



Structural equation modeling of microaggressions, religious and racism-related coping, medication adherence, and viral load among Black women living with HIV

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Abstract

Despite the disproportionate impact of HIV, microaggressions, and discrimination among Black women living with HIV (BWLWH), BWLWH have demonstrated resilience by mobilizing religious and other coping strategies. The current study sought to examine whether racism-related or religious coping moderates the relationship between latent gendered racial microaggressions (GRMs), antiretroviral therapy (ART) adherence and viral load (VL) among 119 BWLWH. Data was collected via self-report measures of GRMs and coping. ART adherence was measured via self-report and electronic monitoring and VL was measured via blood specimens. Structural equation modeling showed significant main effects of religious coping on adherence and VL. Furthermore, GRMs × racism-related coping and GRMs × religious coping significantly predicted adherence and VL. Our findings indicate the unique and culturally salient role of religious and racism-related coping among BWLWH in the context of GRMs. Such findings may be optimized in the development of culturally relevant multilevel interventions for BWLWH.

Keywords Black women · HIV · Microaggressions · Racism-related coping · Religious coping · Medication adherence

Introduction

Black women living with HIV (BWLWH) represent the majority of new HIV diagnoses compared to other racial/ethnic groups (Centers for Disease Control and Prevention, 2021). Furthermore, BWLWH face multiple adversities and stressors related to the intersectionality of sexism, racism, and HIV stigma (Wright et al., 2022). These include structural factors (e.g. poverty and poor access to care) as well as interpersonal experiences of overt discrimination and subtle microaggressions (Geter et al., 2018; Lewis & Neville, 2015), all of which require BWLWH to utilize internal and external coping resources (Dale & Safren, 2018). The far-reaching effects of discrimination and the employment of coping strategies in the face of adversities suggest that these factors may be a vital component of interventions seeking

to improve antiretroviral therapy (ART) adherence and viral load (Dale et al., 2018).

Overt forms of discrimination have been shown to have negative psychosocial and health implications for people living with HIV (PLWH), however daily covert and subtle forms of discrimination may also be harmful (Boarts et al., 2008; Dale et al., 2019; Dale & Safren, 2020; Omosanya et al., 2014a; Thompson & Dale, 2022; Turan et al., 2017). When discrimination takes the form of subtle insults that are based on prejudicial beliefs, it is known as a microaggression (Lui & Quezada, 2019). These insults reflect intersecting systems of oppression (e.g. racism, sexism) and may target gender, race, HIV status, and other marginalized identities. Gendered racial microaggressions are defined as subtle expressions of oppression and discrimination impacting the intersection of one's race and gender (Lewis & Neville, 2015). There is evidence to show that gendered racial microaggressions are associated with higher barriers to HIV care (Dale et al., 2019), higher depressive symptoms (Dale & Safren, 2020), post-traumatic stress disorder symptoms (Dale & Safren, 2019), and current suicidality among BWLWH (Thompson & Dale, 2022). Thus, microaggressions, though subtle, may have implications for health

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outcomes such as HIV disease progression via medication adherence and viral suppression.

Despite the fact that BWLWH face the aforementioned stressors, they have demonstrated resilience through the use of coping strategies and by seeking out resources in their environment to cope with daily challenges (Boga & Dale, 2022; Dale et al., 2019). Resilience may be defined as the ability to adapt and bounce back after experiencing challenges and adversities (Dulin et al., 2018; Fletcher & Sarkar, 2013). The ability to bounce back is dependent on the availability of resilience resources at the individual (e.g. psychological), interpersonal, and societal levels (e.g. social policies and community resources) (Dulin et al., 2018). In addition, the mobilization of these resources facilitate an individual's overall development and health (Dulin et al., 2018; Earnshaw et al., 2013; Fletcher & Sarkar, 2013). Coping is one such resource that is individually-based, but also impacted by societal factors (e.g. one's ability to adhere to an ART regimen may be impacted by access to resources such as health care and insurance to obtain medications). As such, it is not surprising that coping has been positively correlated with medication adherence (Lyimo et al., 2014). Two types of coping that are particularly relevant within the Black community are religious coping and racism-related coping.

