

## Discrimination, Religious Affiliation, and Arterial Stiffness in African American Women and Men

Jason J. Ashe<sup>1</sup>, Peter H. MacIver<sup>2</sup>, Shuyan Sun<sup>2</sup>, Antione D. Taylor<sup>2</sup>,  
Michele K. Evans<sup>1</sup>, Alan B. Zonderman<sup>1</sup>, and Shari R. Waldstein<sup>2, 3</sup>

<sup>1</sup>Laboratory of Epidemiology and Population Sciences, National Institute of Aging Intramural Research Program Biomedical Research Center, Baltimore, Maryland, United States

<sup>2</sup>Department of Psychology, University of Maryland, Baltimore County

<sup>3</sup>Division of Gerontology, Geriatrics, and Palliative Medicine, University of Maryland School of Medicine

**Objective:** This study examined the interactive relations of experienced interpersonal discrimination, sex, and religious affiliation with pulse wave velocity (PWV), a noninvasive measure of arterial stiffness and indicator of subclinical cardiovascular disease (CVD) prognostic for clinical CVD. **Method:** We used multivariable linear regression analyses with cross-sectional data from 797 African American midlife adults in the Healthy Aging in Neighborhoods of Diversity Across the Life Span study in Baltimore, Maryland, to examine the interactive relations of both linear and quadratic discrimination, religious affiliation status, and sex with PWV in models adjusted for age and poverty status. **Results:** Findings revealed a significant three-way interaction of Discrimination<sup>2</sup> × Religious Affiliation Status × Sex with PWV ( $B = 0.004$ ,  $SE = 0.001$ ,  $p = .004$ ). Simple effect analyses showed a U-shape relation for only religiously affiliated men ( $B = 0.001$ ,  $SE = 0.001$ ,  $p = .008$ ). Both lower and higher levels of discrimination were related to higher PWV. No such relations emerged among unaffiliated men or women. Findings remained robust after sensitivity analyses adjusted for depressive symptoms, cigarette use, obesity, marital status, hypertension, Type 2 diabetes, CVD medical history, cholesterol, lipid-lowering medication use, systolic blood pressure, and heart rate. **Conclusion:** Religiously affiliated African American men who reported the lowest and highest experienced discrimination showed a heightened risk for subclinical CVD. Having a religious identity might either play a role in suppressing men's unwanted memories of discrimination or increase men's susceptibility to and salience of mistreatment, which might manifest in adverse cardiovascular health outcomes.

### Public Significance Statement

The current study offers that religious affiliation may play an important role in uncovering nuances across racial health disparities. Findings suggest that for African American men, having a religious affiliation may affect how discrimination is linked with poorer cardiovascular health.

**Keywords:** African Americans, intersectionality, discrimination, religion, arterial stiffness

**Supplemental materials:** <https://doi.org/10.1037/hea0001424.supp>

This article was published Online First September 23, 2024.

Carmela Alcantara served as action editor.

Jason J. Ashe  <https://orcid.org/0000-0003-2485-9605>

We would like to acknowledge our funding sources: the National Institute on Aging (NIA) Intramural Research Program (IRP) (ZIAG000513) and the University of Maryland Claude D. Pepper Older Americans Independence Center (P30 AG028747). The funders had no role in study design, data collection and analysis, decision to publish, or preparation of the article. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the authors and do not necessarily reflect the views of the NIA or the National Institutes of Health (NIH). The authors declare that there are no conflicts of interest to disclose. The Healthy Aging in Neighborhoods of Diversity Across the Life Span (HANDLS) study sample is relatively small and drawn from a vulnerable population residing in specific census tracts in Baltimore City, Maryland, United States. Therefore, maintaining confidentiality—especially in the context of a longitudinal study—is paramount. Participants' identities are at risk under these conditions. Therefore, interested investigators should consult the HANDLS website at <https://handls.nih.gov/>—specifically, the instructions for collaborators at <https://handls.nih.gov/06Coll-dataDoc.htm>. The authors would like to thank the HANDLS staff, investigators, and participants. We also extend appreciation to the NIA/NIH/IRP internal reviewers of this article. Finally, we

would like to thank Dalya Jawhar for her assistance with formatting tables and figures in the [online supplemental materials](#) in preparation for publication.

Jason J. Ashe served as lead for conceptualization, formal analysis, methodology, visualization, writing—original draft, and writing—review and editing. Peter H. MacIver served in a supporting role for conceptualization, writing—original draft, and writing—review and editing. Shuyan Sun contributed equally to formal analysis and served in a supporting role for writing—review and editing. Antione D. Taylor served in a supporting role for conceptualization, writing—original draft, and writing—review and editing. Michele K. Evans served as lead for funding acquisition, investigation, and project administration and served in a supporting role for data curation, resources, supervision, and writing—review and editing. Alan B. Zonderman served as lead for funding acquisition, investigation, project administration, and resources and served in a supporting role for conceptualization, data curation, formal analysis, supervision, writing—original draft, and writing—review and editing. Shari R. Waldstein served as lead for conceptualization, supervision, writing—original draft, and writing—review and editing.

Correspondence concerning this article should be addressed to Jason J. Ashe, Laboratory of Epidemiology and Population Sciences, National Institute of Aging Intramural Research Program Biomedical Research Center, 251 Bayview Boulevard, Baltimore, MD 21224-6825, United States. Email: [jasonjashe@gmail.com](mailto:jasonjashe@gmail.com)

Interpersonal discrimination is an established chronic stressor implicated in underlying cardiovascular disease (CVD) risk for African American (AA) adults. Compared to other racial and ethnic groups in the United States, AA adults (men usually more so than women) report more perceived discrimination based on their race and have these experiences in everyday settings or interactions (Beatty Moody et al., 2021; National Public Radio et al., 2017). Higher levels of interpersonal discrimination have been linked with multiple CVD risk factors and subclinical CVD markers, indicating poorer health (Cardel et al., 2021; Dunlay et al., 2017; Forde et al., 2020).

Subclinical CVDs, like arterial stiffening, are symptomless precursors that strongly predict risk for future clinical CVD events (Chen et al., 2017; Singh et al., 2018). Arterial stiffness is the loss of elasticity in the arterial wall lining and is a key sign of arterial aging (Newman, 2003; Pewowaruk et al., 2022). Pulse wave velocity (PWV) is a noninvasive measure of arterial performance that captures blood pressure (BP) wave flow through the circulatory system and is a reliable prognostic marker for CVD morbidity and mortality (Kouis et al., 2020). Compared to White adults, AA adults are more likely to have stiffer arteries, and risk for arterial stiffening occurs earlier and progresses more rapidly (Buie et al., 2019). To date, a small body of work has shown initial evidence that greater experienced discrimination may be related to stiffer arteries, but several questions remain.

First, most of the prior research has utilized samples not generalizable to the United States and focused on racially appraised discrimination (Camelo et al., 2022; Cruickshank et al., 2016). Although racism and anti-Blackness have implications for health outcomes globally, we were particularly interested in examining these linkages in AA adults, for whom experienced discrimination wields a cumulative burden on their physical health and emotional well-being (Williams et al., 2019). While most reports tend to rely heavily on racially appraised unfair treatment, discrimination is also multidimensional. It can target multiple identities at once, happen in everyday situations, or have a major impact on one's life (S. P. Harrell, 2000). How the accumulation of such experiences portends damaging health consequences remains understudied.

Second, a growing body of research has found curvilinear relations between levels of discrimination and hemodynamic-related endpoints (Allen et al., 2019; Everage et al., 2012). For example, in a cross-sectional sample of AA and Latino adults, Ryan et al. (2006) found a U-shaped relation between perceived racial discrimination and BP levels, wherein individuals who reported no prior experiences of racial discrimination and those reporting the most had higher systolic BP readings. It has been hypothesized that there may be an alternate appraisal pathway of discrimination for some persons, wherein they might suppress unpleasant memories of being discriminated against, though the harm is still internalized (Krieger & Sidney, 1996).

Third, prior work shows that examining intersectional perspectives is warranted. Bromfield et al. (2020) found that more everyday discrimination was related to higher PWV values and increased arterial stiffness for Black women, but not Black men or White adults. Although AA men tend to report more perceived discrimination than AA women do, AA women face unique challenges with gendered racism and sexism. Intersectionality theory challenges researchers to consider how multiple interlocking oppressive systems malign and subject certain groups to multiple forms of discrimination concurrently (Crenshaw, 1989). Moreover, studies have shown that higher levels of perceived discrimination were linked with worse health outcomes for AA women but not their male or White counterparts (McKinnon et al., 2021; Roberts et al., 2007).

Lastly, religious affiliation is an understudied yet salient identity for many AA adults. Compared to 70% of the U.S. population, nearly 80% of AA adults identify with a faith tradition (Mohamed et al., 2021). Although most epidemiologic research relies on global measures of religiosity (e.g., religious service attendance), religious affiliation has notably been correlated with better biobehavioral outcomes and physical health endpoints, too (Kim et al., 2015; Larson et al., 2016). However, religion is not always helpful for everyone. For some religious AA women and men, denominational differences may be linked with heightened CVD risk and CVD-related comorbidities (Bentley-Edwards et al., 2021). Furthermore, having a religious identity might subject individuals to discrimination at work, school, in clinical settings, or with law enforcement. Religion can also shape racial identity and corresponding perceptions of discrimination (Shelton & Emerson, 2012). Although research has shown that devout adherence to religion has been linked with cardiovascular health benefits for AA adults (Bell et al., 2012; Brewer et al., 2022; Bruce et al., 2022), and when faced with discrimination, religion can sometimes act as a stress-buffering resource (mitigating discrimination's adverse effects on mental and physical health outcomes, Bierman, 2006; Hope et al., 2017; Shah, 2019), little is known about the modifying role of religious affiliation across the relations of perceived discrimination and CVD risk.

Thus, the current study examined both linear and nonlinear relations between experienced, multidimensional, interpersonal discrimination and PWV in a sample of community-dwelling AA midlife adults, and whether these linkages were moderated by sex and religious affiliation status. We hypothesized that more experienced discrimination would be related to higher PWV and would be most striking among religiously affiliated AA women. Finally, we explored if these relations withstood adjustment for relevant psychosocial, biobehavioral, and biomedical factors in sensitivity analyses, including depressive symptoms, history of cigarette use, marital status, systolic BP, heart rate, medical history of prior CVDs and comorbidities (hypertension, diabetes), total cholesterol, and use of lipid-lowering medication.

