


RESEARCH ARTICLE

Black-White differences in perceived lifetime discrimination by education and income in the MIDUS Study in the U.S.

Javier M. Rodriguez¹ , Chunggeun Koo^{2*}, Giacomo Di Pasquale³ and Shervin Assari⁴

¹Claremont Graduate University, Department of Politics and Government, Claremont, United States, ²Gachon University, Korea Inequality Research Lab, Seongnam, Republic of Korea, ³University of Vermont, Department of Economics, Burlington, United States and ⁴Charles R Drew University of Medicine and Science, Department of Family Medicine, Los Angeles, United States

*Corresponding author. Email: chunggeun.koo@cgu.edu

(Received 18 March 2021; revised 23 September 2022; accepted 26 September 2022; first published online 10 November 2022)

Abstract

There is growing evidence on the negative effects of perceived discrimination on health outcomes and their interactions with indicators of socioeconomic status. However, less has been studied on whether income and education lead individuals of a different race to encounter different discriminatory experiences in their lifetime. Using data from the national survey of the Midlife Development in the United States—MIDUS 1 (1995–1996) and MIDUS Refresher (2011–2014)—on eight measures of perceived lifetime discrimination, this study compares discriminatory experiences of Black and White persons in two time periods. We applied generalized structural equation models and generalized linear models to test multiplicative effects of income and education by race on lifetime discrimination. In both periods, we find substantive disparities between White and Black people in all types of lifetime discrimination, with Black people reporting much higher levels of discrimination. Such disparities exacerbated in the top cohorts of society, yet these associations have changed in time, with White individuals reporting increasing levels of discrimination. Results show that, for Black people in the mid-1990s, perceived discrimination increased as education and income increased. This finding persisted for education by the early 2010s; income effects changed as now both, low- and high-income Black people, reported the highest levels of discrimination. These findings highlight a policy conundrum, given that increasing income and education represent a desirable course of action to improve overall discrimination and health outcomes. Yet, we show that they may unwittingly exacerbate racial disparities in discrimination. We also show that the U.S. is moving toward a stagnation period in health outcomes improvement, with racial disparities in discrimination shrinking at the expense of a deterioration of whites' lifetime discriminatory experiences. Our results highlight the need for a multi-systems policy approach to prevent all forms of discrimination including those due to historical, institutional, legal, and sociopolitical structures.

Keywords: lifetime discrimination; racism; minority diminished returns; racial disparities in health; socioeconomic status

1. Introduction

Perceived lifetime discrimination has been identified as a critical set of experiences that shape different health profiles between individuals reporting different levels of discrimination (Bound et al., 2015, 2000; Goosby et al., 2018; Lacy, 2007; Pattillo, 2013). Research shows that the differential stigma and discrimination that individuals experience throughout their lifetimes are patterned across socioeconomic strata as well as gender and racial lines in the United States and abroad (Echeverria-Estrada et al., 2020). In the United States, different levels of structural

discrimination are distributed across sociodemographic groups through the political apparatus—e.g., from the housing policies that have historically created residential segregation and the criminal justice system that creates mass incarceration to the immigration policies that separated immigrant families and held their children in detention camps. As residents of the United States go on to live their daily lives, they interact with historically embedded, now institutionalized features of society that expose them to racialized experiences of privilege and discrimination.

Fundamental Cause Theory (FCT) research has shown that socioeconomic inequalities differentially distribute health outcomes across demographic groups, and that such differences can persist over time. Individuals with a high socioeconomic status tend to use their resources—e.g., power, knowledge, money, and prestige—to avoid risks and to protect themselves. Recent studies in FCT address how these processes result in long-term social stratification, stigma and discrimination, and structural racism and how these, in turn, affect health outcomes—e.g., by affecting people's chances to access timely and high-quality medical treatments (Dorling, 2015; Rodriguez *et al.*, 2021; Ye and Rodriguez, 2021).

Research has also shown that the health status of individuals depends on where they locate their life experiences in the privilege-discrimination spectrum (Assari and Caldwell, 2018; Blackwell *et al.*, 2009). Unfortunately, the sociopolitical conditions that guide the lifetime discriminatory experiences that limit the personal and socioeconomic development of racial and ethnic communities, are entrenched (Rodriguez, 2019). Detrimental features of U.S. society, like structural and institutional racism, remain stubbornly correlated with racial disparities in health, in spite of powerful governmental and non-governmental interventions. The strong correlation between perceived discrimination and health status is also robust across time and space. In the United States, this correlation can be observed across populations with different disease and health risk profiles, different cultural and demographic characteristics, and across different as well as political and economic settings. Institutional racism has proven to be extremely flexible, adapting and re-adapting itself to public and private efforts designed to end it.

Understanding differences in perceived lifetime discrimination by race and socioeconomic status (SES) is critical for our understanding of many stress-mediated social determinants of health. This is because perceived lifetime discrimination captures some of the critical structural and individual variation related to the processes that distribute stress-related physiological dysregulation throughout the lifespan (Rodriguez, 2018). The perception of unfair treatment is essential given that the individual is the ultimate recipient unit of discriminatory processes—irrespective if the process originated at the structural or individual level, or if it is explicit or implicit. Individual-level perceptions of discrimination clustered by race and SES inform us about the structural paths that thread the social fabric and the public policies to address them. No serious policy model for shrinking racial and SES disparities in health is conceivable without incorporating a rigorous strategy to drastically reduce lifetime discrimination on the basis of class and race.

The study of lifetime discrimination gains additional salience as the types of discrimination analyzed in this study have the potential to thwart lifetime socioeconomic opportunities to racial and ethnic minorities. As these discriminatory experiences inhibit access to social, economic, and political resources, they have been found to strongly correlate with lower personal development, and worse health and wellbeing (Cardarelli *et al.*, 2007). These associations suggest that, as race and SES are confounded, a different profile of unexplored outcomes may arise from their interactions, including in experiences of discrimination and health. For instance, research has shown that key social determinant of health like education and income bring weaker health benefits for Black people than for whites (Assari and Caldwell, 2018; Blackwell *et al.*, 2009). Such non-equivalence patterns of SES protective effects for Black people are also manifested by individuals with other characteristics of vulnerability (Assari and Lankarani, 2016; Hudson *et al.*, 2013).

Such diminished returns to SES resources among Black people bring to light some overlooked yet critical policy complexities, especially those anti-discriminatory efforts aiming at reducing health disparities. Policies and programs that improve income and education can also be applied

to improve health outcomes in vulnerable communities. There is urgency for designing anti-discriminatory policies that would improve overall health as well as racial health inequities. From the perspective of reducing racial disparities in health, desirable improvements in education and income are imperative to improve the health of all, but they may also be over-simplistic as they can also increase health disparities between racial groups (Assari and Caldwell, 2018; Blackwell et al., 2009). These diminished returns of education and income are observed to increase differences across a great variety of health outcomes and sociodemographic groups. For instance, although increasing income and education improved depression, sleep latency, hypertension, suicide, and mortality outcomes, such improvements also showed to be higher for whites than for Black people in the U.S. These results are also detected in a risk factors such as obesity, drinking, smoking, eating a healthy diet, and exercising (Ayalon and Gum, 2011; Gee and Walsemann, 2009; Lewis et al., 2006) across all age groups (Beatty Moody et al., 2019; Cuevas et al., 2020).

