Stigma and Health

Everyday Discrimination and Age-Related Trajectories of Blood Pressure Among Black and White Middle-Aged and Older Adults

Heather R. Farmer, Alexis Z. Ambroise, Michael D. Green, and Matthew E. Dupre

Online First Publication, April 15, 2024. https://dx.doi.org/10.1037/sah0000524

AMERICAN PSYCHOLOGICAL ASSOCIATION

Stigma and Health

ISSN: 2376-6972

https://doi.org/10.1037/sah0000524

Everyday Discrimination and Age-Related Trajectories of Blood Pressure Among Black and White Middle-Aged and Older Adults

Heather R. Farmer[1], Alexis Z. Ambroise[1], Michael D. Green[2], and Matthew E. Dupre[2, 3, 4]

[1] Department of Human Development and Family Sciences, University of Delaware

[2] Department of Population Health Sciences, Duke University

[3] Department of Sociology, Duke University

[4] Center for the Study of Aging and Human Development, Duke University

Racial differences in high blood pressure (BP) have been well-documented. Prior studies suggest that exposure to discrimination is a potentially important factor contributing to elevated levels of BP among U.S. Black adults. However, evidence has been mixed and largely based on cross-sectional studies. This study uses longitudinal data from the Health and Retirement Study (2006–2018) to examine how everyday discrimination is associated with age-related trajectories of systolic BP among Black and White middle-aged and older adults (n = 16,067). Multivariable mixed models were used to estimate the association between discrimination and trajectories of BP in women and men and to assess the potential socioeconomic, psychosocial, behavioral, and health-related factors contributing to the associations. Mean levels of BP were significantly higher among Black adults than White adults (132.8 mmHg vs. 128.5 mmHg; $p \leq .001$) and among men than women (132.0 mmHg vs. 127.2 mmHg; $p \leq .001$). For Black men, discrimination was associated with lower levels of BP in middle adulthood and significantly higher levels of BP at older ages. The patterns were the opposite in White men. In Black women, discrimination was associated with BP and this association varied by age; the patterns were similar in White women. Adjusting for a wide range of factors largely accounted for the associations in women but not men. This study highlights the complex age-related associations between discrimination and BP among Black and White men and women. Additional studies are needed to better understand how the type and timing of discrimination may impact changes in BP over the life course.

Clinical Impact Statement

This research provides new knowledge that can potentially inform the development of (and adequate timing of) interventions aimed at dimensions of stigma in order to reduce elevated blood pressure in Black and White middle-aged and older women and men.

Keywords: racial disparities, blood pressure, discrimination, social determinants of health

Supplemental materials: https://doi.org/10.1037/sah0000524.supp

Racial differences in the prevalence of hypertension have been well-documented in the United States for more than half a century (Benjamin et al., 2019; Borhani, 1968; Carnethon et al., 2017; Hypertension Detection and Follow-Up Program Cooperative Group, 1977; Kurian & Cardarelli, 2007). Studies have shown that U.S. Black adults exhibit a disproportionately earlier onset of hypertension and higher average levels of blood pressure (BP) than non-Hispanic U.S. White adults (Carnethon et al., 2017; Flack et al., 2003; Geronimus et al., 2007). There is also evidence to suggest that racial differences in BP are not uniform across age and may widen in later adulthood (Carnethon et al., 2017; Geronimus et al., 2007). Despite these large and well-documented racial differences in BP, the factors contributing to changes in BP among Black and White middle-aged and older adults are not clearly understood.

A growing body of literature has documented the debilitating health consequences of stigma, which is defined as "a social process that involves distinguishing people based on social statuses (such as attributes, illnesses, and identities) and socially devaluing, discrediting

Heather R. Farmer https://orcid.org/0000-0003-3889-548X

The authors' positionality statements are as follows: The authors acknowledge that the authors' social identities may influence the authors' research. With respect to race, one author identifies as non-Hispanic Black, one author identifies as non-Hispanic Black and White and Caribbean ethnicity, one author identifies as Hispanic White, and one author identifies as non-Hispanic White. With respect to gender, two of the authors self-identify as cis women, and two of the authors self-identify as cis men.

Heather R. Farmer played a lead role in conceptualization, data curation, formal analysis, methodology, supervision, visualization, writing–original draft, and writing–review and editing. Alexis Z. Ambroise played a supporting role in conceptualization, writing–original draft, and writing–review and editing. Michael D. Green played a supporting role in writing–original draft and writing–review and editing. Matthew E. Dupre played a lead role in validation, a supporting role in supervision, and an equal role in conceptualization, formal analysis, methodology, visualization, writing–original draft, and writing–review and editing.

Correspondence concerning this article should be addressed to Heather R. Farmer, Department of Human Development and Family Sciences, University of Delaware, 112 Alison Hall, Newark, DE 19711, United States. Email: hfarmer@udel.edu

and excluding individuals with those statuses)" (Earnshaw et al., 2022, p. 236). Numerous studies have shown that manifestations of stigma, such as frequent exposure to discrimination, are associated with worse physical and mental health outcomes, including BP and hypertension risk (Beatty Moody et al., 2016; Brondolo et al., 2008, 2011; Clark, 2003; Farmer et al., 2019; Krieger & Sidney, 1996; Lewis et al., 2009; D. L. B. Moody et al., 2019; Pascoe & Smart Richman, 2009; Williams & Mohammed, 2009). Discrimination has been hypothesized as a key mechanism contributing to racial disparities in elevated levels of BP (Barnes et al., 2004; Williams & Mohammed, 2009). However, to date, the studies examining this association have yielded mixed findings—which may reflect various approaches to the conceptualization and measurement of BP, (e.g., ambulatory [daytime and nocturnal] BP, resting BP) across studies (Brondolo et al., 2011; Lewis et al., 2009; Sims et al., 2022). In particular, research has shown that exposure to discrimination is associated with higher levels of ambulatory and/or resting systolic BP (Beatty Moody et al., 2016; Brondolo et al., 2008; Goosby et al., 2015; Krieger & Sidney, 1996; D. L. B. Moody et al., 2019; Ryan et al., 2006; Steffen et al., 2003). However, other studies have found no association between discrimination and systolic BP (Arriola, 2002; Barksdale et al., 2009; Beatty Moody et al., 2016; C. Brown et al., 2006; Hill et al., 2007; LeBrón et al., 2020; Lewis et al., 2009; Matthews et al., 2005; Orom et al., 2017; Peters, 2006). Research on diastolic BP is less common and the results are also mixed (e.g., Beatty Moody et al., 2016; Goosby et al., 2015; Krieger & Sidney, 1996; D. L. B. Moody et al., 2019). Collectively, the existing evidence is largely based on studies with cross-sectional or limited longitudinal designs and have largely focused on younger adults when the levels (and changes) in systolic BP (hereafter, BP) are less pronounced.

The life course perspective emphasizes that people's lives are cumulatively shaped by their social and historical context (Elder, 1998). This contributes to considerable heterogeneity in experiences and exposures as individuals age based on several factors, such as race and sex. Drawing from a life course perspective, studies have consistently documented how health disparities arise in populations as individuals age, with some groups who are differentially exposed to greater or lesser risks (e.g., stress, discrimination) and protective factors (e.g., social and economic capital) across their life course (Alwin & Wray, 2005). Accordingly, research suggests that Black adults face disproportionately greater exposure to discrimination relative to White adults (Williams et al., 1997). We hypothesize that as adults age, they transition in and out of social institutions (e.g., workforce) and are in various contexts (e.g., health care), and as a result, exposure to discrimination—and its implications for BP—will vary across age. On one hand, it is possible that the impact of discrimination increases with age as individuals experience physiological deterioration, making them more vulnerable to stress-related processes. On the other hand, it is also possible that the association weakens with age as individuals accumulate experiences and improve their ability to cope with stressors like discrimination (Charles, 2010). Given the disproportionate exposure to discrimination that Black adults experience over the life course—and the well-known links between chronic stress and the development and progression of cardiovascular disease at later ages—we hypothesize that discrimination contributes to greater age-related changes in BP among Black adults compared to White adults across middle and older adulthood. In addition, we further hypothesize that these differences in age-related trajectories of BP may be more pronounced in men due to the elevated rates of BP documented among them relative to women (Benjamin et al., 2019).

