




# Absent Relations of Religious Coping to Telomere Length in African American and White Women and Men

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## ABSTRACT

**Objectives:** This study investigated whether race and sex moderated the relations of religious coping to telomere length (TL), a biomarker of cellular aging implicated in race-related health disparities.

**Methods:** Participant data were drawn from the Healthy Aging in Neighborhoods of Diversity across the Life Span (HANDLS) study, which included 252 socioeconomically diverse African American and White men and women aged (30–64 years old). Cross-sectional multivariable regression analyses examined interactive associations of religious coping, race, and sex to TL, adjusting for other sociodemographic characteristics.

**Results:** Religious coping was unrelated to TL in this sample ( $p$ 's > .05). There were no notable race or sex differences. Post hoc exploratory analyses similarly found that neither secular social support coping use nor substance use coping was associated with TL.

**Conclusion:** There was no evidence to support that religious coping use provided protective effects to TL in this sample of African American and White women and men. Nevertheless, future studies should use more comprehensive assessments of religious coping and intersectional identities to provide an in-depth examination of religiosity/spirituality as a potential culturally salient protective factor in cellular aging among African Americans in the context of specific chronic stressors such as discrimination.



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## Introduction

Religiosity is a multidimensional construct, encompassing aspects of private and public religious activity, beliefs, and membership that is related to better health outcomes. Mounting evidence has shown that higher levels of religiosity are related to increased longevity and better quality of life; decreased risk across cancers, cardiovascular disease events, and all-cause mortality; more optimal cardiovascular health and levels of low-grade inflammation; and lower allostatic load scores, with more robust associations demonstrated among African American women and men compared to White adults (Bell, Bowie, & Thorpe, 2012; Brewer et al., 2022; Bruce et al., 2020, 2022; Ellison, Hummer, Cormier, & Rogers, 2000; Ferraro & Kim, 2014; Gillum, King, Obisesan, & Koenig, 2008; Koenig et al., 1997; Obisesan, Livingston, Trulear, & Gillum, 2006; Steffen, Hinderliter, Blumenthal, &

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Sherwood, 2001). For example, Ferraro and Kim (2014) showed that African American adults who frequently attended religious services had lower concentrations of C-reactive protein (CRP) compared to nonattenders, but these relations were not found among White adults.

Perspectives differ among researchers regarding which dimensions of religiosity (e.g., religious service attendance, prayer) are most salient to the prediction of health outcomes (Harris, Howell, & Spurgeon, 2018; VanderWeele, 2017). Whereas a preponderance of work has considered the frequency with which individuals attend religious services, pray/meditate, or read sacred literature as primary indicators of religiosity with respect to health (Bell, Bowie, & Thorpe, 2012; Bruce et al., 2022; Gillum, 2006a, 2006a, 2006b; Koenig et al., 1998; Koenig, 2012, 2015), fewer studies have addressed how religious coping impacts health (Harrison, Koenig, Hays, Eme-Akwari, & Pargament, 2001). Unlike other dimensions of religiosity, religious coping is unique to an individual's situational context, illustrating how one's inner resources and coping mechanisms are utilized in response to life's stressors vis-à-vis faith belief systems and spirituality (Gall et al., 2005). Religious coping is defined as "the responses to stress in terms of spiritual language, attitudes, practices, and sources of spiritual support" (Sulmasy, 2002, p. 27). The social patterning of stress exposure – across a myriad of external sources (e.g., discrimination, financial strain, caregiver stress) – may be indicative of how sociodemographic variations across frequencies of religious coping use and other religious activities are subsequently impactful on health endpoints. Namely, in the United States (U.S.), religiosity varies greatly according to both race and sex, such that African American adults and women display higher levels of religious engagement than their White and male counterparts, respectively (Chatters, Taylor, Bullard, & Jackson, 2008, 2008; Krause & Chatters, 2005; Levin & Taylor, 1993, 1997; Pew Research Center, 2014; Taylor & Chatters, 2011; Taylor, Chatters, & Joe, 2011); women endorse higher use of religious coping than men; and compared to non-Hispanic White Americans, Black Americans are more likely to look to God for strength and comfort, and pray as a coping mechanism (Chatters, Taylor, Jackson, & Lincoln, 2008).

Importantly, in this area of research, examining race and sex as moderators has led to greater understanding of the nuances across racial and sex health disparities, given that African American adults and women – the most religious and spiritual groups in the U.S. – readily use religious coping to deal with a broad range of personal, health-related, and social stressors that adversely affect their long-term health outcomes. To illustrate, Steffen, Hinderliter, Blumenthal, and Sherwood (2001) found that higher religious coping use was associated with significantly lower awake and sleep ambulatory blood pressure levels for African American adults only, but not White adults. However, these beneficial social health effects were not observed in the full sample of White and African American adults. It is important to consider how religious coping – a sociocultural resource of comfort, support, and resilience – may buffer the onslaught of particular life stressors, especially among African American adults and women (Holt, Clark, Debnam, & Roth, 2014; Mattis & Grayman-Simpson, 2012; Park, Holt, Le, Christie, & Williams, 2018).

African American adults, women, and African American women uniquely, often turn to their religious beliefs and faith-based communities to make sense of their experiences with racism and sexism in the context of faith, transcendence, and survival (Abrams, Maxwell, Pope, & Belgrave, 2014; Jacob et al., 2022; Mattis, 2002). For instance, the African American community's greater observance of, deference to, and reliance on religion and religious

coping provide insight as to how this racial group makes meaning of and understands their socially lived experiences through a faith vantage point. Black-affirming religious institutions have been cornerstones of the African American community, with large representation and prominent leadership across decades of civil rights activism; and collaborative partnerships to combat inequitable educational, economic, healthcare-related, and political policies (Lincoln & Mamiya, 1990; Warnock, 2020). The historical institution of the “Black Church” offers social embeddedness, meaning-making systems, racial, and gender empowerment for youth and adults across the lifespan; and cultural toolkits to support African Americans’ survival and ability to flourish in a society that has historically disparaged and denigrated their social identities (Billingsley & Caldwell, 1991; Cone, 1997; Kyere & Boddie, 2021; Mattis & Grayman-Simpson, 2012; Williams, 2013). African American adults who are more religious and spiritual are also more likely to use multiple coping strategies like religious coping, frequent prayer, working harder, and speaking with others when confronted with stressors like racial discrimination, illnesses and chronic conditions, or personal injuries to family members (Ellison & Taylor, 1996; Hayward & Krause, 2015; Jacob et al., 2022; Lewis-Coles & Constantine, 2006; Shelton & Emerson, 2012). Furthermore, women turn to an array of religious coping strategies that include seeking social support and other methods beyond what men more readily employ (Chatters et al., 2011; Levin, Taylor, & Chatters, 1994; Rathier, Davis, Papandonatos, Grover, & Tremont, 2015; Taylor, Chatters, & Jackson, 2007). For these reasons, many have argued that simultaneous consideration of race and sex highlights the particular centrality of religion for African American adults and African American women specifically, suggesting that research on the effects of religion and health should appropriately account for the importance of social identities, not as confounding variables, but as modifiers of these potentially promising associations (Van Ness, 2003). In aggregate, these sociodemographic patterns suggest that if religious coping is a key resilience factor among African American adults and women, it should portend more optimal health outcomes and possibly buffer their disproportionate stress exposure that leads to associated physiological dysregulation, development of chronic diseases, and accelerated aging processes.

