

The Effect of Racism on Black Mortality and Life Expectancy

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Abstract

Although many theoretical arguments have been made linking racism to high mortality and lower life expectancy among African Americans, studies to date have been unable to measure racism directly to determine the strength of its effect on health and well-being. Here we take advantage of a new internet-based method to measure interstate variation in anti-black sentiment and connect it to cross-state variation in mortality and life expectancy. Estimates of a structural equations model indicate that racism: increases the rate of black homicide through the intervening variable of racial segregation; raises infant mortality through the intervening variable of low birth weight; and increases mortality from diabetes and heart disease through the intervening variable of obesity. Excess deaths from infant mortality, diabetes, and heart disease in turn act to lower black life expectancy, and racism has a direct effect in reducing black life chances as well. Varying the level of racism from its lowest to highest observed level across states is sufficient to shift black life expectancy by an estimated 3.9 years.

The poor health, high mortality, and low life expectancy of African Americans relative to whites in the United States are very well documented (Hummer, 1996; Rogers, Hummer, and Nam, 2000). Whereas the average expectation of life at birth for a white American is currently 78.4 years, the figure black Americans is just 74.3, a five percent differential. Although controlling for socioeconomic status reduces the racial differential in mortality and life expectancy, it by no means eliminates it, implying that the poor health of African Americans is not simply a matter of poverty and disadvantage (Kitagawa and Hauser, 1973; Sorlie, et al 1992; Williams and Collins, 1995; Jackson et al., 1996; Geronimus et al., 1996; Smith et al., 1998; Deaton and Lubotsky, 2003).

Given the long history of racial exclusion, discrimination, and oppression directed at African Americans in the United States, researchers have hypothesized a connection between racism, health, and mortality (Semmes, 1996; Williams, 1996). The mechanisms by which racism affects black health are not hard to imagine. Williams and Mohammed (2013) divide them into two basic categories. *Institutional racism* refers to social and economic structures that reduce black access to housing, secure neighborhoods, employment, insurance, medical care, and other resources that contribute to health and longevity (Feagin and Bennefield, 2014). *Cultural racism* refers to socially embedded practices and concepts that create an invidious social environment for African Americans, one characterized by widespread stereotyping, discrimination, and exclusion (Williams and Mohammed, 2013).

Several streams of research support the notion that racism is connected to health outcomes among African Americans. Racial segregation, a prototypic example of institutional racism, is associated with black mortality and morbidity (Williams and Collins, 2001). Living in a

segregated neighborhood is linked with greater exposure to toxins and violence, lower quality education, less access to quality healthcare and limited economic mobility all of which detract from health (Sampson, 2012; Sharkey, 2013).

Institutional and cultural racism also generate significant stress for African Americans who must cope with stigma and discrimination in daily life (Phelan et al., 2014; Link and Phelan, 2014). Prolonged exposure to stress is known to generate excessive levels of hormones such as adrenaline and cortisol in the bloodstream by over-activating the hypothalamic-pituitary-adrenal axis, producing what is known as allostatic load, a condition that over time compromises both physical and mental health (Sterling and Ayer, 1988; McEwan and Lasley, 2002). The increase in allostatic load resulting from prolonged exposure to stressful circumstances related to racism has been hypothesized to undermine black mental and physical health (Massey, 2004; Jackson and Knight, 2006). Studies have indeed found that blacks are more likely than whites to display high allostatic loads after controlling for socioeconomic status and other background variables (Geronimus et al., 2006). Recent research has also shown that black boys exposed to disadvantaged environments display reduced telomere length (Mitchell et al., 2014). Telomeres are nucleotide sequences at the ends of human chromosomes that protect genetic material deterioration and recombination and their shortening is a natural consequence of aging, but shortening has also been found to occur as a result of prolonged exposure to stress (Brady, 2007).