## Method

### Sample and Participants

Participant data were drawn from the Healthy Aging in Neighborhoods of Diversity Across the Life Span (HANDLS) study, an ongoing longitudinal study that examines age-related health disparities attributable to race and socioeconomic status in a fixed cohort of AA and White women and men (Evans et al., 2010), aged 30–64 years old, from 13 neighborhoods in Baltimore City, Maryland. Eligibility for HANDLS required that participants were able to give informed consent, complete at least five measures, and provide valid photo identification. The study protocol was approved by the Institutional Review Board at the National Institute of Environmental Health Sciences. In addition to HANDLS parent study exclusions, participants were excluded from the current analyses if they were diagnosed with HIV/AIDS or self-reported medical history of stroke, dementia, multiple sclerosis, Parkinson's disease, renal dialysis, or carotid endarterectomy. Of the 1,567 AA participants who completed HANDLS baseline data collection between 2004 and 2009, the present study's final sample in analyses included 797 AA women and men who were not missing data for the current study. There were no statistical

differences across key sociodemographic characteristics and PWV distribution by completer status.

## Measures

### Sociodemographic Information

Participants reported their age (in years), annual household income as a function of household size, and self-identified race (AA/Black). Biological sex was noted during the physical examination and confirmed by chromosomal analysis (1 = women, 2 = men). Poverty status was classified as either above or below 125% of the federal poverty threshold line (1 = above, 2 = below). Participants endorsed their religious affiliation status (0 = unaffiliated, 1 = yes) and provided faith tradition or denominational affiliation with fill-in responses, which were cleaned and reclassified into four categories: (a) unaffiliated; (b) Christian; (c) Catholic; (d) other (e.g., Jewish, Muslim); and (e) illegible/indecipherable, for descriptive purposes only.

### Outcome Variable

To measure carotid-femoral PWV, a minimum of 10 arterial flow waves from the right common carotid and femoral arteries were recorded using nondirectional transcutaneous Doppler probes (Model 810A, 9- to 10-MHz probes; Parks Medical Electronics, Inc.) and averaged using QRS for synchronization per the established protocol (Vaitkevicius et al., 1993). PWV was calculated as the distance traveled by the flow wave divided by the time differential (m/s).

### Predictor Variable

Four interpersonal discrimination measures were included in our multidimensional composite score: (a) frequency of social status-based related sources of discrimination (LaVeist et al., 2003), (b) lifetime burden of discrimination (Beatty Moody et al., 2021), (c) gender, and (d) racial discrimination (Krieger, 1990). The frequency of social status-based sources of discrimination comprised 10 items asking if participants had experienced discrimination due to different social status-based identities (gender, race, ethnicity, income, age, religion, physical appearance, sexual orientation, health status, or disability). Higher scores indicated a greater frequency of social status-based related sources of discrimination (Cronbach's  $\alpha = .84$ ). Lifetime burden of discrimination was assessed with two items: "How much has discrimination interfered with having a full and productive life?" "How much harder has life been because of discrimination?" Higher scores indicated more overall lifetime burden of discrimination (Cronbach's  $\alpha = .86$ ). Gender and racial discrimination were measured with five and six items, respectively, across various settings of discrimination ("Have you ever experienced gender or racial discrimination: at school, when getting a job, at work, when getting medical care, while at home, when getting housing, and from the police or in judicial courts; Cronbach's  $\alpha = .76$  and  $.81$ , respectively"). Higher scores indicated more gender and racial discrimination. To reflect a singular construct representing multidimensional, interpersonal discrimination, the total composite scores for each of the four dimensions were standardized and summed. Higher scores indicated greater perceived, multidimensional, interpersonal discrimination. To account for negative Z scores, a constant ( $c'$ ) was added to transpose the predictor variable prior to analyses.

### Psychosocial and Clinical Variables

Depressive symptoms within the past week were characterized using the Center for Epidemiological Studies-Depression scale (Radloff, 1977). Cigarette use was dichotomized as 0 = never used and 1 = ever used. Obesity status was derived from participants' body mass index values and recoded as a dichotomous variable ( $\geq 30 \text{ kg/m}^2$  = "obese"). Marital status was also coded as a dichotomous variable, 0 = unmarried and 1 = married/partnered. Hypertension was defined as resting systolic BP  $\geq 140$  mmHg or diastolic BP  $\geq 90$  mmHg, a previous physician diagnosis, and/or used antihypertensive medications. Diabetes was defined as a previous physician diagnosis, use of diabetes medications, and/or blood glucose levels  $\geq 126$  mg/dl (7 mmol/l). Participants self-reported prior physician diagnoses of CVDs (coronary artery disease, claudication, heart attack/myocardial infarction, congestive heart failure, and atrial fibrillation). Medical history of CVDs was recoded into a binary variable (0 = no prior diagnosis of CVDs, 1 = any prior medical history of CVDs). Participants indicated if a doctor had prescribed lipid-lowering medication (0 = no treatment, 1 = treatment). Systolic BP was collected using a standard brachial artery auscultation method in the seated position, with the participant's palm facing up and their arm positioned at a 90° angle. Two measures across a 5-min time interval were averaged. Radial heart rate was measured during the physical exam. Serum levels of total cholesterol were derived enzymatically.

### Data Analytic Plan

Descriptive analyses assessed means, standard deviations, distributions, and linearity of variables. Initial data visualization revealed a positive skew for the PWV distribution. Logarithmic data transformation resolved the skewness. The transformed variable was used in all primary study analyses, except for descriptive analyses and interaction plots. Multivariable linear regression analyses examined the independent and interactive relations of both linear and quadratic discrimination, sex, and religious affiliation status with PWV using the Statistical Package for the Social Sciences (SPSS) Version 27. We computed the quadratic term for discrimination and the three-way interaction terms for both linear and quadratic discrimination with religious affiliation status and sex, and all two-way interaction effects prior to analyses in SPSS. Analyses began with models that included up to the linear and quadratic three-way interaction terms, two-way interaction terms, main effects, and adjustment variables (age, poverty status). When the three-way nonlinear interaction term was statistically significant ( $p < .05$ ), the model was retained, and analyses proceeded to examine simple slope regressions. We recalculated all interaction terms of linear and quadratic discrimination with dummy coded variables to represent four reference groups per religious affiliation status and sex concurrently: (a) unaffiliated women, (b) affiliated women, (c) unaffiliated men, and (d) affiliated men. We then reran multivariable linear regression analyses, whereby the relations were retested to reflect these different groups individually. For each set of permutations, per the respective reference group, we identified whether the quadratic discrimination term was significant to determine simple effects and plotted the discrimination variable against the unstandardized predicted values for PWV in graphic illustrations.

### Sensitivity Analyses

Subsequent analyses assessed the respective contributions of depressive symptoms, cigarette use status, obesity status, marital status,

hypertension, diabetes, medical history of CVDs, total cholesterol, use of lipid-lowering agents, resting systolic BP, and heart rate as covariates in separate models. Each sensitivity variable was entered into the model one at a time due to concerns about reduced statistical power. This approach allowed for determining potentially emergent mediational influences, which may have been masked if all variables were compared together concurrently.

## Results

Participant data were drawn from 797 AA midlife adults (52.3% women,  $M_{\text{age}} = 48.42$  years old, 44.2% below poverty). Average PWV in the full sample was 8.15 m/s, with a range of 2.69–20.89 m/s (Table 1). Approximately 60% of participants were religiously affiliated, many identifying as either Christian or Catholic (55.6%). A small minority identified as Jewish, Muslim, or other faith traditions (3.5%). Seven participants' fill-in responses were indecipherable but were not excluded from the final analyses. Although men reported more discrimination than women, women were more likely to be religiously affiliated than men ( $ps < .05$ ; Table 1). Compared to unaffiliated individuals, religiously affiliated persons reported more discrimination and were more likely to be above the federal poverty level ( $ps < .05$ ). (Post hoc histogram plots were produced to visualize the distribution of one item from the multidimensional discrimination composite score that asked participants about prior discrimination due to their religion. Most participants reported no such experience.) Bivariate correlations of all variables are listed in the online supplemental materials.

Findings from the primary multivariable linear regression analyses revealed a significant three-way interaction of Discrimination<sup>2</sup> ×

Religious Affiliation Status × Sex with log-PWV,  $B = 0.004$ ,  $SE = 0.001$ ,  $p = .004$  (see Table 2 for full regression model results). Simple effect analyses can be found in the online supplemental materials. The relations between quadratic discrimination and PWV were only significant for religiously affiliated AA men,  $B = 0.001$ ,  $SE = 0.001$ ,  $p = .008$  (*U* shaped), such that lower and higher levels of discrimination were linked with higher PWV (Figure 1). Simple effect analyses for unaffiliated men and all women showed that these relations were nonsignificant ( $ps > .05$ ). Sensitivity analyses showed that these findings remained robust after adjustments for depressive symptoms, cigarette use, obesity, marital status, hypertension, diabetes, prior medical history of CVDs, total cholesterol, antilipidemic medication use, systolic BP, and heart rate ( $ps > .05$ ). For review of all sensitivity analyses, see the online supplemental materials.

## Discussion

In a sample of urban-dwelling, midlife AA adults, we found interactive relations between quadratic discrimination, sex, and religious affiliation status with PWV. Among religiously affiliated AA men only, those reporting the lowest and greatest levels of discrimination had higher PWV values. No such relations were observed for AA women or nonreligious men. Our findings remained robust after adjusting for depressive symptoms, biobehavioral and biomedical factors, and additional hemodynamic-related influences in sensitivity analyses. To our knowledge, ours is the first study to establish a curvilinear relationship between a composite construct of experienced, multidimensional, interpersonal discrimination and a measure of arterial stiffness in community-dwelling AA adults, with observable modifying effects by both sex and religious affiliation status concurrently.

**Table 1**

*Participant Demographic Characteristics and Descriptive Statistics for Study Variables, Differences by Sex and Religious Affiliation*

Descriptive statistics for all of present study's variables, HANDLS study (Wave 1, 2004–2009)								
Variable	Range	Total sample ( <i>n</i> = 797)	Women ( <i>n</i> = 417)	Men ( <i>n</i> = 380)	Sig.	Religiously affiliated ( <i>n</i> = 478)	Unaffiliated ( <i>n</i> = 319)	Sig.
Women (%)		417 (52.3)				57.9	43.9	***
Age ( $\pm$ <i>SD</i> )	30–65	48.42 (9.30)	48.94 (9.46)	47.85 (9.10)		49.80 (8.86)	46.35 (9.56)	
Below 125% federal poverty level (%)		44.2	44.4	43.9		39.7	50.8	**
Depressive symptoms <sup>a</sup> ( $\pm$ <i>SD</i> )	0–55	14.72 (10.77)	15.39 (11.44)	13.99 (9.94)	**	13.74 (10.42)	16.19 (11.11)	**
Ever used cigarettes (%)		67.1	58.5	76.6	***	65.3	69.9	***
Obesity (%)		41.8	53.5	28.9	***	47.3	33.5	***
Married (%)		41.8	34.5	49.7	***	42.9	40.1	
Hypertension (%)		52.1	57.8	45.8	***	55.6	46.7	*
Diabetes mellitus (%)		16.9	18.9	14.7		16.9	16.9	
History of cardiovascular diseases (% having any)		15.7	16.5	14.7		17.2	13.5	
Total cholesterol ( $\pm$ <i>SD</i> )	68–651	185.74 (44.16)	189.46 (41.26)	181.66 (46.84)		187.85 (40.11)	182.58 (49.50)	
Systolic blood pressure ( $\pm$ <i>SD</i> )	80–176	121.58 (16.82)	122.46 (17.82)	120.62 (15.62)		122.92 (16.98)	119.58 (16.41)	
Heart rate ( $\pm$ <i>SD</i> )	42–112	72.26 (10.26)	73.06 (9.50)	71.38 (10.98)	*	72.30 (10.28)	72.20 (10.24)	
Lipid-lowering medication use (%)		10.9	13.2	8.4	*	13.2	7.5	*
Multidimensional discrimination	1–15.97	5.09 (3.25)	4.58 (3.17)	5.65 (3.25)	***	5.37 (3.42)	4.67 (2.95)	**
Affiliated with religion? (%)		60.0	66.4	52.9	***			
Christian/Catholic		55.6	63.3	47.1				
Other faith <sup>b,c</sup>		3.5	1.7	5.5				
PWV (m/s), ( $\pm$ <i>SD</i> )	2.69–20.89	8.15 (2.06)	8.17 (1.96)	8.12 (2.16)		8.31 (2.12)	7.90 (1.93)	

*Note.* Significance mean differences across sex and religious affiliation status were examined with independent samples *t* tests and chi-square tests of independence. HANDLS study = Healthy Aging in Neighborhoods of Diversity Across the Life Span study,  $n = 797$ . Sig. = significance; PWV = pulse wave velocity.