### ***Telomere Length: A “Psychobiomarker”***

Telomere length (TL) – an indicator of cellular aging – has recently received attention in the study of religiosity, psychosocial stress and influence, and health. Telomeres are non-coding, nucleoprotein regions located at the ends of chromosomes that protect against genomic instability during cell divisions, and naturally shorten over the life course with each routine cell division (Iwama et al., 1998). Shorter telomeres, or telomere attrition, not only confer risk for the development of chronic diseases (e.g., cardiovascular disease, diabetes, cancer), but also exhibit vulnerability for existing cardiometabolic risk or disease (Fitzpatrick et al., 2007; Mwasongwe et al., 2017; Shammass, 2012; Spyridopoulos & von Zglinicki, 2014). Across several reports and meta-analyses, shorter TL has further been related to multiple acute and chronic psychosocial stressors that increase the risk for disease and premature mortality (Mathur et al., 2016; Ridout, Ridout, Price, Sen, & Tyrka, 2016; Willis, Reid, Calvo, Staudinger, & Factor-Litvak, 2018). Chronic activation of stress responses can lead to long-term detrimental health outcomes, such as increased resting blood pressure and hypertension risk, low-grade systemic inflammation, accelerated

cellular aging, and indeed, shorter telomeres (Epel et al., 2004; Tomiyama et al., 2012). Studies demonstrate that lower social support, more caregiver stress, and more self-reported racial discrimination and unfair treatment across the lifespan are associated with shorter telomeres (Chae et al., 2017; Hailu et al., 2019; Lee, Kim, & Neblett, 2017; Liu & Kawachi, 2017; Montoya & Uchino, 2023). There is evidence to suggest that these relations also vary by race and sex among samples of African American and White women and men (Beatty Moody et al., 2019; Pantesco et al., 2018). Accordingly, TL has been described as a “psychobiomarker” that, in part, captures disproportionate stress exposure (Epel, 2009, p.6).

But at the same time, literature demonstrating observed health advantages reaped from religiosity and religious coping provide insight into the biological mechanisms explaining how “religion gets under the skin.” Religion is thought to dampen the brain’s responses to stress by way of spiritual interpretations and reframing (Benson & Klipper, 1976). In turn, religious practices, such as prayer help to diminish sympathetic nervous system and anterior pituitary/adrenocortical axis activity (e.g., lower cortisol levels); and modulate cardiovascular and immune responses to psychological stressors (Lee et al., 2018; Tartaro, Luecken, & Gunn, 2005; Tobin & Slatcher, 2017). A growing body of literature has begun to illustrate the potential ameliorative linkages between religiosity and cellular aging. TL may be a critically important outcome in the study of U.S. health disparities insofar as it both reflects individuals who experience unique health risks and may also reap the most benefit from religious coping, a culturally-specific source of coping strategies and meaning-making systems within faith traditions, particularly among African American adults and women.

### ***Religiosity, Religious Coping, and Telomere Length***

To date, six studies have examined the linkages of religiosity to TL (Al Ahwal, Al Zaben, Sehlo, Khalifa, & Koenig, 2018; Hill, Ellison, Burdette, Taylor, & Friedman, 2016; Hill, Vaghela, Ellison, & Rote, 2017; Koenig, Nelson, Shaw, Saxena, & Cohen, 2016; Wang et al., 2020; Wang, Koenig, Al Shohaib, & Wang, 2020). While these investigations provide some initial support for a positive relation between religiosity and TL (Hill, Ellison, Burdette, Taylor, & Friedman, 2016; Hill, Vaghela, Ellison, & Rote, 2017; Koenig, Nelson, Shaw, Saxena, & Cohen, 2016), these linkages remain unclear as the overall findings are mixed; and three studies on Muslim populations may not be widely generalizable to the U.S (Al Ahwal, Al Zaben, Sehlo, Khalifa, & Koenig, 2018; Wang et al., 2020; Wang, Koenig, Al Shohaib, & Wang, 2020). Only one study examined the relations of religious coping to TL among African American and White community-dwelling adults but reported null findings (Hill, Ellison, Burdette, Taylor, & Friedman, 2016). Most notably, the bulk of this work has assessed religious involvement as a singular, multidimensional construct predicting TL, for which scales comprised various dimensions, including frequencies of prayer/meditation and religious service attendance, endorsed religious beliefs and coping behaviors; and subjective religiosity and spirituality (Al Ahwal, Al Zaben, Sehlo, Khalifa, & Koenig, 2018; Hill, Ellison, Burdette, Taylor, & Friedman, 2016; Koenig, Nelson, Shaw, Saxena, & Cohen, 2016; Wang et al., 2020, Wang, Koenig, Al Shohaib, & Wang, 2020). And yet still, despite findings of potential advantages of religiosity on TL, several documented linkages appeared age-specific, varied per levels of religiosity, or were better explained vis-à-vis affective, biobehavioral, and genetic factors (Koenig, Nelson, Shaw, Saxena, & Cohen, 2016; Hill,

Vaghela, Ellison, & Rote, 2017; Wang et al., 2019, Wang et al., 2020). Lastly, none have directly examined “race by sex” interactions conjointly with respect to religious coping and TL (Hill, Ellison, Burdette, Taylor, & Friedman, 2016; Koenig, Nelson, Shaw, Saxena, & Cohen, 2016). Thus, it remains yet to be determined whether greater religious coping levels uniquely contribute to longer telomeres, and how these might vary per African American and White women and men.