This study used population-level longitudinal data from 2006 to 2018 to examine how exposure to everyday discrimination is associated with age-related trajectories of systolic BP among U.S. Black and White middle-aged and older adults. We first examined race and sex-specific trajectories of BP across age. We then assessed whether discrimination was associated with age-related changes in BP and how the trajectories of BP differed by race for men and women. Finally, we explored whether and to what extent a wide range of sociodemographic, psychosocial, behavioral, and health-related characteristics accounted for the association between discrimination and age-related trajectories of BP.

Method

Sample

The present study used data from the Health and Retirement Study (HRS), a nationally representative panel study of noninstitutionalized middle-aged and older adults residing in the United States that is sponsored by the National Institute on Aging, the Social Security Administration, and the Institute for Social Research at the University of Michigan (Juster & Suzman, 1995; Sonnega et al., 2014). Beginning in 1992, the HRS has followed respondents every 2 years through 2018. In addition to the core surveys that collect data on sociodemographic, economic, and health characteristics, the HRS also collects data on psychosocial factors (e.g., discrimination) and physical measures (e.g., systolic BP) from random half samples of respondents every 4 years. Comprehensive details on the HRS sampling design, study procedures, and response rates have been extensively documented elsewhere (Juster & Suzman, 1995; Sonnega et al., 2014). All subjects provided their informed consent to participate in the HRS and the study was approved by the University of Michigan Health Sciences Human Subjects Committee.

Data from the present study come from the biennial core interviews, psychosocial leave-behind questionnaire, and physical measures collected from 2006 to 2018. We limited our sample to non-Hispanic Black and White adults who were aged 45 and older at baseline. We further limited our sample to adults aged ≤85 to reduce potential bias due to selective survival. All participants in the study had at least one measure of BP and complete data for all covariates (missing data ≤5%). The final analytic sample consisted of 16,067 Black and White respondents who provided 32,483 observations during the study period from 2006 to 2018.

Measures

Outcome

Systolic BP was the primary outcome measure for the study given that current guidelines by the American Heart Association and American College of Cardiology identify systolic BP as a major risk factor for the development of cardiovascular disease and included in the atherosclerotic cardiovascular risk calculator (Goff et al., 2014). At each survey wave, systolic BP was measured by taking the average of three consecutive readings (taken 45 s apart) at varying times of day and in varying locations (e.g., home, coffee shop)

depending on the respondent's interview from the respondent's left arm using a validated automated device (Omron HEM-780 Intellisense blood pressure monitor with ComFit cuff; Crimmins et al., 2008). The HRS protocol requests that all respondents sit in a comfortable position with palms facing upward and that interviewers remain quiet during the procedure to reduce interference with BP readings (Crimmins et al., 2008). Extreme values of BP were windsorized (<60 mmHg [n = 17] or >200 mmHg [n = 81]) and BP was treated continuously for the analyses (described in detail below).

Everyday Discrimination

Discrimination was measured using a well-established, validated five-item index that assesses the frequency of discrimination in day-to-day life (Williams et al., 1997). The index consists of the following items: (a) You are treated with less courtesy or respect than other people; (b) You receive poorer service than other people at restaurants or stores; (c) People act as if they think you are not smart; (d) People act as if they are afraid of you; (e) You are threatened or harassed. Response options included: never, less than once a year, a few times a year, a few times a month, at least once a week, and almost every day. Due to small cell sizes, responses of "almost every day" and "at least once a week" were collapsed into one category. The variable was calculated by taking the average score of the items (range, 0–4, where higher scores indicate more frequent exposure to discrimination). The psychometrics for this index have been reported for the HRS at each wave (Smith et al., 2017).

Covariates

Sociodemographic characteristics included age (in years), sex (male or female), birth cohort (born before 1942, born between 1942 and 1959, or born after 1960), educational attainment (in years), medical insurance (insured, Medicaid-only, or uninsured), and geographic region (South or other). Psychosocial characteristics included marital status (married, never married, divorced/separated, or widowed), and depressive symptoms within the past week using the Center for Epidemiological Studies Depression Scale short version (Radloff, 1977). Behavioral characteristics included smoking (past, current, or never smoked), alcohol consumption (heavy, moderate, or no consumption), physical inactivity in the past month (yes or no), and current use of BP medications (yes or no). Health-related characteristics included a continuous measure of body mass index (calculated as weight divided by squared height) and reported diagnoses of several chronic diseases (yes or no) including lung conditions, heart conditions, diabetes, or stroke. The diagnosis of hypertension was highly correlated with the use of BP medications (correlation = .88) and thus not included in the models. Finally, we also included covariates for the total number of observations that a respondent contributed to the study and mortality during the study period (yes or no) in all models, consistent with prior research (Dupre et al., 2019; Shaw & Liang, 2013; Yang & Land, 2016). All variables were time-varying with the exception of sex, race, birth cohort, number of observations, and mortality.

Statistical Analysis

Descriptive statistics, including mean, standard deviation, and frequency, were calculated for all variables in the sample in Table 1. Descriptive statistics were also provided separately by race and sex (Supplemental Tables S1 and S2, respectively). All tests were two-tailed and considered statistically significant at $p < .05$. A major strength of the present study is that it draws upon an accelerated longitudinal design to leverage the strengths of the HRS data (Galbraith et al., 2017; Raudenbush & Chan, 1992; Yang, 2007). Multilevel growth curve models (i.e., mixed models) were used to examine the relationship between discrimination and age-related trajectories of BP accounting for the repeated observations (Level 1) within HRS participants (Level 2). First, we fit models with fixed and random linear (age) and quadratic (age^2) functions that were added to an intercept-only model in the full sample and then estimated additional models that adjusted for the use of BP medications, number of observations, and whether the participant died during the study period. Preliminary analyses also showed that trajectories of BP varied by sex (Supplemental Table S3) and therefore the mixed models were estimated separately for women and men. Preliminary analyses showed that a quadratic function of age best parameterized changes in BP for men and a linear function of age best parameterized changes in BP for women.

Next, the sex-stratified mixed models included interaction terms to account for significant differences in changes in BP by age, race, and discrimination (shown in Supplemental Tables S4 and S5 for men and women, respectively), controlling for BP medication use, number of observations, and mortality. Significant interactions from these models were retained and served as the base models for the underlying associations among race, everyday discrimination, and age-related changes in BP in men (Table 2) and women (Table 3). We then estimated a series of models to examine the associations after taking into account sociodemographic characteristics (Model 2), psychosocial characteristics (Model 3), behavioral factors (Model 4), and health-related characteristics (Model 5). All analyses were conducted using Stata Version 14.2 (StataCorp LP, College Station, TX).