<sup>a</sup> Center for Epidemiological Studies-Depression scale (Radloff, 1977). <sup>b</sup> Jewish, Muslim, Wiccan, and so forth. <sup>c</sup> The remaining 0.9% of participants reported denominations that were illegible but were still included in the present analyses.

\*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .

**Table 2**  
*Multivariable Regression Models Estimating Three-Way Interactive Relations of Multidimensional Interpersonal Discrimination<sup>2</sup> × Religious Affiliation Status × Sex With PWV*

Model predictor	Unstandardized B (SE)	p
Discrimination <sup>2</sup> × Religious Affiliation Status × Sex	0.004 (0.001)**	.004
Discrimination <sup>2</sup> × Sex	-0.001 (0.001)	.168
Discrimination <sup>2</sup> × Religious Affiliation Status	-0.006 (0.002)**	.007
Discrimination <sup>2</sup>	0.003 (0.002)	.143
Discrimination × Religious Affiliation Status × Sex	-0.057 (0.017)***	<.001
Discrimination × Religious Affiliation Status	0.084 (0.026)***	.001
Discrimination × Sex	0.022 (0.013)	.101
Religious Affiliation Status × Sex	0.18 (0.044)***	<.001
Discrimination	-0.037 (0.022)	.088
Religious affiliation status <sup>a</sup>	-0.245 (0.066)***	<.001
Sex <sup>b</sup>	-0.067 (0.034)	.050
Age	0.004 (0.000)***	<.001
Poverty status <sup>c</sup>	-0.012 (0.007)	.070

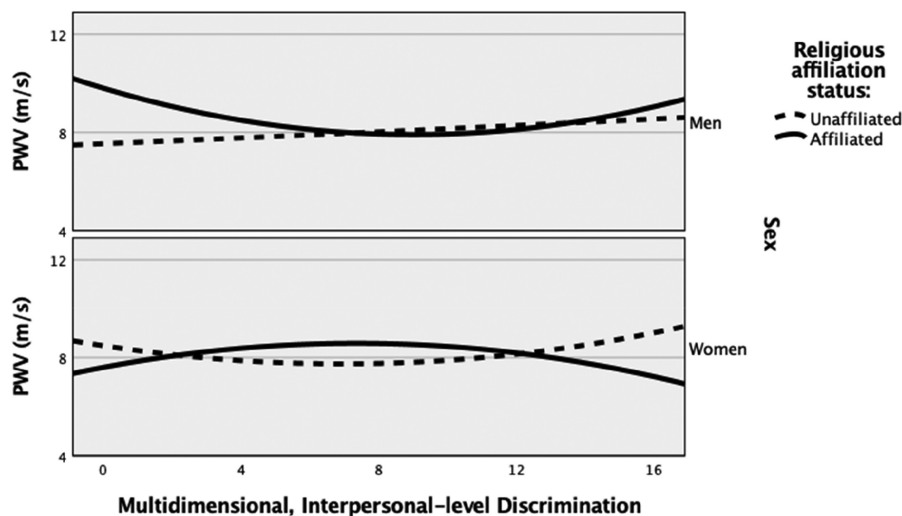
Note. PWV = pulse wave velocity (logarithmically transformed).  
<sup>a</sup> Unaffiliated adults, reference group. <sup>b</sup> Women, reference group. <sup>c</sup> Above 125% federal poverty level per household income, reference group.  
 \*\*  $p < .01$ . \*\*\*  $p < .001$ .

Overall, our study’s primary findings were consistent with the growing body of work demonstrating the potentially harmful effects of interpersonal discrimination on arterial stiffening. [Camelo et al. \(2022\)](#) found that greater experienced racial discrimination was linked with higher PWV values among self-identified Black and Brown Brazilian adults compared to their White counterparts. Additionally, a prospective study of mixed-ethnic young adults in London, United Kingdom, found that more experienced racism independently predicted arterial stiffening among people of color (specifically Black Caribbean and African adults and Indian women compared to White men; [Cruickshank et al., 2016](#)). Experiencing

discrimination can engender copious psychological and physiological responses, such as feelings of hopelessness, vascular reactivity, and cardiovascular pathophysiology, which can give way to accelerated biological aging and stiffer arteries ([Ong et al., 2017](#)).

Our findings suggest that the risk for accelerated arterial stiffness may be driven by the interplay between psychosocial stressors and underlying biological and aging processes that exacerbate the risk of developing CVDs ([Sara et al., 2022](#)). Although clinically high cutoff values for PWV differ by age and health profiles across sub-populations, a systematic review and meta-analysis reported that a 1 SD increase in aortic PWV was associated with 40% increased risk

**Figure 1**  
*Panel Figures Demonstrating Significant Quadratic Interactive Relations of Multidimensional, Interpersonal-Level Discrimination<sup>2</sup> × Religious Affiliation Status × Sex With PWV (m/s)*



Note. PWV = pulse wave velocity.

This document is copyrighted by the American Psychological Association or one of its allied publishers. This article is intended solely for the personal use of the individual user and is not to be disseminated broadly.

of future CVD events and all-cause and CVD-related mortality (Vlachopoulos et al., 2010). Higher values of PWV may be indicative of lost elastic integrity in arterial walls and increased vascular age, a reliable clinical assessment and measurement of arterial function, especially when compared to an individual's chronological age (Marshall et al., 2024). Our findings show that discrimination remains an implicated chronic stressor in racial health disparities that contributes to earlier onset and progression of atherosclerotic subclinical and clinical CVD risk. Importantly, these effects are not limited to AA adults; they appear to be generalizable to people of color, regardless of nationality or origin.

That notwithstanding, our overall findings were incongruent with our initial hypothesis. We originally suspected these relations would be most evident among AA women, but this was disproven. Although AA women carry an unequal burden of CVD risk factors and comorbidities compared to AA men and White adults (Howard et al., 2017), they are also less likely to report perceived discrimination compared to AA men, despite still facing “double jeopardy” by way of their race and sex. Our findings were inconsistent with the prior cross-sectional report that found more everyday discrimination was linked with higher PWV values in Black women and not Black men or White adults (Bromfield et al., 2020). Notably, they did not test non-linear relations or additional moderating influences of other social identities. Furthermore, their sample comprised individuals previously diagnosed with myocardial infarction. It is possible that for AA women with preexisting clinical CVD, the “weathering” phenomenon—wherein cumulative social disadvantage exacerbates biological aging, disease severity, and physiological dysregulation (Geronimus, 1992)—might explain the inconsistencies across findings.

However, the additional consideration of religious affiliation status to the research on experienced discrimination and CVD risk is an important contribution. Although having a religious affiliation can offer positive mental health, strong beliefs of self-worth and humanity, access to social support and community, and convictions across values or worldviews; it can also be an identity subjected to mistreatment. Our findings showed that these relations were only prominent for religious AA men. Both the lack and presence of cumulative, experienced discrimination, across multiple dimensions and identities, appeared critically injurious to their vascular health. We persist that this work lends to two critical applications: additional epidemiologic research on the roles that psychosocial factors play in intraracial heterogeneity; and that targeted interventions and health promotion programs for religious AA men may be a necessary strategy for addressing early CVD risk. The first address continues to be an important aspect of unveiling contributors to health disparities; while the second seeks to help those with already compromised cardiovascular health. Although religious AA adults often turn to prayer and other religious-based coping strategies when faced with discrimination (Hayward & Krause, 2015), religious Black men with underlying CVD also engage their religious practices as a form of coping, with respect to their health (Skipper, 2022). Our findings suggest that nuances within racial groups, across health disparities and risks, continue to emerge, particularly when intersectional identities are considered.

Indeed, there is a dearth in knowledge linking psychosocial determinants of health and CVD risk for AA men. AA men face earlier onset and more accelerated severe CVDs when compared to AA women and White adults, even though AA women tend to carry a higher prevalence of comorbid risk factors like hypertension and obesity (Howard et al., 2017; Pool et al., 2017). And when compared

to their female and other racial counterparts, AA men also report experiencing more discrimination due to their race or other identities (size, physical appearance) and experience discrimination in regularly encountered places, like at school, work, or health care-related environments. These interactions though prove damaging for their cardiovascular health (Bey et al., 2020). However, given the novelty of this study and our disproven hypothesis, we postulate several surmised explanations for the modifying role of religious affiliation. First, the salience of AA men's racial identity, and awareness of their social susceptibilities to racial discrimination, might be intensified because of religion or in religious spaces. The Black Church as a historical, social institution is a cornerstone in the AA community. It has long supported the fight for racial equality. But Taylor et al. (2004) stated that “for Black Americans, group and personal identity is developed within an environment that is characterized by the presence of racism and discrimination, prejudice, and pejorative images of their racial group” (p. 49). In a recent nationally representative survey report on faith in the lives of AA adults, poll findings showed that many Black Protestant churchgoers heard sermons about racism, race relations, and racial inequalities within the year surrounding the death and internationally publicized murder of George Floyd (Mohamed et al., 2021). These same respondents, however, were less likely to hear homilies about other forms of societal ills like sexism, suggesting that racial identity and racial awareness are often centered in Black liturgical settings, above and beyond other social identities and issues.