A strong contribution of this study is its use of an integrative theoretical framework to support our hypotheses. First, we hypothesized that if there are positive associations between religious coping and TL, they would be most pronounced among African American women, for whom their greater adherence to religion and religious coping use are sources of comfort and resiliency when dealing with a multitude of stressors. Relatedly, *Intersectionality* theory posits that individuals who hold multiple marginalized identities experience differential social disadvantage (Cole, 2009; Crenshaw, 1989, 1991); given that African American women experience “double jeopardy” and “weathering” – unique health risks and early health deterioration due to psychosocial and environmental stress, they may also reap the most benefit from religious coping with respect to TL (Beal, 2008; Geronimus et al., 2010; Geronimus, 1992; Geronimus, Hicken, Keene, & Bound, 2006). Lastly, whereas most studies highlight the influences of religion to TL using global measures of religiosity (e.g., religious service attendance), this study focuses on religious coping, and examines both race and sex as concurrent moderators. Exploratory analyses also assessed secular social support seeking coping behaviors and substance use coping alongside religious coping use to determine unique influences in tandem with one another; and subsequently assessed religious affiliation status as a proxy variable for religious coping, positing that those who had endorsed a religious affiliation would have longer TL, and that similarly these differences would be most noticeable among African American women. Lastly, we expected that these relations would persist after adjustment for psychological (e.g., depressive symptoms), biobehavioral (e.g., history of smoking and alcohol use), social support, and biomedical factors (e.g., obesity, diabetes, hypertension), all of which have previously been associated with higher levels of religiosity (Chida et al., 2009; Koenig, 2015; Powell et al., 2003).

## Methods

Participants were drawn from the Healthy Aging in Neighborhoods of Diversity across the Life Span (HANDLS) study (Evans et al., 2010), who had available telomere data collected at Wave 1. HANDLS is an ongoing longitudinal study that recruited a representative sample of African American and White men and women, above and below poverty, between 30 and 64 years old from thirteen neighborhoods in Baltimore City, Maryland, US. HANDLS examines age-related disparities in health and disease attributable to race and socioeconomic status (SES) in both low and high SES strata as a fixed cohort. Eligibility for HANDLS required that participants be 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. Participants were excluded if individuals were pregnant at the time of baseline recruitment or within 6 months of cancer treatment. Two phases of data collection at baseline occurred: the first included informed consent and interview survey; and second, all participants completed medical physical exams, psychological and neurocognitive tests, and audio

computer-assisted self-interview questionnaires on mobile Medical Research Vehicles. In sum, 3,720 participants met recruitment criteria and were enrolled based on the sampling design; 2,707 completed both phases of data collection; and of those participants, 69 did not consent to genetic analyses. A total of 360 participants with DNA in the biorepository from wave 1 were randomly selected from a factorial cross of race, sex, and baseline age (median-split) for telomere assays. In the present study, participants were excluded if they were missing data for any relevant predictor, outcome, or adjustment variables ( $n = 111$ ), resulting in a final analysis sample of 140 African American and 112 White participants.

## Measures

### *Sociodemographic Characteristics*

Participants self-reported their age, annual household income as a function of household size, years of education, religious affiliation status, and race. Participants were classified as living either above or below 125% of the 2004 US Federal household poverty line as an indicator of poverty status. Education was dichotomized to reflect attainment of a high school education ( $\geq 12$  years of education). **Religious Affiliation Status.** Participants endorsed their religious affiliation status and reported denomination with fill-in responses. A binary variable was created distinguishing between those who were unaffiliated and affiliated. Denominational affiliations were reportedly for descriptive purposes only.

### *Telomere Length*

Approximately 10 ng of DNA were isolated from peripheral blood mononuclear cells to analyze modulations in gene expression. TL was determined via telomere assays measured by quantitative polymerase chain reaction (qPCR) and the Southern blot method, yielding an average cycle threshold (Ct) values of the T/S (relative telomere to single copy gene) ratio, as has been previously described by Cawthon (2002). These values approximate TL in kb.

### *Religious Coping*

The Brief COPE Inventory religious coping subscale comprises two items: “When confronted with a difficult or stressful event:” (Item 1) “I try to find comfort in my religion or spiritual beliefs;” and (Item 2) “I pray or meditate” (Carver, 1997). Responses ranged from 1 (“not at all”) to 4 (“a lot”). Previous studies have noted high internal consistency and strong test-retest reliability for this subscale (Bryant-Davis, Ullman, Tsong, & Gobin, 2011; Carver, 1997; Carver, Scheier, & Weintraub, 1989; Horning, Davis, Stirrat, & Cornwell, 2011). In addition, one item taken from the General Social Survey asks participants, “How often [do you] find strength in spirituality?” with possible responses including, “many times a day” to “never/almost never” on a 6-point Likert scale. A principal components analysis using varimax rotation resulted in a single religious coping component with an eigenvalue of 2.18 and component loadings ranging from 0.81 to 0.88. Each religious coping item was standardized before indexing to help account for the different questions, formatting, and response categories. Higher scores indicated more frequent religious coping use. A constant ( $c$ ) was added to religious coping scores for descriptive statistics and graphed illustrations, only.



## Adjustment Variables

**Depressive symptoms** were characterized using the Center for Epidemiological Studies-Depression scale (CES-D; Radloff, 1977), which assesses depressive symptoms within the past week. **Cigarette and alcohol use** were dichotomized as 0 (“never used”) and 1 (“ever used”). **Marital status** was coded as a dichotomous variable, 0 (unmarried) and 1 (married). **Obesity** status was derived from participants’ body mass index (BMI) scores and was recorded as a dichotomous variable ( $\geq 30$  kg/m<sup>2</sup> – “obese” Centers for Disease Control and Prevention, 2022). **Hypertension** status was defined if a participant previously received a physician’s diagnosis; had use of antihypertensive medications, had resting systolic blood pressure  $\geq 140$  mmHg or diastolic blood pressure  $\geq 90$  mmHg. **Diabetes** status was determined by way of self-reported previous physician diagnosis, use of diabetes medications, and/or had fasting blood glucose levels  $\geq 126$  mg/dl (7 mmol/liter). Hypertension and diabetes were treated as separate dichotomous variables to reflect diagnostic status, respectively. **Emotional and instrumental social support, and substance use coping.** The emotional and instrumental social support coping use subscales from the Brief COPE inventory were used to assess social support (Carver, 1997). Two items assessed respondents’ receipt of emotional support, and comfort/understanding from others when dealing with a stressful situation. Similarly, two items assessed the frequency of instrumental social support coping use, whereby respondents reported how often they either tried to or received help or advice from others. The substance use coping subscale was measured with two items that asked the frequency at which respondents use alcohol or drugs to make themselves feel better or to help get through stressful situations. Responses to each item ranged from 1 (“never”) to 4 (“very often”); with overall composite scores ranging from 2 to 8 per each subscale. Raw values were used for descriptive statistics, but composite scores were standardized prior to linear regression analyses. In the final sample, the emotional and instrumental social support, and substance use coping subscales had good internal consistency ( $\alpha = .54, .71, .87$ , respectively).

