), scholars have restricted analyses to single large-city case studies, and thus a theoretical framework remains untested outside large metropolitan cities. This has two main implications. First, it is possible that by truncating our analysis of the spatial distribution of incarceration, we attenuate

the large gaps in neighborhood life immediately preceding a prison term. Second, conditions of social control and concentrated disadvantage have been under-theorized in small cities. Thus, small cities have received very little attention in the literature on mass incarceration and neighborhood disadvantage, despite the significance of non-metropolitan areas for the persistence of mass imprisonment in the United States.

In this paper I analyze concentrated disadvantage in pre-incarceration neighborhoods for a sample of men and women admitted to state prison for a new criminal offense in 2009–2014 who, prior to their imprisonment, resided in Massachusetts. Using the entire state as the sample of neighborhoods in which an individual may be living prior to incarceration, I examine the pre-prison neighborhood environment of racial and ethnic groups within the prison population with unprecedented detail, moving beyond the focus in prior research on data from single large-city case studies. Understanding the differences in neighborhood context across cities and towns could influence how we understand community-level conditions of mass incarceration, as well as place-based criminal justice reform. This paper is further motivated by the growing interest in small cities in urban and community sociology—places that have received far less attention than large urban cities, particularly in studies of crime, incarceration, and neighborhood disadvantage (Simes 2018).

Findings show the most disadvantaged pre-prison neighborhoods come from places outside of Boston—the largest and most densely populated city in Massachusetts. Whites and Hispanics who enter prison from small cities, suburbs, and rural areas in Massachusetts lived in significantly more concentrated disadvantage than their counterparts in Boston. However, black men and women living in Boston and small cities prior to state imprisonment lived in the greatest concentrated disadvantage among the black admission population. Taken together, the prison

population is drawn from a diverse set of communities, and the highest levels of concentrated disadvantage in the state are composed of small cities and suburban towns. To understand the relationship between racial inequality and patterns of social control, a wide range of cities should be included in an analysis of the neighborhood context of mass incarceration.

RACE, NEIGHBORHOOD DISADVANTAGE, AND MASS IMPRISONMENT

Over the past several decades, racial and ethnic disparities in imprisonment have provoked intense scholarly and policy concern. An extensive research literature has uncovered the ways these racial disparities map onto disparities in other realms of life—from political participation (Uggen and Manza 2002) to employment (Pager 2007) to the fundamental ways we measure and understand economic and social inequality in America (Western 2006; Beckett and Western 2001; Pettit 2012). Less is known, however, about how these racial disparities relate to disparities in neighborhood context. Although it is clear that blacks reside in the poorest neighborhoods after prison (Hipp, Turner, and Jannetta 2010; Morenoff and Harding 2014), prior research has not fully examined whether these patterns reflect existing residential inequalities by race and ethnicity, or in small cities. Do incarcerated people of different racial and ethnic groups come from starkly different neighborhood contexts outside of large cities?

Neighborhood Disadvantage and the Residential Patterns of Incarcerated People

Scholars have studied the relationship between place and punishment in a number of ways. First, Massoglia, Firebaugh, and Warner (2013) examine how incarceration affects neighborhood attainment after prison, finding that whites experience an incarceration effect on neighborhood attainment, while non-whites who come from highly disadvantaged neighborhoods see little change in neighborhood quality after a period of incarceration. Kirk (2009; 2015)

examines the effect of neighborhood disadvantage in pre- and post-prison residential locations, and in particular, the effect of neighborhood context on recidivism; Kirk finds across multiple studies that neighborhood disadvantage and returning to one's former neighborhood significantly increases the chance of future criminal activity and incarceration.

The consequences of living in a disadvantaged neighborhood for life chances have been broadly examined in terms of economic outcomes (Sampson 2012; Besbris et al. 2014), exposure to crime and violence (Peterson and Krivo 2014; Sharkey 2013), and the increased chance of recidivism (Kirk 2009). For example, Besbris et al. (2015) find that individuals from disadvantaged neighborhoods bear a stigma that influences their prospects in economic exchanges, and that "residence in a disadvantaged neighborhood not only affects individuals through mechanisms involving economic resources, institutional quality, and social networks but also affects residents through the perceptions of others" (p. 4994). The potential double stigma of living in a disadvantaged neighborhood with a felony record calls for additional understanding of the patterns of inequality between racial groups and their residential locations, particularly for formerly incarcerated people. This could be particularly important in an analysis of the ecological context of criminal justice contact across cities and towns and in disadvantaged neighborhoods.

However, few studies directly observe the neighborhood environments of pre-incarceration neighborhoods for a sample of prison admissions for an entire penal jurisdiction. Previous studies of pre-incarceration neighborhoods have typically examined national samples of census tracts (Massoglia, Firebaugh, and Warner 2013) or single cities (Sampson and Loeffler 2010; Cadora et al. 2003; Fagan et al. 2003), neither allowing for an analysis of all populations residing within an entire prison jurisdiction. The current study expands this work by examining

address-level data, to study the spatial pattern of incarceration beyond large cities across an entire prison jurisdiction.

Recent research has drawn attention to the growth in criminal justice contact in small cities and rural towns. Non-metropolitan counties now account for the lion's share of jail and prison incarcerations in the United States. According to a recent Vera Institute of Justice report, in the 35 states for which there is reliable county-level data, there is an almost universal urban-to-rural shift in prison admissions, regardless of whether admissions are declining in the state as a whole (Subramanian, Henrichson and Kang-Brown 2015). Eason (2010; 2017) has demonstrated the proliferation of prisons to rural areas and how this has shaped the social, political and economic conditions of rural areas in the United States. Few researchers have examined small cities—places that have been significantly impacted by deindustrialization (Cowie and Heathcott 2003; Hobor 2012; Bell and Jayne 2009), poverty (Murphy 2007), and the opioid crisis (Kneebone and Allard 2017), while not experiencing the same benefits of the crime decline that large cities have experienced (Matthews, Maume and Miller 2001). The current study analyzes prison admissions disaggregated by race and ethnicity and the spatial structure of pre-prison neighborhoods across all cities in Massachusetts, moving beyond an urban-rural framework.

The Ecology of Race and Punishment

Social scientists consider race and place to fundamentally organize social disadvantage and advantage in the United States (Sampson 2012; Bonilla-Silva 2001; Omi and Winant 1994). In particular, scholars have argued that there exists a qualitative difference in the experience of concentrated disadvantage between racial groups. William Julius Wilson (1987) argues that concentrated disadvantage is unique to the urban black population, and Sharkey (2013) shows in

comparing black and white children who live in poor neighborhoods, blacks are more likely to have lived in poor neighborhoods for multiple generations. Communities and neighborhoods are key aspects of the racially differentiated experience of social life, and these hierarchically dispensed advantages and disadvantages in place also yield differences in the punishments experienced by those living in these places (Peterson and Krivo 2010).