2. Diminished Returns, Health, and Discrimination

In a study, although racial disparities in low birthweight were significant in the context of maternal age and neighborhood socioeconomic characteristics, the greatest disparities were found between African-American and Caucasian adolescents that lived in areas of higher socioeconomic status (Watson et al., 2004). In another example, although higher SES showed a protective effect for whites in Milwaukee, it did not have the same protective effect for Black people (Hankivsky et al., 2014). Some possible solutions to such observed SES diminished returns have been proposed. Some of these solutions focus on equalizing work conditions and benefits as they correlate with educational attainment. For example, benefit-equalizing interventions at the industry level, or in non-profit or government institutions, should consider that lower education correlates with worse overall working conditions, lesser control and decision-making independence, lower salaries and time-off (e.g., vacation and sick leave), and that these disadvantages are more intense for Black people compared to White people (Lewis et al., 2006). Other strategies are psychosocial, including socioeconomic and residential interventions through the welfare system to reduce the long-term effects of living in poverty during childhood (Austin, 2011). Another type of solution is structural as, for example, non-poor Blacks are more likely to continue living in poor neighborhoods (Barry, 2014) than their White counterparts (Haas et al., 2012) and, therefore, the improvement of poor neighborhood infrastructure may improve the returns of SES for Black people (Barry, 2014).

Another set of studies use a biopsychosocial approach to understand how discriminatory experiences affect the intersections between the environmental context, health, SES, and race. Findings of this research show that high-achieving Black people—i.e., highly educated, high-earning individuals—report higher levels of discrimination in a variety of social contexts. When looking at how these stressful experiences correlate with health outcomes, these studies persistently show Black people at a higher disadvantage relative to their White counterparts (Haas et al., 2012). A long list of detrimental stress-related health outcomes has been found to correlate with the perception of discrimination (Mustillo et al., 2004) including cardiovascular disease (Mustillo et al., 2004; Nazroo, 2003), blood pressure (Nazroo, 2003; Rodriguez et al., 2019) kidney disease (Szanton et al., 2012), low birthweight (Coley et al., 2015) and self-reported health, physical, and mental health (Goosby et al., 2015; Priest et al., 2011; Sidanius et al., 2001). Research has shown that some of the effects of discrimination are mediated through oxidative stress (Dorling, 2015), dysregulation in cortisol production (Lewis et al., 2006), and inflammation (Coley and Nichols, 2016).

Using data from the longitudinal Coronary Artery Risk Development in Young Adults study (CARDIA), Borrell et al. (2006) assessed the health effects of perceived racial discrimination among Black people on a variety of social contexts and activities, from experiences at school

and trying to get a job to trying to get a house and accessing medical care. Borrell *et al.* also looked at socialization dynamics within labor environments and in public settings. They find that racial discrimination was more commonly detected in men than in women and in individuals with higher educational levels, who, at the same time, reported worse physical and mental health profiles (Coley and Nichols, 2016).

Research shows that detrimental health effects manifest through the process of trying to get hired or through the labor dynamics that assign promotions at work (Geronimus *et al.*, 2019; Harrison, 2013; Roberts *et al.*, 2004). Discrimination experienced in work settings contribute to diminished psychological well-being. This type of health harm is mediated by stress and it is subsequently manifested in contained economic advancement (Hankivsky *et al.*, 2014). Given that stress-mediated health effects and socioeconomic success go hand-in-hand, racial discrimination is ultimately reflected in the aggregate inequities observed in society which, in turn, fix racial minorities in a labor opportunity market that keeps them at a disadvantage (Geronimus *et al.*, 2019).

That the health of racial minorities is conditional on perceived discrimination is a finding reported in studies that analyze this association across a variety of geographical contexts. For example, some research identifies associations between racial discrimination and health in New Zealand and report that experiences of ethnically motivated attacks (physical and verbal) or unfair treatment are associated with poor self-rated health, lower physical functioning, lower mental health, smoking behavior, and cardiovascular disease (Assari and Caldwell, 2018; Harris *et al.*, 2006). Because discrimination is linked to space, other areas of research highlight the role of residential segregation. Discrimination in neighborhoods and the collective marginalization that places and maintains vulnerable groups in poor areas adversely affect health through restricted access to health and public services. These mechanisms also expose segregated individuals to social stressors such as higher crime rates, lack of leisure infrastructure like parks and walking zones, high pollution, and higher unemployment among many others (Feagin and Sikes, 1994; Kim and Fredriksen-Goldsen, 2017). Given the connections between segregation and harmful health exposures, a recent study reported that during the COVID-19 pandemic, U.S. counties with high immigrant density and high residential segregation showed much higher infection rates than those with low segregation and low immigrant density (Gonzales *et al.*, 2019).

Another branch of health research has more specifically investigated the interactive associations of race, education, and income with lifetime discrimination (Cottrell *et al.*, 2019; Gee and Walsemann, 2009; Hudson *et al.*, 2013; Szanton *et al.*, 2012; Ye and Rodriguez, 2021). Racial discrimination is shown to be associated with increased risk of depression among Black men with higher income and levels of education (Fuller-Rowell *et al.*, 2017). Discrimination has also been found to affect health behaviors among racial minorities, for example, increasing drinking among Black and Hispanic men (Ye and Rodriguez, 2021). Further, the relationship between education and perceived discrimination has been shown to be moderated by race even among healthy individuals, especially women (Cottrell *et al.*, 2019). In examining the association between discrimination and critical biomarkers, Van Dyke *et al.* (2017) [70] found that discrimination across SES indicators is an important stressor altering the C-reactive protein (CRP)—a biomarker of inflammatory responses. Van Dyke *et al.* find particularly harmful effects among Black people with high levels of education.

Perceived lifetime discrimination is multi-faceted and affects the health of vulnerable communities differently depending on their socioeconomic position. However, little is known about the different types of perceived lifetime discrimination and the effect on racial minorities with varying incomes and educational standing. Understanding how discrimination affects long-term personal and socioeconomic development of individuals is imperative to implement adequate solutions and policies for fair treatment of all races. The study of a cumulative and independent set of perceived discriminatory experiences is also valuable to better map how Black people's discriminatory experiences have evolved through history, and how these continue to affect them today.

3. Research Questions

This study contributes to the existing literature by answering the following three research questions:

- i. Are race-education and race-income intersections associated with an overall index of perception of lifetime discriminatory experiences?
- ii. Have these associations changed in time and, if so, how?
- iii. Are these race-education and race-income intersections differently associated with individual types of perceived lifetime discrimination?

4. Data and methods

The data are from two waves of the Midlife Development in the United States (MIDUS 1, 1995-1996, and MIDUS Refresher, 2011-2014). Although the MIDUS 1 study was fielded in 1995/1996, it already includes a large battery of lifetime discrimination items that were reproduced in MIDUS Refresher and, in both instances, they varied enough to capture perceptions of discrimination across a wide range of contexts and areas of human development. By analyzing the MIDUS Refresher (2011-2014) data, we are able to investigate if the findings from MIDUS 1 have persisted about two decades later. MIDUS 1 comprises a national sample of 7,108 participants, of which 5,728 responded to the questions of the lifetime discrimination battery. After all methodological and data-cleaning procedures, our final analytic sample includes 5,036 individuals.