In addition, self-reported discrimination on the part of black respondents is negatively related to mental and physical health throughout the life span (Landrine and Klonoff, 1996; Kessler, Michelson, and Williams, 1999; Broman, Havaddat, and Hsu, 2000). Infants born to mothers who reported experiencing a great deal of racism were more likely to be preterm and/or

lower weight (Collins et al., 2004; Dominguez, 2008; Lespinasse et al., 2004). Perceived discrimination among adults is associated with negative health markers such as poor mental health (Schmitt et al., 2014; Steffen and Bowden, 2006), risk factors for cardiovascular disease (Guyl, Matthews, and Bromberger, 2001; Lewis et al., 2010; Lewis et al., 2011; Roberts et al., 2007; Steffen, et al., 2003), eating comfort food (Pascoe and Richman, 2007), poor sleep (Steffen and Bowden, 2006) and mental decline (Barnes et al., 2012). It is not surprising, therefore, that the increase in black morbidity and mortality stemming from cumulative exposure to racism has been labeled the “weathering hypothesis” by Geronimus (1992), as the health and vitality of African Americans are gradually worn down by constant exposure to the social elements of prejudice and discrimination.

A longstanding epistemological problem with much of the research done to date, however, is the lack of a direct measure of racism (Meyer, 2003; Williams and Mohammed, 2013). In many studies, the effect of racism in producing poor health is generally inferred after socioeconomic status and other personal characteristics are controlled statistically to leave an unexplained racial residual that is attributed to racism. Another common strategy is to use surveys to measure perceived discrimination on the part of black respondents. Perceived discrimination does not necessarily equate with actual discrimination, however, since much discrimination is clandestine and not observed in the absence of audit studies (Blank, Dabady, and Citro, 2004). Additionally, perceptions of discrimination are affected by psychological factors that are conceptually independent of the racial attitudes prevailing in one’s environment, such as the degree of identification with one’s own racial group (Branscombe, Schmitt, and Harvey, 1999) and the motivation to minimize perceptions of personal discrimination in order to foster a sense of

perceived control (Contranda et al., 2000).

All of the research described above uses one of these approaches. One recent study attempted to assess the effect of structural racism on health by measuring black-white gaps with respect to political participation, employment, education, and judicial treatment across different U.S. States and then linking these measures to health outcomes (Lukachko, Hatzenbuehler, and Keyes, 2014). The authors found that African Americans living in states with high levels of structural racism were more likely to experience heart attacks than those living in low-structural racism states, controlling for a variety of individual characteristics. Even in this study, however, racism was assessed in terms of intermediate outcomes such as racial gaps in employment and education rather than being measured directly.

A recent study by Stephens-Davidowitz (2013), however, made imaginative use of the internet to develop a direct measure of racial animus against blacks by tallying the percentage of Google search queries that included the word “nigger” during the period 2004-2007. The resulting index of racial animus correlated strongly with other known measures of racial prejudice at the aggregate level and that strongly and negatively predicted voter turnout for Obama across market areas in the 2008 presidential election. Rugh and Massey (2013) borrowed this idea and used Google Trends to tabulate search frequencies on the word “nigger” by metropolitan area from 2004 through 2012 and found that the resulting index of anti-black sentiment very strongly predicted levels of black-white segregation and residential isolation in 2010 holding a variety of metropolitan characteristics constant. Here we use the Rugh-Massey frequency index tabulated at the state rather than the metropolitan level and use it to predict interstate variation in mortality outcomes and life expectancy, following the model of Daniel, Smith, and Kawachi, (2014) who

analyzed the relationship between suicide and social capital across the 50 states. After describing our methodology and inductive approach to model specification, we present and interpret estimates of a structural equation model to elucidate how racism reduces black life expectancy through a variety of direct and indirect pathways.

Data and Methods

As noted above, our investigation uses states as units of analysis and takes state-level tabulations of search frequencies for the word “nigger” compiled during 2004-2012 using Google Trends on January 18, 2013. The Google algorithm standardizes the frequency on a zero to 100 scale where zero corresponds to no searches on “nigger” during the time period and 100 corresponds to the highest observed search frequency. Figure 1 shows the distribution of states ranked by their level of anti-black sentiment. According to these data, the least racist states are Utah, Hawaii, Idaho, New Mexico, and Colorado, with respective scores of 33, 38, 44, 46, and 52, and the most racist states are West Virginia, Louisiana, Pennsylvania, Kentucky, and Ohio, with scores of 100, 93, 91, 90, and 89, respectively.