Racial differences in pre-prison neighborhood environment may exist for a number of reasons. African Americans and Hispanics are more likely than whites to live in extreme residential segregation, and these neighborhoods tend to be where prison admissions and incarceration rates are most concentrated (Sampson 2012). Neighborhood disadvantage may be more prevalent among blacks and Hispanics entering prison due to this broader population dynamic of racial and ethnic disparities in place and neighborhood attainment. Whites with a prison record, however, also tend to be socio-economically disadvantaged, which may be important for understanding the pre-prison neighborhoods of whites. Among a recent cohort of men, 68% of black men who dropped out of high school served time in prison, and 28% of whites and 20% of Hispanics who dropped out had a prison record by the peak of the prison boom (Travis, Western and Redburn 2014).

Levels of violent crime and perceptions of crime can profoundly impact the spatial pattern of arrest, conviction, and offending, as well as biases about race and criminality (Besbris et al. 2014; Quillian and Pager 2001; Shihadeh and Steffensmeier 1994; Sampson and Wilson 1995; Velez et al. 2003; Peterson and Krivo 2010). Contextual factors, such as the degree of violent crime in a city, or the type of crimes individuals are convicted of, could help explain prior neighborhood contexts for those incarcerated in state prisons.

Another possible explanation for the relationship between place and racial disparities in incarceration is that one's neighborhood background may influence court decisions. An individual's community context plays a role in sentencing outcomes independent of the characteristics of the incarcerated person (Ward et al. 2009; Anwar et al. 2012). Sentencing research has found that neighborhood disadvantage was a strong predictor of whether or not to charge, prosecute, and imprison an individual (Wooldredge and Thistlethwaite 2004; Wooldredge 2007; 2012).

Racial disparities in neighborhood context could also be explained by the targeting of disadvantaged neighborhoods by law enforcement, and the clustering of crime, arrest, and incarceration in disadvantaged neighborhoods (Fagan et al. 2003; Fagan and West 2013). The routine activities of urban drug dealing, for example, tend to occur in public, outdoor locations, making arrests and drug enforcement easier than in middle class neighborhoods, suburbs, or rural areas where drug activities tend to happen indoors and away from public view (Cohen and Felson 1979; Tonry 1995:105). In a study of people incarcerated for drug crimes in Massachusetts between 1994 and 1996, Brownsberger (2000) finds a pattern of minority neighborhood targeting for drug crimes.

The current study uses prison admissions to study the relationship between race, neighborhood inequality, and contact with the criminal justice system. Imprisonment constitutes the deep end of the criminal justice system, which involves systems of court processing and policing; thus, while the current study does not observe policing or court decisions, the outcome of prison admissions could be usefully seen as a product of these institutional processes, and these processes are a partial explanation for racial and ethnic disparities in neighborhood context for those entering prison.

Gender and age differences in neighborhood context prior to incarceration has received limited attention. Leverentz (2014) argues that incarcerated women come from similar neighborhoods as incarcerated men, and their lives and offending patterns are shaped by those same neighborhood dynamics. Recent research on the neighborhood context of returning citizens finds that older incarcerated individuals come from more disadvantaged neighborhoods (Western et al. 2015).

The aforementioned review of the literature and its limitations raises questions about how differences in pre-prison residential experiences varies by race and space. In this paper, I investigate how the level of concentrated disadvantage varies by race and ethnicity for those entering prison, and how racial disparities in pre-prison environment compare across large and small cities. This paper presents one of the first analyses of pre-prison neighborhood context for an entire prison jurisdiction. In the following section, I describe the context of Massachusetts and a brief history of race and imprisonment in a historically progressive northeastern state.

RACE, PLACE AND INCARCERATION IN MASSACHUSETTS

The current analysis examines prior addresses reported during prison intake from the Massachusetts Department of Correction. Historically, Massachusetts was a harbinger for progressive penal policy and reform. For example, the Norfolk Prison Colony, which was established in 1927, addressed overcrowding in a Boston prison. Reformers sought to apply social, medical, psychological, and educational techniques in its charter, and incarcerated people can participate democratically in policy decisions at the prison (Rotman 1998:160). The progressive nature of early Massachusetts prisons is reflected in contemporary institutions. People sentenced to prison for less than three years typically serve these sentences in a local

county House of Corrections rather than state prison, and today the Massachusetts incarceration rate is less than half (192 per 100,000) of the national rate (477 per 100,000) (Bureau of Justice Statistics 2015). In many respects, Massachusetts's penal history and urban inequality typifies Northeast and Midwest states (Bacon and Chen 2013; Muller 2012; Jacobs 1977; Rothman 2002).

Massachusetts's racial disparities in minority versus white incarceration are higher than national levels. In 2014 the black-white ratio of imprisonment rates in Massachusetts was 7.5 compared to a national black-white ratio of 5.1 (Nellis 2016). In the same year Massachusetts has the highest Hispanic to white ratio of incarceration in the nation, 4.3, over three times the national ratio of 1.4 (Nellis 2016). If we broaden to all types of correctional facilities, while only seven percent of the Massachusetts population is non-Hispanic black, blacks represent about one quarter of the incarcerated population (Prison Policy Initiative 2014). Hispanics encompass ten percent of the state's population, but 26 percent of its incarcerated population (Prison Policy Initiative 2014). While the incarceration rate in Massachusetts is low compared to the national average, the rate of imprisonment nevertheless grew considerably over the last four decades. Since the 1980s, Massachusetts has tripled its prison and jail population. Half of the increase was attributable to growth in incarcerated people with governing offenses for drug crimes (MassINC 2015). Although racial disparities are higher where the black population is predominantly urban and a small percentage of the total state population (Bridges and Crutchfield 1988), the paradox of progressive penal practice and intense racial disproportionality provides an important context for understanding potential sources of these disparities.

