



# Social Epidemiology of Perceived Discrimination in the United States: Role of Race, Educational Attainment, and Income

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## Abstract

**Background and aims:** This study aimed to compare non-Hispanic Black (NHB) and non-Hispanic White (NHW) American adults for the associations of educational attainment and household income with perceived racial discrimination.

**Methods:** The 2010 National Alcohol Survey (NAS N12), a nationally representative study, included 2635 adults who were either NHB (n=273) or NHW (n=2362). We compared NHBs and NHWs for the associations between education, income, and perceived racial discrimination. We used linear regression for data analysis. Outcome was perceived racial discrimination; the predictors were educational attainment and household income; covariates were age and gender; and moderator was race.

**Results:** In the total sample, high income was associated with lower levels of perceived racial discrimination, while educational attainment was not significantly associated with perceived racial discrimination. There was also an interaction between race and education but not household income, suggesting a difference in the association between educational attainment and perceived racial discrimination between NHB and NHW individuals. For NHW individuals, household income was inversely associated with perceived racial discrimination. For NHB individuals, however, household income was not related to perceived racial discrimination. For NHB but not NHW individuals, educational attainment was correlated with more not less perceived racial discrimination.

**Conclusion:** High income protects NHW but not NHB individuals against perceived racial discrimination, and NHB individuals with high education levels report more not less perceived racial discrimination.

**Keywords:** Socioeconomic status, Income, Education, Racism, Perceived racial discrimination

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## Introduction

While socioeconomic status (SES) indicators such as educational attainment and household income protect most populations from poor health,<sup>1</sup> Minorities' Diminished Returns (MDRs)<sup>2,3</sup> refer to non-Hispanic Blacks' (NHBs) smaller returns of SES relative to non-Hispanic Whites' (NHWs)<sup>4</sup>. These MDRs are robust as they are observed for children, youth, adults, and older adults, and are replicated regardless of cohorts and settings.<sup>4</sup> In line with the MDRs, high education and income have been shown to increase the risk of depression for NHB individuals.<sup>5</sup>

Oliver and Shapiro<sup>6</sup> and Hamilton and Darity<sup>7</sup> have published on "Black-White wealth gap", which refers to an enormous racial wealth gap persisting between NHB and NHW individuals with similar education and income profiles. This has sometimes been referred to as the Black tax, or the hidden cost associated with being NHB in the US.<sup>8</sup> While some work has focused on the contribution

of institutional and structural racism to explaining the reduced effects of educational and income attainment for NHB individuals, less knowledge is available on the role of perceived racial discrimination in this regard. We know even less about the experiences of NHB individuals who despite perceived societal injustice manage to acquire high levels of education and income.<sup>9</sup>

Perceived racial discrimination has been mentioned as a plausible mechanism that can explain diminished returns of SES to NHBs who manage to obtain high levels of education and income.<sup>4,9</sup> As shown by multiple review papers,<sup>10,11</sup> perceived societal injustice increases the risk of multiple physical and mental health outcomes. Research suggests that the social patterning of perceived racial discrimination is different for NHB and NHW individuals.<sup>12-14</sup> Some evidence suggests that high SES may increase rather than decrease the perceived racial discrimination for NHBs,<sup>9</sup> which may be in part due to

an increased contact with NHWs.<sup>12</sup> Thus, while high SES reduces discrimination for NHW Americans,<sup>15</sup> high SES means experiencing more, but not less, perceived racial discrimination for NHB individuals.<sup>9,13</sup>

Although, theoretically speaking, perceived racial discrimination is an ideal explanation for the observed MDRs, we are only aware of one study that has specifically compared NHW and NHB individuals for the associations between SES and perceived racial discrimination. In their study, Colen and colleagues<sup>13</sup> borrowed data from the National Longitudinal Survey of Youth (NLSY) and showed that for NHWs, income gain over time was associated with a reduced exposure to perceived racial discrimination. Upwardly mobile NHB people, however, reported more not less perceived racial discrimination, when compared to socioeconomically stable NHBs.<sup>13</sup> Although there are also other studies showing that among NHB people, high SES may increase perceived racial discrimination,<sup>14</sup> those studies have been limited to NHB individuals only.<sup>16</sup> These studies do not provide information on differential effects of SES on perceived racial discrimination between NHW and NHB people.