Results

Descriptives

Characteristics of the study respondents are presented in Table 1 by sex and race. Results showed that mean levels of BP were significantly higher among Black adults compared to White adults (132.8 mmHg vs. 128.5 mmHg; $p < .001$) and among men than women (132.0 mmHg vs. 127.2 mmHg; $p < .001$; Supplemental Tables S1 and S2, respectively). There were also significant differences in everyday discrimination scores by race and sex, where Black adults and men reported more discrimination than White adults or women, respectively (Supplemental Tables S1 and S2). Among the race and gender groups, Black men had the highest everyday discrimination score, followed by Black women, White men, and White women (Table 1). Black women (*Mdn* = 62; IQR = 14) and men (*Mdn* = 63; IQR = 14) were significantly younger compared to White women (*Mdn* = 68; IQR = 16) and men (*Mdn* = 68; IQR = 16). Black women and men were also more likely to live in the South compared to White women and men; and Black women were more likely to be never married compared to the other groups.

Table 1
Sample Distributions by Sex and Race, Health and Retirement Study (2006–2018)

	Women		Men	
	Black	White	Black	White
Variable	n = 3,444	n = 15,461	n = 1,942	n = 11,636
BP, *M* (*SD*), mmHg	131.5 (21.2)	126.3 (19.5)	135.2 (19.7)	131.5 (18.2)
Everyday discrimination, *M* (*SD*)	0.7 (0.8)	0.5 (0.6)	0.9 (0.9)	0.6 (0.7)
Age, *Mdn* (IQR)	62 (14)	68 (16)	63 (14)	68 (16)
Sociodemographic characteristic				
Birth cohort, %				
Born before 1942	27.5	45.0	30.9	49.2
Born between 1942 and 1959	62.2	48.4	60.0	46.5
Born in or after 1960	10.3	6.5	9.1	4.3
Education, *M* (*SD*), year	12.8 (2.5)	13.4 (2.3)	12.4 (2.9)	13.7 (2.6)
Health insurance coverage, %				
Currently insured	80.1	94.8	83.1	95.3
Medicaid-only	8.9	1.6	6.2	0.9
No insurance	11.0	3.6	10.7	3.8
Lives in the South, %	60.3	36.8	58.3	35.9
Psychosocial characteristic				
Marital status, %				
Married	37.0	61.2	58.8	77.8
Never married	12.7	2.9	9.7	4.1
Divorced	28.1	13.9	23.1	11.2
Widowed	22.2	22.0	8.4	6.9
CES-D, *M* (*SD*)	1.7 (2.1)	1.3 (1.9)	1.5 (1.8)	1.0 (1.6)
Behavioral characteristic				
Smoking status, %				
Never smoker	47.8	50.8	31.7	35.5
Past smoker	33.6	37.6	45.4	53.0
Current smoker	18.6	11.6	22.9	11.5
Alcohol consumption, %				
No consumption	73.8	62.8	58.1	49.9
Moderate consumption	20.3	32.8	26.1	35.5
Heavy consumption	5.9	4.4	15.8	14.6
Physical inactivity, %	22.3	17.5	13.7	12.8
BP medications, %	69.0	48.2	64.1	51.6
Health characteristic				
Body mass index, *M* (*SD*)	31.1 (6.8)	28.0 (6.2)	28.8 (5.5)	28.6 (5.1)
Diagnosed condition, %				
Heart conditions	19.4	21.0	20.0	30.9
Diabetes	29.0	16.6	32.1	22.9
Stroke	6.6	4.7	9.2	6.8
Lung problems	9.5	11.3	7.1	10.2
Mortality during study, %	10.3	13.4	15.9	19.6

Note. All differences by sex and race were significant at $p < .01$ (except BP medications and body mass index). Values reported as weighted percentages, means (standard deviation), or median (IQR). BP = blood pressure; IQR = interquartile range; CES-D = Center for Epidemiological Studies Depression Scale.

Figure 1 illustrates the results from the multilevel growth curve models showing the age-related changes in BP by race in men and women while adjusting for use of BP medications, number of observations, and mortality over the study period. Among men, we found that BP had a quadratic increase across age, with Black men exhibiting significantly higher levels of BP than White men at all ages. Among women, we found that BP increased linearly across age, and at relatively lower levels than men at most ages, with Black women exhibiting significantly higher levels of BP than White women.

Tables 2 and 3 present the results for the associations among race, discrimination, and age-related trajectories of BP in men and women, respectively. We found significant differences in these patterns for Black and White men across age ([Discrimination × Age × Black interaction] $p < .05$). The results of these analyses are plotted in Figure 2 (upper panel) to facilitate interpretation of the estimates from the mixed models. Overall, levels of BP were generally higher in Black men than in White men. Among Black men, we found that those who reported low discrimination had higher BP at younger ages than those who reported high discrimination. However, Black men who experienced high levels of discrimination exhibited greater age-related increases in BP ([Discrimination × Black × Age interaction] $b = 0.14$, 95% CI [0.02, 0.25], $p < .05$) relative to Black men who experienced low levels of discrimination. Among White men, we found that those who

Table 2

Parameter Estimates for Age-Related Trajectories of Blood Pressure (BP) in U.S. Black and White Men (2006–2018)

Parameter	Model 1	Model 2	Model 3	Model 4	Model 5
Fixed-effects parameter					
Intercept	121.49*** (119.15–123.83)	136.45*** (132.84–140.06)	136.35*** (132.71–140.00)	135.31*** (131.53–139.10)	131.14*** (127.31–134.96)
Age	0.95*** (0.76–1.14)	0.70*** (0.50–0.90)	0.70*** (0.50–0.91)	0.73*** (0.53–0.93)	0.76*** (0.56–0.96)
Age^2	−0.02*** (−0.02 to −0.01)	−0.02*** (−0.02 to −0.01)	−0.02*** (−0.02 to −0.01)	−0.02*** (−0.02 to −0.01)	−0.01*** (−0.02 to −0.01)
Black	9.43*** (6.13–12.73)	9.54*** (6.23–12.84)	9.42*** (6.11–12.72)	9.55*** (6.26–12.83)	9.99*** (6.72–13.26)
Everyday discrimination	1.76** (0.51–3.00)	1.58* (0.34–2.82)	1.69** (0.45–2.93)	1.69** (0.45–2.93)	1.65** (0.42–2.88)
Black × Age	−0.27*** (−0.42 to −0.13)	−0.30*** (−0.44 to −0.16)	−0.30*** (−0.45 to −0.16)	−0.30*** (−0.45 to −0.16)	−0.34*** (−0.48 to −0.20)
Everyday Discrimination × Age	−0.10*** (−0.15 to −0.05)	−0.10*** (−0.15 to −0.04)	−0.10*** (−0.15 to −0.04)	−0.10*** (−0.15 to −0.04)	−0.09*** (−0.15 to −0.04)
Everyday Discrimination × Black	−2.85* (−5.30 to −0.41)	−2.82* (−5.25 to −0.38)	−2.79* (−5.22 to −0.35)	−2.79* (−5.21 to −0.37)	−2.77* (−5.17 to −0.36)
Everyday Discrimination × Age × Black	0.14* (0.02–0.25)	0.14* (0.03–0.25)	0.14* (0.02–0.25)	0.14* (0.03–0.25)	0.14* (0.02–0.25)
Random-effects variance component					
Level 1: Within-person	0.11 (0.05–0.25)	0.11 (0.05–0.25)	0.11 (0.05–0.25)	0.10 (0.04–0.24)	0.11 (0.05–0.24)
Level 2: Intercept	152.37 (110.42–210.24)	148.68 (107.25–206.11)	148.61 (107.24–205.94)	138.75 (98.43–195.58)	142.57 (102.44–198.43)
Level 2: Slope	−1.43 (−3.58 to 0.72)	−1.41 (−3.54 to 0.72)	−1.46 (−3.59 to 0.67)	−1.13 (−3.23 to 0.96)	−1.42 (−3.50 to 0.65)
Goodness-of-fit					
BIC value	115825.70	115741.80	115755.40	115732.80	115550.70

Note. Bracket values indicate coefficient (95% CI). All models adjusted for BP medications, number of observations, and mortality over the study period. Model 2 adjusted for sociodemographic characteristics (birth cohort, education, insurance status, and geographic region); Model 3 adjusts for psychosocial characteristics (marital status and CES-D); Model 4 adjusts for behavioral characteristics (smoking status, alcohol consumption, and physical activity); Model 5 is fully adjusted with the addition of health-related factors (BMI, diabetes, heart conditions, stroke, and lung problems). BIC = Bayesian information criterion; CI = confidence interval; CES-D = Center for Epidemiological Studies Depression Scale; BMI = body mass index.
* $p < .05$. ** $p < .01$. *** $p < .001$.