This paradox of progressive policy ideals and lived realities of inequality characterize much of Massachusetts's history. The intense racial segregation and backlash against school

integration that ensued in the 1960s and 70s belied Massachusetts' ostensible opposition to school segregation in the late 19th and early 20th centuries. In the summer of 1974, District Court Judge Arthur Garrity ruled that the Boston School Committee had deliberately engaged in school segregation, exposing an undercurrent of racial tension and discrimination in a city heralded for its educational and scientific excellence and cultural institutions (Formisano 1991). To achieve racial balance in the schools, Garrity ordered that students be bused to schools in surrounding neighborhoods, though focused primarily on the predominately white neighborhood of South Boston and the predominately black neighborhood of Roxbury, to alter the racial makeup of those schools. The conditions of segregation, income inequality, and housing insecurity persist in Boston and now more commonly in other regions and small cities in the state (Bacon and Chen 2013).

Similar to other states and regions, researchers and policymakers have begun to focus on small cities (Bell and Jayne 2009) and the level of socio-economic disadvantage found in such places. The Massachusetts Department of Housing and Economic Development initiated a taskforce called the Gateway Cities Program to address these issues besetting small cities suffering from economic decline and depopulation. These include the small cities of Fall River in the southeastern part of the state, or Holyoke in the west, where the median household income in 2010 hovered around \$30,000 – less than half of the state's median (U.S. Bureau of the Census 2011). These areas contribute significantly to the prison population, and on average are far more disadvantaged than most Boston neighborhoods.

DATA AND METHODS

Data were collected on state prison admissions in Massachusetts from January 1, 2009 to December 31, 2014. The Massachusetts Department of Correction (DOC) provided prison intake data, which includes individuals' race, ethnicity, age, gender, and the governing offense that led to their imprisonment. From the offense data, I coded individuals as having been convicted of drug, property, sex, person (e.g. violent offenses), or other offenses. This analysis is restricted to anyone who was convicted of a new offense and sentenced from court to state prison. A number of people are sent to state prison for other reasons, including parole or probation violations, civil commitments for drug or mental illness, or pre-trial detention. Limiting the sample to those who are entering prison for a new criminal conviction attenuates estimates of the overall number of individuals who enter prison.

In addition to demographic and criminal record information, the Massachusetts DOC also collects data on an individual's last known address upon admission to prison. These addresses were geocoded for the purposes of understanding the relationship between neighborhood ecology and the characteristics of the prison admission population. Six percent of individuals either did not provide an address during the intake process at their admission to prison, or the address provided could not be geocoded. Thus, one limitation of the current study is that people who are homeless or did not report an address are not included in the analysis.

Table 1 displays descriptive statistics for individual, census tract, and city characteristics used to understand the distribution of neighborhood disadvantage among a prison admission cohort in Massachusetts. In the six-year period, 38% of prison admissions are non-Hispanic white, 29% are non-Hispanic black, and 32% are Hispanic. About 17% of individuals are under the age of 24 at the time of admission. Older people entering prison tended to be white; nearly 70% of people admitted to prison for a new criminal offense over the age of 55 were non-

Hispanic white. Half of all prison admissions were for violent, sex, or other crimes against persons, and over one-quarter were for drug crimes. Fully 44% of Hispanics prison admissions were for drug crimes, but only 28% of white admissions were for drug crimes. Statewide, non-whites constituted 71% of prison admissions for drug offenses.

[Table 1 about here]

Addresses were geocoded to census tracts, which were matched to city and region-level indicators. For parsimony, I display four regions in the data: the city of Boston, Boston suburbs, small cities outside of Greater Boston (Boston and its suburbs), and other suburbs and rural towns. Greater Boston accounts for 30% of admissions during the six-year period (2009–2014), and Greater Boston accounts for about 30% of the state population. Prison admissions from small cities, defined as central cities outside of Greater Boston, account for 21% of the state’s population, but 45% of prison admissions in the sample. An initial examination of Table 1 describes a highly differentiated spatial pattern of incarceration, where small cities play a significant and surprisingly large role in the level of imprisonment in the state. While 45% of the 12,536 people imprisoned in Massachusetts state prisons for new court commitments in 2009–2014 came from small cities outside Greater Boston, including other suburbs and rural towns strikingly shows that 70% of prison admissions came from cities and towns outside the large cities and suburbs of Greater Boston. Whites overwhelming come from places outside of the city of Boston – 90% of whites lived outside Boston prior to their imprisonment. Over one-third (36%) of blacks admitted to prison came from the city of Boston. Nearly 80% of Hispanic men and women entering prison came from small cities and towns outside of Greater Boston.

Data on neighborhood characteristics were derived from the American Community Survey five-year estimates (2006–2010). For this analysis, I focus on five conditions that, taken together at high rates, define concentrated disadvantage (Sampson 2012; Sampson, Raudenbush, and Earls 1997). These measures include the proportion of children living in poverty, the proportion of individuals age 16 and over who are unemployed, the proportion of female-headed family households, the proportion of individuals over the age of 25 without a high school degree, and the proportion of households receiving cash public assistance, food stamps, or assistance from the Supplemental Nutrition Assistance Program (SNAP).

Table 1 displays these measures for the full sample and for racial and ethnic sub-groups. For the full sample entering Massachusetts state prison, the average neighborhood experiences about a 30% rate of children living in poverty, 13% of adults unemployed, and one-fifth of households on public assistance and female-headed. Additionally, 21% of adults have less than a high school degree. Thus, the overall prison population is drawn from highly disadvantaged places in Massachusetts, which supports prior research on neighborhoods and pre-incarceration contexts (Massoglia et al. 2013). Incarcerated people are by definition a vulnerable and marginalized group, yet there are significant racial and ethnic disparities within this population. Whites admitted to prison tend to come from less impoverished areas than their black and Latino counterparts. The average neighborhood a Hispanic person comes from when entering prison has a child poverty rate of nearly 37%, while non-Hispanic whites experience on average a child poverty rate of about 21%.

Analyzing Neighborhood Disadvantage Prior to Imprisonment

To study neighborhood differences in poverty and socio-economic disadvantage, the five measures of socio-economic disadvantage reported in Table 1 were used to create a measure of concentrated disadvantage.

[Table 2 about here]

Consistent with prior research, these poverty-related variables are highly correlated and load on the same factor (Table 2). With an eigenvalue greater than 3, the first factor is dominated by high loadings (>0.80) for child poverty, female-headed households, low educational attainment, and public assistance income. I calculate a factor regression score that weights each variable by its factor loading and joined this measure to the associated census tract from a given individual's pre-prison address. The factor regression score of concentrated disadvantage is the dependent variable of the analysis.

