DO RACIST ATTITUDES HARM THE COMMUNITY HEALTH INCLUDING BOTH THE VICTIMS AND PERPETRATORS? A MULTI-LEVEL ANALYSIS

(Extended Abstract)

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Introduction

Racism appears to be a major risk factor for poor physical and mental health of the targets of prejudice, reducing one's life expectancy and health to a greater extent than obesity.[1-4] There is some evidence that racism may also affect the health of those who express racist feelings. For instance, Kennedy et al found that higher levels of collective racial prejudice were associated with higher rates of mortality among whites.[5]

There are several possible explanations for the association between racism and the poor health outcomes. People's ideas, beliefs, and attitudes can exert a profound effect on their health. For instance, internalized racism (e.g., a low sense of intrinsic worth) may extract a psycho-physiological toll on the individual.[6-7] A study found that those who feel they are victims of racial discrimination have poorer birth outcomes among black women delivering at the same hospital, and higher rates of hypertension than similar people who do not feel that they are victims of discrimination.[1,7] On the flip side, feelings of anger or hostility, such as those plausibly expressed as a form of racism, are also associated with hypertension which can cause various health problems among perpetrators.[8-10] It is also possible that racist beliefs can spill over onto other aspects of community functioning, thus indirectly affecting the health of residents living in the community. For example, if white voters harboring racist views convince their state legislators to cut spending on welfare or Medicaid (in the belief that they are punishing undeserving poor blacks living in their area), their actions may end up hurting poor white constituents and poor black constituents alike.

To our knowledge, however, no previous study has examined racial prejudice as a multilevel risk factor contributing to both majority and minority health status. We extend existing studies by investigating individual and community level effects of racial prejudice on health. For this purpose, we employ a multi-level approach that includes prospective mortality data for individuals who report their beliefs about race. We also examine the

interaction between individual level racism and community level characteristics.[11] Through the secondary analysis stratified by race, we explore whether the effect of collective racial prejudice varies by different race/ethnicity.

Data and Methods

We use the cumulative 1985-2002 GSS survey, linked prospectively to mortality data through the National Death Index (GSS-NDI).[12] At the individual level, we include key socio-demographic, socio-economic characteristics, survey year and a risky behavior, smoking. Socio-demographic and socioeconomic variables include race (white, black, other), sex (male, female), age (continuous variable), household income (<$20,000, $20,000-$45,000, >$45,000 per year), and educational attainment (less than high school, high school graduate, more than college). Household income is adjusted to constant 2002 dollars.[13] From the information on smoking behaviors, we create a dichotomous indicator of smoking status.

We also develop an individual racism scale by calculating individuals' scores over four questions encompassing two dimensions of racism. Responses to the four questions are averaged into a single continuous variable indicating whether an individual is high on one or all questions versus none of the questions. In addition, the total scores are dichotomized as low racism and high racism, using the median score as the cut point across individuals. The two dimensions encompass:

(1) attributions of causes of racial inequality ("Do you think racial differences in jobs, income, and housing are caused by the fact that most blacks/African-Americans have less in-born ability to learn?" and "Do you think blacks are in worse socio-economic situation because of the fact that most blacks just don't have the motivation or willpower to pull themselves up out of poverty?"). Each is coded as "yes (score 1)" or "no (score 0)"

(2) degrees of negative feeling against blacks compared with whites ("Whether people in the group of blacks (whites) tend to be hard-working or lazy" and "Whether people in the group of blacks (whites) tend to be intelligent or unintelligent"). Each response can be selected on the 7-level Likert scales from "lazy" to "hardworking" and from "unintelligent" to "intelligent." Ratings of whites are subtracted from the ratings of blacks to quantify unfavorable feelings against blacks compared with whites.

The reliability of the scale, calculated with the Cronbach's alpha, is 0.68. When exploratory factor analysis is performed, the variables load strongly on each individual item, providing an added level of confidence in the scales' reliability (>0.60).

Community-level racism is measured based on the PSU of the GSS, which are

composed of either metropolitan statistical areas, or rural counties. These PSUs serve as a proxy for the 'life space' where the individual resides.[14] From 1985 to 2002, the National Opinion Research Center conducted their interviews in the same 348 PSUs, encompassing 25,572 GSS respondents. To devise a scale of community-level racism while reducing time variance noise, we estimate the number of each PSU's residents whose racial prejudice is above the median on the total racism scale across four-year surveys, and then average general moving trends of the entire survey years. We also control for additional covariates aggregated to the PSU level, viz.: proportion of African Americans living in a PSU, the proportion of people below federal poverty line adjusted for family size and survey year, and the proportion of people above the median on the social trust scale. Social trust variable is aggregated into a community level based on a question from the GSS: "Generally speaking, would you say most people can be trusted?"