Religious coping efforts and racism-related coping have been examined to some extent in the literature as it relates to HIV outcomes. The use of spirituality and religion as a coping strategy by the Black community has been documented (Dalmida et al., 2009; Runnels et al., 2018). In addition, the use of religious coping has implications for long- and short-term outcomes related to HIV. Religious coping has been associated with cognitive and motivational factors that have direct implications for medication adherence. For example, positive spiritual reframing (the perspective that living with HIV is part of a divine plan that will result in positive outcomes in one's life) is one such spiritual practice that has predicted lower viral load and higher survival rates (Ironson et al., 2016). The ability to find meaning has also been cited as a process via which spiritual coping may confer benefits for HIV survival rates by motivating one to maintain physical and mental health, which may be achieved through ART adherence (Ickovics et al., 2001). Spirituality has also been shown to predict survival rates as well as CD4 count and viral load among PLWH (Doolittle et al., 2018; Ironson et al., 2016; Szaflarski, 2013). Critical consciousness ("the awareness of social oppression that promotes joining with others to enact social change") is a form of racism-related coping that has been related to lower likelihood of detectable viral load among women living with HIV who experience high levels of racial discrimination (Kelso et al., 2014). Critical consciousness is especially pertinent for BWLWH as it may help to buffer against daily experiences of racism

and sexism and, in turn, relates to lower viral load. Furthermore, in the context of racism, HIV-related stigma and heterosexism have been associated with lower ART adherence among Black men who have sex with men (MSM) living with HIV and have been associated with structural factors such as stigma within community and medical settings and lack of access to prevention services and treatment in the form of ART (Arnold et al., 2014; Peterson & Jones, 2009). However, other research has shown that coping with racism has not been a buffer against race-related stress (Han et al., 2015). As such, there are mixed findings on the effectiveness of racism-related coping in reducing levels of discrimination-related stress and whether it has positive effects on health-enhancing behaviors such as medication adherence.

Given the pertinence of microaggressions, religious, and racism-related coping to BWLWH, it begs the question of how each examined together in a structural model, relates to medication adherence and viral load among BWLWH. The aim of the current study is to examine whether racism-related or religious coping moderates the relationship between gendered racial microaggressions and ART adherence among BWLWH.

Methods

Participants and procedures

Data collection took place between October 2017 and January 2019 as a component of a behavioral medicine intervention development trial and baseline data was used in the current study. The aim of this trial was to alleviate trauma symptoms and improve coping strategies and medication adherence. Study participants were recruited from community-based clinics and organizations, hospitals, transitional housing and recovery programs as well as university settings. Women were screened via phone for potential eligibility and then scheduled for an in-person visit. The phone screen eligibility criteria were as follows: 1) ≥ 18 years of age 2) Black or African American 3) English speaking 4) Cis-gender female, 5) Prescribed antiretroviral therapy for the past two months, at a minimum, 6) Indicated the possibility of low ART adherence, detectable viral load within the past year, and/or missed HIV-related medical visits within the past year and 7) Had a history of trauma. Participants completed baseline assessments (to determine eligibility for parent study randomization) that lasted for two visits over the course of two weeks at the research institution. Participants provided written informed consent and completed a semi-structured clinical interview and self-report measures using Research Electronic Data Capture ([REDCap], a secure web-based application)(Harris et al., 2009). These

study procedures and the measures below were approved by the Institutional Review Board at the University of Miami.

Measures

Demographic variables were measured via a demographic survey that was completed via self-report (see Table 1). The demographic survey assessed age, race, education level, income, employment status, relationship status, religion, and sexual orientation (see Table 1).

HIV antiretroviral therapy (ART) Adherence This was measured via self-report and the Wisepill, an electronic monitoring device. Self-report adherence was assessed by a brief measure that inquired about participants' adherence in the past week and past two weeks (Lu et al., 2008). The Wisepill device stores pills and facilitates the transmission of data to a research team via a web-based server in real time each time the device is opened by the participant (Haberer et al., 2010). Participants were asked to use the Wisepill device for one HIV medication that they used most frequently or found most difficult to take.