To understand the distribution of disadvantage across cities and racial/ethnic subgroups, Table 3 presents the proportion of white, black, and Hispanic incarcerated people in low and high disadvantaged neighborhoods in four city-size classifications: (1) cities with less than 50,000 inhabitants, (2) cities with populations between 50,000 and 100,000, (3) cities with 100,000 to 250,000, and finally Boston, with a population of approximately 661,103 in 2014. Low poverty neighborhoods are those that fall within the first quartile (25th percentile) of the neighborhood disadvantage score. High poverty neighborhoods are those that fall in the top quartile (75th percentile) of neighborhood disadvantage.

[Table 3 about here]

Table 3 describes a racial-spatial divide in disadvantage prior to incarceration. While 12-31% of whites live in high disadvantage neighborhoods prior to incarceration, 20-64% of blacks and 22-51% of Hispanics live in conditions of concentrated disadvantage. For Hispanics living in cities between 100,000-250,000 residents, 51% of prison admissions come from high disadvantage neighborhoods, compared with 15% of whites. In Boston, 64% of black prison admissions lived in neighborhoods of concentrated disadvantage prior to imprisonment, compared with 12% of whites.

Figure 1 displays a map of this factor regression score in deciles. The lowest deciles of disadvantage tend to concentrate in suburban and rural towns between large population centers. Inner-ring suburbs tend to contain census tracts at the median of the range of concentrated disadvantage, and Boston and other small cities comprise the largest portion of tracts with extreme concentrated disadvantage.

[Figure 1 about here]

Figure 2 provides a graphical display of the distribution of the factor regression score of concentrated disadvantage and divides this distribution by race and ethnicity. The density plot with a solid line represents the distribution for all Massachusetts census tracts. For the most part, non-Hispanic white men and women entering prison during this time period have a similar distribution of concentrated disadvantage to that of the entire state. Black and Hispanic people entering prison have entirely different distributions than whites, and Hispanics are most likely to live in the highest levels of concentrated disadvantage.

[Figure 2 about here]

More specifically, the density plot in Figure 2 can be summarized in the following way: 74% of non-Hispanic blacks and 78% of Hispanics entering prison came from the top quartile (75th percentile or higher) of concentrated disadvantage in Massachusetts, while 40% of whites lived in this level of concentrated disadvantage immediately before entering prison.

To understand and describe how individual characteristics, offense categories, and spatial conditions predict pre-incarceration neighborhood disadvantage, OLS regression is used to model to the factor regression score of neighborhood disadvantage, Y_i ,

$$\hat{Y} = \beta_0 + \beta_1 \log \bar{y}_i + \mathbf{d}'_i \beta_2 + \beta_3 O_i + \beta_4 R_i + \beta_5 \log C_i,$$

where predictors include a spatial lag, \bar{y} , a vector of person-level demographics, \mathbf{d} , a set of categorical variables defining the governing offense, O , a region indicator relating to the individual's city prior to incarceration, R , and the violent crime rate in the respondent's city, C . In the presence of heteroscedasticity in a large sample, a sensible way to estimate variance in the linear coefficient estimates is to use the sandwich estimator. For the OLS models reported in the results, I include standard errors estimated using sandwich estimates (Long 2000).

Because it is hypothesized that there are significantly different dynamics of neighborhood disadvantage for those entering prison by race, I will estimate four models: a full model where race/ethnicity are included, and three models stratified by race and ethnicity.

The spatial lag, \bar{y} , records the average neighborhood disadvantage score in contiguous census tracts. A Moran's I score of 0.65 ($p < .001$) for tract-level neighborhood disadvantage indicates significant spatial autocorrelation. The spatial lag coefficient indicates the correlation of neighboring prison admissions net of other predictors in the model.

A final model fits a quantile regression to the neighborhood disadvantage score. Quantile regressions examines the relationship between independent variables and different percentiles of the dependent variable (Koenker 2005). In the first specification described above, the least squares regression predicts the mean of neighborhood disadvantage for the whole sample and for racial/ethnic subgroups. Quantile regression can be used to estimate high levels of neighborhood disadvantage associated with the race and ethnicity of incarcerated people, and other demographic and spatial characteristics. In this analysis, I focus on the top quartile (75th percentile) of neighborhood disadvantage, to provide an intuitive way of analyzing extreme levels of neighborhood disadvantage:

$$Q(\hat{Y}) = \beta_0 + \beta_1 \log \bar{y}_i + \mathbf{d}'_i \beta_2 + \beta_3 O_i + \beta_4 R_i + \beta_5 \log C_i,$$

where Q is a conditional quantile function, comparable to the conditional expectation of linear regression.

This paper is motivated by an interest in understanding the clustering of poverty-related neighborhood disadvantages for those entering state prison for a new criminal offense. An explicitly causal interpretation of these results would not be possible; in the current framework I cannot identify sorting mechanisms producing incarceration in some places and not others. The main goal is to understand and describe the pre-incarceration neighborhood across cities, suburbs

and towns and identify important associations and clusters in the sample of prison admissions. Understanding selection into incarceration from disadvantaged neighborhoods would require additional data on individuals who were not incarcerated for similar crimes, for example, which is beyond the scope of the current analysis.

RESULTS

Table 4 reports the results from OLS and quantile regression analyses of neighborhood disadvantage in a sample of prison admissions in Massachusetts, 2009– 2014. Five models are included. Models 1 and 5 includes the entire sample of men and women who entered prison during this time period to serve a state criminal sentence. Model 2 restricts the sample to non-Hispanic whites, Model 3 restricts the sample to non-Hispanic blacks, and Model 4 restricts the sample to Hispanics.

[Table 4 about here]

Using OLS regression to model the factor regression score of neighborhood disadvantage, I examine levels of neighborhood disadvantaged experienced by black and Hispanic people entering prison with whites as a reference category (Model 1). As the hypotheses suggested, black and Hispanic men and women were more likely than their white counterparts to come from neighborhoods of higher levels of concentrated disadvantage – a difference of .41 and .69 on the factor regression scale, respectively. For reference, one standard deviation in the neighborhood disadvantage scale is .97. The difference between whites and non-whites in the sample is larger in the reported quantile regression (Model 5). In this model, blacks live at a level of concentrated

disadvantage about .423 points higher than whites on the factor regression score scale, and Hispanics are .739 points higher than whites on the neighborhood disadvantage scale, and these differences are statistically significant ($p < .001$).

Other demographic characteristics of the prison admissions sample, such as age and gender, have weak relationships to neighborhood disadvantage. Age is negatively associated with pre-incarceration neighborhood disadvantage in the full OLS model (Model 1), and for Hispanics in the stratified model (Model 4). In all models, men and women entered prison having resided in the same level of disadvantage.