Our statistical models test the hypothesis that individuals' health risks depend in part on the community within which a person has or had resided. In order to test this hypothesis, we develop weighted two-level multilevel models of individuals nested within the same PSUs within the GSS. Since the outcome is binary, a multilevel logistic model with random intercepts based on a logit-link function is estimated. Models are fit using the HLM program with restricted maximum likelihood approximation.[15] To address collinearity, our individual-level racism scale is centered around the PSU-level mean values on the racism scale.[16] The following five models are developed sequentially.

Model 1. A two-level empty model of individuals (level 1) residing within PSUs (level 2) without any predictors in the fixed and the random effects components of the model.

Model 2. Based on the model 1, we add all the individual predictors in the fixed part of the model excluding individual-level racism. Survey year, respondents' socio-demographic variables (age, sex, and race), socio-economic indicators (household income, and educational attainment), and smoking status are included. Model 3 has two components: 3A) is similar to model 2, but the fixed effect of PSU-level racism is adjusted. 3B) includes the simultaneous effects of PSU-level poverty, the proportion of black residents, social trust and racial prejudice on mortality. In model 4, we add individual-level strong racism to model 3B to compare the relative impact of individual racism to PSU-level racism on mortality. Model 5 considers cross-level interactions between individual-level racism and community characteristics. This model is developed to assess the extent to which the contextual effects of poverty, percent of black residents, social trust and racial attitudes on individuals' mortality

differ for low- and high-racism individuals.

Random effects models also allow us to explore the variations in mortality among different PSUs. The PSU-level random variance is presented as the variance component and variance partition coefficient (VPC).[17] The VPC is a measure of the heterogeneity of neighborhood level mortality across neighborhoods. In logistic regression models, the VPC is calculated as $\sigma^2_u/(\sigma^2_e+\sigma^2_u)$ where σ^2_u is the between neighborhood-level variance and σ^2_e is the residual variations among individuals.[18] The subsequent analysis examines whether, and how collective racial prejudice is associated with mortality rates of the non-Hispanic whites and non-Hispanic blacks.

Preliminary Results

Table 1 lists the basic demographic characteristics of the subjects (n=25,572) from the analytic sample. Approximately 24% of the overall GSS/NDI respondents died between 1985 and 2002. The mean age of the cohort is 46, and the range is 18-89 years. About 44% of respondents are male and 56% are female, and 81% are white and 14% are black.

Table 2 presents the odds ratio estimates from the multilevel models. In the empty model (model 1), there is a significant variation in mortality across PSUs. Model 2, is designed to test the basic individual-level associations between socio-demographic characteristics and mortality. We show that higher mortality in the GSS-NDI linked cohort is associated with the predictable individual covariates, including year, male sex, higher age, black race, lower SES, and smoking. For instance, black individual experienced a roughly 75% higher all cause mortality compared with whites (OR=1.75, 95% CI=1.47 to 2.10), as did those with the lowest level of educational attainment (less than high school) compared to college and above (OR=1.30, 95% CI =1.06 to 1.59) and those earning <$20,000 relative to those earning >$45,000 (OR=1.33, 95% CI=1.12 to 1.59). Smoking is also significantly and positively related to individuals' mortality rate for both white and black respondents (OR = 1.33, 95% CI = 1.17 to 1.51).

In model 3A, we introduce PSU-level racism to the model. Contextual racism is associated with a small but statistically significant odds of mortality (OR =1.02, 95% CI = 1.02 to 1.03). The effects of individual-level covariates are similar to the results in Model 2. When PSU-level poverty, percent black residents, social trust and PSU-level racism are simultaneously adjusted (model 3B), higher PSU-level racism is remained associated with a statistically significant excess odds of mortality (OR= 1.02, 95% CI = 1.02 to 1.03). When individual-level racism is added to model 4, the effect of PSU-level racism remains

statistically significant. Individual-level racism has a marginally significant positive effect on mortality rate. In model 5, we examine the cross-level interactions between contextual and individual level effects. Specifically, we assess whether there is an effect modification of individual-level racism by PSU-level factors. A significant interaction effect is seen between individual racism and PSU-level poverty (OR=1.02, 95% CI =1.01 to 1.04). As for the random effects, approximately 9.5% of the overall variation in mortality is at PSU-level. When we introduce the PSU-level confounding variables (% black and % poverty), the variance component decreases slightly but remains statistically significant (See Table 3).