## Data Analytic Plan

### Statistical Analyses

Descriptive statistics were computed for predictor, outcome, and adjustment variables. Regression diagnostics evaluated normality, skewness, outliers, and multicollinearity. Analyses were conducted using ordinary least squares regression models with the Statistical Package for the Social Sciences (SPSS) Version 26.0. Multivariable regression models were used to assess up to the three-way interactive effects of (a) religious coping, (b) race, and (c) sex to predict TL. Analyses began with fully adjusted models, which included the highest order three-way interaction effect, all two-way interaction effects, as well as respective main effects and adjustment variables for age, poverty status, and educational attainment. If the three-way interaction effect was significant, the fully adjusted model was retained, and analyses would proceed with sensitivity analyses to explore whether any noted interactive relations withstood further adjustment for potential confounding or mediating variables of clustered psychological (depressive symptoms), behavioral (cigarette and alcohol use), social (marital status and social support coping use), and biomedical factors (diagnoses of hypertension, type 2 diabetes, and obesity status). However, if the three-way

interaction effect was nonsignificant, analyses proceeded through a backward elimination procedure, which guides the removal of highest-order nonsignificant, interaction terms from regression analyses until only main effects and covariates remain (Morrell, Pearson, & Brant, 1997). If any interactive or main effects were found to be significant, subsequent sensitivity analyses were conducted. Using G\*Power 3.1.9.2 statistical software, analyses were powered ( $1-\beta = .79$ ) to detect a small to medium Cohen's effect  $f^2$  estimate of .030 at conventional levels of alpha (.05). The PROCESS macro for SPSS Version 3.3 was selected to probe and decompose any noted three-way or two-way significant interactive effects (i.e., model 1 and 3; see Hayes, 2013). Post hoc exploratory analyses assessed the influences of other aspects of coping (i.e., emotional and instrumental social support, substance use coping) in addition to religious coping use to determine unique effects per behavior and coping strategy to TL. Additionally, a series of analyses also examined religious affiliation status as a proxy variable for religiosity in similar procedures testing up to the three-way interaction level in base model analyses that adjusted for religious coping use.

## Results

In the present study, after exclusion criteria were applied, participants included 252 adults (mean age = 48.3 years; 49.2% female; 55.6% African American; 51.6% below poverty; 31.3% earned less than a high school education; 51.2% endorsed a religious affiliation). Descriptive statistics appear in Table 1. Preliminary visual screenings of histograms and Q-Q plots revealed no significant violations of normality for the outcome variable distribution. Overall, TL in the present sample ranged from 3.80 to 8.50 kb, and most participants endorsed moderate use of religious coping ( $M = 2.88$ ,  $SD = 1.00$ , range = 1–4.20). Religious coping use in the full sample revealed a negative skew; though linear regression analyses do not require normal distributions for predictor variables (Fox, Weisberg, & Fox, 2011).

Within the final sample, compared to White participants, African American participants expressed higher levels of religious coping use ( $t(250) = -5.78$ ,  $p < .001$ ), were more likely to have reported ever smoking cigarettes or other tobacco-related products, diagnosed with hypertension, and were less likely to identify as Catholic ( $\chi^2$  tests of independence, all  $p$ 's  $< .05$ ). Women were more likely to endorse a religious affiliation (and identify as Christian) compared to men, less likely to report recent alcohol consumption ( $\chi^2$  tests of independence, all  $p$ 's  $< .05$ ), reported more emotional social support coping use ( $t(250) = 4.19$ ,  $p < .001$ ) and higher levels of religious coping ( $t(250) = -2.55$ ,  $p = .01$ ), and have shorter telomeres than men ( $t(250) = -2.10$ ,  $p = .04$ ). In addition, educational attainment and marital status significantly differed per religious affiliation status ( $\chi^2$  tests of independence,  $p$ 's  $< .05$ ) such that nonreligious persons were less likely to have earned a high school diploma or GED and be unmarried compared to their religious counterparts. Significant mean differences in religious coping use across religiously affiliated and unaffiliated individuals also emerged ( $t(250) = -6.11$ ,  $p < .001$ ). No other differences across race, sex, or religious affiliation emerged (all  $p$ 's  $> .05$ ). Unadjusted bivariate correlations between religious coping use and religious affiliation status, and emotional and instrumental social support ranged from  $r = 0.29$  to  $r = 0.36$  (all  $p$ 's  $< .01$ ; Supplemental Table 1 contains bivariate correlations among all study variables).

Results from the multivariable regression analyses testing the associations of religious coping use to TL are documented in Table 2. Base models adjusted for age, poverty



**Table 1.** Participant demographic characteristics and descriptive statistics (HANDLS study, 2004–2009).

Variables	Total Sample (n = 252)	White (n = 112)	African American (n = 140)	Men (n = 128)	Women (n = 124)	Unaffiliated (n = 123)	Religiously Affiliated (n = 129)
African American (%)	55.6	—	—	57.0	54.0	54.0	57.0
Women (%)	49.2	50.9	47.9	48.9	47.7	58.0	44.0
Age (± SD)	48.3 (8.8)	48.0 (8.0)	48.5 (9.5)	48.9 (8.3)	47.7 (9.4)	48.0 (9.3)	48.6 (8.4)
Below 125% federal poverty level (%)	51.6	53.6	50.0	54.7	48.4	56.0	47.0
Less than High school diploma or GED (%)	31.3	37.5	26.4	27.3	35.5	39.8**	23.3**
Affiliated with religion (%)							
Christian	38.5	33.0	42.9	30.5**	46.8**	—	—
Catholic	1.3	16.1**	5.7**	10.9	9.7	—	—
Other faith	2.4	0.9	3.6	3.1	1.6	—	—
None	48.8	50.0	47.9	55.5*	41.9*	—	—
Depressive Symptoms (CES- D) (± SD)	14.4 (1.2)	14.9 (10.4)	14.0 (10.1)	12.0 (8.8)	16.9 (10.9)	15.2 (10.4)	13.7 (10.1)
Ever used alcohol (%)	84.1	83.0	85.0	90.6**	77.4**	87.8	80.6
Ever used cigarettes (%)	67.5	58.0**	75.0**	70.3	64.5	67.5	67.4
Unmarried (%)	66.3	61.6	70.0	64.1	68.5	74.8***	58.1***
Emotional social support (± SD)	4.62 (1.61)	4.67 (1.75)	4.57 (1.48)	4.21 (1.48) ***	5.03 (1.63) ***	4.42 (1.50)	4.80 (1.69)
Instrumental social support (± SD)	4.75 (1.67)	4.82 (1.76)	4.69 (1.60)	4.62 (1.61)	4.89 (1.73)	4.55 (1.59)	4.94 (1.73)
Substance use coping (± SD)	2.83 (1.48)	2.82 (1.57)	2.76 (1.44)	2.61 (1.35)	2.98 (1.61)	2.94 (1.65)	2.65 (1.31)
Obese (%)	42.1	44.6	40.0	38.3	46.0	39.84	44.2
Diabetes mellitus (%)	16.7	16.1	17.1	12.5	21.0	18.6	18.6
Hypertension (%)	45.2	36.6*	52.1*	46.1	44.4	41.0	49.0
Religious coping (± SD)	2.88 (1.00)	2.50 (1.01) ***	3.19 (0.88)***	2.72 (1.02)*	3.04 (0.95)*	2.51 (0.97) ***	3.23 (0.89) ***
Telomere length (± SD)	5.68 (.70)	5.75 (0.71)	5.62 (0.68)	5.77 (0.70)*	5.58 (0.68)*	5.67 (0.70)	5.68 (0.70)