Crime and violence patterns the pre-incarceration neighborhoods in this sample of prison admissions. With crimes against persons as the reference category for offense type, in the full model, individuals convicted of drug crimes or other crimes as their governing offense were significantly more likely than people convicted of offenses against persons to come from concentrated disadvantage. The most common offenses categorized as “other” were weapons offenses, illegal gun possession, and driving under the influence. Similarly to the race coefficients, the association between drugs and other offenses and neighborhood disadvantage is stronger at the top quarter of the distribution of neighborhood disadvantage (Model 5). In the full OLS and quantile regression models, and all stratified models, cities with a higher level of violent crime is associated with significantly higher levels of disadvantage among the prison admission cohort and for racial sub-groups.

Spatial autocorrelation and regional variation play an important role in the ecology of disadvantage for this sample of incarcerated people in Massachusetts. With Boston as a reference category, small cities and suburbs or rural towns have much higher levels of neighborhood disadvantage. Individuals who came from small cities outside of Greater Boston had higher

levels of concentrated disadvantage than their Boston counterparts – a difference of .38 on the factor regression scale.

Model 2 restricts the analysis to non-Hispanic white men and women admitted to state prison for a criminal offense. For whites, the spatial embeddedness of neighborhood disadvantage is particularly strong and statistically significant ($p < .001$), and regional variation in neighborhood disadvantage is also pronounced. Whites from every locality, including small cities and suburbs in Massachusetts came from higher levels of concentrated disadvantage than whites in Boston.

Model 3 restricts the analysis to the sample of non-Hispanic black prison admissions. For this model, blacks are significantly more likely to enter prison having lived in the greatest concentrated disadvantage in Boston rather than any other region in the state, except for other small cities where there is no significant difference compared to Boston. These results suggest that unlike whites and Hispanics, the concentration of blacks in poor and disadvantaged neighborhoods in large cities remains an important feature of the ecology of punishment.

Finally, Model 4 is restricted to Hispanic admissions. All non-violent offenses, including drug, property, and other crimes, indicate a significant relationship to neighborhood disadvantage as compared to person offenses. Similar to whites entering prison, Hispanics coming from small cities outside of Boston, especially those living in the suburbs and rural towns in Massachusetts, tend to come from neighborhoods of greater concentrated disadvantage than those that lived in Boston prior to incarceration.

Visualizing Racial Disparities in Neighborhood Disadvantage Prior to Incarceration

To supplement the regression analysis with an more intuitive interpretation of the factor score of neighborhood disadvantage, I examine the differences in neighborhood disadvantage by race across age in the sample.

[Figure 3 about here]

Figure 3 displays a simple bivariate generalized additive model (GAM) of neighborhood disadvantage and age by racial and ethnic groups. GAMs are a class of statistical models where the linear relationship between the outcome (neighborhood disadvantage) and predictors are replaced by non-linear smooth functions to model and capture any non-linearities in the data. The plot displays the distribution of the dependent variable along different values of the independent variable, in this case, age.

The most striking part of this graph is the difference in intercept. At no point throughout the age distribution do whites ever experience the same level of disadvantage as black or Hispanic people entering prison. This is an indication of fundamentally different neighborhood contexts for a group of people who are nevertheless significantly socially disadvantaged. Hispanics experience higher levels of concentrated disadvantage than blacks throughout the vast majority of the age distribution in the statewide sample.

[Figure 4 about here]

Figure 4 displays the same model presented in Figure 3, except the data are restricted to Boston census tracts. This plot demonstrates the pitfalls of studying broad demographic trends in single large cities. Such an analytic decision attenuates estimates of disparities in neighborhood

disadvantage. Furthermore, Hispanics experience less disadvantage in Boston than in small cities, and this describes a very different set of neighborhoods than experienced by the majority of Hispanic incarcerated people.

To summarize the key results, there are significant racial disparities in pre-incarceration neighborhood context. The hypothesis about men and women coming from equally disadvantaged places was confirmed. Whites and Hispanics who lived in small cities outside of Boston tend to come from greater disadvantage than their Boston counterparts, but the same is not true for non-Hispanic blacks. Hispanic admissions for drug and property crimes were particularly concentrated in areas of disadvantage compared to Hispanic men and women convicted of person (e.g. violent) offenses. Finally, including all cities in this analysis uncovers wide disparities in neighborhood context prior to imprisonment.

DISCUSSION

Prior research indicates that durable neighborhood inequality produces large gaps in individual life chances (Sharkey 2013; Sampson 2012; Peterson and Krivo 2010), and that neighborhood context can significantly impact the trajectory of individuals throughout the criminal justice system (Kirk 2009; 2015; Massoglia et al. 2013). The neighborhood context of incarceration has been studied in large city case studies (Sampson and Loeffler 2010; Cadora et al. 2003; Clear 2007; Fagan et al. 2003), or using household surveys such as the National Longitudinal Survey of Youth (Massoglia et al. 2013). This study aimed to explore neighborhood disadvantage for prisoners—a highly vulnerable and disadvantaged group—across an entire state. Understanding the contours of inequality among a hard-to-reach and understudied population with granular data allows for greater nuance in the study of the spatial patterns of residential inequality and

imprisonment. Using a rare dataset of prison records and the last known addresses of incarcerated people, the current study examines disparities in pre-incarceration neighborhood disadvantage for individuals entering prison between 2009 and 2014 in Massachusetts. Findings indicate incarcerated people experienced significant neighborhood disadvantage, largely in small cities, and these places have particular importance for white and Hispanic incarcerated people. Imprisonment in Massachusetts must be understood as an institution involving a broad set of cities and populations often ignored by research in urban sociology and the sociology of punishment.

The goal of this study is to take a broad demographic approach to understanding disparities in neighborhood context for individuals sentenced to prison. In doing so, the paper has three main contributions to the study of small cities, imprisonment, and racial inequality. First, without restricting the analysis spatially, racial differences in neighborhood context are profound, shown most dramatically in a statewide context. Although a large portion of whites come from disadvantaged neighborhoods prior to incarceration, they nevertheless come from entirely different neighborhoods than blacks or Hispanics. About three-quarters of the black and Hispanic prison admission cohort came from the 75th percentile or higher of concentrated disadvantage in Massachusetts, and 40% of whites lived in such neighborhoods prior to incarceration. Surprisingly, small cities are vital to fully understanding these disparities.