Even outside of Christianity (e.g., Islam, Black Jewish communities), Black-affirming religions have been reclaiming White-dominated theological tenets and have challenged sacred text interpretations to inspire radical, progressive, racial empowerment through years of enduring socially imposed suffering (Auston, 2017; Byng, 1998). But within this collective movement is an underlying strategy and response to a heightened awareness of recurring, race-based discrimination and violence. This can manifest as a form of “racism-related vigilance” (Williams & Mohammed, 2009). Racism-related vigilance engenders an unhealthy alertness to racism that affects underlying cardiometabolic and vascular functioning (Hicken et al., 2013). Excessive worry and higher levels of anxiety can exacerbate AA men's underlying accelerated aging processes, poorer sleep hygiene, hypertensive risk, and worse health outcomes (Chae et al., 2016; Jonas, 1997). Ferguson et al. (2023) found that in a mixed-ethnic sample of predominantly Christian and Muslim Black adults, participants' appraised experiences of prior police harassment as both racially motivated and religion-based discrimination, with such sentiments being strongest among Muslims and Black adults who were either Christian or Muslim. Because of their salient awareness of race-related mistreatment, the authors conjectured that Black people might also be aware of how their religious identities can be subjected to persecution, too.

Additionally, by considering multidimensional discrimination, we attempted to capture the effects of cumulatively perceived, multiple discriminatory experiences that would be linked with stiffer arteries. Importantly, our study responds to myriad calls for researchers to investigate the experienced discrimination as multidimensional and consider Intersectionality-driven statistical methods (Harnois et al., 2022). Discrimination is a multifaceted phenomenon that contributes to racial health inequities, especially for individuals who identify with more than one historically marginalized community. Additional work is needed to understand how intraracial variations and heterogeneity may be driving disparities across vascular

aging and CVD risk. Solely examining racially appraised mistreatment can fundamentally overlook other contributions of discrimination to deleterious health consequences, even within racial groups. In the same report on faith in the lives of AA adults, about 16% claimed they experienced discrimination in religious settings, with some Black Protestants and Catholics stating these instances occurred in their own congregations, and that these happened more in predominantly White or mixed-race churches as opposed to historically Black churches (Mohamed et al., 2021). Also, though profoundly understudied, AA religious minorities, including Muslim and Jewish individuals, are uniquely targeted, disrespected, and physically harassed because of their faiths. Islamophobic, antisemitic, and xenophobic hate crimes continue to plague the United States; the stigma against religious minorities has dire health implications (Samari, 2016; Scheitle & Ecklund, 2020). Additional research is needed to examine how the collective intersection of identities for religious AA men affects their perceptions of discrimination and its related risks for poorer cardiovascular health and CVDs.

However, our multidimensional construct did not assess aspects of vicarious discrimination or systemic oppression. This might be particularly relevant given that our sample comprised Baltimoreans, a city where the sociopolitical climate and lived environments have been heavily plagued by overt and invisibilized forms of historical, structural, and institutionalized racism (e.g., housing segregation, redlining, overpolicing and state-sanctioned violence [e.g., Freddie Gray], educational disparities, medical exploitation [e.g., Henrietta Lacks]). These structural barriers and historical episodes further aggravate health inequities for AA families. For these reasons, interpersonal discrimination may not fully capture the entirety of experienced social injustices.

To this end, our nonlinear findings were intriguing. Comparable to those who reported the highest levels of perceived discrimination, religious AA men who reported fewer or no discriminatory experiences also had higher PWV values. Other research has found curvilinear relationships between perceived discrimination and health outcomes or has noted unexpected inverse relations (Chae et al., 2010), whereby no prior experiences of discrimination were linked with poorer health. In HANDLS, Beatty Moody et al. (2019) found nonlinear relations of perceived discrimination with age and white matter lesion volume, a subclinical cerebrovascular risk factor predictive of future stroke incidence, among AA adults. They noted that compared to lower and higher levels of experienced discrimination, those who reported some discrimination showed less white matter lesion volume among older AA adults; the effects were opposite in younger adults. Additionally, among AA men from the Jackson Heart Study, Sims et al. (2020) reported cross-sectional, inverse relations between lifetime and everyday discrimination and levels of high-sensitivity C-reactive protein. It is posited that while some individuals may report little or no experiences with discrimination, they still have poorer health because they have suppressed emotional memories in an effort to guard themselves against the guilt, shame, or anger associated with these occurrences. However, the adverse stress physiological responses still manifest (C. J. P. Harrell et al., 2011). Jacob et al. (2023) noted that compared to women, Black men were less likely to discuss discriminatory experiences with their social support network and community, which in turn can lead to poorer emotional regulation. These mechanisms might be further exacerbated in religious AA men who acquiesce to religious fatalistic views (i.e., what happened to me was meant to be or divinely orchestrated).

Thus, our findings should be considered alongside some potentially important limitations. First, our measure of religious affiliation status was a single item with no additional information on salience of religion and its impact on identity, or frequency of engagement in religious activities. Also, due to the nature of how information was collected on denominational affiliation, we could not pursue exploratory analyses to ascertain if these linkages varied within religion (i.e., Baptists, Methodists), despite previous research demonstrating that these differences are dynamic (Robbins et al., 2021). Moreover, given the smaller sample size of non-Christian individuals, we were unable to look at how these relations differ for religious minority groups. Such data may have helped us understand even further how discrimination targets those whose religious identities underwrite their daily activities and coping behaviors. We acknowledge that this was a missed opportunity. Additionally, our data were cross-sectional; we were unable to infer any temporal associations between experienced discrimination and arterial stiffness. Future examinations should assess these associations in longitudinal studies. Lastly, because measurements of interpersonal discrimination do not always account for other structural inequities, we were not able to determine what other psychological and social stressors of structural or vicarious injustices might be affecting vascular aging and subclinical CVD risk. The present study could not ascertain if participants were previously or currently affected by other forms of social disadvantage or disenfranchisement. Further research is needed to examine structural determinants' effects on CVD precursors.

## Conclusion

The present study provided evidence that lower and higher levels of experienced, multidimensional, interpersonal discrimination were linked with increased subclinical CVD risk among religiously affiliated AA men. PWV is a reliable physiological measure of arterial health. Our findings further substantiate that psychosocial factors contribute to an underlying, incremental accumulation of stress that can heighten the risk of poorer health and future CVD with nuances emerging in subpopulations. Population health research seeking to inform translational work should consider faith-based communities and houses of worship as sites for strategic outreach to maximally impact and connect with AA families. Given that the awareness of racism and forms of maltreatment may be affecting these communities intimately, these sacred spaces are opportunities for aimed interventions. There are also clinical implications, too. Screening for health-related social risk factors can help identify and prevent further exacerbation of underlying disease susceptibilities. Health care practitioners should consider that various exposures to discrimination, and diverse social identities, might present with more adverse health profiles leading to subclinical CVD outcomes and clinical CVD events.

## Resumen

**Objetivo:** Este estudio examinó las relaciones interactivas de la discriminación interpersonal experimentada, el sexo y la afiliación religiosa con la velocidad de la onda del pulso (PWV, por sus siglas en inglés), una medida no invasiva de la rigidez arterial e indicador del pronóstico de enfermedad cardiovascular subclínica (CVD, por sus siglas en inglés) para la CVD clínica. **Métodos:** Utilizamos análisis de regresión lineal multivariable con datos transversales de 797 adultos

Afroamericanos (AA) de mediana edad en el estudio Envejecimiento Saludable en Vecindarios de Diversidad a lo Largo de la Vida (HANDLS, por sus siglas en inglés) en Baltimore, Maryland, para examinar las relaciones interactivas de ambos lineales. y discriminación cuadrática, estado de afiliación religiosa y sexo con PWV en modelos ajustados por edad y estado de pobreza. **Resultados:** Los hallazgos revelaron una interacción triple significativa de discriminación<sup>2</sup> \* estado de afiliación religiosa \* sexo con PWV ( $B = 0.004$ ,  $SE = 0.001$ ,  $p = .004$ ). Los análisis de efectos simples mostraron una relación en forma de  $U$  sólo para hombres con afiliación religiosa ( $B = 0.001$ ,  $SE = 0.001$ ,  $p = .008$ ). Tanto los niveles más bajos como los más altos de discriminación estaban relacionados con una mayor PWV. No surgieron relaciones de este tipo entre hombres o mujeres no afiliados. Los hallazgos se mantuvieron sólidos después de los análisis de sensibilidad ajustados por síntomas depresivos, consumo de cigarrillos, obesidad, estado civil, hipertensión, diabetes tipo 2, historial médico de CVD, colesterol, uso de medicamentos para reducir los lípidos, presión arterial sistólica y frecuencia cardíaca. **Conclusión:** Los hombres de AA afiliados a una religión que informaron que experimentaron la discriminación más baja y más alta mostraron un mayor riesgo de CVD subclínica. Tener una identidad religiosa podría desempeñar un papel en la supresión de los recuerdos no deseados de discriminación de los hombres o aumentar la susceptibilidad de los hombres y la prominencia del maltrato, lo que podría manifestarse en resultados adversos para la salud cardiovascular.