Table 3

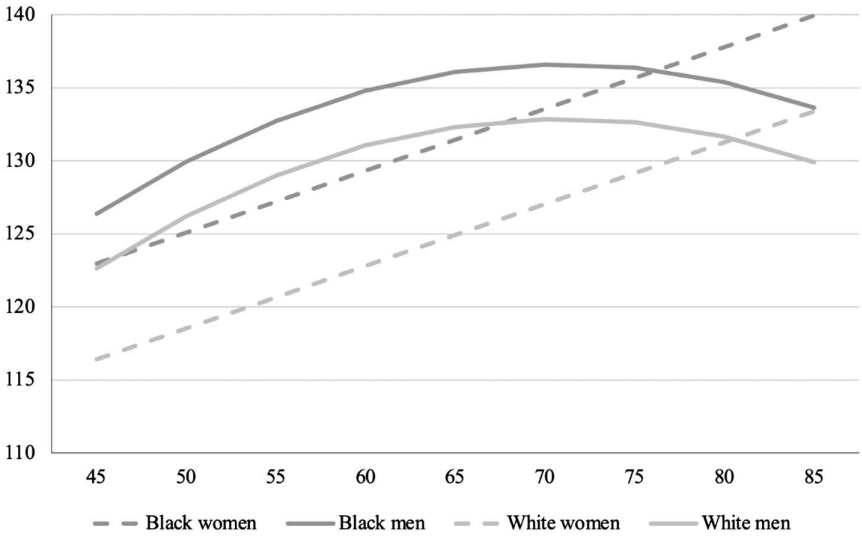
Parameter Estimates for Age-Related Trajectories of Blood Pressure (BP) in U.S. Black and White Women (2006–2018)

Parameter	Model 1	Model 2	Model 3	Model 4	Model 5
Intercept	115.53*** (114.19–116.88)	129.17*** (126.36–131.99)	129.61*** (126.78–132.45)	130.53*** (127.55–133.50)	127.87*** (124.86–130.88)
Age	0.48*** (0.43–0.52)	0.35*** (0.29–0.41)	0.33*** (0.28–0.39)	0.35*** (0.29–0.41)	0.38*** (0.32–0.44)
Black	10.89*** (9.00–12.77)	10.19*** (8.29–12.09)	10.08*** (8.16–12.00)	10.09*** (8.17–12.01)	9.69*** (7.78–11.60)
Black × Age	−0.23*** (−0.31 to −0.14)	−0.22*** (−0.30 to −0.13)	−0.22*** (−0.31 to −0.13)	−0.21*** (−0.30 to −0.12)	−0.22*** (−0.30 to −0.13)
Everyday discrimination	0.26 (−0.68 to 1.20)	0.14 (−0.80 to 1.08)	0.29 (−0.66 to 1.23)	0.23 (−0.72 to 1.17)	0.09 (−0.84 to 1.03)
Everyday Discrimination × Age	−0.04* (−0.08 to 0.00)	−0.04 (−0.08 to 0.01)	−0.04 (−0.08 to 0.00)	−0.03 (−0.08 to 0.01)	−0.03 (−0.07 to 0.01)
Random-effects variance component					
Level 1: Within-person	0.12 (0.07–0.24)	0.12 (0.06–0.23)	0.12 (0.06–0.23)	0.13 (0.07–0.23)	0.11 (0.06–0.22)
Level 2: Intercept	145.78 (110.89–191.64)	136.46 (102.67–181.38)	137.27 (103.43–182.19)	139.16 (105.31–183.89)	129.46 (96.37–173.91)
Level 2: Slope	−1.30 (−3.11 to 0.52)	−1.13 (−2.91 to 0.65)	−1.14 (−2.92 to 0.64)	−1.24 (−3.02 to 0.53)	−0.93 (−2.69 to 0.83)
Goodness-of-fit					
BIC value	162906.50	162761.20	162778.10	162772.30	162706.80

Note. Bracket values indicate coefficient (95% CI). All models adjusted for BP medications, number of observations, and mortality over the study period. Model 2 adjusted for sociodemographic characteristics (birth cohort, education, insurance status, and geographic region); Model 3 adjusts for psychosocial characteristics (marital status and CES-D); Model 4 adjusts for behavioral characteristics (smoking status, alcohol consumption, and physical activity); Model 5 is fully adjusted with the addition of health-related factors (BMI, diabetes, heart conditions, stroke, and lung problems). BIC = Bayesian information criterion; CI = confidence interval; CES-D = Center for Epidemiological Studies Depression Scale; BMI = body mass index.
* $p < .05$. ** $p < .01$. *** $p < .001$.

Figure 1

Age-Related Trajectories of Blood Pressure (BP) by Sex and Race (2006–2018)



Note. Model adjusted for BP medications, number of observations, and mortality over the study period.

reported experiencing discrimination had significantly higher levels of BP at the youngest ages compared to those who did not experience discrimination. With increasing age, however, we found that experiencing discrimination was associated with significantly lower levels of BP. Adjusting for a wide range of socioeconomic, psychosocial, behavioral, and health-related factors only partially attenuated the associations (Table 2, Model 5).

Among women (Figure 2 [lower panel]), results showed that levels of BP were generally higher in Black women than in White women. We also found that there were significant race differences in age-related changes in BP for women ([Black × Age interaction] $b = -0.23$, 95% CI [−0.31, −0.14], $p < .001$). In addition, we found some evidence that women who experienced high levels of discrimination had lower levels of BP at the oldest ages compared to those who did not experience discrimination. However, adjusting for socioeconomic, psychosocial, behavioral, and/or health-related characteristics accounted for the association between perceived discrimination and BP in women (Table 3, Model 5).