In the secondary analysis, we find that for the non-Hispanic blacks, effect of collective racism on mortality is mediated by smoking (See Table 4). For non-Hispanic whites, the collective racism effect remains strong after controlling for smoking and social trust covariates.

In summary, we find that individuals who had been exposed to the racist social atmosphere tend to have poor health outcomes regardless of their race. Random effect analysis suggests that collective racial prejudice may be an independent influence on all cause mortality, beyond individual socio-demographic characteristics, and individually-held racist beliefs. The community level-racism effect is smaller (a 2% increase, or roughly 2.5 fewer months of life, comparing PSUs above and below the median of the aggregated racism scale). Nonetheless, on a population scale, these apparently small differences can add up to a non-trivial impact. Assuming that the effect estimates are unconfounded and causal, then reducing racism to below the median on our racism scale within a population of 100,000 people could save 21,000 years of life. We also find that individuals who rate high on our racism scale and live in predominantly poor communities have higher mortality than those who live in comparatively rich neighborhoods (See Figure 1). This result, along with the previous studies, indicates that neighborhood deprivation can be an effect modifier of the relationship between racial prejudice and mortality.

The result of a model stratified by the race/ethnic is presented in table 4. As for the non-Hispanic whites, the effect of community level racism is significant even after adjusting for individual level smoking and community level social trust covariates. Interestingly, the effect of PSU-level racism increases after controlling for social trust covariate. This observation implies that a negative effect of racism on health is partly suppressed before controlling for social trust. Thus, we deduce that social trust is related with less racism which may mediate the association of the racial prejudice with mortality rate. For non-Hispanic blacks, the effect

of community level racism on mortality rate becomes insignificant after controlling for individual-level smoking behavior, indicating that smoking was a mediator of the effect of racism on health status of blacks.

Future Steps

While racism unquestionably harms the health of victims, our findings suggest that it impacts the health of those who hold racist beliefs, as well as the broader communities within which they have or had lived. We also find a significant interaction effect between racist attitudes and community level poverty.

Since our predictions are based on the prospective mortality data, we cannot take into account the possibility that people may move to other PSUs before they die. Thus we will continuously explore the relationship between collective racial prejudice and health by using different types of health indicators such as residents' self-rated health. We will also investigate potential unmeasured confounders /mediators such as racial segregation and income inequality to drill down into the mechanisms linking collective prejudice and community health.[19]

Table 1. Demographic characteristics of respondents in the 1985-2002 General Social Survey-National Death Index data.

Characteristics	N (%)
Level-1, individuals, n=25,572	
Mortality	
Dead	6,151 (24.0%)
Alive	19,421 (76.0%)
Age	
18-24	2,463 (9.6%)
25-44	11,419 (44.7%)
45-64	7,051 (27.6%)
65-89	4,604 (18.0%)
Sex	
Male	11,142 (43.6%)
Female	14,430 (56.4%)
Race/ethnicity	
White	20,767 (81.2%)
Black	3,604 (14.1%)
Other	1,201 (4.7%)
Educational attainment	
$\leq$ High school	4,888 (19.2%)
High school	13,566 (53.2%)
$\geq$ High school	7,039 (27.6%)
Annual household income	
<$20,000	6,271 (27.3%)
Between $20,000-$45,000	7,138 (31.1%)
>45,000	9,583 (41.7%)
Smoking	
Yes	2,631 (31.1%)

No	5,817 (68.9%))
Racial attitudes	
High Racism	8,782 (51.4%)
Low Racism	8,298 (48.6%)
Level 2, Primary Sampling Units, n=384	Mean (Range)
Percent above median on racism scale	51.8 (19.1-85.5)
Percent below the federal poverty level	14.0 (1.3-46.6)
Percent black	14.1 (0-60.7)
Percent above median on stoical trust scale	36.7 (8-71.4)

Table 2. Multilevel logistic models predicting odds of all-cause mortality by individual and community (PSU)-level characteristics