In parallel to MIDUS 1, MIDUS Refresher was designed to replenish the MIDUS 1 sample, and it thus corresponds to a more recent dataset for the assessment of the biopsychosocial processes represented in MIDUS 1 (Brown et al., 2000), [71]. Accordingly, MIDUS Refresher recruited a national probability sample of 3,577 individuals, of which 2,163 were included in our final analytic sample after methodological and data-cleaning procedures were carried out. The lifetime discrimination questions used in both MIDUS 1 and MIDUS Refresher asked participants if: 1) you were discouraged from seeking high education, 2) you were not hired for a job, 3) you were not given a job promotion, 4) you were prevented from renting or buying a home, 5) you were hassled by the police, 6) you were denied a bank loan, 7) you were denied or provided inferior medical care, and 8) you were denied or provided other inferior services [74].

All discrimination subscales were coded as 1=never, 2=rarely, and 3=sometimes or often (Bound et al., 2014). In addition to these eight variables—treated simultaneously as our dependent variables to answer research question 3—we also generated a sample-specific overall index of discrimination to answer research questions 1 and 2. This index of discrimination was calculated as the sum of the eight subscales listed above. Our independent variables of interest are race (1=Black, 0=White (for our race variable, we were unable to distinguish Hispanics from non-Hispanics as the MIDUS study does not include information about ethnicity), education (1=less than high school or high school, 2=some college, and 3=at least bachelor's), and household income tertiles (1=bottom tertile, 2=middle tertile, 3=top tertile). We further controlled for age, gender, and body mass index (BMI) given that these individual characteristics are known to confound the association between SES and discrimination.

To increase the comparability between the two groups of interest—Black and White people—and between the two periods—1995-1996 and 2011-2014—we implemented a weighting procedure comprised of propensity scores matching, adjustment for missingness, and sample-specific weights accounting for survey design and post-stratification. To do this, we first applied the same propensity scores model and matching technique to both samples, separately. The propensity score—in our case, the probability of being a Black person—was estimated using a logistic regression (Clouston and Link, 2021). Subsequently, we used an Automated Coarsened Exact Matching

(CEM) technique to match Black people to their similar White counterparts on propensity score. By using CEM, we matched Black individuals to White individuals situated in the same optimized propensity score stratum (Assari *et al.*, 2016). To further control for residual variation associated to our estimates of interest, our main models included the same variables we used in the propensity score models, which is standard in the literature.

We also applied inverse probability weighting to account for possible bias due to missingness in our analytic samples. For each of our analytic samples, we used a logistic regression to estimate the probability that a given individual would be missing conditional on the covariates included in our main model. Also, both MIDUS 1 and MIDUS Refresher samples, were weighted to account for survey design and post-stratification. Both samples were, accordingly, made representative of the Current Population Survey (CPS)—one of the main intercensal surveys in the U.S.—counts at the moment of measurement (i.e., 1995 and 2011, respectively). For each of the samples, our final compound sample-specific analytic weights were computed as the multiplication of the three weights mentioned above. In this manner, our analyses allow us to compare within-sample Black to White individuals, and compare our associations in our two points in time (as they are representative of their respective CPS sample in the year of measurement).

To answer our first research question, we used a Generalized Linear Model (GLM) approach, with the overall index of lifetime discrimination (one per sample) as the dependent variable. After combining all the types of discrimination into a single index scale (as is customary in existing literature), the distributional shape of our dependent variable mapped into a gamma distribution, which was determined via a Park's Test. We used a logarithmic link function and, to account for the fact that some MIDUS participants belong to the same family, we clustered our standard errors at the family level. Our GLM were estimated using Ordinary Least Squares and robust estimation. To answer our second research question, we ran our GLM regressions for each time point, separately—i.e., 1995-1996 (MIDUS 1) and 2011-2014 (MIDUS Refresher).

To answer our third research question, we used a Generalized Structural Equation Model (GSEM) approach, with all eight dependent variables included in a single model—i.e., instead of estimating equations independently, the GSEM allows to simultaneously estimate parameters in all equations to optimize the multiple-equations model fitting to the data. To account for the skewness and the count nature of our variables, our GSEM regressions applied a Poisson family distribution with a logarithmic link function. Our GSEM models were estimated using maximum likelihood estimation. Both GSEM and GLM models were weighted using the resulting analytic weights described above. The Appendix contains a formal description of our models.

5. Results

Table 1 lists summary statistics for our analytic samples—unweighted for the overall sample, and before and after matching on propensity score, by race. In MIDUS 1 (M1), the eight types of discrimination varied from an average of 0.03 (prevented from renting or buying a home and denied or provided inferior medical care) to an average of 0.22 (not hired for a job) whereas in MIDUS Refresher (MR) they varied from 0.15 and 0.16 (prevented from renting or buying a home and denied or provided inferior medical care, respectively) to 0.39 (not hired for a job). These results show that, although discrimination values have increased in time, the types of discrimination with the lowest and highest values have not changed. Reflecting this increase, the overall index of discrimination went from 0.77 in M1 to 1.90 in MR. Also, as noted by the literature, these experiences varied broadly by race. For example, the overall index of discrimination in M1 was 0.13 for Whites and 0.28 for Black people, whereas in MR it was 0.24 for Whites and 0.46 for Black people. Results show, therefore, that Black people report, on average, about double the discrimination reported by White people in both time points.

Table 1. Summary statistics of the analytic samples

MIDUS 1 (N=5,256)											
	Unweighted statistics			Before Matching				After Matching			
	Percent	Mean	SD	Whites	Blacks	Diff.	P-value	Whites	Blacks	Diff.	P-value
Discrimination											
High education		.09	.34	.079	.315	.236	.000	.070	.335	.266	.000
Denied job		.22	.53	.202	.533	.331	.000	.198	.544	.346	.000
Promotion		.16	.43	.140	.446	.306	.000	.141	.389	.248	.000
Buy a home		.03	.20	.022	.230	.209	.000	.017	.176	.159	.000
By police		.07	.32	.053	.386	.332	.000	.045	.378	.334	.000
Denied loan		.07	.30	.059	.316	.257	.000	.053	.271	.217	.000
Medical care		.03	.20	.026	.092	.066	.000	.021	.108	.087	.000
Other service		.14	.46	.132	.283	.151	.000	.136	.262	.126	.000
Overall Index		.77	1.61	.690	2.439	1.749	.000	.671	2.452	1.781	.000
Demographics											
Race (Black)	5.0			94.99	5.01			96.16	3.84		
Age		46.7	12.8	46.84	44.58	-2.27	.005	46.60	43.31	-3.298	.000
Female	51.9			.513	.610	.097	.002	.519	.567	.048	.180
Income											
Bottom tertile	34.0	27,529	14,872	28,047	21,899	-6,148	.000	27,864	21,863	-6,001	.000
Middle tertile	32.8	73,420	14,551	73,641	67,536	-6,106	.001	73,984	67,022	-6,963	.001
Top tertile	33.2	186,358	77,425	186,644	177,466	-9,178	.383	189,075	173,510	-15,565	.203
Education											
< HS or HS	38.8			.361	.424	.063	.037	.349	.340	-.050	.140
Some college	30.6			.304	.341	.037	.201	.294	.366	.072	.028

(Continued)

Table 1. (Continued)