Discussion

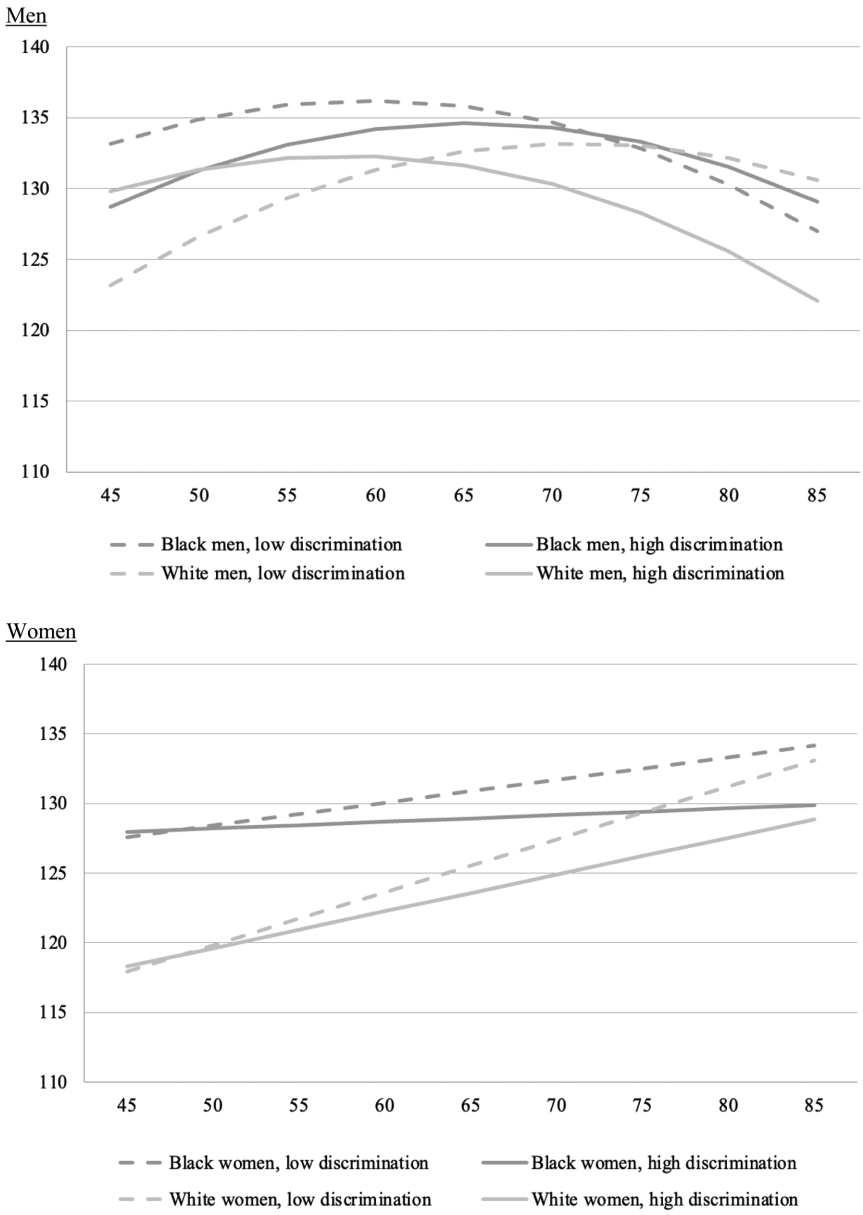
In this population-based investigation of middle-aged and older Black and White adults, we found that the relationship between discrimination and age-related patterns of BP varied by sex and race. For Black men, contrary to our hypothesis, experiencing discrimination was associated with significantly lower levels of BP in middle adulthood and somewhat higher levels of BP in older ages. For White men, the opposite was found. Results for women showed that perceived discrimination was not associated with age-related changes in BP and that the patterns were similar in Black and White women. Adjusting for a wide range of socioeconomic, psychosocial, behavioral, and health-related factors largely accounted for the associations in women, but not men.

Overall, our descriptive findings align with previous research showing higher levels of BP in Black adults compared to White adults (e.g., Kurian & Cardarelli, 2007) and higher rates of everyday discrimination among Black adults compared to White adults (Barnes et al., 2004; Williams et al., 1997). We also found patterns by sex and race; Black men had the highest discrimination scores, while White women had the lowest scores. This work contributes to a growing body of literature that seeks to better understand heterogeneity in the experiences of stigma, including discrimination, in later life and how these experiences may contribute to worse health outcomes across the life course (Cobb et al., 2020; Mouzon et al., 2017, 2020; Nguyen et al., 2022).

Our hypothesis that exposure to discrimination would be associated with increases in BP with advancing age was only partially supported. In particular, we found that experiencing greater levels of discrimination was associated with higher BP only among White men in middle adulthood, and that lower levels of discrimination were associated with higher BP for White men starting around age 62. Contrary to our expectations, we also found that Black men who experienced greater levels of discrimination had lower levels of BP at younger ages. Notably, Black men who reported high levels of discrimination had greater age-related increases in BP relative to Black men who reported less discrimination. In both cases, it should be noted that Black men experienced clinically high levels of BP (i.e., Stage I hypertension [systolic BP ≥ 130]) at nearly all ages irrespective of the amount of discrimination they faced. The finding that higher levels of discrimination was associated with worse BP among White men at younger ages aligns with previous research (Arriola, 2002; Brondolo et al., 2008; Orom et al., 2017; Ryan et al., 2006). Furthermore, a recent study by Mouzon et al. (2020) used data from the National Survey of American Life to show that increasing age was associated with a lower likelihood of reporting frequent discrimination among Black older adults. It is possible that the

Figure 2

Fully Adjusted Age-Related Trajectories of Blood Pressure (BP) by Race and Level of Discrimination in U.S. Men and Women (2006–2018)



Note. Models are adjusted for BP medications, number of observations, mortality over the study period, birth cohort, education, insurance status, geographic region, marital status, CES-D, smoking status, alcohol consumption, physical activity, BMI, diabetes, heart conditions, stroke, and lung problems. CES-D = Center for Epidemiological Studies Depression Scale; BMI = body mass index.

different conclusions from these studies reflects their cross-sectional design, their focus on younger—rather than older—samples, and limitations with the measurement of discrimination.

For women, we did not find support for our hypothesis that discrimination would be positively associated with age-related increases in BP and found some support that age moderated the association between discrimination and BP for Black compared to White women. However, our study found that discrimination was not associated with overall levels of BP and/or age-related changes in BP among Black and White women after adjustment for a wide range of factors. These findings for women may reflect different strategies to cope with the stress associated with discrimination. For example, women tend to report greater levels of social support, an important psychosocial resource, than men do, and one longitudinal study of Black adults showed that women were more likely to exercise after exposure to racial discrimination, compared to men, who were less

likely to exercise (Brodish et al., 2011; Matud, 2004; Rubio et al., 2016). Taken together, and in the context of our findings for men, the results of this study further underscore the importance of considering the complex and dynamic associations among sex, race, and discrimination and their impact on age-related changes in BP.

Overall, our findings based on longitudinal data demonstrate that there are unique sex, race, and age-related patterns in this relationship, which advance the literature in a number of ways. First, this work highlights the need for further research to deepen our understanding of the intricate relationship between discrimination and blood pressure as individuals age (e.g., Barksdale et al., 2009; C. Brown et al., 2006; Lewis et al., 2009; Peters, 2006). Indeed, there are several promising areas for future research to consider. For example, the stress related to constant vigilance and vicarious exposure to discrimination may shed light on the different ways that discrimination may undermine health (M. D. Moody et al., 2022). Second, as others have suggested, it is also important to consider the ways that people cope with discrimination and how these strategies could influence BP among Black and White women and Black men, particularly as people age. For example, the strength and vulnerability integration framework suggests that older adults may be better able to regulate their emotional responses to stress, which may explain why BP levels are lower for Black and White women and middle-aged Black men reporting high discrimination (Charles, 2010). A growing body of research has also begun to show that structural stigma is associated with adverse health outcomes (T. H. Brown et al., 2022; Flentje et al., 2022; Homan et al., 2021). Relatedly, more research is warranted to understand whether structural stigma may contribute to changes in BP across the life course.