Second, important spatial differences across racial groups shed light on the importance of small cities in the pre-prison environments of racial and ethnic subgroups. For whites, small cities, suburbs and rural areas comprise the highly disadvantaged places in which people live before a period of imprisonment. For black Bostonians and residents of small cities, the conditions of neighborhood disadvantage are far worse than for blacks who come from suburbs

and rural areas. Hispanics who are sentenced for felony drug and property crimes in small cities and suburbs outside of Boston experience the greatest neighborhood disadvantage in the sample. One implication to derive from these findings is that there will be significant challenges to ameliorating the impacts of poverty and social control with a one-size-fits-all social policy aimed at particular demographics or places. To reduce racial inequality in prison admissions, policymakers and practitioners could usefully consider how discrimination and disadvantages relating to neighborhood context vary significantly depending on local city context, and the composition of criminal justice-involved individuals in those places.

Third, profound differences in neighborhood context for people entering prison may have a variety of implications for how we understand social inequality broadly, and moreover, how we might respond to the crisis of concentrated disadvantage and its intimate link with patterns of punishment. In a state like Massachusetts, racial disparities in incarceration are high, and it is possible that deep social inequality in neighborhood life may be partially to blame for these disparities. Future research could usefully consider how disproportionality in incarceration is due to the conditions of neighborhoods prior to incarceration. Indeed, if a large number of individuals return to communities after a period of incarceration (as the average length of stay in Massachusetts is about five years), it is reasonable to assume that a significant portion will return to these same disadvantaged neighborhoods. However, reducing recidivism is not the only policy issue of importance in considering neighborhood contexts and reentry. These findings indicate a divided social world in which marginalized groups are deeply embedded in a social fabric of poverty, intense social control, and neighborhood inequality. Whites have greater opportunities to avoid disadvantaged neighborhoods than blacks or Hispanics who return to areas of severe socio-economic disadvantage.

Research on state or federal policies and jurisdictions, as well as broad demographic trends, should study these patterns with geographic variation. This would mean studying cities without distinctions such as small versus large, urban versus suburban/rural, but rather including all areas beyond single cities or types of cities, particularly when policies or jurisdictions are unconstrained by city limits. This kind of research practice involves collecting new forms of data, and this will be significant for urban theory building in the future. Cities – small and large – are not isolated from one another but form an intricate geography of population and social conditions. Future research studying the geography of crime, imprisonment and poverty should consider the ways such conditions have changed over time, and how regional and spatial variation in these patterns inform our understanding of broader trends in social inequality.

Several limitations of the current study warrant discussion and present avenues for future research. One limitation of this analysis is it does not take into consideration the criminal histories of the prison admission cohort, and how this might impact neighborhood context and choice. Furthermore, the study only has information on neighborhood histories beginning in 2009, omitting neighborhoods from prior periods. Thus, it is possible that the neighborhood context of the cohort of admissions is explained by unobserved variation in residential and criminal histories. Another limitation is that the data does not allow a study of prison admissions for parole or probation violations (unless the person was also convicted of a new offense), which attenuates the estimates of prison admissions. These significant limitations notwithstanding, the current study invites future examination of the residential patterns and neighborhood context of individuals who are incarcerated using additional data and other contextual information on cities and counties, as well as individuals.

This paper offers one of the first statewide analyses of pre-prison neighborhood context for people entering state prison. From a study of over 12,000 prison admission records over a period of six years, this paper concludes that significant racial disparities exist in pre-prison environment, and this does not seem to be fully explained by the broader distribution of race and poverty in the state. However, the geographic disparities seem to be less powerful in determining concentrated disadvantage than the differences between racial groups. Indeed, racial disparities are resilient across spatial units, but how and to what degree disadvantage is experienced prior to imprisonment comes into focus in a study that takes advantage of sources of spatial variation across cities.

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TABLES

Table 1. Proportion distribution of census tract characteristics, demographic and offense characteristics, Massachusetts prison admissions, 2009–2014.

	All	White	Black	Hispanic
<i>Census Tract Variables</i>				
Concentrated disadvantage score	.96	.35	1.17	1.50
prop. children in poverty	.30	.21	.33	.37
prop. unemployed	.13	.11	.15	.15
prop. female-headed families	.20	.15	.24	.24
prop. adults less than HS degree	.21	.16	.21	.26
prop. households on public assistance	.21	.14	.23	.27
<i>Person Variables</i>				
Age (years)	34.00	36.36	32.81	33.27
Male	.96	.94	.98	.99
<i>Person's Governing Offense</i>				
Person	.43	.51	.42	.34
Sex	.07	.10	.05	.06
Property	.11	.17	.07	.07
Drug	.28	.14	.30	.44
Other crimes	.11	.08	.16	.09
<i>City Characteristics</i>				
Log violent crime rate	6.49	6.13	6.74	6.69
<i>Geographic Region</i>				
Boston	.18	.10	.36	.14
Boston suburbs	.12	.17	.11	.07
Small cities	.45	.36	.40	.59
Suburbs and rural towns	.25	.37	.13	.20
Person observations	12,536	4,738	3,600	3,954

Table 2. Orthogonal rotated factor pattern of concentrated disadvantage in 1,476 Massachusetts census tracts.

	Factor
children in poverty	.81
adults unemployed	.75
female-headed households	.87
adults less than HS degree	.81
households with public assistance	.95

Note: Reported loadings ≥ 0.75 . Data are from the 2006–2010 American Community Survey.

Table 3. Proportion of Massachusetts prison admissions 2009-2014 in low and high disadvantaged neighborhoods by race and ethnicity and Massachusetts city population.

	Pop. under 50K			Pop. 50,000-100K			100,000-250K			Boston		
	W	B	H	W	B	H	W	B	H	W	B	H
Low NH Disadvantage	.72	.12	.13	.63	.20	.15	.33	.39	.27	.58	.21	.18
High NH Disadvantage	.31	.20	.47	.35	.24	.38	.15	.31	.51	.12	.64	.22
<i>N</i>	2,005	638	944	1,756	861	1,214	517	813	1,257	460	1,288	539

Note: W= Non-Hispanic white prison admissions, B=Non-Hispanic black prison admissions, H=Hispanic prison admissions.

Table 4. Regression analysis of neighborhood disadvantage in sample of prison admissions in Massachusetts, 2009--2014.