MIDUS 1 (N=5,256)											
	Unweighted statistics			Before Matching				After Matching			
	Percent	Mean	SD	Whites	Blacks	Diff.	P-value	Whites	Blacks	Diff.	P-value
At least BA	30.6			.335	.235	-.100	.001	.357	.234	.122	.000
Body mass index		26.6	5.1	26.51	28.35	1.83	.000	26.46	27.69	-1.223	.001
Discrimination											
High education		.22	.57	.214	.355	.141	.003	.212	.291	.079	.060
Denied job		.39	.70	.371	.619	.389	.000	.409	.557	.148	.006
Promotion		.31	.62	.293	.529	.236	.000	.309	.483	.173	.000
Buy a home		.15	.50	.136	.361	.225	.000	.125	.305	.180	.000
By police		.21	.57	.186	.568	.382	.000	.179	.542	.363	.000
Denied loan		.19	.54	.184	.284	.100	.026	.212	.259	.047	.253
Medical care		.16	.52	.156	.252	.095	.029	.161	.132	.071	.067
Other service		.26	.63	.243	.458	.216	.000	.255	.424	.169	.000
Overall Index		1.90	3.76	1.783	3.426	1.642	.000	1.862	3.091	1.230	.000
Demographics											
Race (Black)	7.2			92.83	7.71			91.07	8.93		
Age		52.3	14.1	52.56	49.08	-3.47	.003	48.64	47.64	-1.002	.280
Female	52.1			.510	.671	.161	.000	.677	.662	.015	.664
Income											
Bottom tertile	33.6	23,155	15,160	23,943	16,946	-6,997	.000	23,477	15,337	-8,140	.000
Middle tertile	33.5	72,220	15,051	72,251	71,761	-490	.831	72,598	72,639	-41	.983
Top tertile	32.9	160,693	58,420	161,139	150,333	-10,806	.322	158,842	150,248	-8,594	.315

(Continued)

Table 1. (Continued)

MIDUS 1 (N=5,256)											
	Unweighted statistics			Before Matching				After Matching			
	Percent	Mean	SD	Whites	Blacks	Diff.	P-value	Whites	Blacks	Diff.	P-value
Education											
< HS or HS	23.2			.210	.252	.041	.225	.420	.434	.014	.712
Some college	30.6			.288	.335	.047	.214	.290	.289	-.000	.990
At least BA	46.2			.501	.413	-.089	.034	.290	.277	-.013	.697
Body mass index		28.9	6.9	28.71	31.49	2.79	.000	31.55	31.37	-.181	.790

Note: This table shows results for mean differences across all variables used in the analyses before and after matching. The procedure was a propensity scores matching, where the propensity scores were estimated using a logistic regression and the matching technique was Automated Coarsened Exact Matching (see text). The resulting weights are for the subsample of Whites whereas variables of the subsample of Black people are used as the calibrating distributions.

Table 2. Predicted values from GLM models

MIDUS 1		Black	White	Difference (B-W)	Difference p-value
Education	Less than HS or HS	1.98 (.529)	.55 (.049)	1.43 (.532)	.007
	Some college	3.54 (.548)	.68 (.050)	2.86 (.550)	.000
	At least Bachelor's	4.30 (1.243)	.79 (.054)	3.51 (1.244)	.005
Income	Bottom tertile	1.42 (.309)	.71 (.063)	.71 (.314)	.024
	Middle tertile	3.04 (.721)	.64 (.043)	2.40 (.722)	.001
	Top tertile	4.75 (.952)	.68 (.051)	4.07 (.953)	.000
MIDUS Refresher					
		Black	White	Difference (B-W)	p-value
Education	Less than HS or HS	2.12 (.448)	1.86 (.120)	.26 (.464)	.572
	Some college	3.79 (.939)	2.13 (.162)	1.67 (.954)	.080
	At least Bachelor's	3.90 (1.112)	1.59 (.126)	2.31 (1.120)	.039
Income	Bottom tertile	3.4 (.684)	1.93 (.109)	1.48 (.693)	.033
	Middle tertile	2.85 (.706)	1.72 (.133)	1.13 (.718)	.117
	Top tertile	2.69 (1.063)	1.86 (.195)	.83 (1.081)	.443

The M1 and MR analytic samples had an average age of 47 and 52 years, respectively, and both had a slightly higher fraction of females (52%). The average income of households located at the bottom, middle, and top tertiles were \$27,529, \$73,420 and \$186,358 in M1, and \$23,155, \$72,222, and \$160,693 in MR, respectively—which is higher than those of the overall population. Similarly, in M1 69% of the analytic sample had an educational level of at least some college whereas in MR it was 54%. The average body mass index was 26.6 in M1 and 28.9 in MR, suggesting a healthy overall sample of individuals in the two time points.

Over 99% of the original sample was successfully matched in both samples. That loss of information was minimal is critical given the relatively low percentage of Black individuals included in the sample (5% in M1 and 7% in MR). Indeed, our matching procedure diminished racial differences across covariates, with none of these differences (with the exception of income for the bottom tertile in both samples) reaching statistical significance after matching. Overall, after matching, racial differences in perceived discrimination diminished, especially in the MR sample. This contraction indicates that the factors that differ between White and Black people may be partially related to the different perceived levels of discriminatory experiences between the races, more strongly in MR relative to M1.

Both GLM and GSEM parameter estimates are reported in the Appendix. Table 2 reports the predicted values of our GLM models for education-race and income-race effects, with results for

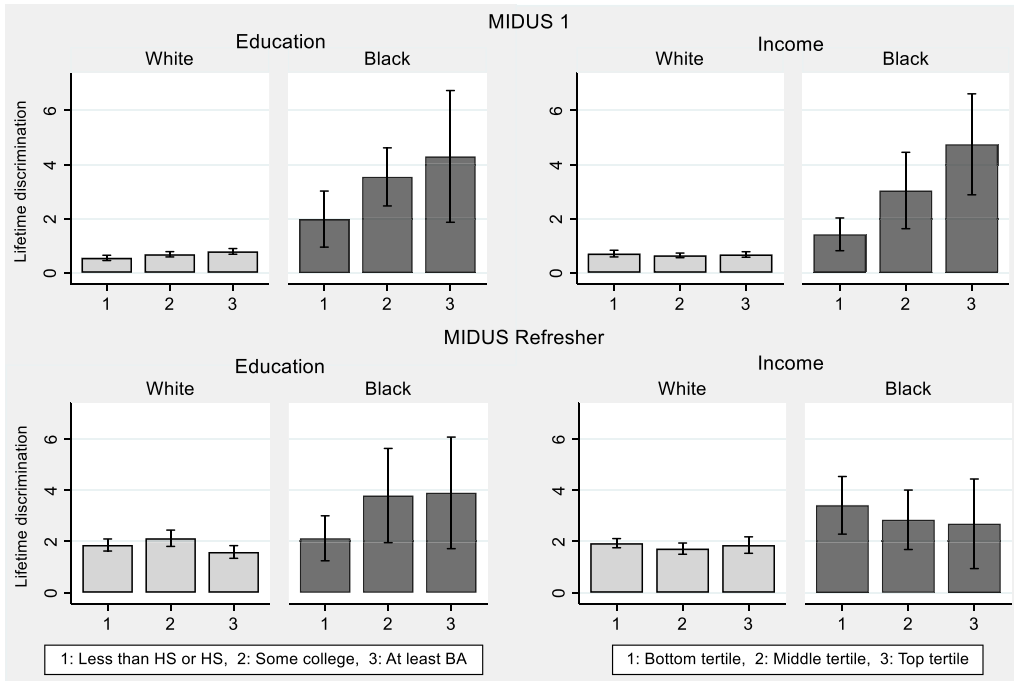


Figure 1. Predicted values for overall index of lifetime discrimination for the MIDUS 1 and MIDUS Refresher samples by education, income, and race. Note: the bars denote 95% CIs. The standard errors were calculated using the delta method.