A major strength of this study included the use of nationally representative panel survey data from Black and White midlife and older adults with repeated measures of BP from seven waves of data from 2006 to 2018, which allowed us to explore age-related patterns of the relationship between discrimination and BP. Previous studies on discrimination and BP have generally been conducted in cross-sectional samples, limited longitudinal designs (often $\leq$4 years), or a diagnosis of hypertension (often self-reported) rather than focusing on age-related changes in BP. Our focus on age-related changes in discrimination and BP in a sample of midlife and older adults is a notable strength and adds to our understanding of the impacts of discrimination on BP at different points in the life course. To date, many existing longitudinal studies have been conducted in considerably younger populations, neglecting the potentially powerful role that changes in discrimination across the life course may have on BP levels. Studies that have examined the relationship between discrimination and BP/hypertension in older adults typically have a shorter follow-up period or have not examined how discrimination may be related to age-related changes in BP. Furthermore, in focusing on examining levels of BP, rather than a diagnosis of hypertension, we provide new knowledge that could potentially inform the development of (and adequate timing of) interventions aimed at reducing BP prior to a diagnosis of hypertension. Finally, our study is strengthened because we explore whether age-related patterns in discrimination and BP varied by race and sex, giving us more insight into this complex association.

While there are several strengths of this work, we also recognize the study has limitations. For instance, while we used respondent information from multiple data waves, the present study followed an accelerated longitudinal design, meaning that some respondents provided a single wave of data, and others have contributed multiple waves of data. Because of this, we must remain cautious in our conclusions, as our findings cannot directly address temporality among study variables. We also recognize that our BP measure may be limited because readings could be taken at various times of day (due to the timing of the interview) and other potentially important dimensions of BP were not captured, such as nocturnal dipping. We further encourage studies to examine whether patterns of diastolic BP are consistent with those identified in this article. Moreover, there may have been some limitations in the discrimination measure used for this study. Although the Everyday Discrimination Scale is a widely used assessment tool across a diverse set of research fields and purposes, it does not assess an individual's appraisal of discrimination, which can capture how stressful or upsetting the experience was, nor does it measure other salient aspects of discrimination (such as vicarious or institutional discrimination). Future studies should assess additional dimensions of stigma beyond discrimination, such as anticipated and structural stigma, which may allow for a deeper understanding of how stigma may impact BP.

While beyond the scope of this study, we did not formally test for mediation in our exploration of the mechanisms that might account for the relationships observed. For example, changes in BP could be attributed to other factors beyond the covariates assessed in this study, such as dietary salt intake (Mohan & Campbell, 2009), new or increased caffeine consumption (Myers, 1988), or sleep quality (Lo et al., 2018). Moreover, people may engage in adaptive or maladaptive behaviors (such as exercise or smoking) to cope with experiences of discrimination, which may serve as safeguards or pose potential risks. While earlier research has explored the relationships between coping dispositions and strategies with health outcomes that are associated with stress (Aldwin et al., 1996; Dressler et al., 1998; Nguyen et al., 2022; Penley et al., 2002), it would be important to integrate findings from such studies into new research that seek richer exploration of certain phenomena regarding BP in later adulthood.

We also encourage future studies to investigate how specific attributions of discrimination, as well as combinations of attributions, may uniquely shape age-related changes in BP across these subgroups. For example, there is reason to believe that specific attributions of discrimination may be more strongly implicated in adverse health outcomes. In a recent study, Cobb et al. (2023) demonstrated that reporting discrimination due to age, race, and physical disability were associated with greater risks for mortality among Black adults. In Supplemental Material, we explored the various attributions reported by HRS respondents across each subgroup (Supplemental Table S6). Considering the changing frequency and nature of discrimination with advancing age (e.g., older adults may be experiencing age-based or disability-based discrimination for the first time in their lives) may provide new and informative insights into the ways that discrimination may impact BP.

In this nationally representative sample of U.S. midlife and older Black and White adults, we found that discrimination was not associated with age-related levels or changes in BP among women. For men, we found significant differences in BP by race and discrimination. Black men who reported low levels of discrimination had higher BP at younger ages than those who reported high levels of discrimination. Furthermore, Black men who experienced high levels of discrimination exhibited greater age-related increases in BP relative to Black men who experienced low levels of

discrimination. For White men, the opposite patterns were found. The findings of this study underscore the importance of more closely analyzing the complex relationship between patterns of discrimination and BP among Black and White men and women across the life course.

References

Aldwin, C. M., Sutton, K. J., & Lachman, M. (1996). The development of coping resources in adulthood. *Journal of Personality*, *64*(4), 837–871. https://doi.org/10.1111/j.1467-6494.1996.tb00946.x

Alwin, D. F., & Wray, L. A. (2005). A life-span developmental perspective on social status and health. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences*, *60*(Special Issue 2), S7–S14. https://doi.org/10.1093/geronb/60.special_issue_2.s7

Arriola, K. R. J. (2002). Racial discrimination and blood pressure among Black adults: Understanding the role of repression. *Phylon*, *50*(1/2), 47–69. https://doi.org/10.2307/4150001

Barksdale, D. J., Farrug, E. R., & Harkness, K. (2009). Racial discrimination and blood pressure: Perceptions, emotions, and behaviors of black American adults. *Issues in Mental Health Nursing*, *30*(2), 104–111. https://doi.org/10.1080/01612840802597879

Barnes, L. L., Mendes De Leon, C. F., Wilson, R. S., Bienias, J. L., Bennett, D. A., & Evans, D. A. (2004). Racial differences in perceived discrimination in a community population of older blacks and whites. *Journal of Aging and Health*, *16*(3), 315–337. https://doi.org/10.1177/0898264304264202

Beatty Moody, D. L., Waldstein, S. R., Tobin, J. N., Cassells, A., Schwartz, J. C., & Brondolo, E. (2016). Lifetime racial/ethnic discrimination and ambulatory blood pressure: The moderating effect of age. *Health Psychology*, *35*(4), 333–342. https://doi.org/10.1037/hea0000270

Benjamin, E. J., Muntner, P., Alonso, A., Bittencourt, M. S., Callaway, C. W., Carson, A. P., Chamberlain, A. M., Chang, A. R., Cheng, S., Das, S. R., Delling, F. N., Djousse, L., Elkind, M. S. V., Ferguson, J. F., Fornage, M., Jordan, L. C., Khan, S. S., Kissela, B. M., Knutson, K. L., … the American Heart Association Council on Epidemiology and Prevention Statistics Committee and Stroke Statistics Subcommittee. (2019). Heart disease and stroke statistics-2019 update: A report from the American Heart Association. *Circulation*, *139*(10), e56–e528. https://doi.org/10.1161/CIR.0000000000000659

California. Department of Public Health, & Borhani, N. (1968). *The alameda county blood pressure study*. California Committee on Regional Medical Programs.

Brodish, A. B., Cogburn, C. D., Fuller-Rowell, T. E., Peck, S., Malanchuk, O., & Eccles, J. S. (2011). Perceived racial discrimination as a predictor of health behaviors: The moderating role of gender. *Race and Social Problems*, *3*(3), 160–169. https://doi.org/10.1007/s12552-011-9050-6

Brondolo, E., Libby, D. J., Denton, E. G., Thompson, S., Beatty, D. L., Schwartz, J., Sweeney, M., Tobin, J. N., Cassells, A., Pickering, T. G., & Gerin, W. (2008). Racism and ambulatory blood pressure in a community sample. *Psychosomatic Medicine*, *70*(1), 49–56. https://doi.org/10.1097/PSY.0b013e31815ff3bd

Brondolo, E., Love, E. E., Pencille, M., Schoenthaler, A., & Ogedegbe, G. (2011). Racism and hypertension: A review of the empirical evidence and implications for clinical practice. *American Journal of Hypertension*, *24*(5), 518–529. https://doi.org/10.1038/ajh.2011.9