### ***Aims***

To better understand the role of perceived racial discrimination in generating MDRs,<sup>2,4</sup> this study used a national sample of American adults and compared NHB and NHW individuals for the associations of education attainment and household income with perceived racial discrimination. In this study, we were interested in social epidemiology of perceived discrimination based on three major social determinants: race, education, and income. Our hypothesis was inverse associations of educational attainment and income with perceived racial discrimination; however, these inverse associations were expected to be weaker for NHB than NHW individuals.

## **Materials and Methods**

### ***Setting and Design***

This was a secondary analysis of existing data. This cross-sectional analysis used data from the 2010 National Alcohol Survey (NAS N12). The NAS is a unique national data set conducted by the Alcohol Research Group (ARG) to monitor risk factors, patterns of use, and consequences of alcohol use in the US. Publicly available data are available at the ARG website. The data collection of the NAS N12 occurred in 2010 in 50 states and District of Columbia (DC).

### ***Participants and Sampling***

The NAS N12 has applied a multistage area probability sample of adults defined as individuals aged 18 and older in households. The sampling has enrolled individuals within all 50 states and DC. The NAS N12 has oversampled Blacks and Hispanics. The NAS has used a

dual frame for sampling. This dual frame is believed to cover 97% of the US population. These frames were based on landline and cellphone. At least 40 interviews per state were conducted. The sample was a random digit number (RDD) of individuals with a landline or cellphone, which were selected both across states and areas with high and low density of Blacks and Hispanics. The current analysis restricted our analytical sample to 2635 participants who were either NHW (n=2362) or NHB (n=273).

### ***Data Collection***

The NAS used computer-assisted telephone interviewing (CATI) to collect data. Interviewers were highly trained and familiar with conducting surveys using CATI. The interviews were administered using a fully structured interview in English. All the interviews were conducted via phone. Using Macros and CATI, the NAS implemented a complex survey with complex skip patterns. The study also used data quality control.

### ***Measures***

For the current study, we used the following variables from the NAS N12: race, age (1-10), sex, educational attainment, household income, and perceived racial discrimination.

*Race/Ethnicity.* In the NAS N12, race was self-identified as either NHB or NHW. Although the NAS had individuals from Hispanic ethnicity or other races, the analysis of the current study was restricted to individuals without any Hispanic background.

*Educational Attainment.* Education was measured using a self-reported item. The question was "What was the highest grade or year in school that you completed?" Responses were 1 for 1st grade, 2 for 2nd grade, 3 for 3rd grade, 4 for 4th grade, 5 for 5th grade, 6 for 6th grade, 7 for 7th grade, 8 for 8th grade, 9 for 9th grade, 10 for 10th grade, 11 for 11th grade, 12 for 12th grade, 13 for 1-year college, 14 for 2-year college, 15 for 3-year college, 16 for 4-year college degree, and 17 for graduate/professional school, beyond 4-year degree. We treated educational attainment as an interval variable ranging between 1 and 17.

*Household Income.* Household income was assessed using the following single item, using self-report data. The question was "Please stop me when I get to the category that describes your total household income from all sources in (YEAR) before taxes": 1 for \$10,000 or less, 2 for more than 10,000 to 15,000, 3 for more than 15,000 to 20,000, 4 for more than 20,000 to 30,000, 5 for more than 30,000 to 40,000, 6 for more than 40,000 to 60,000, 7 for more than 60,000 to 80,000, 8 for more than 80,000 to 100,000, 9 for more than 100,000 to 120,000, and 10 for more than 120,000. Annual household income was treated as an interval variable ranging from 1 to 10, with higher score indicating higher income.