## References

- Allen, A. M., Wang, Y., Chae, D. H., Price, M. M., Powell, W., Steed, T. C., Rose Black, A., Dhabhar, F. S., Marquez-Magaña, L., & Woods-Giscombe, C. L. (2019). Racial discrimination, the superwoman schema, and allostatic load: Exploring an integrative stress-coping model among African American women. *Annals of the New York Academy of Sciences*, 1457(1), 104–127. <https://doi.org/10.1111/nyas.14188>
- Auston, D. (2017). Prayer, protest, and police brutality: Black Muslim spiritual resistance in the Ferguson era. *Transforming Anthropology*, 25(1), 11–22. <https://doi.org/10.1111/traa.12095>
- 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. <https://doi.org/10.1037/hea0000638>
- Beatty Moody, D. L., Waldstein, S. R., Leibel, D. K., Hoggard, L. S., Gee, G. C., Ashe, J. J., Brondolo, E., Al-Najjar, E., Evans, M. K., & Zonderman, A. B. (2021). Race and other sociodemographic categories are differentially linked to multiple dimensions of interpersonal-level discrimination: Implications for intersectional, health research. *PLOS ONE*, 16(5), Article e0251174. <https://doi.org/10.1371/journal.pone.0251174>
- Bell, C. N., Bowie, J. V., & Thorpe, R. J. (2012). The interrelationship between hypertension and blood pressure, attendance at religious services, and race/ethnicity. *Journal of Religion and Health*, 51(2), 310–322. <https://doi.org/10.1007/s10943-010-9346-7>
- Bentley-Edwards, K. L., Robbins, P. A., Blackman Carr, L. T., Smith, I. Z., Conde, E., & Darity, W. A. (2021). Denominational differences in obesity among Black Christian adults: Why gender and life stage matter. *Journal for the Scientific Study of Religion*, 60(3), 498–515. <https://doi.org/10.1111/jssr.12722>
- Bey, G. S., Person, S. D., & Kiefe, C. (2020). Gendered race and setting matter: Sources of complexity in the relationships between reported interpersonal discrimination and cardiovascular health in the CARDIA study. *Journal of Racial and Ethnic Health Disparities*, 7(4), 687–697. <https://doi.org/10.1007/s40615-020-00699-6>
- Bierman, A. (2006). Does religion buffer the effects of discrimination on mental health? Differing effects by race. *Journal for the Scientific Study of Religion*, 45(4), 551–565. <https://doi.org/10.1111/j.1468-5906.2006.00327.x>
- Brewer, L. C., Bowie, J., Slusser, J. P., Scott, C. G., Cooper, L. A., Hayes, S. N., Patten, C. A., & Sims, M. (2022). Religiosity/spirituality and cardiovascular health: The American Heart Association life's simple 7 in African Americans of the Jackson Heart Study. *Journal of the American Heart Association*, 11(17), Article e024974. <https://doi.org/10.1161/JAHA.121.024974>
- Bromfield, S. G., Sullivan, S., Saelee, R., Elon, L., Lima, B., Young, A., Uphoff, I., Li, L., Quyyumi, A., Bremner, J. D., Vaccarino, V., & Lewis, T. T. (2020). Race and gender differences in the association between experiences of everyday discrimination and arterial stiffness among patients with coronary heart disease. *Annals of Behavioral Medicine*, 54(10), 761–770. <https://doi.org/10.1093/abm/kaa015>
- Bruce, M. A., Beech, B. M., Kermah, D., Bailey, S., Phillips, N., Jones, H. P., Bowie, J. V., Heitman, E., Norris, K. C., Whitfield, K. E., & Thorpe, R. J. (2022). Religious service attendance and mortality among older Black men. *PLOS ONE*, 17(9), Article e0273806. <https://doi.org/10.1371/journal.pone.0273806>
- Buie, J. N. J., Stanley, A., Nietert, P. J., Logan, A., Adams, R. J., & Magwood, G. S. (2019). Racial disparities in arterial stiffness between healthy whites and African Americans in the United States: A meta-analysis. *Journal of the National Medical Association*, 111(1), 7–17. <https://doi.org/10.1016/j.jnma.2018.06.001>
- Byng, M. D. (1998). Mediating discrimination: Resisting oppression among African-American Muslim women. *Social Problems*, 45(4), 473–487. <https://doi.org/10.2307/3097208>
- Camelo, L. V., Machado, A. V., Chor, D., Griep, R. H., Mill, J. G., Brant, L. C. C., & Barreto, S. M. (2022). Racial discrimination is associated with greater arterial stiffness and carotid intima-media thickness: The ELSA-Brasil study. *Annals of Epidemiology*, 72, 40–47. <https://doi.org/10.1016/j.annepidem.2022.03.009>
- Cardel, M. I., Chi, X., Min, Y.-I., Sims, M., Musani, S. K., Dulin, A., Gravlee, C. C., Smith, S. M., DeBoer, M. D., & Gurka, M. J. (2021). Experiences of discrimination are associated with worse metabolic syndrome severity among African Americans in the Jackson Heart Study. *Annals of Behavioral Medicine*, 55(3), 266–279. <https://doi.org/10.1093/abm/kaa050>
- Chae, D. H., Epel, E. S., Nuru-Jeter, A. M., Lincoln, K. D., Taylor, R. J., Lin, J., Blackburn, E. H., & Thomas, S. B. (2016). Discrimination, mental health, and leukocyte telomere length among African American men. *Psychoneuroendocrinology*, 63, 10–16. <https://doi.org/10.1016/j.psyneuen.2015.09.001>
- Chae, D. H., Lincoln, K. D., Adler, N. E., & Syme, S. L. (2010). Do experiences of racial discrimination predict cardiovascular disease among African American men? The moderating role of internalized negative racial group attitudes. *Social Science & Medicine*, 71(6), 1182–1188. <https://doi.org/10.1016/j.socscimed.2010.05.045>
- Chen, Y., Shen, F., Liu, J., & Yang, G.-Y. (2017). Arterial stiffness and stroke: De-stiffening strategy, a therapeutic target for stroke. *Stroke and Vascular Neurology*, 2(2), 65–72. <https://doi.org/10.1136/svn-2016-000045>
- Crenshaw, K. (1989). Demarginalizing the intersection of race and sex: A Black feminist critique of antidiscrimination doctrine, feminist theory, and antiracist politics. *The University of Chicago Legal Forum*, 1989, Article 8. <https://chicagounbound.uchicago.edu/uclf/vol1989/iss1/8>
- Cruikshank, J. K., Silva, M. J., Molaodi, O. R., Enayat, Z. E., Cassidy, A., Karamanos, A., Read, U. M., Faconti, L., Dall, P., Stansfield, B., & Harding, S. (2016). Ethnic differences in and childhood influences on early adult pulse wave velocity. *Hypertension*, 67(6), 1133–1141. <https://doi.org/10.1161/HYPERTENSIONAHA.115.07079>



- Dunlay, S. M., Lippmann, S. J., Greiner, M. A., O'Brien, E. C., Chamberlain, A. M., Mentz, R. J., & Sims, M. (2017). Perceived discrimination and cardiovascular outcomes in older African Americans. *Mayo Clinic Proceedings*, 92(5), 699–709. <https://doi.org/10.1016/j.mayocp.2017.01.024>
- Evans, M. K., Lepkowski, J. M., Powe, N. R., LaVeist, T., Kuczmarski, M. F., & Zonderman, A. B. (2010). Healthy aging in neighborhoods of diversity across the life span (HANDLS): Overcoming barriers to implementing a longitudinal, epidemiologic, urban study of health, race, and socioeconomic status. *Ethnicity and Disease*, 20(3), 267–275.
- Everage, N. J., Gjelsvik, A., McGarvey, S. T., Linkletter, C. D., & Loucks, E. B. (2012). Inverse associations between perceived racism and coronary artery calcification. *Annals of Epidemiology*, 22(3), 183–190. <https://doi.org/10.1016/j.annepidem.2012.01.005>
- Ferguson, J., Scheitle, C. P., & Ecklund, E. H. (2023). Religion, race, and perceptions of police harassment. *Social Problems*, 70(3), 735–754. <https://doi.org/10.1093/socpro/spac040>
- Forde, A. T., Sims, M., Muntner, P., Lewis, T., Onwuka, A., Moore, K., & Diez Roux, A. V. (2020). Discrimination and hypertension risk among African Americans in the Jackson Heart Study. *Hypertension*, 76(3), 715–723. <https://doi.org/10.1161/HYPERTENSIONAHA.119.14492>
- Geronimus, A. T. (1992). The weathering hypothesis and the health of African-American women and infants: Evidence and speculations. *Ethnicity & Disease*, 2(3), 207–221.
- Hamois, C. E., Bastos, J. L., & Shariff-Marco, S. (2022). Intersectionality, contextual specificity, and everyday discrimination: Assessing the difficulty associated with identifying a main reason for discrimination among racial/ethnic minority respondents. *Sociological Methods & Research*, 51(3), 983–1013. <https://doi.org/10.1177/0049124120914929>
- Harrell, C. J. P., Burford, T. I., Cage, B. N., Nelson, T. M., Shearon, S., Thompson, A., & Green, S. (2011). Multiple pathways linking racism to health outcomes. *Du Bois Review: Social Science Research on Race*, 8(1), 143–157. <https://doi.org/10.1017/S1742058X11000178>
- Harrell, S. P. (2000). A multidimensional conceptualization of racism-related stress: Implications for the well-being of people of color. *American Journal of Orthopsychiatry*, 70(1), 42–57. <https://doi.org/10.1037/h0087722>
- Hayward, R. D., & Krause, N. (2015). Religion and strategies for coping with racial discrimination among African Americans and Caribbean blacks. *International Journal of Stress Management*, 22(1), 70–91. <https://doi.org/10.1037/a0038637>
- Hicken, M. T., Lee, H., Ailshire, J., Burgard, S. A., & Williams, D. R. (2013). “Every shut eye, ain’t sleep”: The role of racism-related vigilance in racial/ethnic disparities in sleep difficulty. *Race and Social Problems*, 5(2), 100–112. <https://doi.org/10.1007/s12552-013-9095-9>
- Hope, M. O., Assari, S., Cole-Lewis, Y. C., & Caldwell, C. H. (2017). Religious social support, discrimination, and psychiatric disorders among black adolescents. *Race and Social Problems*, 9(2), 102–114. <https://doi.org/10.1007/s12552-016-9192-7>
- Howard, G., Safford, M. M., Moy, C. S., Howard, V. J., Kleindorfer, D. O., Unverzagt, F. W., Soliman, E. Z., Flaherty, M. L., McClure, L. A., Lackland, D. T., Wadley, V. G., Pulley, L., & Cushman, M. (2017). Racial differences in the incidence of cardiovascular risk factors in older black and white adults. *Journal of the American Geriatrics Society*, 65(1), 83–90. <https://doi.org/10.1111/jgs.14472>
- Jacob, G., Faber, S. C., Faber, N., Bartlett, A., Ouimet, A. J., & Williams, M. T. (2023). A systematic review of black people coping with racism: Approaches, analysis, and empowerment. *Perspectives on Psychological Science*, 18(2), 392–415. <https://doi.org/10.1177/17456916221100509>
- Jonas, B. S. (1997). Are symptoms of anxiety and depression risk factors for hypertension? Longitudinal evidence from the national health and nutrition examination survey I epidemiologic follow-up study. *Archives of Family Medicine*, 6(1), 43–49. <https://doi.org/10.1001/archfam.6.1.43>
- Kim, J., Smith, T. W., & Kang, J. H. (2015). Religious affiliation, religious service attendance, and mortality. *Journal of Religion and Health*, 54(6), 2052–2072. <https://doi.org/10.1007/s10943-014-9902-7>
- Kouis, P., Kousios, A., Kanari, A., Kleopa, D., Papatheodorou, S. I., & Panayiotou, A. G. (2020). Association of non-invasive measures of sub-clinical atherosclerosis and arterial stiffness with mortality and major cardiovascular events in chronic kidney disease: Systematic review and meta-analysis of cohort studies. *Clinical Kidney Journal*, 13(5), 842–854. <https://doi.org/10.1093/ckj/sfz095>
- Krieger, N. (1990). Racial and gender discrimination: Risk factors for high blood pressure? *Social Science & Medicine*, 30(12), 1273–1281. [https://doi.org/10.1016/0277-9536\(90\)90307-E](https://doi.org/10.1016/0277-9536(90)90307-E)
- 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>
- Larson, C., Ph. D., Niebler, S., & Hargreaves, M. (2016). Religious affiliation and health behaviors and outcomes: Data from the Nashville REACH 2010 project. *American Academy of Health Behavior*, 32(6), 714–724. <https://doi.org/10.5555/ajhb.2008.32.6.714.Religious>
- LaVeist, T. A., Rolley, N. C., & Diala, C. (2003). Prevalence and patterns of discrimination among U.S. health care consumers. *International Journal of Health Services*, 33(2), 331–344. <https://doi.org/10.2190/TCAC-P90F-ATM5-B5U0>
- Marshall, A. G., Neikirk, K., Afolabi, J., Mwesigwa, N., Shao, B., Kirabo, A., Reddy, A. K., & Hinton, A. (2024). Update on the use of pulse wave velocity to measure age-related vascular changes. *Current Hypertension Reports*, 26(3), 131–140. <https://doi.org/10.1007/s11906-023-01285-x>
- McKinnon, I. I., Shah, A. J., Lima, B., Moazzami, K., Young, A., Sullivan, S., Almuwaqqat, Z., Garcia, M., Elon, L., Bremner, J. D., Raggi, P., Quyyumi, A. A., Vaccarino, V., & Lewis, T. T. (2021). Everyday discrimination and mental stress-induced myocardial ischemia. *Psychosomatic Medicine*, 83(5), 432–439. <https://doi.org/10.1097/PSY.0000000000000941>
- Mohamed, B., Cox, K., Diamant, J., & Gecewicz, C. (2021, February 16). Faith among Black Americans. *Pew Research Center's Religion & Public Life Project*. <https://www.pewresearch.org/religion/2021/02/16/faith-among-black-americans/>
- National Public Radio, Robert Wood Johnson Foundation, & Harvard T.H. Chan School of Public Health. (2017). *Discrimination in America: experiences and views of African Americans*. <https://www.npr.org/assets/img/2017/10/23/discriminationpoll-african-americans.pdf>
- Newman, A. B. (2003). “Successful aging” effect of subclinical cardiovascular disease. *Archives of Internal Medicine*, 163(19), Article 2315. <https://doi.org/10.1001/archinte.163.19.2315>
- Ong, A. D., Williams, D. R., Nwizu, U., & Gruenewald, T. L. (2017). Everyday unfair treatment and multisystem biological dysregulation in African American adults. *Cultural Diversity & Ethnic Minority Psychology*, 23(1), 27–35. <https://doi.org/10.1037/cdp0000087>
- Pewowaruk, R. J., Korcarz, C., Tedla, Y., Burke, G., Greenland, P., Wu, C., & Gepner, A. D. (2022). Carotid artery stiffness mechanisms associated with cardiovascular disease events and incident hypertension: The multi-ethnic study of atherosclerosis (MESA). *Hypertension*, 79(3), 659–666. <https://doi.org/10.1161/HYPERTENSIONAHA.121.18772>
- Pool, L. R., Ning, H., Lloyd-Jones, D. M., & Allen, N. B. (2017). Trends in racial/ethnic disparities in cardiovascular health among US adults from 1999–2012. *Journal of the American Heart Association*, 6(9), Article e006027. <https://doi.org/10.1161/JAHA.117.006027>
- 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>
- Robbins, P. A., Scott, M. J., Conde, E., Daniel, Y., Darity, W. A., & Bentley-Edwards, K. L. (2021). Denominational and gender differences in hypertension among African American Christian young adults. *Journal of Racial and Ethnic Health Disparities*, 8(5), 1332–1343. <https://doi.org/10.1007/s40615-020-00895-4>