FIGURE 1 ABOUT HERE

With a range of 33 to 100 across the 50 states, there is considerable variation in our racism index and our goal is to determine whether this variation is associated with various health outcomes and life expectancy. The variables used in our analysis and the sources from which they were drawn are listed in Table 1. Recent research documents the link between racism and black residential segregation (Rugh and Massey, 2013) and various studies have linked racial segregation to black mortality and health (LaVeist, 1989; Polednak, 1997; Williams and Collins, 2001). We therefore considered racial segregation as a possible mediating variable in predicting

health and mortality outcomes and used the Social Explorer website to compile census tract data by state to compute black-white dissimilarity indices to indicate the degree of racial segregation in each state. This index measures the degree to which the distribution of blacks and whites across tracts departs from an ideal of evenness. It varies from 0 to 100 and indicates the relative percentage of blacks and whites who would have to exchange tracts to achieve an even distribution. The index equals zero when each tract has the same racial composition as the state and 100 when blacks and whites share no tracts in common.

TABLE 1 ABOUT HERE

As shown in Table 1, we obtained state-level measures of black health and mortality from the Henry J. Kaiser Family Foundation website, which conveniently compiled information and computed rates using data from the All County Micro-Data File on Mortality obtained from the Centers for Disease Control and Prevention through the National Center for Health Statistics. Using this database, we downloaded measures of life expectancy at birth, infant mortality, the rate of low weight births, the cancer death rate, the diabetes death rate, the heart disease death rate, the overweight and obesity rate. Since homicide is a major cause of death among young African Americans, especially males, we compiled homicide rates for males aged 10-24 from the Centers for Disease Control and Prevention's database on Youth Violence: State Statistics. In addition to the foregoing variables of substantive and theoretical interest, we also applied a variety of control variables in our interstate analyses, including the state GDP per capita, the percentage black, the black poverty rate, Medicaid spending per capita, the percent uninsured, and the percentage of blacks holding a college degree.

We began with an exploratory analysis that regressed each of the health and mortality

outcomes on our state-level indicators of racism and found significant zero-order associations with homicide, infant mortality, diabetes, heart disease, and life expectancy. We then sought to determine the degree to which these outcomes were directly connected to racism or were mediated through other variables. We determined that homicide mortality among young black males was mediated through segregation and had no direct relationship to racism. Likewise we found that infant mortality had no direct relation to segregation or racism but was mediated through the intervening variable of low birth weight, which was strongly predicted by racism. Hearst, Oakes, and Johnson (2008) also found no significant relationship between infant mortality and segregation. Finally, the diabetes and heart disease death rates had no direct connection to racism but were mediated through the intervening variable of the black obesity rate.

In sum, we empirically determined that racism produced racial segregation which predicted black homicide; that racism predicted low black birth weights which determined infant mortality; and that racism increased the black overweight and obesity rate which, in turn, increases mortality rates from diabetes and heart disease. Having sorted out these relationships, we then re-estimated the corresponding equations after including all of the control variables to guard against the potential confounding effects of other state-level factors. We then estimated a final equation that predicted black life expectancy from racism and the proximate determinants of homicide, infant mortality, diabetes mortality, and heart disease mortality, along with control variables. Segregation, low birth weight, and obesity had no direct effect on life expectancy once the effects of the proximate determinants were taken into account.

Path Analysis of Black Mortality and Life Expectancy

In general, we found that very few of the control variables had significant effects on mortality outcomes, and in a final stage we re-estimated the equations once again including only those control variables that proved significant in the prior phase, retaining the percent uninsured in the birth weight equation, the state GDP in the diabetes equation, and the percentage black in the heart disease equation. The final structural equations are summarized in the top panel of Table 2 and the associated path analysis is depicted in Figure 2, which shows the various pathways linking racism to life expectancy and their associated standardized regression coefficients.