**Perceived Racial Discrimination.** Perceived racial discrimination was measured using a modified version of the David Williams' Everyday Discrimination Scale (EDS).<sup>17</sup> Participants were asked "Have you ever experienced discrimination, been prevented from doing something, or been hassled or made to feel inferior because of your race, ethnicity or color?" The participants reported being discriminated against in the following types: 1) At school, 2) Getting hired or getting a job, 3) At work, 4) Getting housing, 5) Getting medical care, 6) Getting service in a store or restaurant, 7) Getting credit, bank loans, or a mortgage, 8) On the street or in a public setting, and 9) From the police or in the courts. This scale uses multiple items to assess routine, chronic, daily, and less overt discriminatory experiences over the past year.<sup>17</sup> Example items include "In your day-to-day life, how often have any of the following things happened to you?" Sample items include: "being followed around in stores," "people acting as if they think you are dishonest," "receiving poorer service than other people at restaurants," and "being called names or insulted." Responses are given on a 0/1 scale: 0 for no (never) and 1 for yes (at least once in the lifetime). For discrimination score, we calculated a sum score ranging from 0 to 9, with a higher score reflecting more frequent experiences with discriminatory events over their lifetime.

### Statistical Analysis

We used SPSS to analyze the data. We took into account the complex sampling design and study weights. As a result, analytic inferences were generalizable to the US general population. For our multivariable analysis, we fitted four linear regression models. Before our modeling, we ruled out multi-collinearity between race, educational attainment, and income particularly. We also tested the assumption of linearity of the distribution of residuals (error terms). In all models, educational attainment and household income were the independent variables, perceived racial discrimination was the dependent variable, and age and gender were the covariates. We ran four models. *Model 1* was estimated in the pooled sample to

predict perceived racial discrimination using main effects of race, educational attainment, and household income without any interaction terms. To our *Model 2*, two interaction terms were added: educational attainment  $\times$  race, and household income  $\times$  race. We then estimated similar stratified models for NHW (*Model 3*) and NHB (*Model 4*) individuals. We reported regression coefficients (*b*), standard errors (SEs), 95% confidence intervals (CIs), *t* value, and *P* values. A *P* value of less than 0.05 was considered statistically significant.

## Results

### Descriptive Statistics

This study included 2635 participants who were either NHW ( $n=2362$ ) or NHB ( $n=273$ ). As shown in Table 1, NHB individuals were younger, had lower educational attainment, and had lower household income than NHW individuals. NHB individuals also reported higher levels of perceived racial discrimination than NHW individuals.

### Pooled Sample

In Table 2, we summarize the results of two linear regressions with perceived racial discrimination as the outcome. *Model 1* indicated that race was associated with perceived racial discrimination. Compared to NHWs, NHBs reported more perceived racial discrimination. While educational attainment was not associated with perceived racial discrimination, income was inversely associated with perceived racial discrimination in the pooled sample.

*Model 2*, in which two interaction terms were added between race and education and income, showed that education had an interaction with race, suggesting that the association between education and perceived racial discrimination was significantly different between NHW and NHB adults. Income, however, did not show any interaction with race, suggesting that the association between income and perceived racial discrimination was significant for NHW and NHB individuals.

**Table 1.** Demographic Descriptive Data of Non-Hispanic Black and Non-Hispanic White Individuals

	Total Sample (n=2636)		Non-Hispanic White (n=2362)		Non-Hispanic Black (n=273)	
	Mean	SD	Mean	SD	Mean	SD
Age (1-10) *			7.93	3.09	7.00	3.30
Educational attainment*			13.61	2.36	12.96	2.45
Household income*			5.92	2.58	4.09	2.60
Perceived racial discrimination (Everyday)*			0.51	1.21	3.36	2.83
	<b>n</b>	<b>%</b>	<b>n</b>	<b>%</b>	<b>n</b>	<b>%</b>
Gender*						
Female	1443	54.7	1270	53.7	173	63.4
Male	1193	45.3	1093	46.3	100	36.6

Notes: CI; Confidence Interval. \*  $P < 0.05$ .

Source: National Survey of American Life (NSAL 2001-2003).