HIV Viral load Viral load was measured via blood specimens that were collected from participants at baseline visits or sometimes taken from medical records (if participants had completed HIV blood work within 30 days of their baseline assessment).

Latent Gendered Racial Microaggressions This latent variable was measured via the Gendered Racial Microaggressions Scale for Black Women (GRMS-BW). This 26-item scale assessed the experience of gendered racial microaggressions (GRMs) that are specific to Black women. The GRMS-BW consists of four subscales that correspond to the four indicators for this structural equation model. These subscales are: Assumptions of Beauty and Sexual Objectification, Silenced and Marginalized, Strong Black Woman and Angry Black Woman subscales. The GRMS-BW also consists of frequency and appraisal subscales, which measure how often microaggressions occur and the level of stress caused, respectively. The appraisal subscale was used given its salience in other work with BWLWH (Dale et al., 2021; Thompson & Dale, 2022). Response options for the appraisal subscale ranged from 0 (Never happened) to 5 (Extremely Stressful). This scale has demonstrated good internal consistency reliability in the original sample and the current sample ($\alpha=0.93$ and 0.95 respectively) (Lewis & Neville, 2015).

Latent Coping This latent variable was assessed via two indicators that were measured using the following scales:

Racism-related Coping was measured by the Racism-Related Coping Scale (RRCS). The RRCS consists of 56 items that evaluate coping behaviors that are used to deal with and counteract racism. The RRCS includes eight

Table 1 Socio-demographic Characteristics of Black women living with HIV ($N=119$)

Characteristics	Mean (SD) / N (%)
Age	49.27 (10.81)
<i>Education</i>	
Eighth grade or lower	6 (5)
Some high school	35 (29.4)
High school graduate/GED	41 (34.5)
Some college	29 (24.4)
College graduate	7 (5.9)
Some graduate school	1 (0.8)
<i>Income</i>	
Less than \$5000	43 (36.1)
\$5000 –\$11,999	32 (26.9)
\$12,000 – \$15,999	8 (6.7)
\$16,000 –\$24,999	6 (5)
\$25,000 –\$34,999	3 (2.5)
\$35,000–\$49,999	2 (1.7)
\$50,000 and greater	3 (2.5)
<i>Employment status</i>	
Full time work	8 (6.7)
Part time work	8 (6.7)
Full time or part time in school	5 (4.2)
Neither work nor school	26 (21.8)
On disability	69 (58)
Other	6 (5)
I choose not to answer	4 (3.4)
<i>Relationship status</i>	
Married	17 (14.5)
Cohabiting relationship, unmarried	18 (15.4)
Non-cohabiting relationship	15 (12.8)
Single	53 (45.3)
Divorced/separated	11 (9.4)
Widow or loss of partner	3 (2.5)
<i>Religion</i>	
Christian	32 (27.4)
Catholic	5 (4.3)
Baptist	62 (53)
None	9 (7.7)
Other	9 (7.7)
<i>Sexual orientation</i>	
Exclusively heterosexual	91 (79.8)
Heterosexual with some gay experience	11 (9.6)
Bisexual	8 (7)
Exclusively gay	4 (3.5)
Self-report adherence (past week)	4.76 (1.29)
Self-report adherence (past two weeks)	4.68 (1.23)
Wisepill ART adherence (Past two weeks)	92.56 (19.39)
Viral load (log)	1.77 (1.07)

subscales (e.g. Empowered action, Bargaining, and Anger Regulation). Response options range from 0 (Did not use/Did not apply) to 3 (Used a great deal). This measure demonstrated good internal consistency reliability in the original sample and the current study sample ($\alpha=0.80$ - 0.90 and 0.96 respectively) (Forsyth & Carter, 2012).

Religious coping was measured via the Positive Religious Coping subscale of the Brief RCOPE. This subscale consists of five items that assess the ways in which one copes with discrimination by using spirituality and religion. Response options range from 0 (Not at all) to 3 (A great deal). This subscale has demonstrated good internal consistency across studies (as demonstrated by a median Cronbach's alpha of 0.92 in the original sample and 0.86 in the current study's sample (Pargament et al., 2011).