TABLE 2 AND FIGURE 2 ABOUT HERE

We interpret the model causally, arguing that homicide, infant mortality, diabetes mortality, and heart disease mortality are not likely to cause racism, nor are obesity, birth weight, or segregation likely to be causing racism. The model, of course, is estimated using cross-sectional data so the possibility of spurious attributions of causality stemming from unmeasured variables cannot be eliminated, though we address this issue in a second analysis described below. According to the model estimates, racism has a rather strong effect on young black male homicide rates through the intervening variable of racial segregation. The coefficient 0.648 linking racism to segregation and the coefficient 0.606 linking segregation to homicide are both very large by the usual standards of path analysis and their product 0.393 captures the powerful effect that residential segregation has in promoting black homicide. As Sampson (2012) has recently demonstrated in Chicago, homicides and violence are strongly clustered within segregated black neighborhoods.

Although not as powerful as the racism-segregation-homicide linkage, the path

coefficients 0.471 linking racism to low birth weight and 0.400 linking low birth weight to infant mortality are also substantial, with their product 0.188 indicating the effect that racism has in driving up rates of black infant mortality. Likewise, the indirect effects of racism on mortality from diabetes and heart disease through the intervening variable of obesity are quite strong. The coefficient 0.471 linking racism to obesity and 0.281 linking obesity to diabetes mortality yield a product of 0.132 whereas when the racism-obesity effect is multiplied by the 0.358 effect of obesity on heart disease mortality we get an indirect effect of 0.169. In sum, by affecting the intervening variables of segregation, low birth weight, and obesity racism plays a strong role in driving up the death rate of blacks owing to four major causes.

The final step in the path analysis is to determine the effects of racism on black life expectancy through the various direct and indirect pathways depicted in Figure 2. The decomposition of effects is summarized in the top panel of Table 3. The total effect of racism is -0.379, suggesting the powerful effect that racism has in compromising black health in the United States. Although racism has a powerful effect on homicide, black male homicide in the age range 10-24 does not have a significant effect on overall black life expectancy so, in the end, racism does not have a significant effect black life expectancy through the intervening variable of homicide. Although the black homicide rate is many times that of whites, it is concentrated among young males and does not have a strong effect on average life expectancy among African Americans in general. The effects of racism through infant mortality and diabetes deaths are modest, accounting for around 13 percent and 11 percent of the total effect of racism on life expectancy, respectively. The major indirect pathway is through racism's effect on obesity and heart disease mortality, which accounts for around 25 percent of the total effect. The most powerful influence, however, is

the direct effect of racism on life expectancy, which accounts for 55% of the total effect. This “direct” effect might be interpreted to represent the effect of racism on life expectancy through unmeasured pathways, such as accidents, autoimmune diseases, and other causes of death not considered here.

The strong direct effect of racism on black life expectancy, as well as its direct effect on the rate of black low weight births and black obesity rates, could also reflect the influence of unmeasured heterogeneity in state-level circumstances. In order to guard against this possibility, we undertook a follow-up analysis that included measures of white levels of life expectancy, low birth weight, and obesity as controls in the relevant equations, on the theory that if unmeasured variation is somehow affecting mortality conditions generally this influence will be observed in the white rates and thus controlled statistically by their inclusion in the structural equations. The results of this exercise are summarized in the bottom panel of Table 2 and depicted graphically in Figure 3. Comparing the two figures we see that the effect of racism on low birth weight is reduced from 0.471 to 0.305 when the rate of white low birth weight births is included in the equation but the coefficient still remains significant. Likewise, controlling for white obesity reduces the effect of racism on black obesity from 0.471 to 0.386 but the coefficient remains highly significant.

In contrast, the direct effect of racism on life expectancy is sharply reduced from 0.207 to 0.070 and the coefficient is no longer statistically significant. In other words, most of the apparent direct effect of racism on life expectancy is likely attributable to unmeasured factors that also affect white life expectancy. As shown in the bottom panel of Table 3, we see that this shift in the size of the direct effect reduces the total effect size from -0.379 to -0.197, a 48% reduction, nonetheless the indirect pathways remain significant, leading to the conclusion that racism affects

black life expectancy principally by increasing black rates of low weight births which in turn produce higher rates of infant mortality, and by increasing black obesity rates, which raise rates of mortality from diabetes and heart disease.