- Roberts, C. B., Vines, A. I., Kaufman, J. S., & James, S. A. (2007). Cross-sectional association between perceived discrimination and hypertension in African-American men and women: The Pitt County Study. *American Journal of Epidemiology*, *167*(5), 624–632. <https://doi.org/10.1093/aje/kwm334>
- 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*(2), 116–132. <https://doi.org/10.1353/hpu.2006.0092>
- Samari, G. (2016). Islamophobia and public health in the United States. *American Journal of Public Health*, *106*(11), 1920–1925. <https://doi.org/10.2105/AJPH.2016.303374>
- Sara, J. D. S., Toya, T., Ahmad, A., Clark, M. M., Gilliam, W. P., Lerman, L. O., & Lerman, A. (2022). Mental stress and its effects on vascular health. *Mayo Clinic Proceedings*, *97*(5), 951–990. <https://doi.org/10.1016/j.mayocp.2022.02.004>
- Scheitle, C. P., & Ecklund, E. H. (2020). Individuals' experiences with religious hostility, discrimination, and violence: Findings from a new national survey. *Socius: Sociological Research for a Dynamic World*, *6*, Article 2378023120967815. <https://doi.org/10.1177/2378023120967815>
- Shah, S. (2019). Does religion buffer the effects of discrimination on distress for religious minorities? The case of Arab Americans. *Society and Mental Health*, *9*(2), 171–191. <https://doi.org/10.1177/2156869318799145>
- Shelton, J. E., & Emerson, M. O. (2012). *Blacks and Whites in Christian America: How racial discrimination shapes religious convictions*. New York University Press.
- Sims, K. D., Sims, M., Glover, L. M., Smit, E., & Odden, M. C. (2020). Perceived discrimination and trajectories of C-reactive protein: The Jackson Heart Study. *American Journal of Preventive Medicine*, *58*(2), 199–207. <https://doi.org/10.1016/j.amepre.2019.09.019>
- Singh, S. S., Pilkerton, C. S., Shrader, C. D., & Frisbee, S. J. (2018). Subclinical atherosclerosis, cardiovascular health, and disease risk: Is there a case for the Cardiovascular Health Index in the primary prevention population? *BMC Public Health*, *18*(1), Article 429. <https://doi.org/10.1186/s12889-018-5263-6>
- Skipper, A. D. (2022). Examining the frequency of religious practices among hypertensive and non-hypertensive black men. *Journal of Healthcare, Science and the Humanities*, *7*(1), 41–58. <https://pubmed.ncbi.nlm.nih.gov/37465462/>
- Taylor, R. J., Chatters, L. M., & Levin, J. S. (2004). *Religion in the lives of African Americans: Social, psychological, and health perspectives*. Sage Publications.
- Vaitkevicius, P. V., Fleg, J. L., Engel, J. H., O'Connor, F. C., Wright, J. G., Lakatta, L. E., Yin, F. C., & Lakatta, E. G. (1993). Effects of age and aerobic capacity on arterial stiffness in healthy adults. *Circulation*, *88*(4), 1456–1462. <https://doi.org/10.1161/01.CIR.88.4.1456>
- Vlachopoulos, C., Aznaouridis, K., & Stefanadis, C. (2010). Prediction of cardiovascular events and all-cause mortality with arterial stiffness. *Journal of the American College of Cardiology*, *55*(13), 1318–1327. <https://doi.org/10.1016/j.jacc.2009.10.061>
- Williams, D. R., Lawrence, J. A., & Davis, B. A. (2019). Racism and health: Evidence and needed research. *Annual Review of Public Health*, *40*(1), 105–125. <https://doi.org/10.1146/annurev-publhealth-040218-043750>
- 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>

Received October 20, 2023  
 Revision received June 6, 2024  
 Accepted July 22, 2024 ■

### E-Mail Notification of Your Latest Issue Online!

Would you like to know when the next issue of your favorite APA journal will be available online? This service is now available to you. Sign up at <https://my.apa.org/portal/alerts/> and you will be notified by e-mail when issues of interest to you become available!

**Supplementary Table 1.** Pearson's Correlations for all variables included in analyses.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1 PWV <sup>a</sup>	1															
2 Discrimination <sup>b</sup>	0.002	1														
3 Religious affiliation status	.096**	.106**	1													
4 Sex	-0.014	.164**	-.138**	1												
5 Age	.399**	0.06	.182**	-0.059	1											
6 Poverty status	-.088*	0.032	-.109**	-0.004	-.085*	1										
7 Depressive symptoms <sup>c</sup>	-0.061	.163**	-.111**	-0.065	-.115**	.117**	1									
8 Cigarette use	0.049	.084*	-0.048	.192**	.084*	.074*	0.026	1								
9 Obesity	.142**	0.006	.136**	-.248**	0.057	-.103**	-0.004	-.100**	1							
10 Marital status	-0.028	-0.015	0.027	.154**	-.071*	-.134**	-.083*	-0.008	-0.032	1						
11 Hypertension	.319**	0.02	.088*	-.120**	.380**	0.014	.073*	-0.019	.248**	-0.048	1					
12 History of CVDs <sup>d</sup>	0.056	.097**	0.05	-0.025	.181**	.117**	0.058	0.037	-0.002	-0.065	.186**	1				
13 Total cholesterol	0.028	-0.042	0.059	-.088*	.083*	-0.025	-0.061	-0.038	.098**	-0.034	.118**	-0.004	1			
14 Antilipidemic use	.187**	.095**	.089*	-.076*	.301**	-0.036	-0.008	-0.003	.128**	-0.035	.255**	.159**	-0.011	1		
15 Systolic blood pressure	.356**	-0.001	.097**	-0.055	.290**	0.015	0.008	0.003	.224**	-0.009	.483**	.092**	.127**	.124**	1	
16 Heart rate	.161**	-0.039	0.005	-.082*	-0.031	0.044	0.014	-0.035	.130**	-0.037	.126**	-0.038	0.069	0.053	0.03	1

**Note.** HANDLS Study = Healthy Aging in Neighborhoods of Diversity across the Life Span Study, n = 797. \*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ . PWV<sup>a</sup> = Pulse Wave Velocity. Discrimination<sup>b</sup> = Multidimensional interpersonal discrimination construct. Depressive symptoms<sup>c</sup> = Center for Epidemiological Studies-Depression scale (CES-D; Radloff, 1977). CVDs<sup>d</sup> = cardiovascular diseases.

**Supplementary Table 2.** Multivariable regression models estimating 3-way interactive relations of multidimensional interpersonal discrimination<sup>2</sup>\*religious affiliation status\*sex with PWV: Sensitivity analyses for depressive symptoms.

Model predictors	Unstandardized <i>B</i> (SE)	<i>p</i> -value
Discrimination <sup>2</sup> × Religious affiliation status × Sex	0.004 (0.001) **	.004
Discrimination <sup>2</sup> × Sex	-0.001 (0.001)	.169
Discrimination <sup>2</sup> × Religious affiliation status	-0.006 (0.002) **	.007
Discrimination <sup>2</sup>	0.003 (0.002)	.143
Discrimination × Religious affiliation status × Sex	-0.057 (0.017) ***	.001
Discrimination × Religious affiliation status	0.084 (0.026) ***	.001
Discrimination × Sex	0.022 (0.013)	.101
Religious affiliation status × Sex	0.179 (0.044) ***	<.001
Discrimination	-0.037 (0.022)	.088
Religious affiliation status <sup>a</sup>	-0.245 (0.066) ***	<.001
Sex <sup>b</sup>	-0.067 (0.034)	.050
Age	0.004 (0.000) ***	<.001
Poverty status <sup>c</sup>	-0.012 (0.007)	.070
Depressive symptoms <sup>d</sup>	0.000 (0.000)	.911

**Note.** HANDLS Study = Healthy Aging in Neighborhoods of Diversity across the Life Span Study,  $n = 797$ . \*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ . PWV = Pulse Wave Velocity (logarithmically transformed). Religious affiliation status<sup>a</sup> = unaffiliated adults, reference group. Sex<sup>b</sup> = women, reference group. Poverty status<sup>c</sup> = above 125% federal poverty level per household income, reference group. Depressive symptoms<sup>d</sup> = Center for Epidemiological Studies-Depression scale (CES-D; Radloff, 1977).