Fixed parameters	Model 1	Model 2	Model 3A	Model 3B	Model 4	Model 5
Constant	0.328(0.30,0.36)	0.347 (0.32,0.38)	0.101 (0.07,0.15)	0.047 (0.02,0.10)	0.047 (0.02,0.13)	0.046 (0.02,0.01)
Individual Characteristics						
Age		1.067 (1.06,1.07)	1.068 (1.06,1.07)	1.068 (1.06,1.07)	1.071 (1.07,1.08)	1.071 (1.07,1.08)
Year		0.869 (0.84, 0.90)	0.868 (0.84, 0.90)	0.869 (0.84, 0.90)	0.864 (0.83,0.90)	0.864 (0.83,0.90)
Gender						
Male		Reference	Reference	Reference	Reference	Reference
Female		0.630 (0.55,0.72)	0.629 (0.55,0.72)	0.629 (0.55,0.72)	0.660 (0.56,0.77)	0.664 (0.57,0.78)
Race						
White		Reference	Reference	Reference	Reference	Reference
Black		1.754 (1.47,2.10)	1.756 (1.47,2.10)	1.760 (1.47,2.11)	1.783 (1.31,2.43)	1.713 (1.25,2.34)
Other		1.154 (0.73,1.83)	1.157 (0.73,1.84)	1.157 (0.73,1.84)	1.501 (0.78,2.90)	1.526 (0.79, 2.97)
Educational attainment						
$\leq$ High school		1.296 (1.06,1.59)	1.293(1.05,1.59)	1.293 (1.05,1.59)	1.170 (0.88,1.55)	1.180 (0.89,1.56)
High school		1.205(1.04,1.40)	1.205(1.04,1.40)	1.205 (1.04,1.40)	1.196 (1.00,1.44)	1.211 (1.01,1.46)
$\geq$ High school		Reference	Reference	Reference	Reference	Reference

| Variable	Model 1	Model 2	Model 3	Model 4	Model 5
Annual household income					
Less than $20,000	1.332 (1.12,1.59)	1.337 (1.13,1.60)	1.337 (1.13,1.59)	1.344 (1.07,1.68)	1.355 (1.08,1.70)
$20,000-$45,000	1.159 (1.00,1.34)	1.161 (1.01,1.34)	1.159 (1.00,1.34)	1.297 (1.05,1.60)	1.297 (1.05,1.60)
More than $45000	Reference	Reference	Reference	Reference	Reference
Smoking	1.331 (1.17, 1.51)	1.330 (1.17, 1.51)	1.330 (1.17,1.51)	1.373 (1.16, 1.63)	1.380 (1.16, 1.64)
High racism*	—	—	—	1.173 (1.00,1.40)	1.553(0.39,6.26)
Neighborhood(PSU-Level) Characteristics					
Percent above median on racism scale	—	1.022 (1.02,1.03)	1.023 (1.02,1.03)	1.020 (1.01,1.03)	1.020 (1.01,1.03)
Proportion of people in poverty	—	—	1.014 (1.01,1.03)	1.025 (1.01,1.04)	1.024 (1.01,1.04)
Proportion black	—	—	1.000 (1.00,1.01)	1.000 (0.99,1.01)	1.000 (0.99,1.01)
Percent above median on social trust	—	—	1.012 (1.01, 1.02)	1.013 (1.01, 1.03)	1.013 (1.01, 1.03)
PSU/Individual interaction					
PSU racism*High racism					0.995 (0.98,1.01)
Proportion blacks people*High racism					0.990 (0.98,1.00)
Proportion in poverty*High racism					1.022 (1.01,1.04)
Social trust* High racism					0.995 (0.98, 1.01)

Table 3. Random effects results for the multilevel mortality models.

Random parameters	Model 1	Model 2	Model 3A	Model 3B	Model 4	Model 5
Variance component ($\sigma^2_{\mu 0}$)	0.34***	0.14***	0.10***	0.10***	0.17***	0.17***
Variance partition coefficient (%)	9.5%	12.4%	11.5%	11.4%	11.1%	11.1%

Table 4. Estimated odds ratios for the effect of PSU-level racial prejudice (and 95% confidence intervals) on all cause mortality for Non-Hispanic Whites and Non-Hispanic Blacks, 1985 – 2002.