Discussion

To our knowledge this study represents the first time that a direct measure of anti-black racial animus has been linked analytically to levels of black mortality and life expectancy. Although our model was only estimated cross-sectionally for the 50 U.S. states circa 2010 and is thus not fully provable as causal, the pathways we detected make logical sense. According to our estimates, interstate variation in the level of anti-black sentiment strongly predicts interstate variability in segregation which, in turn, predicts cross-state variation in homicide. Racial segregation, of course, is well known to concentrate disadvantage and produce disordered, violent neighborhoods (Massey and Denton, 1993; Sampson, 2012; Qullian, 2012).

Variation in racist sentiment likewise strongly predicts the prevalence of low-weight births and the rate of obesity among blacks. The former effect is consistent with the weathering hypothesis of Geronimus (1992) that the health of African-American women deteriorates in early adulthood as a physical consequence of cumulative exposure to the vicissitudes of life in a racist society; and the latter effect concurs with Jackson, Knight, and Rafferty's (2010) argument that people who inhabit stressful environments often cope by engaging in unhealthy behaviors such as eating sweet and fatty comfort foods and not exercising, thus promoting excess weight and obesity.

In addition, the creation of "food deserts" that fail to provide access to fresh meats, fruits, and vegetables owing to the prejudicial location of supermarkets away from black communities

and the saturation of minority neighborhoods with convenience stores and fast food outlets is well documented (Story et al., 2008; Walker, Keane, and Burke, 2010). In their comprehensive analysis of 6,500 food desert census tracts throughout the United States Dutko, Ver Ploeg, and Farrigan (2012) found that food deserts tend to have higher concentrations of minorities, elevated rates home abandonment, low levels of education, high unemployment rates, and greater poverty rates—precisely the profile of inner city ghetto neighborhoods and zones of rural black poverty. Given a greater prevalence of low weight births and black obesity tied to racism, the former naturally produces elevated rates of infant mortality and the latter generates higher death rates from diabetes and heart disease, which in turn lower black life expectancies.

In order to illustrate the potential of racism to reduce black life chances we performed a final exercise by using the structural equations in in the bottom panel of Table 2 to generate predicted life expectancies beginning with two different starting values of the racism index: the value of 33 observed in Utah and the value of 100 observed in West Virginia. Given with these two exogenous values, the equations can be used mechanically to generate values for all intermediate variables and then to generate a final predicted life expectancy. When this is done the model yields a predicted life expectancy of 76.8 given the minimum observed racism in the United States and a value of 72.9 give maximum racism, a differential of 3.9 years. The actual black life expectancies observed in Utah and West Virginia are 76.5 and 72.8, respectively.

The ability of our index of racial animus to generate a 3.9 year shift in black life expectancy is but into perspective by the fact that current gap between average black and white life expectancies is 4.1 years. Moreover, even though in our models homicide does not play a significant role in contributing to the racial gap in life expectancy, the collateral consequences of

high rates of violence and murder for black communities are grave (see Massey, 2001, 2004; Peterson and Krivo, 2010; Sampson, 2012; Sharkey, 2010, 2013; Sharkey et al., 2012) and the racism-segregation- homicide nexus is quite powerful. Using the equations in the bottom panel of Table 2 to predict homicide rates from starting values of the racism index of 33 and 100, we find that shifting racism from the levels observed in Utah to those observed in West Virginia increases the rate of young black male homicide by a factor of 2.5, raising it from 26.7 to 67.8 per 100,000. Such a dramatic shift clearly has profound health and welfare implications for residents of black communities currently exposed to high levels of lethal violence.

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Table 1. Sources of data for analysis linking anti-black racism to black mortality and life expectancy.

Racism Data

Search frequencies by state for the word "Nigger" compiled for 2004-2012 from Google Trends on January 18, 2013

Segregation Data

2010 Black-White dissimilarity indices computed by state at the census tract level using the 2010 U.S. Census of Population and Housing. Data retrieved from Social Explorer at www.socialexplorer.com

Health Data

Kaiser Family Foundation. State Health Facts. Henry J. Kaiser Family Foundation Website. Accessed 11/22/13 at the following addresses:

Life Expectancy at Birth by Race/Ethnicity 2010.