**Table 2.** Linear Regression on the Effects of Educational Attainment and Household Income on Perceived Racial Discrimination in the Overall Sample

	Model 1 All (n=2635)						Model 2 All (n=2635)					
	b	SE	95% CI		t value	P-value	b	SE	95% CI		t value	P-value
Race (Black)	2.82	0.10	2.63	3.01	29.37	0.000	0.29	0.52	-0.72	1.31	0.56	0.573
Gender (Male)	0.30	0.06	0.18	0.41	5.18	0.000	0.30	0.06	0.19	0.42	5.31	0.000
Age	-0.02	0.01	-0.04	-0.01	-2.54	0.011	-0.02	0.01	-0.04	0.00	-2.44	0.015
Education	0.02	0.01	0.00	0.05	1.63	0.103	0.00	0.01	-0.03	0.03	-0.04	0.967
Income	-0.03	0.01	-0.06	-0.01	-2.50	0.012	-0.03	0.01	-0.05	0.00	-1.95	0.052
Race × Education	-	-	-	-	-	-	0.22	0.04	0.13	0.30	4.91	0.000
Race × Income	-	-	-	-	-	-	-0.07	0.04	-0.15	0.01	-1.61	0.108

**Note.** b: Regression coefficient, SE: Standard error.

### Race-Stratified Models

In Table 3, we present the results of the race-stratified regression models. Among NHB individuals (*Model 3*), education was positively associated with perceived racial discrimination. Moreover, in NHW people, high household income was associated with lower perceived racial discrimination.

### Discussion

Five major results were found. First, in the pooled sample, income reduced discrimination, while education did not predict discrimination. Second, race was also associated with perceived racial discrimination, beyond SES, as NHBs reported more racial discrimination than NHWs. Third, in both NHW and NHB adults, male gender was associated with higher discrimination. Fourth, educational attainment increased perceived racial discrimination for NHBs but not NHWs. Fifth, for NHWs, high income was protective against perceived racial discrimination.

Before our findings are interpreted, we should review our study limitations. First, this study used a cross-sectional design. As a result, our results do not imply causation but association. We know that SES and perceived racial discrimination have bidirectional association. Low SES may also interfere with experience of discrimination through experience of upward or downward social mobility. Second, Our study also did not differentiate the perpetrator of the discrimination. Third, this study used a few SES indicators but not wealth.

Our results are related to a study by Colen et al<sup>13</sup> who showed that for NHWs, income gain over time was associated with less exposure to perceived racial discrimination. Upwardly mobile NHB people, however, reported more perceived racial discrimination compared to their socioeconomically stable counterparts.<sup>13</sup> Our results are also related to a study showing that while income improved self-rated mental health for NHWs, NHB individuals reported poor self-rated mental health across all income levels.<sup>18</sup> Finally, our results are related to a study showing that upward and downward educational mobility were associated with an increase in stressful life events for NHWs; however, NHB individuals reported

high levels of stressful life events, regardless of their social mobility status.<sup>19</sup>

As our results show, for NHB individuals, race-related stress is not reduced as a result of occupying a higher status in society. Instead, educational attainment serves as a steady magnet for discrimination for NHBs. This is in addition to the effect of race on perceived racial discrimination that occurs regardless of social position. Thus, race-based stress, also called discrimination, is higher in most educated NHBs. This provides a plausible explanation for MDRs of education in NHB people.<sup>9</sup> Studies have demonstrated that race-related stress is detrimental to the mental health of NHB individuals particularly.<sup>20</sup>

High levels of perceived racial discrimination in highly educated NHBs mean health risk spills over across all SES levels for NHB individuals. While for NHBs, high SES people report more discrimination, for NHWs, individuals with low SES report high levels of discrimination.<sup>15</sup> Some have suggested that for NHB individuals, perceived racial discrimination is mainly a function of race/ethnicity; thus accumulation of human capital or materialistic resources would not protect them against discrimination.<sup>9,15</sup> Racist ideologies, implicit bias, prejudice, and stereotypes all affect various aspects of NHB individuals' lives.<sup>21</sup> Prejudice is deeply embedded in the fabric of the US society, which affects NHB individuals' daily lives across settings and institutions.