**Supplementary Table 3.** Multivariable regression models estimating 3-way interactive relations of multidimensional interpersonal discrimination<sup>2</sup>\*religious affiliation status\*sex with PWV: Sensitivity analyses for cigarette use.

Model predictors	Unstandardized <i>B</i> (SE)	<i>p</i> -value
Discrimination <sup>2</sup> × Religious affiliation status × Sex	0.004 (0.001) **	.004
Discrimination <sup>2</sup> × Sex	-0.001 (0.001)	.169
Discrimination <sup>2</sup> × Religious affiliation status	-0.006 (0.002) **	.007
Discrimination <sup>2</sup>	0.003 (0.002)	.146
Discrimination × Religious affiliation status × Sex	-0.057 (0.017) ***	.001
Discrimination × Religious affiliation status	0.084 (0.026) **	.002
Discrimination × Sex	0.022 (0.013)	.102
Religious affiliation status × Sex	0.180 (0.044) ***	<.001
Discrimination	-0.037 (0.022)	.090
Religious affiliation status <sup>a</sup>	-0.245 (0.066) ***	<.001
Sex <sup>b</sup>	-0.067 (0.034) *	.049
Age	0.004 (0.000) ***	<.001
Poverty status <sup>c</sup>	-0.012 (0.007)	.066
Cigarette use	0.003 (0.007)	.714

**Note.** HANDLS Study = Healthy Aging in Neighborhoods of Diversity across the Life Span Study, *n* = 797. \* *p* < .05. \*\* *p* < .01. \*\*\* *p* < .001. PWV = Pulse Wave Velocity (logarithmically transformed). Religious affiliation status<sup>a</sup> = unaffiliated adults, reference group. Sex<sup>b</sup> = women, reference group. Poverty status<sup>c</sup> = above 125% federal poverty level per household income, reference group.

**Supplementary Table 4.** Multivariable regression models estimating 3-way interactive relations of multidimensional interpersonal discrimination<sup>2</sup>\*religious affiliation status\*sex with PWV: Sensitivity analyses for obesity.

Model predictors	Unstandardized <i>B</i> (SE)	<i>p</i> -value
Discrimination <sup>2</sup> × Religious affiliation status × Sex	0.004 (0.001) **	.004
Discrimination <sup>2</sup> × Sex	-0.001 (0.001)	.159
Discrimination <sup>2</sup> × Religious affiliation status	-0.006 (0.002) **	.007
Discrimination <sup>2</sup>	0.003 (0.002)	.132
Discrimination × Religious affiliation status × Sex	-0.057 (0.016) ***	<.001
Discrimination × Religious affiliation status	0.084 (0.026) ***	.001
Discrimination × Sex	0.023 (0.013)	.089
Religious affiliation status × Sex	0.182 (0.044) ***	<.001
Discrimination	-0.038 (0.022)	.078
Religious affiliation status <sup>a</sup>	-0.249 (0.066) ***	<.001
Sex <sup>b</sup>	-0.062 (0.034)	.065
Age	0.004 (0.000) ***	<.001
Poverty status <sup>c</sup>	-0.009 (0.007)	.157
Obesity	0.029 (0.007) ***	<.001

**Note.** HANDLS Study = Healthy Aging in Neighborhoods of Diversity across the Life Span Study, *n* = 797. \* *p* < .05. \*\* *p* < .01. \*\*\* *p* < .001. PWV = Pulse Wave Velocity (logarithmically transformed). Religious affiliation status<sup>a</sup> = unaffiliated adults, reference group. Sex<sup>b</sup> = women, reference group. Poverty status<sup>c</sup> = above 125% federal poverty level per household income, reference group.

**Supplementary Table 5.** Multivariable regression models estimating 3-way interactive relations of multidimensional interpersonal discrimination<sup>2</sup>\*religious affiliation status\*sex with PWV: Sensitivity analyses for marital status.

Model predictors	Unstandardized <i>B</i> (SE)	<i>p</i> -value
Discrimination <sup>2</sup> × Religious affiliation status × Sex	0.004 (0.001) **	.004
Discrimination <sup>2</sup> × Sex	-0.001 (0.001)	.167
Discrimination <sup>2</sup> × Religious affiliation status	-0.006 (0.002) **	.007
Discrimination <sup>2</sup>	0.003 (0.002)	.144
Discrimination × Religious affiliation status × Sex	-0.058 (0.017) ***	.001
Discrimination × Religious affiliation status	0.085 (0.026) ***	.001
Discrimination × Sex	0.022 (0.013)	.100
Religious affiliation status × Sex	0.181 (0.044) ***	<.001
Discrimination	-0.037 (0.022)	.089
Religious affiliation status <sup>a</sup>	-0.247 (0.066) ***	<.001
Sex <sup>b</sup>	-0.066 (0.034)	.051
Age	0.004 (0.000) ***	<.001
Poverty status <sup>c</sup>	-0.013 (0.007)	.060
Marital status <sup>d</sup>	-0.004 (0.007)	.515

**Note.** HANDLS Study = Healthy Aging in Neighborhoods of Diversity across the Life Span Study, *n* = 797. \* *p* < .05. \*\* *p* < .01. \*\*\* *p* < .001. PWV = Pulse Wave Velocity (logarithmically transformed). Religious affiliation status<sup>a</sup> = unaffiliated adults, reference group. Sex<sup>b</sup> = women, reference group. Poverty status<sup>c</sup> = above 125% federal poverty level per household income, reference group. Marital status<sup>d</sup> = single or widowed, reference group.

**Supplementary Table 6.** Multivariable regression models estimating 3-way interactive relations of multidimensional interpersonal discrimination<sup>2</sup>\*religious affiliation status\*sex with PWV: Sensitivity analyses for hypertensive status.

Model predictors	Unstandardized <i>B</i> (SE)	<i>p</i> -value
Discrimination <sup>2</sup> × Religious affiliation status × Sex	0.004 (0.001) **	.004
Discrimination <sup>2</sup> × Sex	-0.002 (0.001)	.150
Discrimination <sup>2</sup> × Religious affiliation status	-0.006 (0.002) **	.006
Discrimination <sup>2</sup>	0.003 (0.002)	.125
Discrimination × Religious affiliation status × Sex	-0.056 (0.016) ***	.001
Discrimination × Religious affiliation status	0.083 (0.026) ***	.001
Discrimination × Sex	0.022 (0.013)	.093
Religious affiliation status × Sex	0.170 (0.043) ***	<.001
Discrimination	-0.038 (0.021)	.078
Religious affiliation status <sup>a</sup>	-0.235 (0.065) ***	<.001
Sex <sup>b</sup>	-0.059 (0.033)	.073
Age	0.003 (0.000) ***	<.001
Poverty status <sup>c</sup>	-0.014 (0.007) *	.031
Hypertension <sup>d</sup>	0.044 (0.007) ***	<.001

**Note.** HANDLS Study = Healthy Aging in Neighborhoods of Diversity across the Life Span Study, *n* = 797. \* *p* < .05. \*\* *p* < .01. \*\*\* *p* < .001. PWV = Pulse Wave Velocity (logarithmically transformed). Religious affiliation status<sup>a</sup> = unaffiliated adults, reference group. Sex<sup>b</sup> = women, reference group. Poverty status<sup>c</sup> = above 125% federal poverty level per household income, reference group. Hypertension<sup>d</sup> = normotensive, reference group.



**Supplementary Table 7.** Multivariable regression models estimating 3-way interactive relations of multidimensional interpersonal discrimination<sup>2</sup>\*religious affiliation status\*sex with PWV: Sensitivity analyses for diabetic status.

Model predictors	Unstandardized <i>B</i> (SE)	<i>p</i> -value
Discrimination <sup>2</sup> × Religious affiliation status × Sex	0.004 (0.001) **	.002
Discrimination <sup>2</sup> × Sex	-0.001 (0.001)	.157
Discrimination <sup>2</sup> × Religious affiliation status	-0.006 (0.002) **	.005
Discrimination <sup>2</sup>	0.003 (0.002)	.154
Discrimination × Religious affiliation status × Sex	-0.060 (0.016) ***	<.001
Discrimination × Religious affiliation status	0.088 (0.026) ***	.001
Discrimination × Sex	0.023 (0.013)	.083
Religious affiliation status × Sex	0.193 (0.043) ***	<.001
Discrimination	-0.036 (0.021)	.090
Religious affiliation status <sup>a</sup>	-0.261 (0.065) ***	<.001
Sex <sup>b</sup>	-0.070 (0.033) *	.033
Age	0.004 (0.000) ***	<.001
Poverty status <sup>c</sup>	-0.012 (0.007)	.057
Diabetes <sup>d</sup>	0.057 (0.009) ***	<.001

**Note.** HANDLS Study = Healthy Aging in Neighborhoods of Diversity across the Life Span Study, *n* = 797. \* *p* < .05. \*\* *p* < .01. \*\*\* *p* < .001. PWV = Pulse Wave Velocity (logarithmically transformed). Religious affiliation status<sup>a</sup> = unaffiliated adults, reference group. Sex<sup>b</sup> = women, reference group. Poverty status<sup>c</sup> = above 125% federal poverty level per household income, reference group. Diabetes<sup>d</sup> = nondiabetic, reference group.

**Supplementary Table 8.** Multivariable regression models estimating 3-way interactive relations of multidimensional interpersonal discrimination<sup>2</sup>\*religious affiliation status\*sex with PWV: Sensitivity analyses for self-reported physician diagnoses of prior CVD(s).

Model predictors	Unstandardized <i>B</i> (SE)	<i>p</i> -value
Discrimination <sup>2</sup> × Religious affiliation status × Sex	0.004 (0.001) **	.004
Discrimination <sup>2</sup> × Sex	-0.001 (0.001)	.172
Discrimination <sup>2</sup> × Religious affiliation status	-0.006 (0.002) **	.007
Discrimination <sup>2</sup>	0.003 (0.002)	.143
Discrimination × Religious affiliation status × Sex	-0.057 (0.017) ***	.001
Discrimination × Religious affiliation status	0.085 (0.026) ***	.001
Discrimination × Sex	0.022 (0.013)	.105
Religious affiliation status × Sex	0.180 (0.044) ***	<.001
Discrimination	-0.037 (0.022)	.089
Religious affiliation status <sup>a</sup>	-0.246 (0.066) ***	<.001
Sex <sup>b</sup>	-0.066 (0.034)	.052
Age	0.004 (0.000) ***	<.001
Poverty status <sup>c</sup>	-0.013 (0.007)	.059
Medical history of CVDs <sup>d</sup>	0.004 (0.006)	.463

**Note.** HANDLS Study = Healthy Aging in Neighborhoods of Diversity across the Life Span Study, *n* = 797. \* *p* < .05. \*\* *p* < .01. \*\*\* *p* < .001. PWV = Pulse Wave Velocity (logarithmically transformed). Religious affiliation status<sup>a</sup> = unaffiliated adults, reference group. Sex<sup>b</sup> = women, reference group. Poverty status<sup>c</sup> = above 125% federal poverty level per household income, reference group. Medical history of CVDs<sup>d</sup> = CVDs = cardiovascular diseases; no history of prior CVDs, reference group.