<http://kff.org/other/state-indicator/life-expectancy-by-re/>

Infant Mortality Rate by Race/Ethnicity 2007-2009.

<http://kff.org/other/state-indicator/infant-mortality-rate-by-race-ethnicity/>

Births of Low Weight as a Percent of All Births by Race/Ethnicity 2010

<http://kff.org/other/state-indicator/low-birthweight-by-raceethnicity/>

Number of Cancer Deaths per 100,000 Population by Race/Ethnicity 2010.

<http://kff.org/other/state-indicator/cancer-death-rate-by-raceethnicity/>

Number of Diabetes Deaths per 100,000 Population by Race/Ethnicity 2010

<http://kff.org/other/state-indicator/diabetes-death-rate-by-raceethnicity/>

Number of Heart Disease Deaths per 100,000 Population by Race/Ethnicity 2010

<http://kff.org/other/state-indicator/number-of-heart-disease-deaths-per-100000-population-by-raceethnicity-2/>

Overweight and Obesity Rates for Adults by Race/Ethnicity 2011

<http://kff.org/other/state-indicator/adult-overweightobesity-rate-by-re/>

Homicide Data

Centers for Disease Control and Prevention. 2014 Youth Violence: State Statistics. Accessed 11/22/14 at

http://www.cdc.gov/violenceprevention/youthviolence/stats_at-a_glance/state_statistics.html

Continued

Table 1. Continued.

Control Variables

State GDP Per Capita 2010. Department of Commerce. Bureau of Economic Analysis Website Accessed 11/23/13 at <http://www.bea.gov/regional/downloadzip.cfm>

State Percent Black 2010. U.S. Bureau of the Census. Census Briefs: The Black Population: 2010. U.S. Census Bureau Website accessed 8/11/2014 at <http://www.census.gov/prod/cen2010/briefs/c2010br-06.pdf>

State Black Poverty Rates 2007-2011. U.S. Bureau of the Census. American Community Survey Briefs: Poverty Rates for Selected Detailed Race and Hispanic Groups by State and Place: 2007-2011. U.S. Census Bureau Website accessed 8/11/2014 at <http://www.census.gov/prod/2013pubs/acsbr11-17.pdf>

State Medicaid Spending per Capita. Kaiser Family Foundation. State Health Facts: Total Medicaid Spending 2011. Henry J. Kaiser Family Foundation Website accessed 11/22/13 at: <http://kff.org/medicaid/state-indicator/total-medicaid-spending/>

State Percent Uninsured 2011. Kaiser Family Foundation. State Health Facts: Health Insurance Coverage of the Total Population. Henry J. Kaiser Family Foundation Website accessed 11/22/13 at: <http://kff.org/other/state-indicator/total-population/>

State Percentage of Blacks with a College Degree 2010. Tabulation downloaded from IPUMS USA at <https://usa.ipums.org/usa/> on 11/22/13.

Table 2. Structural equations model linking racism to black mortality and life expectancy.

Model with State Socioeconomic Controls

Black Segregation = $17.422 + 0.515 * \text{Racism Index}$ $R^2 = 0.407$
 Black Homicide Rate = $-14.331 + 1.191 * \text{Black Segregation}$ $R^2 = 0.354$
 Black Low Birthweight Rate = $6.679 + 0.058 * \text{Racism Index} + 0.016 * \text{Percent Uninsured}$ $R^2 = 0.366$
 Black Infant Mortality Rate = $8.000 + 0.355 * \text{Black Low Birthweight Rate}$ $R^2 = 0.160$
 Black Obesity Rate = $65.866 + 0.082 * \text{Racism Index}$ $R^2 = 0.205$
 Black Diabetes Death Rate = $-21.009 + 1.149 * \text{Obesity} - 0.4095 * \text{State GDP}$ $R^2 = 0.224$
 Black Heart Death Rate = $-219.295 + 5.653 * \text{Black Obesity Rate} + 1.928 * \text{State Percent Black}$ $R^2 = 0.415$
 Black Life Expectancy = $86.633 + 0.006 * \text{Black Homicide Rate} - 0.269 * \text{Black Infant Mortality Rate} - 0.049 * \text{Black Diabetes Death Rate} - 0.023 * \text{Black Heart Disease Death Rate} - 0.024 * \text{Racism Index}$ $R^2 = 0.802$