	OLS (1)	White (2)	Black (3)	Hispanic (4)	Top Quartile (5)
Log \bar{y}	.0483** (.02)	.0997*** (.02)	-.00229 (.03)	.00926 (.04)	.0821*** (.02)
Black	.406*** (.02)				.423*** (.02)
Hispanic	.689*** (.02)				.739*** (.04)
Male	-.0737 (.04)	-.0694 (.05)	-.125 (.12)	.0666 (.14)	-.0639 (.07)
Property crime	.0505 (.03)	-.00190 (.03)	.0158 (.07)	.235** (.07)	.0263 (.03)
Drug crime	.0462* (.02)	.0376 (.04)	-.0112 (.04)	.132** (.04)	.0912*** (.02)
Other crime	.123*** (.03)	-.000175 (.05)	.0854 (.04)	.188** (.07)	.0699** (.03)
Age	-.0116* (.005)	.00319 (.01)	-.00434 (.01)	-.0296* (.01)	-.00659 (.006)
Age ²	.000108 (.0001)	-.0000512 (.0001)	.0000107 (.0001)	.000322 (.0002)	.00006 (.0001)
Boston suburbs	-.124*** (.03)	.169*** (.05)	-.621*** (.05)	.182* (.06)	-.562*** (.02)
Small cities	.383*** (.03)	.702*** (.05)	.0637 (.08)	.775*** (.05)	.332*** (.03)
Suburbs and rural towns	.305*** (.04)	.265*** (.06)	-.237*** (.04)	1.248*** (.08)	.00074 (.04)
Log violent crime rate	.726*** (.02)	.497*** (.02)	.760*** (.04)	1.110*** (.04)	.697*** (.01)
Constant	-4.027*** (.15)	-3.074*** (.19)	-3.645*** (.34)	-6.201*** (.37)	-3.226*** (.15)
Adjusted R ²	.392	.366	.316	.298	-
Person obs.	12,536	4,738	3,600	3,954	12,536

Note: *p<0.1; **p<0.05; ***p<0.01. Sandwich standard errors in OLS model parentheses. Sex offenses and individuals of some other race/ethnicity suppressed from table.

FIGURES

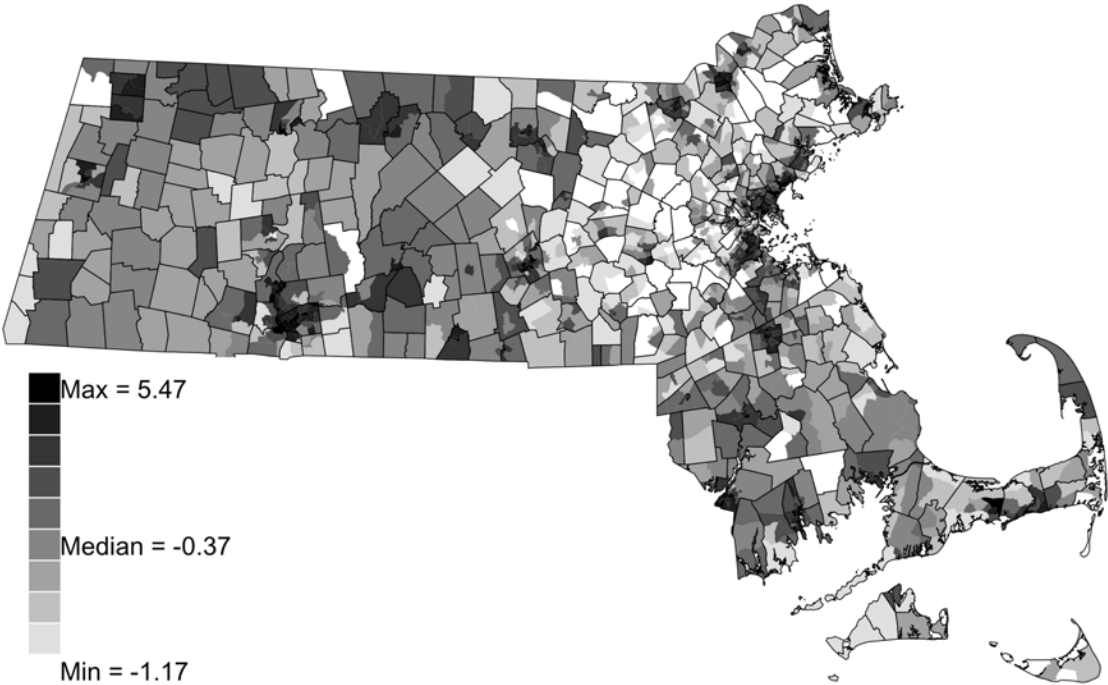


Figure 1. Concentrated disadvantage deciles in Massachusetts census tracts.

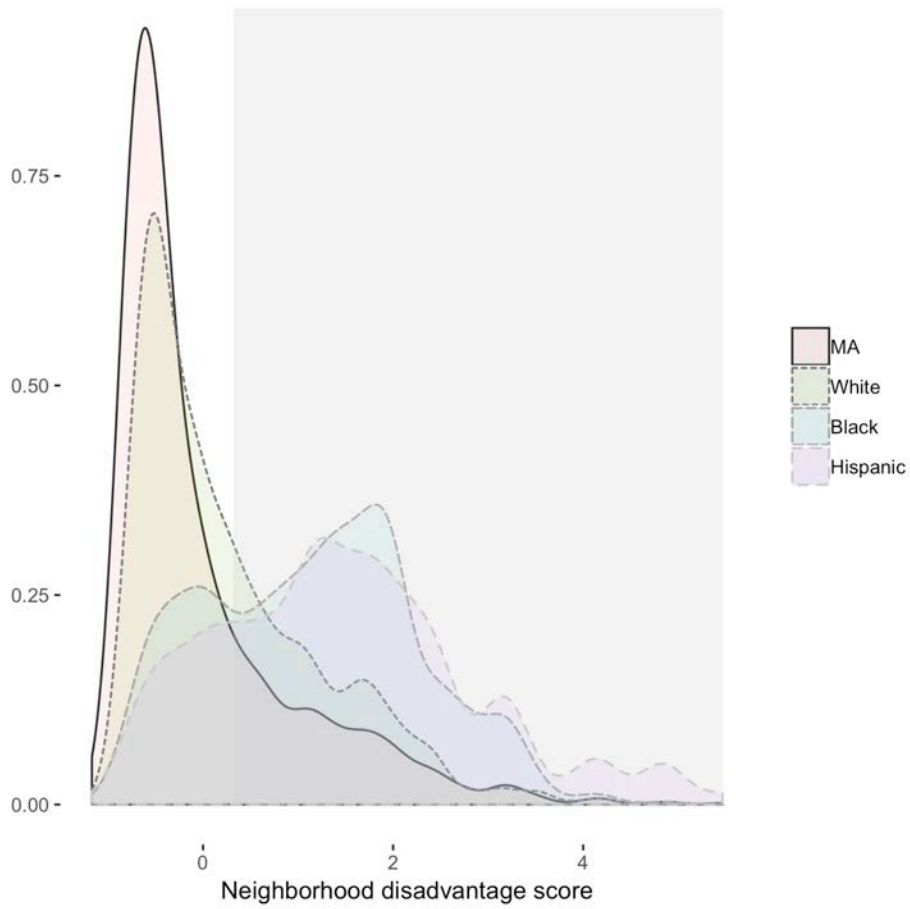


Figure 2. Densities of pre-incarceration neighborhood disadvantage by race and ethnicity. Shaded rectangle indicates top quartile of neighborhood disadvantage score.