**Supplementary Table 9.** Multivariable regression models estimating 3-way interactive relations of multidimensional interpersonal discrimination<sup>2</sup>\*religious affiliation status\*sex with PWV: Sensitivity analyses for total cholesterol.

Model predictors	Unstandardized <i>B</i> (SE)	<i>p</i> -value
Discrimination <sup>2</sup> × Religious affiliation status × Sex	0.004 (0.001) **	.004
Discrimination <sup>2</sup> × Sex	-0.001 (0.001)	.169
Discrimination <sup>2</sup> × Religious affiliation status	-0.006 (0.002) **	.007
Discrimination <sup>2</sup>	0.003 (0.002)	.143
Discrimination × Religious affiliation status × Sex	-0.057 (0.017) ***	.001
Discrimination × Religious affiliation status	0.085 (0.026) ***	.001
Discrimination × Sex	0.022 (0.013)	.101
Religious affiliation status × Sex	0.180 (0.044) ***	<.001
Discrimination	-0.037 (0.022)	.088
Religious affiliation status <sup>a</sup>	-0.246 (0.066) ***	<.001
Sex <sup>b</sup>	-0.067 (0.034) *	.049
Age	0.004 (0.000) ***	<.001
Poverty status <sup>c</sup>	-0.012 (0.007)	.070
Total Cholesterol	-1.259E-5 (0.000)	.867

**Note.** HANDLS Study = Healthy Aging in Neighborhoods of Diversity across the Life Span Study, *n* = 797. \* *p* < .05. \*\* *p* < .01. \*\*\* *p* < .001. PWV = Pulse Wave Velocity (logarithmically transformed). Religious affiliation status<sup>a</sup> = unaffiliated adults, reference group. Sex<sup>b</sup> = women, reference group. Poverty status<sup>c</sup> = above 125% federal poverty level per household income, reference group.

**Supplementary Table 10.** Multivariable regression models estimating 3-way interactive relations of multidimensional interpersonal discrimination<sup>2</sup>\*religious affiliation status\*sex with PWV: Sensitivity analyses for lipid-lowering medication (antilipidemics) use.

Model predictors	Unstandardized <i>B</i> (SE)	<i>p</i> -value
Discrimination <sup>2</sup> × Religious affiliation status × Sex	0.004 (0.001) **	.003
Discrimination <sup>2</sup> × Sex	-0.002 (0.001)	.150
Discrimination <sup>2</sup> × Religious affiliation status	-0.006 (0.002) **	.004
Discrimination <sup>2</sup>	0.003 (0.002)	.123
Discrimination × Religious affiliation status × Sex	-0.060 (0.017) ***	<.001
Discrimination × Religious affiliation status	0.088 (0.026) ***	.001
Discrimination × Sex	0.023 (0.013)	.091
Religious affiliation status × Sex	0.186 (0.044) ***	<.001
Discrimination	-0.039 (0.022)	.075
Religious affiliation status <sup>a</sup>	-0.255 (0.066) ***	<.001
Sex <sup>b</sup>	-0.067 (0.034) *	.048
Age	0.004 (0.000) ***	<.001
Poverty status <sup>c</sup>	-0.012 (0.007)	.074
Lipid-lowering medication use <sup>d</sup>	0.026 (0.011) *	.021

**Note.** HANDLS Study = Healthy Aging in Neighborhoods of Diversity across the Life Span Study, *n* = 797. \* *p* < .05. \*\* *p* < .01. \*\*\* *p* < .001. PWV = Pulse Wave Velocity (logarithmically transformed). Religious affiliation status<sup>a</sup> = unaffiliated adults, reference group. Sex<sup>b</sup> = women, reference group. Poverty status<sup>c</sup> = above 125% federal poverty level per household income, reference group. Lipid-lowering medication use<sup>d</sup> = not currently using lipid-lowering medication, reference group.

**Supplementary Table 11.** Multivariable regression models estimating 3-way interactive relations of multidimensional interpersonal discrimination<sup>2</sup>\*religious affiliation status\*sex with PWV: Sensitivity analyses for systolic blood pressure.

Model predictors	Unstandardized <i>B</i> (SE)	<i>p</i> -value
Discrimination <sup>2</sup> × Religious affiliation status × Sex	0.003 (0.001) **	.007
Discrimination <sup>2</sup> × Sex	-0.001 (0.001)	.194
Discrimination <sup>2</sup> × Religious affiliation status	-0.005 (0.002) *	.011
Discrimination <sup>2</sup>	0.002 (0.002)	.197
Discrimination × Religious affiliation status × Sex	-0.053 (0.016) ***	.001
Discrimination × Religious affiliation status	0.079 (0.025) **	.002
Discrimination × Sex	0.021 (0.013)	.105
Religious affiliation status × Sex	0.167 (0.042) ***	<.001
Discrimination	-0.034 (0.021)	.110
Religious affiliation status <sup>a</sup>	-0.235 (0.064) ***	<.001
Sex <sup>b</sup>	-0.064 (0.033)	.051
Age	0.004 (0.000) ***	<.001
Poverty status <sup>c</sup>	-0.015 (0.006) *	.023
Systolic blood pressure	0.002 (0.000) ***	<.001

**Note.** HANDLS Study = Healthy Aging in Neighborhoods of Diversity across the Life Span Study, *n* = 797. \* *p* < .05. \*\* *p* < .01. \*\*\* *p* < .001. PWV = Pulse Wave Velocity (logarithmically transformed). Religious affiliation status<sup>a</sup> = unaffiliated adults, reference group. Sex<sup>b</sup> = women, reference group. Poverty status<sup>c</sup> = above 125% federal poverty level per household income, reference group.

**Supplementary Table 12.** Multivariable regression models estimating 3-way interactive relations of multidimensional interpersonal discrimination<sup>2</sup>\*religious affiliation status\*sex with PWV: Sensitivity analyses for heart rate.

Model predictors	Unstandardized <i>B</i> (SE)	<i>p</i> -value
Discrimination <sup>2</sup> × Religious affiliation status × Sex	0.004 (0.001) **	.003
Discrimination <sup>2</sup> × Sex	-0.001 (0.001)	.159
Discrimination <sup>2</sup> × Religious affiliation status	-0.006 (0.002) **	.007
Discrimination <sup>2</sup>	0.003 (0.002)	.142
Discrimination × Religious affiliation status × Sex	-0.056 (0.016) ***	.001
Discrimination × Religious affiliation status	0.081 (0.026) **	.002
Discrimination × Sex	0.020 (0.013)	.125
Religious affiliation status × Sex	0.166 (0.043) ***	<.001
Discrimination	-0.034 (0.022)	.115
Religious affiliation status <sup>a</sup>	-0.224 (0.065) ***	.001
Sex <sup>b</sup>	-0.052 (0.033)	.122
Age	0.004 (0.000) ***	<.001
Poverty status <sup>c</sup>	-0.013 (0.007) *	.042
Heart rate	0.002 (0.000) ***	<.001

**Note.** HANDLS Study = Healthy Aging in Neighborhoods of Diversity across the Life Span Study, *n* = 797. \* *p* < .05. \*\* *p* < .01. \*\*\* *p* < .001. PWV = Pulse Wave Velocity (logarithmically transformed). Religious affiliation status<sup>a</sup> = unaffiliated adults, reference group. Sex<sup>b</sup> = women, reference group. Poverty status<sup>c</sup> = above 125% federal poverty level per household income, reference group.

**Supplementary Table 13.** Multivariable regression models estimating 3-way interactive relations of multidimensional interpersonal discrimination<sup>2</sup> × religious affiliation status × sex with PWV. Examining simple slope effects per reference groups and dummy code variables.

<i>Model predictors</i>	<b>Model 1</b> Unaffiliated women		<b>Model 2</b> Religious affiliated women		<b>Model 3</b> Unaffiliated men		<b>Model 4</b> Religiously affiliated men	
	<i>B</i> (SE)	<i>p</i> -value	<i>B</i> (SE)	<i>p</i> -value	<i>B</i> (SE)	<i>p</i> -value	<i>B</i> (SE)	<i>p</i> -value
Discrimination <sup>2</sup> × Religious affiliation status × Sex	0.004 (0.001) **	.004	-0.004 (0.001) **	.004	-0.004 (0.001) **	.004	0.004 (0.001) **	.004
Discrimination <sup>2</sup> × Sex	-0.002 (0.001) *	.039	0.002 (0.001) *	.039	0.002 (0.001) *	.046	-0.002 (0.001) *	.046
Discrimination <sup>2</sup> × Religious affiliation status	-0.001 (0.001)	.168	0.002 (0.001) **	.002	0.001 (0.001)	.168	-0.002 (0.001) **	.002
Discrimination <sup>2</sup>	0.001 (0.001)	.166	-0.001 (0.001)	.086	0.000 (0.001)	.634	0.001 (0.001) **	.008
Discrimination × Religious affiliation status × Sex	-0.057 (0.017) ***	<.001	0.0057 (0.017) ***	<.001	0.057 (0.017) ***	<.001	-0.057 (0.017) **	.001
Discrimination × Religious affiliation status	0.027 (0.012) *	.023	-0.027 (0.012) *	.023	-0.030 (0.012) *	.010	0.030 (0.012) *	.01
Discrimination × Sex	0.022 (0.013)	.101	-0.035 (0.010) ***	<.001	-0.022 (0.013)	.101	0.035 (0.010) ***	<.001
Religious affiliation status × Sex	0.180 (0.044) ***	<.001	-0.180 (0.044) ***	<.001	-0.180 (0.044) ***	<.001	0.180 (0.044) ***	<.001
Discrimination Religious affiliation status	-0.015 (0.010)	.125	0.012 (0.006)	.067	0.007 (0.009)	.457	-0.023 (0.007) **	.002
Sex	-0.066 (0.029) *	.022	0.066 (0.029) *	.022	0.114 (0.034) ***	<.001	-0.114 (0.034) **	.001
Age	-0.067 (0.034)	.050	0.113 (0.028) ***	<.001	0.067 (0.034)	.050	-0.113 (0.028) ***	<.001
Poverty status	0.004 (0.000) ***	<.001	0.004 (0.000) ***	<.001	0.004 (0.000) ***	<.001	0.004 (0.000) ***	<.001
	-0.012 (0.007)	.007	-0.012 (0.007)	.07	-0.012 (0.007)	.070	0.012 (0.007)	.07

**Note.** HANDLS Study = Healthy Aging in Neighborhoods of Diversity across the Life Span Study,  $n = 797$ . \*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ . PWV = Pulse Wave Velocity (logarithmically transformed). **Model 1:** reference group - Unaffiliated women. **Model 2:** reference group - Affiliated women. **Model 3:** reference group - Unaffiliated men. **Model 4:** reference group - Affiliated Men.