Model Controlling for White Low Birthweight Rate, White Obesity, and White Life Expectancy

Black Segregation = $17.422 + 0.515 * \text{Racism Index}$ $R^2 = 0.407$
 Black Homicide Rate = $-14.331 + 1.191 * \text{Black Segregation}$ $R^2 = 0.354$
 Black Low Birthweight Rate = $3.509 + 0.038 * \text{Racism Index} + 0.951 * \text{White Low Birthweight Rate}$ $R^2 = 0.433$
 Black Infant Mortality Rate = $8.000 + 0.355 * \text{Black Low Birthweight Rate}$ $R^2 = 0.160$
 Black Obesity Rate = $65.342 + 0.067 * \text{Racism Index} + 0.078 * \text{White Obesity Rate}$ $R^2 = 0.205$
 Black Diabetes Death Rate = $-57.907 + 1.388 * \text{Black Obesity Rate}$ $R^2 = 0.097$
 Black Heart Death Rate = $-360.890 + 7.917 * \text{Black Obesity Rate}$ $R^2 = 0.235$
 Black Life Expectancy = $56.445 + 0.002 * \text{Black Homicide Rate} - 0.277 * \text{Black Infant Mortality Rate} - 0.034 * \text{Black Diabetes Death Rate} - 0.017 * \text{Black Heart Disease Death Rate} - 0.008 * \text{Racism Index} + 0.349 * \text{White Life Expectancy}$ $R^2 = 0.859$

Table 3. Partitioning the effect of anti-black racism on black life expectancy through the direct and indirect pathways shown in Figure 2.

Pathway	Estimated Effect	Percentage Contribution
Model Predicting Black Outcomes with Controls		
Racism-Segregation-Homicide-Life Expectancy	0.009	+2.4
Racism-Birth Weight-Infant Mortality-Life Expectancy	-0.048	-12.6
Racism-Obesity-Diabetes-Life Expectancy	-0.040	-10.5
Racism-Obesity-Heart Disease-Life Expectancy	-0.093	-24.6
Racism-Life Expectancy	-0.207	-54.7
Total Effect	-0.379	- 100.0
Model Predicting Black Outcomes Controlling for White Outcomes		
Racism-Segregation-Homicide-Life Expectancy	0.012	+6.2
Racism-Birth Weight-Infant Mortality-Life Expectancy	-0.032	-16.2
Racism-Obesity-Diabetes-Life Expectancy	-0.028	-14.0
Racism-Obesity-Heart Disease-Life Expectancy	-0.080	-40.5
Racism-Life Expectancy	-0.070	-35.4
Total Effect	-0.197	- 100.0

Figure 1. Racism index developed from Google Trends search frequencies of racially offensive language.