M1 at the top and results for MR at the bottom. According to these results, racial differences in overall perceived discrimination vary by level of education and income tertile. Whereas differences in overall discrimination for Whites do not differ much by education and income in both samples, they do for Black individuals. Black-White differences in overall discrimination are substantial in both samples, especially as education attainment increases. These Black-White differences reach statistical significance at conventional levels ($p < 0.05$). The two education-race patterns are very similar between the samples, with an increase in perceived discrimination among White people in MR. A change of pattern (from M1 to MR) is more clearly depicted by income, with Black people manifesting higher levels of overall discrimination as income increases in M1 but more similar across income tertiles in MR. Figure 1 is a visualization of these effects (predicted values for all individual types of discrimination from our GSEM models are reported in the Appendix).

6. Discussion

We examined an overall index of lifetime discrimination, computed from eight different types of lifetime discrimination experiences, known to affect the life opportunities of individuals and stress-related processes. Our findings revealed large racial differences in perceived lifetime discrimination depending on income and educational status. Highly-educated, high-earning Black individuals reported perceiving higher discriminatory experiences than any other White-education and White-income group in the samples. White people did not only report lower levels of discrimination at all education and income levels, but, among White individuals, there were no statistically significant differences in discrimination across these levels. Similar levels of racial

inequality in perceived discrimination were substantial and detected in all types of discrimination (Appendix).

Looking at our overall index of discrimination, a Black person with at least a bachelor's degree perceived 5.4 times more lifetime discrimination than a White person of the same educational level in 1995-1996. This ratio decreased by 2011-2014, when the average Black participant in the sample reported 2.5 times more lifetime discrimination than a White person. These Black-White ratios were 3.6 and 5.2 in M1, and 1.1 and 1.8 in MR for people with a high school degree or less and people with some college education, respectively. Table 2 lists the discrimination gap between the races. Although the race-education patterns are strikingly similar in the two time points (Figure 1) and racial differences remain very high almost two decades later (Table 2), the decrease in the ratios is mostly the result of higher discrimination reported among White people (Table 2). Table 2 shows that all Black-White gaps in discrimination, at all levels of education, are statistically significant ($p < 0.05$) in M1 but not in MR, with Black-White gaps in discrimination not reaching statistical significance for individuals of low education in MR.

This finding is important: Black people continue to see diminishing returns to education while White individuals report increasing levels of discrimination at all educational levels. Also, Whites of low-education report an increasing level of discrimination now similar to those of Black people with low levels of education. The racial gap among the least educated is shrinking, but for worse, as both groups are reporting higher levels of discrimination, with low-educated Whites' discrimination tripling in almost two decades. Given the connections between discrimination and health, our findings are reflective of the relative deterioration of low-educated Whites, with their life expectancy declining at least since 1990 (Cottrell *et al.*, 2019; Cuevas *et al.*, 2020; Harris *et al.*, 2012).

Diminishing protective returns were also large for income (Bell *et al.*, 2020; Borrell *et al.*, 2013; Gonzales *et al.*, 2019). In M1, a Black person at the top tertile of the income distribution perceived 7 times more lifetime discrimination than a White person at the same income tertile. This ratio decreased to 1.4 times almost two decades later in the MR sample (Table 2). This is the case even though the average White individual across all educational and income levels reported to perceive, at maximum, the lifetime discrimination reported by the poorest and least-educated average Black individual in any of the samples. These findings suggest that, in 1995-1996 as well as in 2011-2014, as high-achieving Black and White people similarly climb the socioeconomic ladder, Black individuals do it while experiencing high levels of discrimination. These findings confirm evidence showing deteriorated health profiles of Black people (vs. White people) especially in the higher ranks of the labor hierarchy (Borrell *et al.*, 2013; Dyke *et al.*, 2017). However, this doesn't mean that White individuals are improving their overall discriminatory experiences. Indeed, our findings shows that White individuals of all educational and income levels manifested higher levels of discrimination in 2011-2014 than about two decades before.

Our findings show, however, that race-income patterns in discrimination in 1995-1996 are not the same as those in 2011-2014. In 1995-1996, a pattern of diminishing returns to income among Black individuals was clear. However, by 2011-2014, Black individuals show similar high levels of discrimination across all income tertiles, with low- and high-income earners showing the highest levels. Black individuals at the bottom of the income distribution reported almost triple the level of overall discrimination in 2011-2014 than almost two decades before whereas those at the top of the income distribution about half (discrimination levels for those in the middle tertile remained practically unchanged). These results imply that, while high-income Black Americans discriminatory experiences are improving, those of the poor are deteriorating. Black individuals went from a situation of diminishing returns to income in 1995-1996 to one of no protective effects of income by 2011-2014. Research on racial disparities in health and in lived experiences of discrimination should be aware that, as the racial gap in overall discrimination is shrinking along the income distribution, it is mostly at the expense of White Americans' increasing reporting of discrimination at all income tertiles. Our results reflect the stagnation in health gains in the U.S., especially as

Black and White Americans are becoming increasingly exposed to lifetime discriminatory practices and experiences in a wide range of life domains.

These patterns in overall discrimination were reflected in our analyses including all types of discrimination (Appendix). The patterns revealed also illustrate the drastically different biopsychosocial experiences of Black and White individuals across a great variety of life domains. In the United States, “success” has a different meaning and life trajectory depending on race (Harris et al., 2012). At the populational level, race exposes vast heterogeneity in lifetime trajectories—health, discriminatory, socioeconomic—in both relative and absolute terms (Gee and Walsemann, 2009). The heterogeneous protective effects of improving two central social determinants of health—education and income—by race, brought to light critical implications for population health, health policy, and the prescription of effective interventions to improve the social determinants of health and the life standards of vulnerable populations (Darling-Hammond, 1998; Rodriguez et al., 2021). Patterns are changing fast and, unfortunately, in many instances, deteriorating. Such heterogeneity reminds us that improving the overall health profile of populations is imperative and is best done within a framework of equity and social justice. This is a necessary condition not only for truly effective policy, but also to dismantle entrenched structural racism and classism. The experience of discriminatory treatment is deeply related to social, psychological, and cultural factors, as well as to political actors and institutions, and economic and criminal justice systems that shape the biopsychosocial coping mechanisms employed by individuals to attenuate environmental and institutionally-induced stress (Rodriguez et al., 2009; Rodriguez et al., 2021).

Our findings also indicated that neither policies nor public interventions should be single-issue implementations: efforts on how to shrink stress-related, discrimination health effects need to evolve into a multi-systems agenda. Some researchers are noting that policy solutions have been historically doomed to be much less effective than intended as they focus too narrowly on solving one problem at a time while leaving other interconnected problems unattended (Dyke et al., 2017). While furthering income and education have the potential to unwittingly entrench racial disparities in life experiences and health, researchers have pointed the growing resistance of low-education Whites who, for political and ideological reasons, oppose the public programs that demonstrably improve their health and socioeconomic wellbeing, even though they situate among the highest beneficiaries of such programs [73].