Data analysis

Preliminary analyses were conducted in SPSS Version 28. Mplus version 8.8 was used to examine the possible moderating effects of coping on the relationship between latent GRMs and ART adherence (Muthén & Muthén, 2017). Descriptive statistics were generated for all variables included in the analysis. Missingness and tests of normality were assessed via data screening procedures and univariate statistics. Gendered-racial microaggression scores and religious coping scores were normally distributed, while racism-related coping scores had a positively skewed distribution. As such, linear transformations were conducted on the racism-related coping variable. Full information maximum likelihood estimation was used to manage missing data. Sum scores were calculated for racism-related coping items, while the mean score was computed for items measuring gendered racial microaggressions and religious coping.

A structural regression model was used to evaluate the relationship between latent GRMs, latent coping and adherence. The measurement model was tested by using Confirmatory Factor Analysis (CFA) for the latent factors of GRMs and coping. The following fit indices and cut-offs were used to determine acceptable model fit: Chi square test of model fit ($p > .05$), Root Mean Squared Error of Approximation (RMSEA; < 0.06), Comparative Fit and Tucker Lewis Indices (CFI/TLI; > 0.90) and Standardized Root Mean Square Residual (SRMR; < 0.08). After establishing model fit, the structural model was tested via interaction effects between each coping indicator and GRMs in relation to self-report adherence in the past week and two weeks as well as Wisepill adherence in the past two weeks. The XWITH command was used to define interaction terms. The command generates a latent interaction term between a latent factor and an observed variable in the context of a structural equation model (Maslowsky et al., 2015). For the purpose of the current study, the XWITH command was used to create

an interaction term between the latent GRMs factor and religious coping as well as the latent discrimination factor and racism-related coping. Significant interactions were followed by subsequent analysis of simple slopes by rerunning the model, using a moderator that was centered at 1 standard deviation (SD) above the mean and 1 SD below the mean. The proposed and final models are represented graphically in Figs. 1, 2, 3, 4 and 5.

Results

Data screening revealed no outliers or influential observations in the data. Normality of the distribution was checked graphically via Normal Probability plots and histograms of standardized residuals. Non-normal variables and those with outliers in the variance-covariance matrix underwent linear transformations. The percentage of data missing was less than 10%, which is within an acceptable range based on standard conventions in the field. Descriptive statistics were derived for the final sample of 119 women. The mean age of the sample was 49.27, 69% were educated at the high school level or lower and 79% were unemployed. The demographic characteristics of this sample are presented in Table 1. Other preliminary analyses were conducted. Results showed that Wisepill adherence in the past two weeks was moderately and positively correlated with self-report adherence in the past week ($r = .516$, $p < .01$) and two weeks ($r = .44$, $p < .01$).

Measurement model results

Latent factors of GRMS and coping were specified in the measurement model. Confirmatory factor analysis was conducted as the first step to assess the factor loadings under the corresponding latent discrimination factor and latent coping factor. The initial model that was specified indicated good model fit according to the Standardized Root Mean Squared Residual (SRMR = 0.077), while other indices did not suggest good model fit ($\chi^2(8) = 19.632$, $p = .0118$, CFI/TLI = $0.816/0.654$, RMSEA = 0.133). The CFA showed that the factor loadings on the GRMS latent factor were somewhat comparable (ranging from -0.279 to 0.810), while the two coping indicators had factor loadings of 0.647 and -0.461 (See Table 2). The respecified model fit the data better ($\chi^2(2) = 0.543$, $p = .7624$, CFI/TLI = 1 , RMSEA = 0 , SRMR = 0.023). In addition, the single factor model had standardized factor loadings ranging from -0.413 to 2.023 (See Table 3). Due to the low factor loading of -0.461 , racism-related coping and religious coping were treated as separate observed variables in subsequent analyses.