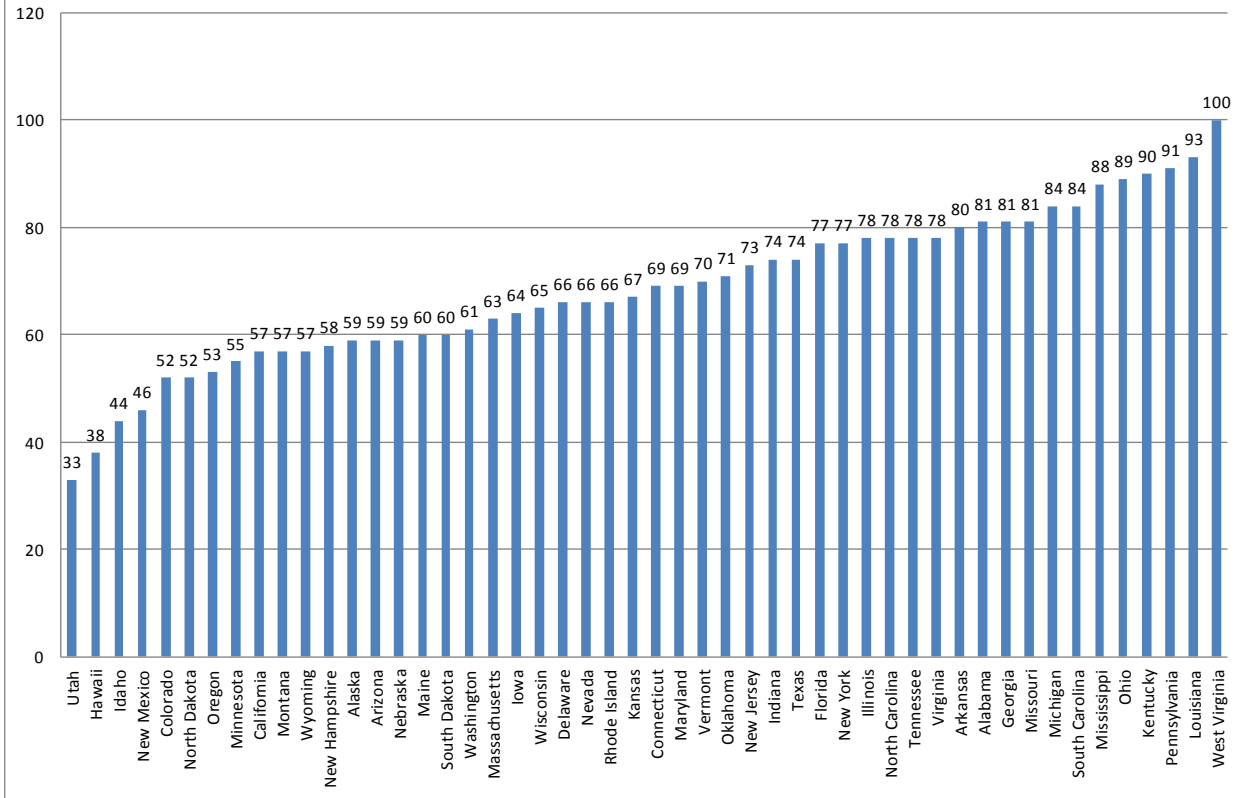


Figure 2. Path model linking anti-black racism to black life expectancy in 50 U.S. states estimated with state-level socioeconomic controls (*p<0.05).

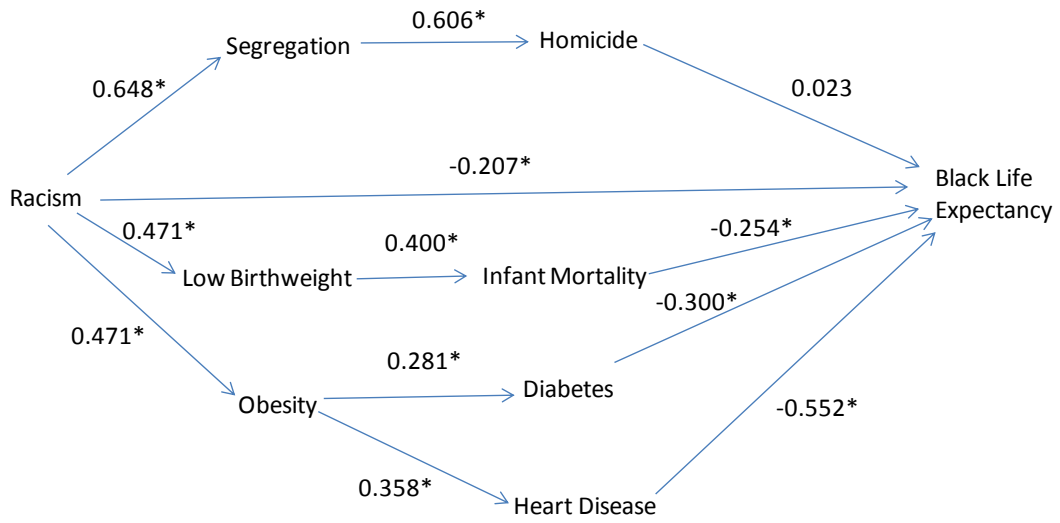


Figure 3. Path model linking anti-black racism to black life expectancy in 50 U.S. states controlling for white low birthweight rate, white obesity rate, and white life expectancy (*p<0.05).