Policies and interventions to increase income and education should be simultaneously coordinated with anti-racism efforts that reduce discrimination across interconnected contexts of social, economic, and political activity (Williams et al., 1997). Research reports that students of color frequently experience racial microaggressions that fabricate often-overlooked circumstances of persistent psychosocial disadvantage throughout their academic and personal development (Lee et al., 2018). Interconnected mechanisms to trigger race equity should incorporate as many of the surrounding actors, factors, and organizational settings that correlate with discrimination. This multi-systems policy approach should implement within- and between-institutional layers of the underlying mechanism that institutionalizes racism and discrimination. For example, education policy should reach out and incorporate other key contexts in which discriminatory practices are entrenched—e.g., the labor and housing environments, and their political and social intersections.

Our findings also suggest that it is not enough, for achieving racial health equity, to champion policies and programs that would assist racial minorities to access the educational levels necessary to reach higher-income professional positions. At the moment, for Whites, education and income still operate as buffers that reduce their discrimination experiences; yet, these favorable effects are shrinking in the last few decades. For Black people, education operates as a catalyst while income returns are nonexistent. If anti-racism educational efforts and monitoring mechanisms do not reach out of the labor environment onto the wider social, business, and housing environments, then policies and interventions could harmfully translate into sustained, subtle mechanisms for

“inclusionary discrimination” [68]—i.e., a *modus operandi* by dominant groups in the social hierarchy that “includes” oppressed minorities as they are simultaneously used to discriminate against same-minority members that do not meet the dominant group’s standards for inclusion [69].

Without stretching policy actions through the intersectional web of stigma and social exclusion, as Black Americans gain access to labor and housing privileged settings through higher income and education, they will continue to experience the contradictory expectation of higher levels of discrimination. The goal behind policy implementation is to penetrate the multivariable layers of the causal structure that otherwise would produce and perpetuate racial and SES inequalities. A multi-systems policy approach against enduring discrimination cannot be put in place without tackling the underlying historical, institutional, legal and sociopolitical structures that produce and distribute the social determinants of health (Rodriguez *et al.*, 2014; Rodriguez *et al.*, 2015; Williams *et al.*, 1997). Sociopolitical power is an indispensable resource employed to materialize policy into community benefits. The most notable manifestations of racism shaping racial disparities in health—i.e., residential segregation, mass incarceration, and premature mortality—are therefore functions of the power that different groups in the social hierarchy—with different interests and historical paths—invest in the government and governance (Rodriguez *et al.*, 2015).

Some limitations of this study are worth mentioning. First, the subsample of Black individuals in our samples is relatively small thus increasing imprecision in the estimates. However, our statistical results were highly consistent both using an overall index of discrimination and across a great variety of types of discrimination (Appendix), confirming patterns in studies of lifetime discrimination with larger subsamples of Black individuals. Second, the Black subsamples included in both MIDUS 1 and MIDUS Refresher are not a nationally representative samples of Black Americans, reminding us that generalization of results should be made with caution. Yet, our application of a compound weighting strategy improved comparability between White and Black participants while allowing us to compare our results in time. Third, our samples show a higher socioeconomic status than the overall U.S. White and Black populations; yet, both Whites and Black Americans in the samples manifest great variation across many of the key indicators we used in our analyses thus including, nevertheless, many individuals of low socioeconomic status. Additionally, we also applied a propensity scores matching technique that effectively enhanced the statistical comparability between Black and White participants accounting for the heterogeneity of our samples (Clouston and Link, 2021).

Taken together, our findings add to the growing record on racial disparities in perceived lifetime discriminatory experiences, especially those that are known to bring long-term health effects. We identified substantive and robust diminishing returns of education across time and a continuing income discrimination disadvantage among Black individuals. As Black individuals increase their education, the more they perceive being discriminated. As Black individuals climb the educational ladder, structural oppression increases thus injecting the negative health repercussions of high-coping effort. Also, the U.S. seems to be in track toward a stagnation of public health gains. From 1995-1996 to 2011-2014, Black individuals manifested worse discriminatory experiences than Whites across educational and income levels while White individuals of all levels of education and income reported increased levels of discriminatory experiences. Racial disparities in discrimination are shrinking at the expense of an overall deterioration of discriminatory experiences, especially among White individuals. Necessary policies and interventions to increase education and income and, therefore, improve population health, paradoxically threatens to deflect our attention from historically embedded factors that differentially distribute or obstruct the benefits of the social determinants of health. The dismantling of lifetime discrimination across all affairs and institutions of society suggests a multi-systems policy-making approach—one that avoids overemphasizing single problems and, instead, directs our efforts toward the interconnected web of causal factors that entrench biopsychosocial differences by socioeconomic status and race.

Supplementary material. To view supplementary material for this article, please visit <https://doi.org/10.1017/S0021932022000360>.