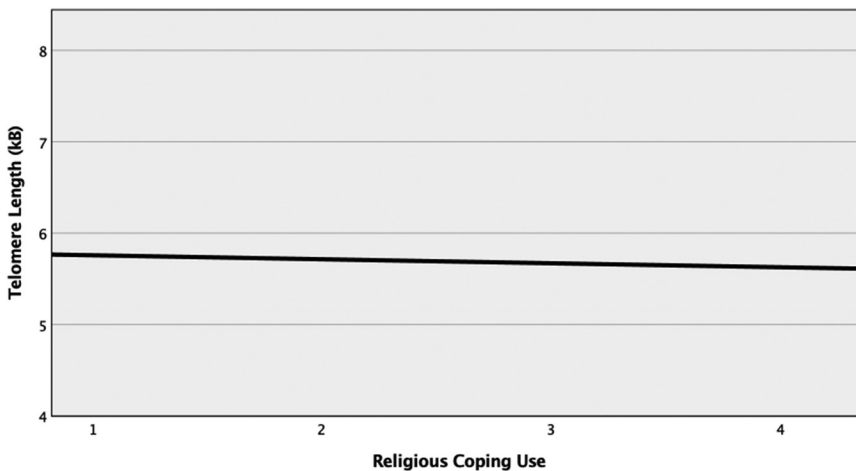
HANDLS (Healthy Aging in Neighborhoods of Diversity across the Life Span) Study, n = 252. Significant mean differences across race, sex, and religious affiliation status were examined with independent samples t-tests and chi-square tests of independence. \*p < .05; \*\*p < .01; \*\*\*p < .001.

status, and educational attainment. The three-way interaction term of religious coping, race, and sex predicting TL revealed no significant three-way interaction of religious coping, race, and sex ( $\beta = 1.17, p = .09, F(10, 241) = 1.574, R^2 = .055, p = .115$  (Model 1). After eliminating the three-way interaction term, there were also no significant two-way interactions of religious coping\*race ( $\beta = -0.08, p = .71$ ), or religious coping\*sex ( $\beta = -0.11, p = .63$ ),  $F(9, 242) = 1.414, R^2 = .050, p = .18$  (Model 2). Lastly, there was no significant main effect of religious coping on TL in the full sample ( $\beta = 0.00, p = .97$ ),  $F(6, 245) = 1.672, R^2 = .039, p = .13$  (Model 3; for visualization, see Figure 1). Sex was related to TL ( $\beta = 0.15, p = .03$ ), whereby men had longer TL than women. (Of note, models were recomputed with all the proposed candidate mediators as added adjustment variables, but results remain unchanged; *data not shown*). There was no multicollinearity in the data, as evidenced by VIF scores ranging between 1.02 and 1.22, and tolerance scores between 0.8 and 1.0. The Bayes factor ( $BF_{01}$ ), a probability metric used to contrast the likelihood of the null hypothesis with the alternative hypothesis, was calculated. This technique is described in (Jarosz & Wiley, 2014). For the final model

**Table 2.** Inferential Statistics across Multivariate Linear Regression Analyses.

Predictors	Model 1				Model 2				Model 3			
	B (SE)	$\beta$	t	p	B (SE)	$\beta$	t	p	B (SE)	$\beta$	t	p
Race <sup>a</sup>	-0.52 (0.30)	-0.37	-1.72	.087	-0.54 (0.30)	-0.39	-1.80	.074	-0.11 (0.09)	-0.08	-1.18	.239
Sex <sup>b</sup>	-0.31 (0.31)	-0.22	-0.99	.324	-0.24 (0.31)	-0.18	-0.79	.432	0.20 (0.09) *	0.15*	2.25	.025
Age	-0.01 (0.01)	-0.11	-1.79	.075	-0.01 (0.01)	-0.11	-1.71	.089	-0.01 (0.01)	-0.11	-1.78	.076
Poverty status <sup>c</sup>	-0.03 (0.09)	-0.02	-0.30	.764	-0.03 (0.09)	-0.02	-0.32	.751	-0.03 (0.09)	-0.02	-0.33	.743
Education <sup>d</sup>	-0.05 (0.10)	-0.03	-0.50	.620	-0.06 (0.10)	-0.04	-0.66	.513	-0.06 (0.10)	-0.04	-0.63	.529
Religious coping (RC)	0.86 (0.48)	1.24	1.80	.073	0.12 (0.20)	0.18	0.60	.550	0.00 (0.05)	0.00	-0.04	.967
RC * Race	-0.54 (0.31)	-1.20	-1.74	.083	-0.04 (0.10)	-0.08	-0.38	.706	—	—	—	—
RC * Sex	-0.53 (0.30)	-1.23	-1.77	.078	-0.05 (0.10)	-0.11	-0.48	.630	—	—	—	—
Race * Sex	0.29 (0.19)	0.47	1.52	.130	0.29 (0.19)	0.46	1.50	.136	—	—	—	—
RC * Race * Sex	0.33 (0.19)	1.17	1.71	.089	—	—	—	—	—	—	—	—

Note. HANDLS (Healthy Aging in Neighborhoods of Diversity across the Life Span) Study,  $n = 252$ . \* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ . Race<sup>a</sup> reference group = White. Sex<sup>b</sup> reference group = Women. Poverty status<sup>c</sup> denotes participants' classification either above or below 125% federal poverty level per household income, reference group = above. Education<sup>d</sup> denotes educational attainment per high school diploma or GED, reference group = < HS diploma or GED. **Abbreviations:** RC = Religious coping.



**Figure 1.** Graph Illustrating Associations of Religious Coping Use and Telomere Length in Full Sample of African American and White Adults.

testing the main effects of religious coping use predicting TL (Model 3), the  $BF_{01} = 15.87$ , providing strong evidence for the null hypothesis and findings in this sample.

### Post Hoc Exploratory Analyses

Additional exploratory analyses tested the unique influences of other coping strategies and behaviors, alongside religious coping use, as main effects in the same model (Model 4).