Brown, C., Matthews, K. A., Bromberger, J. T., & Chang, Y. (2006). The relation between perceived unfair treatment and blood pressure in a racially/ethnically diverse sample of women. *American Journal of Epidemiology*, *164*(3), 257–262. https://doi.org/10.1093/aje/kwj196

Brown, T. H., Kamis, C., & Homan, P. (2022). Empirical evidence on structural racism as a driver of racial inequities in COVID-19 mortality. *Frontiers in Public Health*, *10*, Article 1007053. https://doi.org/10.3389/fpubh.2022.1007053

Carnethon, M. R., Pu, J., Howard, G., Albert, M. A., Anderson, C. A. M., Bertoni, A. G., Mujahid, M. S., Palaniappan, L., Taylor, H. A., Jr., Willis, M., Yancy, C. W., & the American Heart Association Council on Epidemiology and Prevention; Council on Cardiovascular Disease in the Young; Council on Cardiovascular and Stroke Nursing; Council on Clinical Cardiology; Council on Functional Genomics and Translational Biology; and Stroke Council. (2017). Cardiovascular health in African Americans: A scientific statement from the American Heart Association. *Circulation*, *136*(21), e393–e423. https://doi.org/10.1161/CIR.0000000000000534

Charles, S. T. (2010). Strength and vulnerability integration: A model of emotional well-being across adulthood. *Psychological Bulletin*, *136*(6), 1068–1091. https://doi.org/10.1037/a0021232

Clark, R. (2003). Self-reported racism and social support predict blood pressure reactivity in Blacks. *Annals of Behavioral Medicine*, *25*(2), 127–136. https://doi.org/10.1207/S15324796ABM2502_09

Cobb, R. J., Parker, L. J., & Thorpe, R. J., Jr. (2020). Self-reported instances of major discrimination, race/ethnicity, and inflammation among older adults: Evidence from the health and retirement study. *The Journals of Gerontology: Series A*, *75*(2), 291–296. https://doi.org/10.1093/gerona/gly267

Cobb, R. J., Rodriguez, V. J., Brown, T. H., Louie, P., Farmer, H. R., Sheehan, C. M., Mouzon, D. M., & Thorpe, R. J., Jr. (2023). Attribution for everyday discrimination typologies and mortality risk among older black adults: Evidence from the health and retirement study. *Social Science & Medicine*, *316*, 115166. https://doi.org/10.1016/j.socscimed.2022.115166

Crimmins, E., Guyer, H., Langa, K., Ofstedal, M. B., Wallace, R., & Weir, D. (2008). *Documentation of physical measures, anthropometrics, and blood pressure in the health and retirement study*. Survey Research Center, University of Michigan. https://hrs.isr.umich.edu/sites/default/files/biblio/dr-011.pdf

Dressler, W. W., Bindon, J. R., & Neggers, Y. H. (1998). John Henryism, gender, and arterial blood pressure in an African American community. *Psychosomatic Medicine*, *60*(5), 620–624. https://doi.org/10.1097/00006842-199809000-00019

Dupre, M. E., Gu, D., Xu, H., Willis, J., Curtis, L. H., & Peterson, E. D. (2019). Racial and ethnic differences in trajectories of hospitalization in US men and women with heart failure. *Journal of the American Heart Association*, *6*(11). https://doi.org/10.1161/JAHA.117.006290

Earnshaw, V. A., Watson, R. J., Eaton, L. A., Brousseau, N. M., Laurenceau, J.-P., & Fox, A. B. (2022). Integrating time into stigma and health research. *Nature Reviews Psychology*, *1*(4), 236–247. https://doi.org/10.1038/s44159-022-00034-2

Elder, G. H., Jr. (1998). The life course as developmental theory. *Child Development*, *69*(1), 1–12. https://doi.org/10.1111/j.1467-8624.1998.tb06128.x

Farmer, H. R., Wray, L. A., & Thomas, J. R. (2019). Do race and everyday discrimination predict mortality risk? Evidence from the health and retirement study. *Gerontology & Geriatric Medicine*, *5*. https://doi.org/10.1177/2333721419855665

Flack, J. M., Ferdinand, K. C., & Nasser, S. A. (2003). Epidemiology of hypertension and cardiovascular disease in African Americans. *Journal of Clinical Hypertension*, *5*(Suppl. 1), 5–11. https://doi.org/10.1111/j.1524-6175.2003.02152.x

Flentje, A., Clark, K. D., Cicero, E., Capriotti, M. R., Lubensky, M. E., Sauceda, J., Neilands, T. B., Lunn, M. R., & Obedin-Maliver, J. (2022). Minority stress, structural stigma, and physical health among sexual and gender minority individuals: Examining the relative strength of the relationships. *Annals of Behavioral Medicine*, *56*(6), 573–591. https://doi.org/10.1093/abm/kaab051

Galbraith, S., Bowden, J., & Mander, A. (2017). Accelerated longitudinal designs: An overview of modelling, power, costs and handling missing

data. *Statistical Methods in Medical Research*, *26*(1), 374–398. https://doi.org/10.1177/0962280214547150

Geronimus, A. T., Bound, J., Keene, D., & Hicken, M. (2007). Black-white differences in age trajectories of hypertension prevalence among adult women and men, 1999–2002. *Ethnicity & Disease*, *17*(1), 40–48. https://doi.org/10.1016/0277-9536(95)00159-X

Goff, D. C., Jr., Lloyd-Jones, D. M., Bennett, G., Coady, S., D'Agostino, R. B., Gibbons, R., Greenland, P., Lackland, D. T., Levy, D., O'Donnell, C. J., Robinson, J. G., Schwartz, J. S., Shero, S. T., Smith, S. C., Jr., Sorlie, P., Stone, N. J., Wilson, P. W. F., Jordan, H. S., Nevo, L., … the American College of Cardiology/American Heart Association Task Force on Practice Guidelines. (2014). 2013 ACC/AHA guideline on the assessment of cardiovascular risk: A report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines. *Circulation*, *129*(25, Suppl. 2), S49–S73. https://doi.org/10.1161/01.cir.0000437741.48606.98

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. https://doi.org/10.1002/ajhb.22683

Hill, L. K., Kobayashi, I., & Hughes, J. W. (2007). Perceived racism and ambulatory blood pressure in African American college students. *The Journal of Black Psychology*, *33*(4), 404–421. https://doi.org/10.1177/0095798407307042

Homan, P., Brown, T. H., & King, B. (2021). Structural intersectionality as a new direction for health disparities research. *Journal of Health and Social Behavior*, *62*(3), 350–370. https://doi.org/10.1177/00221465211032947

Hypertension Detection and Follow-Up Program Cooperative Group. (1977). Race, education and prevalence of hypertension. *American Journal of Epidemiology*, *106*(5), 351–361. https://doi.org/10.1093/oxfordjournals.aje.a112476

Juster, T. F., & Suzman, R. (1995). An overview of the health and retirement study. *The Journal of Human Resources*, *30*(Special Issue), S7–S56. https://doi.org/10.2307/146277

Krieger, N., & Sidney, S. (1996). Racial discrimination and blood pressure: The CARDIA Study of young black and white adults. *American Journal of Public Health*, *86*(10), 1370–1378. https://doi.org/10.2105/AJPH.86.10.1370

Kurian, A. K., & Cardarelli, K. M. (2007). Racial and ethnic differences in cardiovascular disease risk factors: A systematic review. *Ethnicity & Disease*, *17*(1), 143–152. https://www.jstor.org/stable/48667007

LeBrón, A. M. W., Schulz, A. J., Mentz, G., Reyes, A. G., Gamboa, C., Israel, B. A., Viruell-Fuentes, E. A., & House, J. S. (2020). Impact of change over time in self-reported discrimination on blood pressure: Implications for inequities in cardiovascular risk for a multi-racial urban community. *Ethnicity & Health*, *25*(3), 323–341. https://doi.org/10.1080/13557858.2018.1425378