References

- Acevedo-Garcia, D., Rosenfeld, L. E., Hardy, E., Mcardle, N. & Osypuk, T. L. (2013) Future directions in research on institutional and interpersonal discrimination and children's health. *American journal of public health* **103**(10), 1754–1763.
- Ahmed, A. T., Mohammed, S. A. & Williams, D. R. (2007) Racial discrimination & health: Pathways & evidence. *Indian Journal of Medical Research* **126**(4), 318–318.
- Assari, S. (2018) Health disparities due to diminished return among Black Americans: Public policy solutions. *Social Issues and Policy Review* **12**(1), 112–145.
- Assari, S. (2019) Ethnicity, educational attainment, and physical health of older adults in the United States. *Aging Medicine* **2**(2), 104–111.
- Assari, S. (2019) Socioeconomic determinants of systolic blood pressure; minorities' diminished returns. *Journal of health economics and development* **1**(1), 1–1.
- Assari, S. (2020) College Graduation and Wealth Accumulation: Blacks' Diminished Returns. *World journal of educational research (Los Angeles, Calif)* **7**(3), 1–1.
- Assari, S. & Bazargan, M. (2019) Minorities' diminished returns of educational attainment on hospitalization risk: National Health Interview Survey (NHIS). *Hospital practices and research* **4**(3), 86–86.
- Assari, S., Boyce, S., Bazargan, M. & Caldwell, C. H. (2020) Diminished returns of parental education in terms of youth school performance: Ruling out regression toward the mean. *Children* **7**(7), 74–74.
- Assari, S. & Caldwell, C. H. (2018) High risk of depression in high-income African American boys. *Journal of racial and ethnic health disparities* **5**(4), 808–819.
- Assari, S. & Caldwell, C. H. (2018) Social determinants of perceived discrimination among Black youth: Intersection of ethnicity and gender. *Children* **5**(2), 24–24.
- Assari, S. & Lankarani, M. M. (2016) Race and urbanity alter the protective effect of education but not income on mortality. *Frontiers in public health* **4**, 100.
- Assari, S., Lankarani, M. M. & Caldwell, C. H. (2016) Does discrimination explain high risk of depression among high-income African American men? *Behavioral Sciences* **8**(4), 40–40.
- Austin, P. C. (2011) An introduction to propensity score methods for reducing the effects of confounding in observational studies. *Multivariate behavioral research* **46**(3), 399–424.
- Ayalon, L. & Gum, A. M. (2011) The relationships between major lifetime discrimination, everyday discrimination, and mental health in three racial and ethnic groups of older adults. *Aging & mental health* **15**(5), 587–594.
- Barry, T. R. (2014) The Midlife in the United States (MIDUS) series: A national longitudinal study of health and well-being. *Open health data* **2**(1), 2–5.
- Beatty Moody, D. L., Taylor, A. D., Leibel, D. K., Al-Najjar, E., Katzel, L. I., Davatzikos, C., Gullapalli, R. P., Seliger, S. L., Kouo, T., Erus, G., Rosenberger, W. F., Evans, M. K., Zonderman, A. B. & Waldstein, S. R. (2019) Lifetime discrimination burden, racial discrimination, and subclinical cerebrovascular disease among African Americans. *Health Psychology* **38**(1), 63–74.
- Bell, C. N., Sacks, T., Tobin, C. S. T. & Thorpe Jr, R. J. (2020) Racial Non-equivalence of Socioeconomic Status and Self-rated Health among African Americans and Whites. *SSM-population health* **10**(100561).
- Blackwell, M., Iacus, S., King, G. & Porro, G. (2009) CEM: Coarsened exact matching in Stata. *The Stata Journal* **9**(4), 524–546.
- Borrell, L. N., Kiefe, C. I., Diez-Roux, A. V., Williams, D. R. & Gordon-Larsen, P. (2013) Racial discrimination, racial/ethnic segregation, and health behaviors in the CARDIA study. *Ethnicity & health* **8**(3), 227–243.
- Bound, J., Geronimus, A., Rodriguez, J. & Waidmann, T. (2014) The implications of differential trends in mortality for social security policy.
- Bound, J., Geronimus, A. T., Rodriguez, J. M. & Waidmann, T. A. (2015) Measuring recent apparent declines in longevity: the role of increasing educational attainment. *Health Affairs* **34**(12), 2167–2173.
- Brown, T. N., Williams, D. R., Jackson, J. S., Neighbors, H. W., Torres, M., Sellers, S. L. & Brown, K. T. (2000) Being Black and feeling blue?: The mental health consequences of racial discrimination. *Race and Society* **2**(2), 117–131.
- Cardarelli, R., Cardarelli, K. M. & Luz Chiapa, A. (2007) Brief report: the modifying effects of education and income on Hispanics reporting perceived discrimination. *Hispanic Journal of Behavioral Sciences* **29**(3), 401–407.
- Clouston, S. a. P. & Link, B. G. (2021) A Retrospective on Fundamental Cause Theory: State of the Literature and Goals for the Future. *Annual Review of Sociology* **47**.
- Coley, S. L. & Nichols, T. R. (2016) Race, age, and neighborhood socioeconomic status in low birth weight disparities among adolescent mothers: an intersectional inquiry. *Journal of health disparities research and practice* **9**(4), 1–1.

- Coley, S. L., Nichols, T. R., Rulison, K. L., Aronson, R. E., Brown-Jeffy, S. L. & Sd, M. (2015) Race, socioeconomic status, and age: exploring intersections in preterm birth disparities among teen mothers. *International journal of population research*.
- Cottrell, D., Herron, M. C., Rodriguez, J. M. & Smith, D. A. (2019) Mortality, incarceration, and African American disenfranchisement in the contemporary United States. *American politics research* 47(2), 195–237.
- Cuevas, A. G., Ong, A. D., Carvalho, K., Ho, T., Chan, S. W. C. & Allen, J. (2020) Discrimination and systemic inflammation: A critical review and synthesis. *Brain, behavior, and immunity*.
- Darling-Hammond, L. (1998) Unequal opportunity: Race and education. *The Brookings Review* 16(2), 28–32.
- Dipasquale, G., Gomies, M. & Rodriguez, J. M. (2021) Race and class patterns of income inequality during postrecession periods. *Social Science Quarterly* 102(6), 2812–2823.
- Dorling, D. (2015) Why social inequality still persists, Injustice ed.: Policy Press.
- Dyke, M. E., Vaccarino, V., Dunbar, S. B., Pemu, P., Gibbons, G. H., Quyyumi, A. A. & Lewis, T. T. (2017) Socioeconomic status discrimination and C-reactive protein in African-American and White adults. *Psychoneuroendocrinology* 1(82), 9–16.
- Echeverria-Estrada, C., Javier, M. R. & Claudia, C. (2020) The COVID-19 pandemic, immigrants, and minority communities in the United States. Ankara, Turkey: Yetkin Yayınevi.
- Feagin, J. R. & Sikes, M. P. (1994) *Living with racism: The Black middle-class experience*. Beacon Press.
- Friedman, E. M., Williams, D. R., Singer, B. H. & Ryff, C. D. (2009) Chronic discrimination predicts higher circulating levels of E-selectin in a national sample: the MIDUS study. *Brain, behavior, and immunity* 23(5), 684–692.
- Fuller-Rowell, T. E., Curtis, D. S., El-Sheikh, M., Duke, A. M., Ryff, C. D. & Zgierska, A. E. (2017) Racial discrimination mediates race differences in sleep problems: A longitudinal analysis. *Cultural Diversity and Ethnic Minority Psychology* 23(2), 165–165.
- Gee, G. & Walsemann, K. (2009) Does health predict the reporting of racial discrimination or do reports of discrimination predict health? Findings from the National Longitudinal Study of Youth. *Social Science & Medicine* 68(9), 1676–1684.
- Geronimus, A. T., Bound, J., Waidmann, T. A., Rodriguez, J. M. & Timpe, B. (2019) Weathering, drugs, and whack-a-mole: Fundamental and proximate causes of widening educational inequity in US life expectancy by sex and race, 1990–2015. *Journal of health and social behavior* 60(2), 222–239.
- Gonzales, E., Lee, Y. J. & Marchiondo, L. A. (2019) Exploring the consequences of major lifetime discrimination, neighborhood conditions, chronic work, and everyday discrimination on health and retirement. *Journal of Applied Gerontology* 0733464819.
- Goosby, B. J., Cheadle, J. E. & Mitchell, C. (2018) Stress-related biosocial mechanisms of discrimination and African American health inequities. *Annual Review of Sociology* 44, 319–340.
- Goosby, B. J., Malone, S., Richardson, E. A., Cheadle, J. E. & Williams, D. T. (2015) Perceived discrimination and markers of cardiovascular risk among low-income African American youth. *American Journal of Human Biology* 27(4), 546–552.
- Haas, S. A., Krueger, P. M. & Rohlfen, L. (2012) Race/ethnic and nativity disparities in later life physical performance: the role of health and socioeconomic status over the life course. *Journals of Gerontology Series B: Psychological Sciences and Social Sciences* 67(2), 238–248.
- Hankivsky, O., Grace, D., Hunting, G., Giesbrecht, M., Fridkin, A. & Rudrum, S. (2014) An intersectionality-based policy analysis framework: critical reflections on a methodology for advancing equity. *International journal for equity in health* 13(1), 119–119.
- Harris, R., Cormack, D., Tobias, M., Yeh, L. C., Talamaiavao, N., Minster, J. & Timutimu, R. (2012) The pervasive effects of racism: experiences of racial discrimination in New Zealand over time and associations with multiple health domains. *Social Science & Medicine* 74(3), 408–415.
- Harris, R., Tobias, M., Jeffreys, M., Waldegrave, K., Karlson, S. & Nazroo, J. (2006) Racism and health: The relationship between experience of racial discrimination and health in New Zealand. *Social Science & Medicine* 63(6), 1428–1441.
- Harrison, A. K. (2013) Black skiing, everyday racism, and the racial spatiality of whiteness. *Journal of Sport and Social Issues* 37(4), 315–339.
- Hudson, D. L., Bullard, K. M., Neighbors, H. W., Geronimus, A. T., Yang, J. & Jackson, J. S. (2013) Are benefits conferred with greater socioeconomic position undermined by racial discrimination among African American men? *Journal of men's health* 9(2), 127–136.
- Hudson, D. L., Puterman, E., Bibbins-Domingo, K., Matthews, K. A. & Adler, N. E. (2013) Race, life course socioeconomic position, racial discrimination, depressive symptoms and self-rated health. *Social Science & Medicine* 97, 7–14.
- Kim, H. J. & Fredriksen-Goldsen, K. I. (2017) Disparities in mental health quality of life between Hispanic and non-Hispanic White LGB midlife and older adults and the influence of lifetime discrimination, social connectedness, socioeconomic status, and perceived stress. *Research on Aging* 39(9), 991–1012.
- Lacy, D. A. (2007) The Most Endangered Title VII Plaintiff: Exponential Discrimination against Black Males. *Nebraska Law Review* 86, 552–593.