Analyses were rerun, with base models adjusting for race, sex, age, poverty status, and educational attainment; predictors and covariates of interest included religious coping use, emotional and instrumental social support, and substance use coping, with each subscale standardized prior to multivariate linear regression analyses (for detailed results, see Table 3). There were no significant relations between religious coping use ( $\beta = 0.00$ ,  $p = .96$ ), emotional social support ( $\beta = 0.40$ ,  $p = .69$ ), instrumental social support ( $\beta = -0.05$ ,  $p = .52$ ), or substance use coping ( $\beta = -0.07$ ,  $p = .31$ ) with TL,  $F(9, 242) = 1.283$ ,  $R^2 = .046$ ,  $p = .247$  (Model 4). As seen before, there was a main effect of sex ( $\beta = 0.14$ ,  $p = .04$ ), such that men had longer TL than women; and there was no violation of multicollinearity. VIF scores ranged between 1.03 and 1.77, and tolerance scores ranged between 0.6 and 1.0. (Of note, additional analyses tested the three-way interaction term of religious coping\*race\*sex, along with all two-way interactions listed previously, but with these additional coping subscale measurements – emotional and instrumental social support, substance use coping, but findings remain unchanged. After similarly removing the highest-order interaction term, there were no significant two-way interactive effects of religious coping\*race or religious coping\*sex on TL in analyses that adjusted for these additional coping subscales; *data not shown*. Furthermore, analyses retested each aspect of coping individually – emotional and instrumental social support, substance use coping (in separate models) without religious coping use in base models, adjusted for sociodemographic characteristics, and similarly tested up to three-way interaction terms – e.g., emotional social support\*race\*sex, then proceeded with backward elimination, but no significant interaction terms or main effects were found; *data not shown*.)

Lastly, the interactive effects of religious affiliation, race, and sex were explored. Due to the nature of fill-in-the-blank responses, and limited statistical power to examine individual denominational differences, the dichotomous variable of religious affiliation status served as a proxy for religiosity, broadly. Base models included previously mentioned sociodemographic characteristics (age, poverty status, and education), religious coping use, and the three-way and two-way interaction terms between religious affiliation status, race, and sex. However, religious affiliation was unrelated to TL, either as a main effect or within interactions (see Table 4 for a full review). The three-way interaction term of religious affiliation\*race\*sex was nonsignificant ( $\beta = 0.51$ ,  $p = .62$ ),  $F(11, 240) = 1.233$ ,  $R^2 = .053$ ,  $p$

**Table 3.** Inferential Statistics across Multivariate Linear Regression Analyses.

Predictors	Model 4			
	B (SE)	$\beta$	$t$	$p$
Race <sup>a</sup>	-0.12 (0.10)	-0.08	-1.22	.226
Sex <sup>b</sup>	0.20 (0.09)*	0.14*	2.11	.036
Age	-0.01 (0.01)	-0.12	-1.82	.070
Poverty status <sup>c</sup>	-0.02 (0.09)	-0.01	-0.17	.868
Education <sup>d</sup>	-0.06 (0.10)	-0.04	-0.65	.519
RC	0.00 (0.05)	0.00	0.06	.955
Emotional social support	0.02 (0.06)	0.03	0.40	.691
Instrumental social support	-0.04 (0.06)	-0.05	-0.64	.521
Substance use coping	-0.05 (0.05)	-0.07	-1.02	.308

Note. HANDLS (Healthy Aging in Neighborhoods of Diversity across the Life Span) Study,  $n = 252$ . \* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ . Race<sup>a</sup> reference group = White. Sex<sup>b</sup> reference group = Women. Poverty status<sup>c</sup> denotes participants' classification either above or below 125% federal poverty level per household income, reference group = above. Education<sup>d</sup> denotes educational attainment per high school diploma or GED, reference group = < HS diploma or GED. **Abbreviations:** RC = Religious coping.

**Table 4.** Inferential Statistics across Multivariate Linear Regression Analyses.

Predictors	Model 5				Model 6				Model 7			
	B (SE)	$\beta$	t	p	B (SE)	$\beta$	t	p	B (SE)	$\beta$	t	p
Race <sup>a</sup>	-0.04 (0.93)	-0.03	-0.04	.969	-0.45 (0.42)	-0.32	-1.08	.282	-0.10 (0.10)	-0.07	-1.09	.278
Sex <sup>b</sup>	0.04 (0.92)	0.027	0.04	.967	-0.38 (0.39)	-0.27	-0.96	.339	0.21 (0.09)*	0.15*	2.30	.022
Age	-0.01 (0.01)	-0.1	-1.60	.112	-0.01 (0.01)	-0.10	-1.63	.105	-0.01 (0.01)	-0.11	-1.79	.075
Poverty status <sup>c</sup>	-0.04 (0.09)	-0.03	-0.39	.697	-0.04 (0.09)	-0.03	-0.40	.69	-0.03 (0.09)	-0.02	-0.34	.735
Education <sup>d</sup>	-0.07 (0.10)	-0.05	-0.74	.459	-0.08 (0.10)	-0.05	-0.78	.438	-0.07 (0.10)	-0.05	-0.74	.463
RC	-0.02 (0.05)	-0.03	-0.40	.690	-0.02 (0.05)	-0.03	-0.40	.693	-0.01 (0.05)	-0.02	-0.28	.783
RA	0.39 (0.91)	0.284	0.43	.667	-0.02 (0.39)	-0.01	-0.04	.965	0.07 (0.10)	0.05	0.69	.493
RA *Race	-0.31 (0.57)	-0.49	-0.54	.590	-0.04 (0.18)	-0.06	-0.21	.833	—	—	—	—
RA * Sex	-0.17 (0.58)	-0.25	-0.30	.768	0.10 (0.18)	0.15	0.58	.564	—	—	—	—
Race * Sex	0.00 (0.57)	0.005	0.01	.995	0.27 (0.18)	0.44	1.54	.126	—	—	—	—
RA * Race * Sex	0.18 (0.36)	0.513	0.50	.619	—	—	—	—	—	—	—	—

Note. HANDLS (Healthy Aging in Neighborhoods of Diversity across the Life Span) Study,  $n = 252$ . \* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ . Race<sup>a</sup> reference group = White. Sex<sup>b</sup> reference group = Women. Poverty status<sup>c</sup> denotes participants' classification either above or below 125% federal poverty level per household income, reference group = above. Education<sup>d</sup> denotes educational attainment per high school diploma or GED, reference group = < HS diploma or GED. **Abbreviations:** RC = Religious coping. RA = Religious affiliation status, reference group = unaffiliated.

= .27. There were no significant two-way interactive effects of religious affiliation and race ( $\beta = -0.06$ ,  $p = .83$ ), or religious affiliation and sex ( $\beta = 0.15$ ,  $p = .56$ ),  $F(10, 241) = 1.335$ ,  $R^2 = .052$ ,  $p = .21$ . Lastly, there were no significant main effects of religious affiliation status to TL ( $\beta = 0.05$ ,  $p = .49$ ),  $F(7, 244) = 1.497$ ,  $R^2 = .041$ ,  $p = .17$ . VIF scores ranged between 1.02 and 1.39, and tolerance scores ranged between 0.7 and 1.0; thus, there were no concerns for multicollinearity.