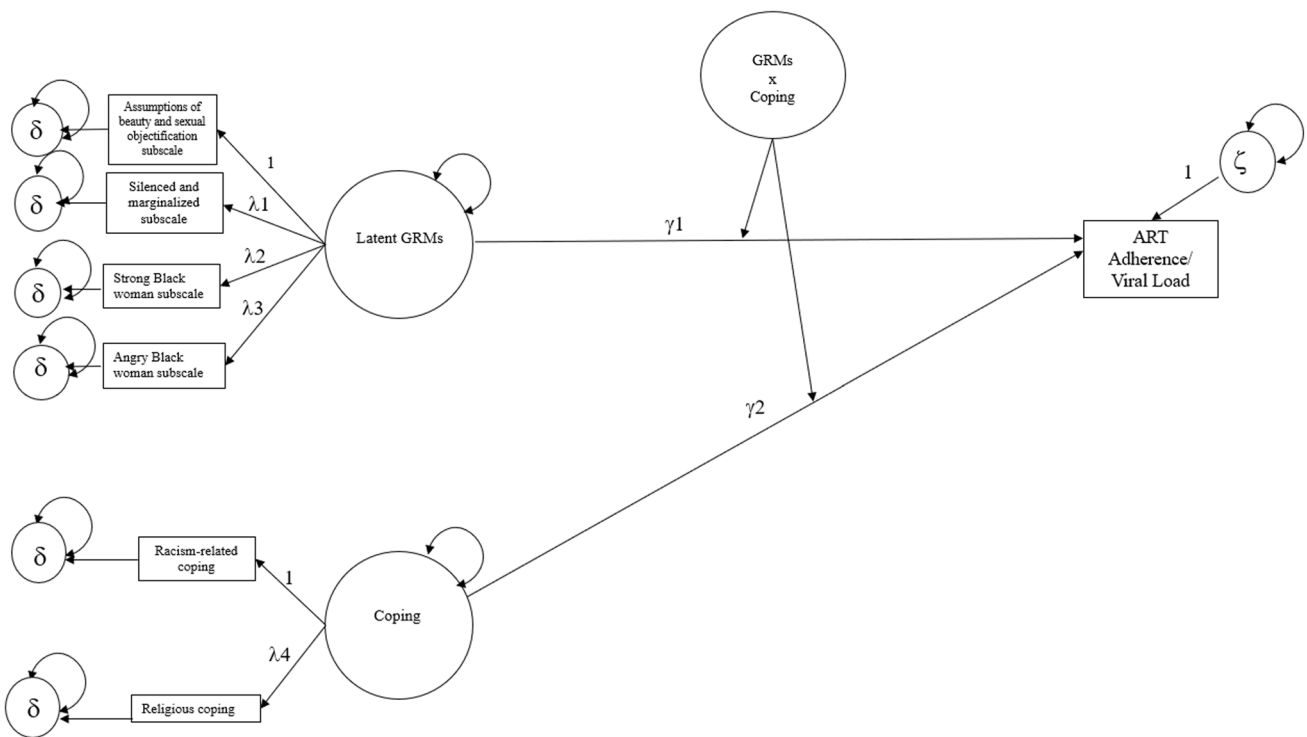


Fig. 1 Proposed structural regression model

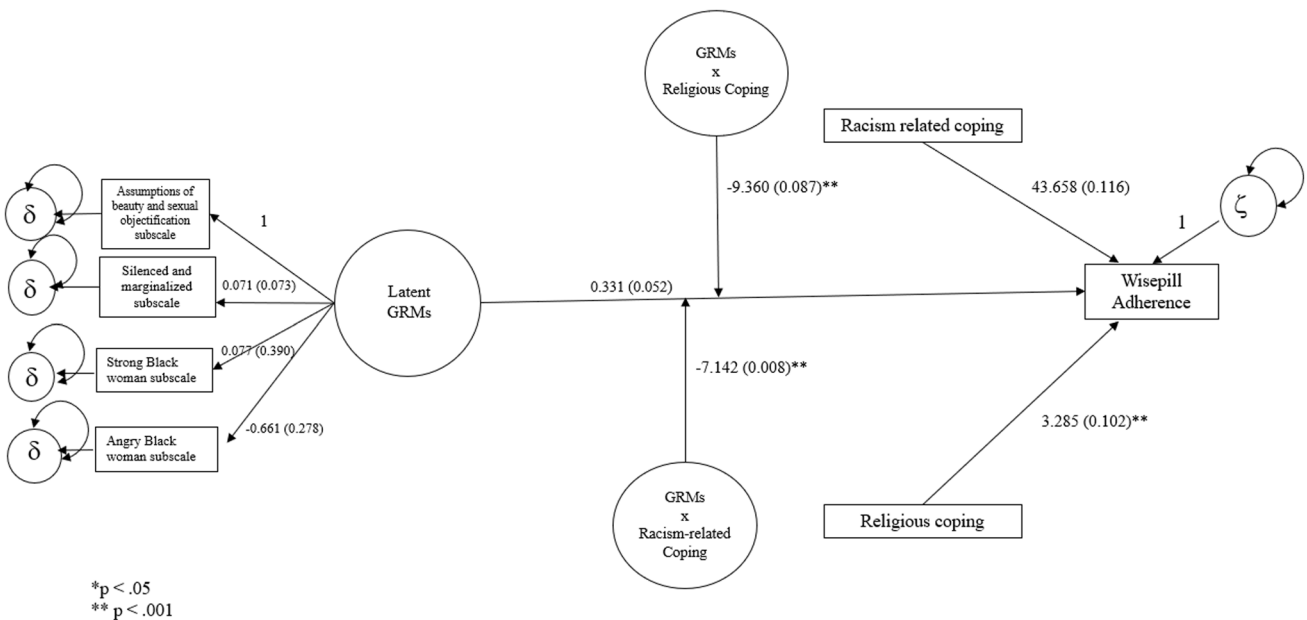


Fig. 2 Final structural regression model assessing outcome of Wisepill adherence

Structural model results

The main effects model tested latent GRMs, religious coping and racism-related coping as predictors of