- Lee, D. B., Peckins, M. K., Heinze, J. E., Miller, A. L., Assari, S. & Zimmerman, M. A. (2018) Psychological pathways from racial discrimination to cortisol in African American males and females. *Journal of behavioral medicine* **41**(2), 208–220.
- Lewis, T. T., Everson-Rose, S. A., Powell, L. H., Matthews, K. A., Brown, C. & Karavolos, K. (2006) Chronic exposure to everyday discrimination and coronary artery calcification in African-American women: the SWAN Heart Study. *Psychosomatic medicine* **68**(3), 362–368.
- Mustillo, S., Krieger, N., Gunderson, E. P., Sidney, S., McCreath, H. & Kiefe, C. I. (2004) Self-reported experiences of racial discrimination and Black–White differences in preterm and low-birthweight deliveries: the CARDIA Study. *American journal of public health* **94**(12), 2125–2131.
- Nazroo, J. Y. (2003) The structuring of ethnic inequalities in health: economic position, racial discrimination, and racism. *American journal of public health* **93**(2), 277–284.
- O'Brien, K. M., Meyer, J., Tronick, E. & Moore, C. L. (2017) Hair cortisol and lifetime discrimination: Moderation by subjective social status. *Health psychology open* **4**(1), 2055102917695176–2055102917695176.
- Pattillo, M. (2013) *Black picket fences: Privilege and peril among the Black middle class*. University of Chicago Press.
- Phelan, J. C. & Link, B. G. (2015) Is racism a fundamental cause of inequalities in health? *Annual Review of Sociology* **41**, 311–330.
- Priest, N., Paradies, Y., Stewart, P. & Luke, J. (2011) Racism and health among urban Aboriginal young people. *BMC Public Health* **11**(1), 568–568.
- Roberts, R. K., Swanson, N. G. & Murphy, L. R. (2004) Discrimination and occupational mental health. *Journal of Mental Health* **13**(2), 129–142.
- Rodriguez, J., Umaña-Taylor, A., Smith, E. P. & Johnson, D. J. (2009) Cultural processes in parenting and youth outcomes: Examining a model of racial-ethnic socialization and identity in diverse populations. *Cultural Diversity and Ethnic Minority Psychology* **15**(2), 106–106.
- Rodriguez, J. M. (2018) Health disparities, politics, and the maintenance of the status quo: A new theory of inequality. *Social Science & Medicine* **200**, 36–43.
- Rodriguez, J. M. (2019) The politics hypothesis and racial disparities in infants' health in the United States. *SSM-population health* **8**, 100440–100440.
- Rodriguez, J. M., Bae, B., Geronimus, A. T. & Bound, J. (2021) The political realignment of health: How partisan power shaped infant health in the U.S., 1915–2017. *Journal of Health Politics, Policy and Law* **95**17191.
- Rodriguez, J. M., Bound, J. & Geronimus, A. T. (2014) Rejoinder: Time series analysis and US infant mortality: de-trending the empirical from the polemical in political epidemiology. *International journal of epidemiology* **43**(3), 831–834.
- Rodriguez, J. M., Bound, J. & Geronimus, A. T. (2014) US infant mortality and the President's party. *International journal of epidemiology* **43**(3), 818–826.
- Rodriguez, J. M., Geronimus, A. T., Bound, J. & Dorling, D. (2015) Black lives matter: Differential mortality and the racial composition of the US electorate, 1970–2004. *Social Science & Medicine* **136**, 193–199.
- Rodriguez, J. M., Karlamangla, A. S., Gruenewald, T. L., Miller-Martinez, D., Merkin, S. S. & Seeman, T. E. (2019) Social stratification and allostatic load: shapes of health differences in the MIDUS study in the United States. *Journal of biosocial science* **51**(5), 627–644.
- Sawyer, P. J., Major, B., Casad, B. J., Townsend, S. S. & Mendes, W. B. (2012) Discrimination and the stress response: Psychological and physiological consequences of anticipating prejudice in interethnic interactions. *American journal of public health* **102**(5), 1020–1026.
- Sidanius, J., Peña, Y. & Sawyer, M. (2001) Inclusionary discrimination: Pigmentocracy and patriotism in the Dominican Republic. *Political Psychology* **22**(4), 827–851.
- Szanton, S. L., Rifkind, J. M., Mohanty, J. G., Miller, E. R., Thorpe, R. J. & Nagababu, E. (2012) Racial discrimination is associated with a measure of red blood cell oxidative stress: a potential pathway for racial health disparities. *International journal of behavioral medicine* **19**(4), 489–495.
- Watson, A. C., Otey, E., Westbrook, A. L., Gardner, A. L., Lamb, T. A., Corrigan, P. W. & Fenton, W. S. (2004) Changing middle schoolers' attitudes about mental illness through education. *Schizophrenia bulletin* **30**(3), 563–572.
- Weinstein, M., Ryff, C. D. & Seeman, T. E. (2019) Midlife in the United States (MIDUS Refresher 1): Biomarker Project, 2012–2016. *Inter-university Consortium for Political and Social Research [distributor]*.
- Williams, D. R., Yu, Y., Jackson, J. S. & Anderson, N. B. (1997) Racial differences in physical and mental health: Socio-economic status, stress and discrimination. *Journal of health psychology* **2**(3), 335–351.
- Ye, W. & Rodriguez, J. M. (2021) Highly vulnerable communities and the Affordable Care Act: Health insurance coverage effects, 2010–2018. *Social Science & Medicine* **270**, 113670–113670.

Cite this article: Rodriguez JM, Koo C, Di Pasquale G, and Assari S (2023). Black-White differences in perceived lifetime discrimination by education and income in the MIDUS Study in the U.S. *Journal of Biosocial Science* **55**, 795–811. <https://doi.org/10.1017/S0021932022000360>