Lewis, T. T., Barnes, L. L., Bienias, J. L., Lackland, D. T., Evans, D. A., & Mendes de Leon, C. F. (2009). Perceived discrimination and blood pressure in older African American and white adults. *The Journals of Gerontology: Series a*, *64*(9), 1002–1008. https://doi.org/10.1093/gerona/glp062

Lo, K., Woo, B., Wong, M., & Tam, W. (2018). Subjective sleep quality, blood pressure, and hypertension: A meta-analysis. *Journal of Clinical Hypertension*, *20*(3), 592–605. https://doi.org/10.1111/jch.13220

Matthews, K. A., Salomon, K., Kenyon, K., & Zhou, F. (2005). Unfair treatment, discrimination, and ambulatory blood pressure in black and white adolescents. *Health Psychology*, *24*(3), 258–265. https://doi.org/10.1037/0278-6133.24.3.258

Matud, M. P. (2004). Gender differences in stress and coping styles. *Personality and Individual Differences*, *37*(7), 1401–1415. https://doi.org/10.1016/j.paid.2004.01.010

Mohan, S., & Campbell, N. R. C. (2009). Salt and high blood pressure. *Clinical Science*, *117*(1), 1–11. https://doi.org/10.1042/CS20080207

Moody, D. L. B., Chang, Y.-F., Pantesco, E. J., Darden, T. M., Lewis, T. T., Brown, C., Bromberger, J. T., & Matthews, K. A. (2019). Everyday discrimination prospectively predicts blood pressure across 10 years in racially/ethnically diverse midlife women: Study of women's health across the nation. *Annals of Behavioral Medicine*, *53*(7), 608–620. https://doi.org/10.1093/abm/kay069

Moody, M. D., Thomas Tobin, C. S., & Erving, C. L. (2022). Vicarious experiences of major discrimination and psychological distress among Black men and women. *Society and Mental Health*, *12*(3), 175–194. https://doi.org/10.1177/21568693221116631

Mouzon, D. M., Taylor, R. J., Nguyen, A. W., Ifatunji, M. A., & Chatters, L. M. (2020). Everyday Discrimination typologies among older African Americans: Gender and socioeconomic status. *The Journals of Gerontology: Series B*, *75*(9), 1951–1960. https://doi.org/10.1093/geronb/gbz088

Mouzon, D. M., Taylor, R. J., Woodward, A., & Chatters, L. M. (2017). Everyday racial discrimination, everyday non-racial discrimination, and physical health among African Americans. *Journal of Ethnic & Cultural Diversity in Social Work*, *26*(1–2), 68–80. https://doi.org/10.1080/15313204.2016.1187103

Myers, M. G. (1988). Effects of caffeine on blood pressure. *Archives of Internal Medicine*, *148*(5), 1189–1193. https://doi.org/10.1001/archinte.1988.00380050193027

Nguyen, A. W., Miller, D., Bubu, O. M., Taylor, H. O., Cobb, R., Trammell, A. R., & Mitchell, U. A. (2022). Discrimination and hypertension among older African Americans and Caribbean Blacks: The moderating effects of John Henryism. *The Journals of Gerontology: Series B*, *77*(11), 2049–2059. https://doi.org/10.1093/geronb/gbab215

Orom, H., Sharma, C., Homish, G. G., Underwood, W., III, & Homish, D. L. (2017). Racial discrimination and stigma consciousness are associated with higher blood pressure and hypertension in minority men. *Journal of Racial and Ethnic Health Disparities*, *4*(5), 819–826. https://doi.org/10.1007/s40615-016-0284-2

Pascoe, E. A., & Smart Richman, L. (2009). Perceived discrimination and health: A meta-analytic review. *Psychological Bulletin*, *135*(4), 531–554. https://doi.org/10.1037/a0016059

Penley, J. A., Tomaka, J., & Wiebe, J. S. (2002). The association of coping to physical and psychological health outcomes: A meta-analytic review. *Journal of Behavioral Medicine*, *25*(6), 551–603. https://doi.org/10.1023/A:1020641400589

Peters, R. M. (2006). The relationship of racism, chronic stress emotions, and blood pressure. *Journal of Nursing Scholarship*, *38*(3), 234–240. https://doi.org/10.1111/j.1547-5069.2006.00108.x

Radloff, L. S. (1977). The CES-D Scale: A self-report depression scale for research in the general population. *Applied Psychological Measurement*, *1*(3), 385–401. https://doi.org/10.1177/014662167700100306

Raudenbush, S. W., & Chan, W. S. (1992). Growth curve analysis in accelerated longitudinal designs. *Journal of Research in Crime and Delinquency*, *29*(4), 387–411. https://doi.org/10.1177/0022427892029004001

Rubio, L., Dumitrache, C., Cordon-Pozo, E., & Rubio-Herrera, R. (2016). Coping: Impact of gender and stressful life events in middle and in old age. *Clinical Gerontologist*, *39*(5), 468–488. https://doi.org/10.1080/07317115.2015.1132290

Ryan, A. M., Gee, G. C., & Laflamme, D. F. (2006). The Association between self-reported discrimination, physical health and blood pressure: Findings from African Americans, Black immigrants, and Latino immigrants in New Hampshire. *Journal of Health Care for the Poor and Underserved*, *17*(Suppl. 2), 116–132. https://doi.org/10.1353/hpu.2006.0092

Shaw, B. A., & Liang, J. (2013). Growth models with multilevel regression. *Longitudinal data analysis* (pp. 217–242). Routledge.

Sims, K. D., Smit, E., Batty, G. D., Hystad, P. W., & Odden, M. C. (2022). Intersectional discrimination and change in blood pressure control among older adults: The health and retirement study. *The Journals of*

Gerontology: Series A, *77*(2), 375–382. https://doi.org/10.1093/gerona/glab234

Smith, J., Ryan, L., Fisher, G. G., Sonnega, A., & Weir, D. (2017). *Psychosocial and lifestyle questionnaire 2006–2016 documentation report core section LB*. Survey Research Center, Institute for Social Research, University of Michigan.

Sonnega, A., Faul, J. D., Ofstedal, M. B., Langa, K. M., Phillips, J. W., & Weir, D. R. (2014). Cohort profile: The Health and Retirement Study (HRS). *International Journal of Epidemiology*, *43*(2), 576–585. https://doi.org/10.1093/ije/dyu067

Steffen, P. R., McNeilly, M., Anderson, N., & Sherwood, A. (2003). Effects of perceived racism and anger inhibition on ambulatory blood pressure in African Americans. *Psychosomatic Medicine*, *65*(5), 746–750. https://doi.org/10.1097/01.PSY.0000079380.95903.78

Williams, D. R., & Mohammed, S. A. (2009). Discrimination and racial disparities in health: Evidence and needed research. *Journal of Behavioral Medicine*, *32*(1), 20–47. https://doi.org/10.1007/s10865-008-9185-0

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. https://doi.org/10.1177/135910539700200305

Yang, Y. (2007). Is old age depressing? Growth trajectories and cohort variations in late-life depression. *Journal of Health and Social Behavior*, *48*(1), 16–32. https://doi.org/10.1177/002214650704800102

Yang, Y., & Land, K. C. (2016). *Age-period-cohort analysis: New models, methods, and empirical applications*. Chapman and Hall/CRC. https://doi.org/10.1201/b13902

Received February 24, 2023
Revision received February 2, 2024
Accepted February 6, 2024 ■