self-report, Wisepill adherence, and viral load. Results indicated that religious coping significantly predicted higher self-report adherence in the past week ($\beta=0.773$, $b=0.427$, $SE=0.051$, 95% CI [0.673, 0.872], $p < .01$),

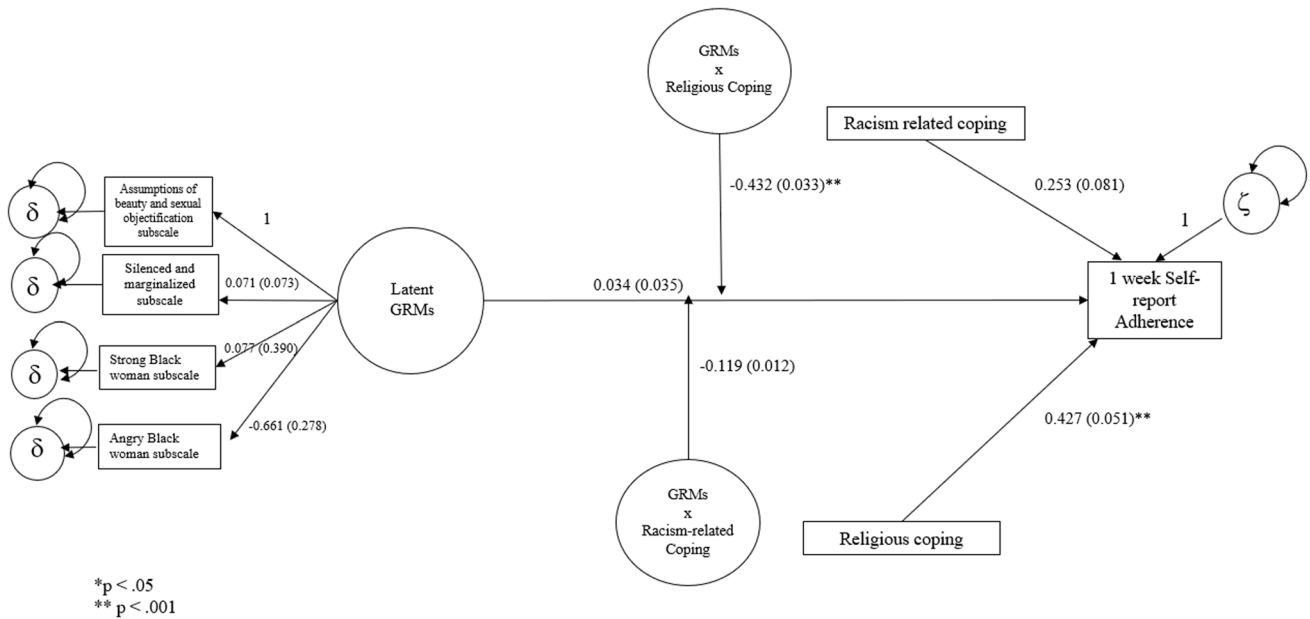


Fig. 3 Final structural regression model assessing outcome of one-week self-report adherence