The current study is not the first to document diminished returns of income for NHB individuals. Shapiro and Oliver have discussed the NHB and NHW wealth gap<sup>6</sup> and also Black tax.<sup>8</sup> They have shown that NHB individuals often gain fewer tangible outcomes than NHW Americans across levels of income. Darity and Hamilton have also documented an extensive wealth gap between NHWs and NHBs.<sup>7</sup> High education may result in worse occupational opportunities and salaries for NHBs compared to NHWs.<sup>6,8</sup> Some of these inequalities may be due to educational system inequalities between NHB and NHW individuals. As such, rather than a solution to inequalities, or an equalizer, education has become a source of inequality in the United States.<sup>22</sup> Some of these observed differences are due to how society gives privilege



**Table 3.** Summary of Linear Regression on the Effects of Educational Attainment and Household Income on Perceived Racial Discrimination by Race

	Model 3 Non-Hispanic White (n = 2362)					Model 4 Non-Hispanic Black (n = 273)						
	b	SE	95% CI		t value	P Value	b	SE	95% CI		t value	P Value
Gender (Male)	0.22	0.05	0.12	0.32	4.37	0.000	1.13	0.35	0.44	1.82	3.22	0.001
Age	-0.04	0.01	-0.05	-0.02	-4.48	0.000	0.09	0.05	-0.02	0.19	1.67	0.096
Education	0.00	0.01	-0.03	0.02	-0.23	0.817	0.27	0.08	0.11	0.42	3.30	0.001
Income	-0.03	0.01	-0.05	0.00	-2.38	0.018	-0.13	0.08	-0.28	0.02	-1.74	0.084

**Note.** b: Regression coefficient, SE: Standard error, CI: Confidence interval.

and power to Whites and Whiteness.<sup>23</sup>

As Williams<sup>24</sup> and Farmer and Ferraro<sup>4</sup> have shown, racial gaps may be larger at the highest rather than the lowest social positions. Navarro has argued that “race *and* class” rather than “race *or* class” shapes racial inequalities.<sup>25</sup> Thus, for NHBs, it is not merely lack of materialistic resources or poverty but the added burden of racism and poverty that causes inequalities. Racism is associated with race-based discrimination for NHBs across all SES levels.<sup>26,27</sup> As Wilson et al<sup>28</sup> as well as Oliver and Shapiro<sup>6,8</sup> have argued, income better enhances purchasing power of NHBs than NHBs.

Our findings may potentially explain why NHB individuals gain less physical and mental health from their income and education in the United States.<sup>29</sup> The results of our study showed that for many NHB individuals, this discrimination continues across SES levels. NHBs cannot be free of the existing racism only through individual behavioral changes and personal ambitions. Structural barriers limit and bound their situation and achievement. NHBs’ dreams are deferred for NHB individuals in the United States.<sup>30</sup>

Future studies should go beyond the effect of race and SES and also consider gender/sex. NHB men may suffer unique types of oppression because of their sex/gender.<sup>24</sup> Gendered racism, which is due to Black men dehumanization, police killings, stop-and-frisk, and war on drugs, may specifically target NHB men. Outgroup male discrimination may contribute to the existing disparities in perceived racial discrimination.<sup>24</sup> As Chetty has documented, upward social mobility is least likely for NHB men.<sup>25</sup> Thus, future research may also compare NHB men and women for the interplay between social mobility and discrimination. Very little research has compared NHB men and women for how perceived racial discrimination correlates with educational attainment and income.<sup>26</sup>

## Conclusion

Our findings showed that education gradient of perceived racial discrimination differs for NHB and NHB individuals. That is, race interacts with education on perceived racial discrimination. Highly educated NHBs report high levels of perceived racial discrimination, a pattern that is not seen in highly educated NHBs.

## Conflict of Interest Disclosures

None.

## Ethical Approval

Participants provided consent. The study protocol was approved by an institutional IRB.

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