Non-Hispanic Whites			Non-Hispanic Blacks		
Adjusted for Individual-level SES & PSU-level characteristics	Adjusted for Individual-level SES & PSU-level characteristics & Smoking	Adjusted for Individual-level SES & PSU-level characteristics & Smoking & Social trust	Adjusted for Individual-level SES & PSU-level characteristics	Adjusted for Individual-level SES & PSU-level characteristics & Smoking	Adjusted for Individual-level SES & PSU-level characteristics & Smoking & Social trust
1.038 [1.03 - 1.04]	1.024 [1.02 - 1.03]	1.026 [1.02 - 1.03]	1.024 [1.01 - 1.04]	1.000 [0.98 - 1.01]	1.000 [0.98 - 1.01]

Figure 1. Relationship between the percentage of Poverty in a Primary Sampling Unit and mortality among individuals above the median on racism scale ("High Racism" and below the mean "Low Racism.")
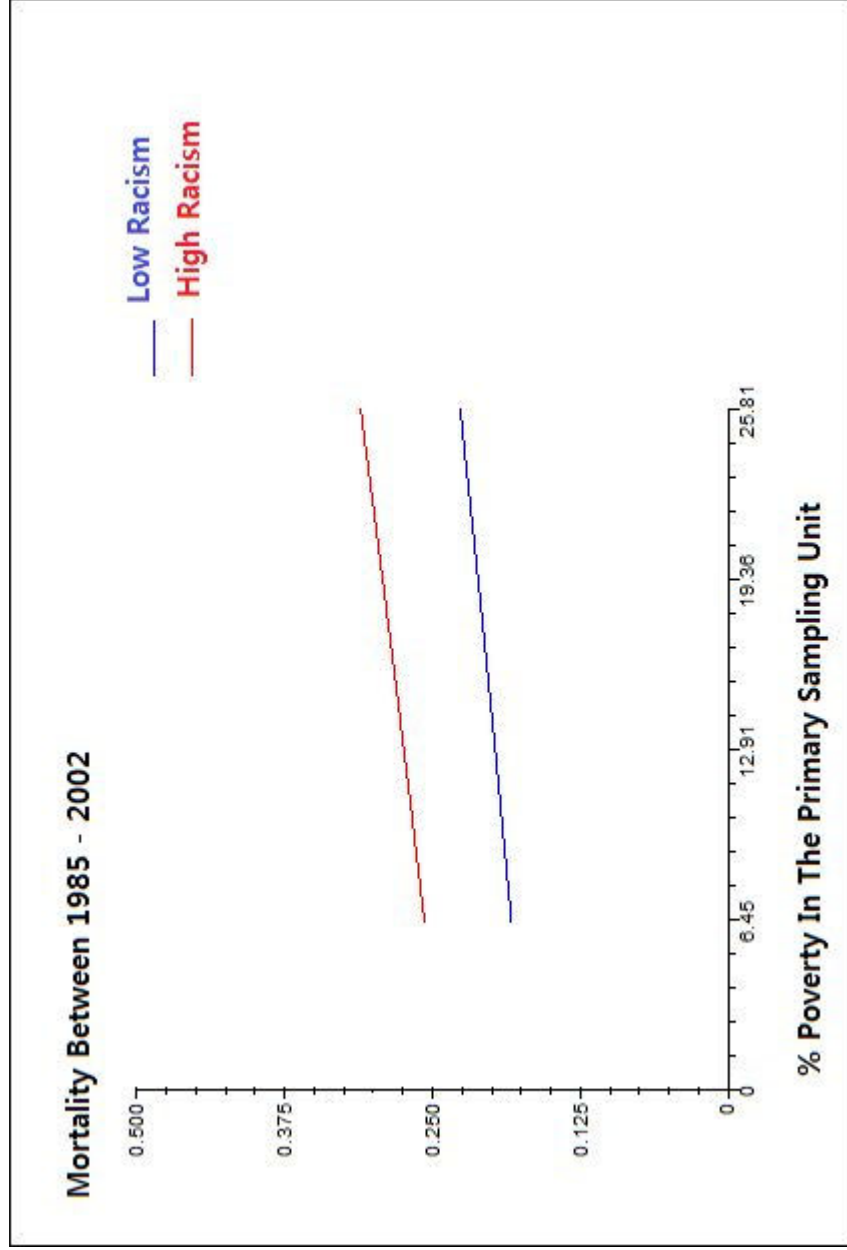
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