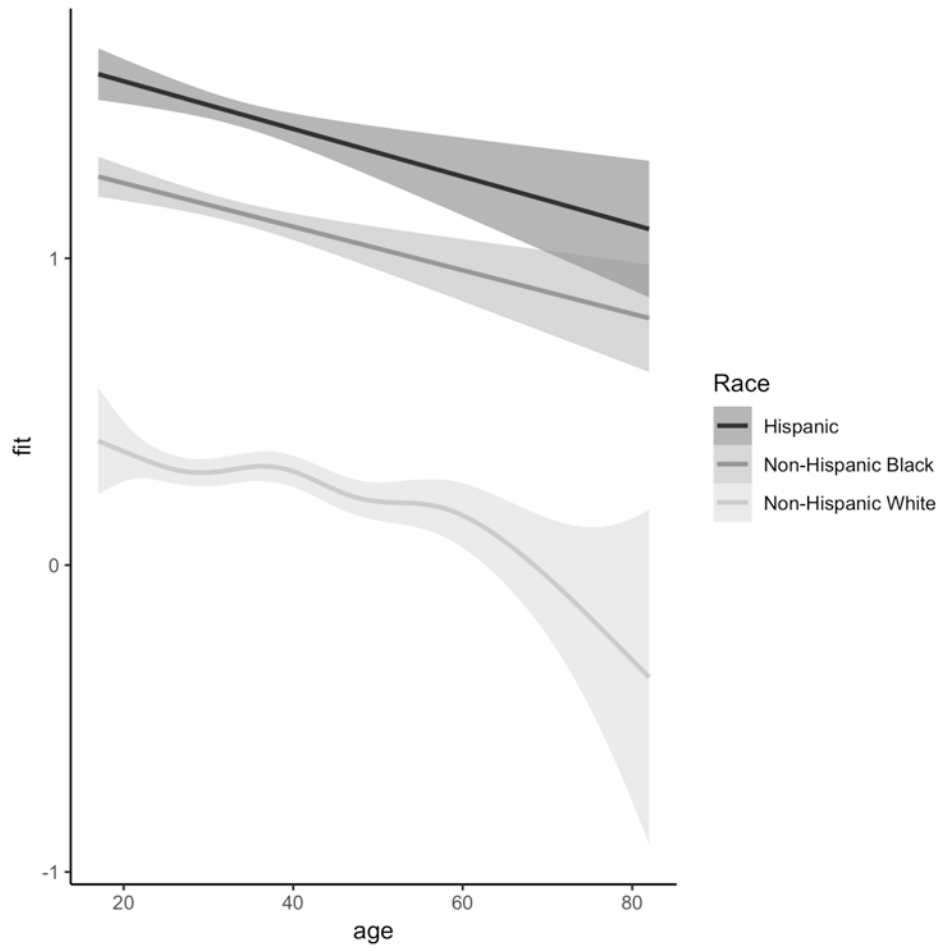


Figure 3. Generalized additive model plot of neighborhood disadvantage and age by race.

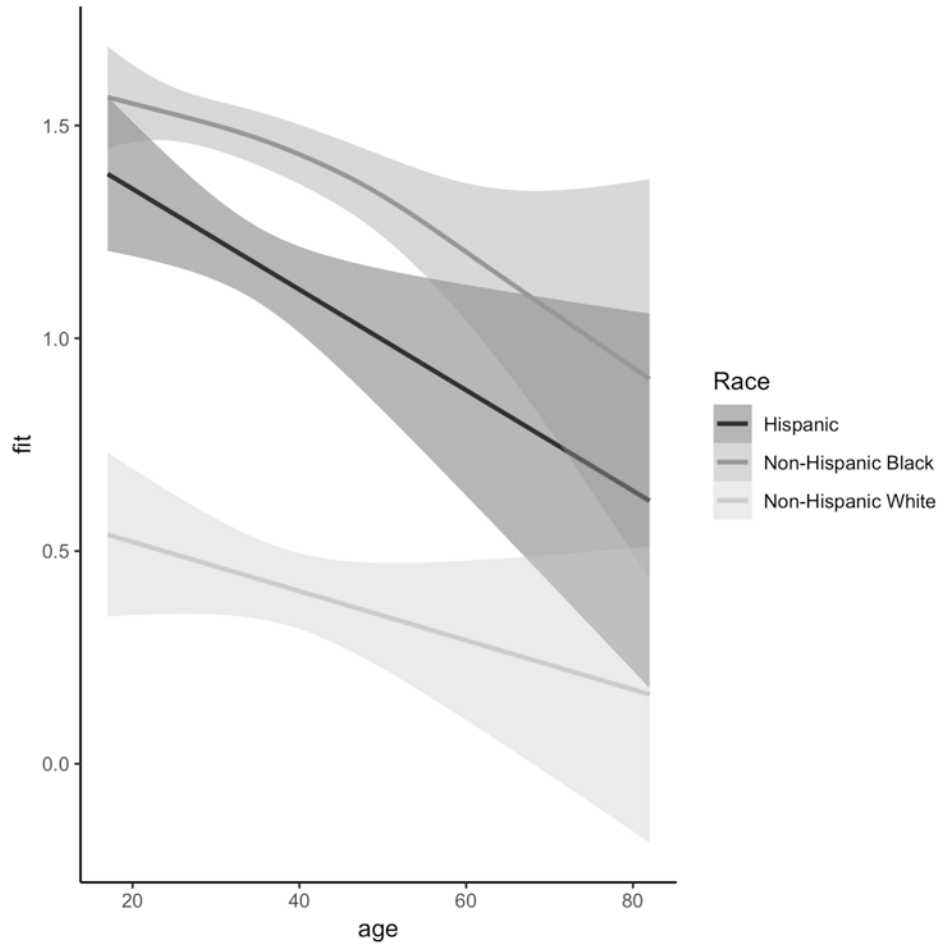


Figure 4. Generalized additive model plot of neighborhood disadvantage and age by race in Boston neighborhoods.