## Discussion

The purpose of this study was to examine cross-sectional associations of religious coping and TL, and to determine whether these associations were moderated by race and sex in a diverse sample of African American and White midlife adults living in Baltimore, MD. To our knowledge, this was the first study to assess “race by sex” interactions conjointly. It was hypothesized that African American women would reap the most benefit from higher levels of religious coping with respect to longer TL; and that these associations would withstand further adjustments for correlated psychological, behavioral, social, and biomedical factors. However, our hypothesis was not confirmed. Findings revealed an absence of significant interactive or independent relations of religious coping to TL across all models. Religious coping use was also not a unique predictor of TL when considered in conjunction with other coping strategies (emotional and instrumental secular social support, substance use coping); neither were these coping behaviors related to TL. Similarly, religious affiliation status was also unrelated to TL, and did not vary by race and sex in this sample. The present

study's results are consistent with prior work that indicated no positive relation between religious coping and TL in community-dwelling White and Black adults across the lifespan (Hill, Ellison, Burdette, Taylor, & Friedman, 2016) or religious involvement among Saudi Arabian Muslim colorectal cancer patients (Al Ahwal, Al Zaben, Sehlo, Khalifa, & Koenig, 2018). Thus, it remains possible that greater religious coping may not uniquely contribute to TL, despite the differences in study populations and methods of religious coping assessment. Additional research is warranted to confirm these findings.

Our findings are somewhat difficult to reconcile with additional previous literature. Prior reports revealed positive associations between broader considerations of religiosity and spirituality with TL using single linear constructs comprising multiple aspects of private and public religious activities, including religious service attendance, subjective religiosity, negative religious coping use, and frequency of prayer and meditation (Hill, Ellison, Burdette, Taylor, & Friedman, 2016; Koenig, Nelson, Shaw, Saxena, & Cohen, 2016). The present study's primary measurement of religious coping incorporated items that consisted of finding strength in religion or spiritual beliefs and using prayer or meditation when confronted with stressful situations. Given that there is evidence suggesting that practiced spirituality and meditation (e.g., practicing yoga or Qigong) are linked to longer telomeres and increased telomerase activity (Ho et al., 2012; Hoge et al., 2013; Jacobs et al., 2011; Lavretsky et al., 2013), we still expected to observe, at minimum, main effects of religious coping to TL in the full sample. However, it should also be noted that the bulk of the previous work on religiosity and TL reflected interesting post hoc theorizing, and thus could not definitively conclude that global measures of religiosity had direct positive effects on TL either (Hill, Vaghela, Ellison, & Rote, 2017; Koenig, Nelson, Shaw, Saxena, & Cohen, 2016). Thus, while it was surprising that there was an absence of positive relations between religious coping and TL in this sample, given the direction of this growing body of literature, further work is needed to understand how religious coping, spirituality, and religious involvement more broadly may serve as unique protective factors related to TL.

As the present study focused on religious coping to assess individuals' response to stress in a religious framework, exploratory analyses also examined whether secular social support coping use and substance use coping, in addition to religious coping use, influence TL in the same model, yet similarly observed null findings. Although there is a growing body of literature to suggest that TL is sensitive to early life adversity and chronic psychosocial stress exposure, the evidence is less clear for substance use coping (Astuti, Wardhana, Watkins, & Wulaningsih, 2017; Beach, Lei, Brody, Yu, & Philibert, 2014; Dixit et al., 2019; Needham et al., 2013), or if more social support is related to longer telomeres (Montoya & Uchino, 2023). Thus, our findings appear congruent with current work that additional coping behaviors may be unrelated to TL. We also explored religious affiliation as a proxy variable for religious coping. Studies also demonstrate that religious affiliation and denominational differences may predict inter-individual variability in health behaviors, cardiovascular and cardiometabolic risk profiles, and mortality, such that, for example, churchgoers, and Catholic and Jewish affiliations were associated with lower mortality rates than Mainline Protestants and nonreligious individuals (Bentley-Edwards et al., 2020; Bruce et al., 2017; Kim, Smith, & Kang, 2015; Robbins et al., 2020; Schlundt, 2008). Surprisingly, some participants not affiliated with any organized religion still endorsed high religious coping use. This suggests a need to further examine how certain stressful situations may engender the use of various coping strategies comprising meaning-making, faith, spirituality, or unity

with nature and others. It is also possible that among those who are not affiliated with a religious group or belief system, religious coping may be a form of desperation because of the overwhelming stress experienced or perceived. Examining religion as a multi-level phenomenon will more likely yield a greater breadth of understanding its protective effects on cellular aging.

Although the present investigation extends the work on religiosity and telomere biology, there remain some study limitations that require further discussion. First, the primary measurement for religious coping used in the present study only comprised three items and could not fully distinguish between secular practices and religious-based coping. Copious reports and commentary have discussed the inherent difficulty in measuring religious coping, given its complex, multidimensional nature (Harrison, Koenig, Hays, Eme-Akwari, & Pargament, 2001; Pargament, Koenig, & Perez, 2000). The present study may have then benefitted from a more comprehensive examination of multidimensional religious coping that comprised different subtypes, nuances, and strategies (e.g., positive and negative coping; Pargament, Feuille, & Burdzy, 2011; Pargament, Koenig, Tarakeshwar, & Hahn, 2004). Thus, it remains possible that these relations may be revealed in future research using more comprehensive assessments of religious coping and/or other measures of religiosity. Although this was the first study, to our knowledge, that examined race and sex moderation conjointly in a mixed-race sample of midlife urban-dwelling adults, we suspect that the absence of relations may, in part, be due to the particular sample used and the measurements for religious coping used.

Furthermore, it is also possible that religious coping and religious involvement may be better understood as stress-buffering resources, such that socially disadvantaged groups might have decreased impact on shortened TL in the presence of these protective factors. For instance, Isehunwa et al. (2022) found that congregational membership, group prayer, and global measures of religiosity and spirituality – which included positive and negative religious coping – moderated the associations of depressive symptoms to TL in racially diverse sample populations. Such an approach may have yielded different results in our study. Also, these analyses were cross-sectional, and the sample size limited the statistical power of the analyses to detect a small effect size (VanderWeele & Shields, 2016). Examining these linkages in prospective designs will provide information beyond the scope of the present study's design. We posit that although this sample comprised midlife adults, and analyses were cross-sectional rather than longitudinal, religiosity and spirituality remain important factors in disease mediation at later stages of life, especially among individuals with multiple comorbidities and early disablement.

## Conclusion

In this sample of midlife African American and White women and men, religious coping use was not associated significantly with TL. Our findings may indeed reflect a true absence of relations, as other reports similarly found nonsignificant relations between religious coping and TL (Hill, Ellison, Burdette, Taylor, & Friedman, 2016). However, based on the strength of prior related literature, additional research is needed to better understand the potential linkages between religiosity and cellular aging. Furthermore, continued examination of whether and how these associations may manifest differentially for African American and White women and men remains warranted



for at least two critical reasons. First, racial and sex health disparities across cardiovascular diseases, cancers, mortality, and life expectancy are arrestingly bleak for African American men and women compared to White adults. It is important that we persist in determining how salient psychosocial aspects of life can exacerbate these risks, or can help to mitigate these inequalities (Cunningham et al., 2017). Second, previous authors have similarly noted that in the absence of an assessment of potential moderating influences for race, sex/gender, or other key dimensions of intersectional identity, significant associations may have been missed (Van Ness, 2003). In the realm of religion and health specifically, when we only consider race and sex as covariates but not potential moderators, analytical models may not fully account for the sociohistorical relevance and salience of religion for historically marginalized groups in the context of racism and sexism in the U.S. Higher displayed religiosity among African American adults and women should be reckoned alongside the fact that religion is a source of comfort in the face of undue, chronic stress. Should there be potential associations of higher religiosity to health endpoints, these relations might be most robust among those who seek religion more frequently because of the society in which they live. Future research should continue to explore how best to operationalize religious coping in health research and further understand how religion “gets under the skin” among historically marginalized groups.

These current findings should motivate additional work to understand how religious coping and other dimensions of religiosity protect against the effects of salient social stressors that lead to poorer health outcomes in racial and gender or sexual minority groups and subgroupings to better identify avenues of intervention and prevention of premature disease onset. In addition, researchers should also consider other key sociodemographic moderators that may influence these associations, such as age, socioeconomic status, sexual orientation, and other sex minority identities. Examining religion as a multi-level phenomenon will more likely yield translational research design for community-based health promotion efforts.

We also further suggest continued focus on African American women due to the risks associated with their dually marginalized social statuses, in addition to their unique resilience factors. Empirical reports have linked African American women’s greater religiosity and resiliency to associated health benefits (Cooper, Thayer, & Waldstein, 2014; Cozier et al., 2018; Reed & Neville, 2014; Vander Weele et al., 2017). Abrams, Maxwell, Pope, and Belgrave (2014) highlighted how religion and spirituality serve as an “anchor” or foundation from where African American women draw much of their strength; and as such, religion and spirituality are readily employed as likely coping mechanisms. Additionally, studies including African American women of other established faith traditions such as Islam have also demonstrated the centrality of faith and community when confronted with discrimination (Byng, 1998; Wyche, 2004), suggesting that African American women’s higher religious involvement and use of religious coping, irrespective of faith tradition or denomination, may portend greater benefits to their overall health and wellbeing. Therefore, despite the lack of significant findings in the present study, we argue that incorporating *Intersectionality*-driven statistical methodologies can help social scientists develop key strategies and suitable interventions that better eliminate racial and sex health inequities that disproportionately affect African American adults and women.

Taken together, it is important to consider the continued relevance of religiosity and spirituality as predictors of biomedical health outcomes, including the dimensions of cellular aging such as TL. Indeed, health disparities research often grapples with the extent to which African American adults and women experience disproportionate stress exposure that leads to poorer health outcomes, but equal attention is also needed for understanding their sustained resilience and how that may manifest across biological systems. Furthermore, by employing an intersectional perspective in future studies on religion and health, social scientists can develop key strategies and suitable interventions that better eliminate health inequities and promote wellness and longevity by advocating for policies that create healthier living conditions for those who have been historically marginalized in society.

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### Declaration of Conflicting Interests

The authors declare that there is no conflict of interest to disclose.

### Research Data & Replication

The HANDLS sample is relatively small and drawn from a vulnerable population residing in specific census tracts in Baltimore City, Maryland, US. 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>.

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**Supplemental Table 1.** Bivariate Correlations for Study's Variables.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
<sup>1</sup> Race	1																		
<sup>2</sup> Sex	0.03	1																	
<sup>3</sup> Poverty status	-0.04	0.06	1																
<sup>4</sup> Age	0.03	0.07	0.08	1															
<sup>5</sup> Education	0.12	0.09	-0.23**	0.01	1														
<sup>6</sup> Obesity	-0.05	-0.08	-0.09	0.14*	-0.01	1													
<sup>7</sup> HTN	0.16*	0.02	0.02	0.39**	0.10	0.31**	1												
<sup>8</sup> Diabetes	0.01	-0.11	-0.08	0.11	-0.02	0.35**	0.36**	1											
<sup>9</sup> Depression (CES-D)	-0.04	-0.24**	0.20**	-0.07	-0.22**	0.00	0.01	0.00	1										
<sup>10</sup> Cigarette use	0.18**	0.06	0.19**	0.10	-0.21**	-0.06	0.02	-0.01	0.11	1									
<sup>11</sup> Alcohol use	0.03	0.18**	0.06	0.08	-0.06	-0.03	0.02	-0.01	-0.14*	0.28**	1								
<sup>12</sup> Substance use coping	-0.02	-0.12	0.14*	-0.05	-0.15*	-0.11	-0.03	-0.11	0.24**	0.25**	0.18**	1							
<sup>13</sup> Marital status	-0.09	0.05	-0.25**	0.01	0.16*	0.09	0.01	-0.05	-0.16*	-0.10	-0.10	-0.18**	1						
<sup>14</sup> Social support <sub>emot.</sub>	-0.03	-0.26**	-0.16*	-0.08	0.04	0.03	-0.06	-0.09	-0.08	-0.14*	-0.06	-0.05	0.06	1					
<sup>15</sup> Social support <sub>instr.</sub>	-0.04	-0.08	-0.10	-0.04	0.13*	-0.09	-0.09	-0.16**	-0.10	-0.10	0.00	-0.01	0.05	0.61**	1				
<sup>16</sup> Religious affiliation status	0.02	-0.14*	-0.09	0.03	0.18**	0.04	0.07	0.05	-0.08	0.00	-0.10	-0.10	0.18**	0.12	0.12	1			
<sup>17</sup> Religious coping	0.34**	-0.16*	-0.18**	0.08	0.12	0.13*	0.13*	0.06	-0.05	0.04	-0.03	-0.08	0.12*	0.29**	0.35**	0.36**	1		
<sup>18</sup> TL	-0.08	0.13*	-0.01	-0.11	-0.03	-0.02	-0.04	-0.02	-0.03	0.02	-0.02	-0.07	0.01	-0.02	-0.04	0.01	-0.06	1	

**Note.** \*  $p < .05$  (2-tailed significance), \*\*  $p < .01$  (2-tailed significance). **Abbreviations.** HTN = Hypertension. CES-D = Center for Epidemiologic-Depression Scale. Social support<sub>emot.</sub> = Emotional social support coping use. Social support<sub>instr.</sub> = Instrumental social support coping use. TL = Telomere Length.