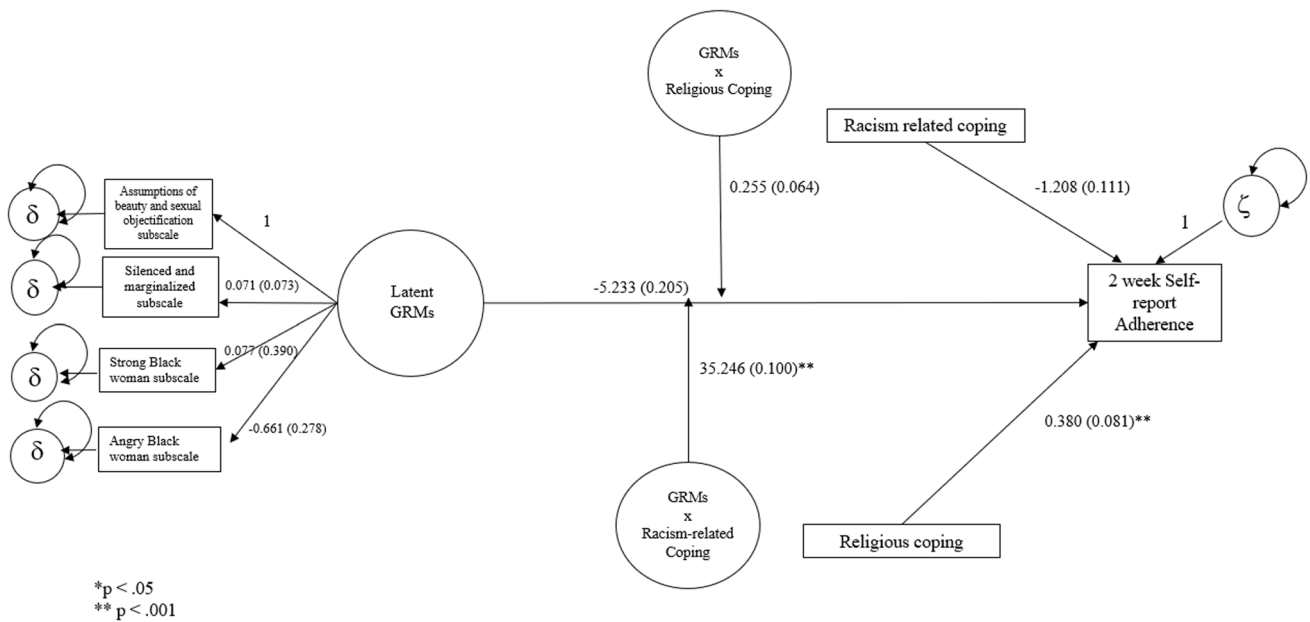


Fig. 4 Final structural regression model assessing outcome of two-week self-report adherence

higher self-report adherence in the past two weeks ($\beta = 0.552$, $b = 0.380$, $SE = 0.081$, 95% CI [0.392, 0.711], $p < .01$), higher Wisepill adherence in the past two weeks ($\beta = 0.398$, $b = 3.285$, $SE = 0.102$, 95% CI [0.198, 0.597], $p < .01$), and higher viral load ($\beta = 0.588$, $b = 0.432$, $SE = 0.068$, 95% CI [0.299, 0.564], $p < .01$). Racism-related coping and latent GRMs did not significantly predict any measure of ART adherence.

In order to conduct the test of moderation, adherence was regressed on the interaction between the latent GRMs factor and religious coping and also the interaction between the latent GRMs factor and racism-related coping. Given that the XWITH command required an Integration algorithm, model fit indices were not available for the moderation models.

Results showed that the interaction between latent GRMs and religious coping significantly predicted lower self-report

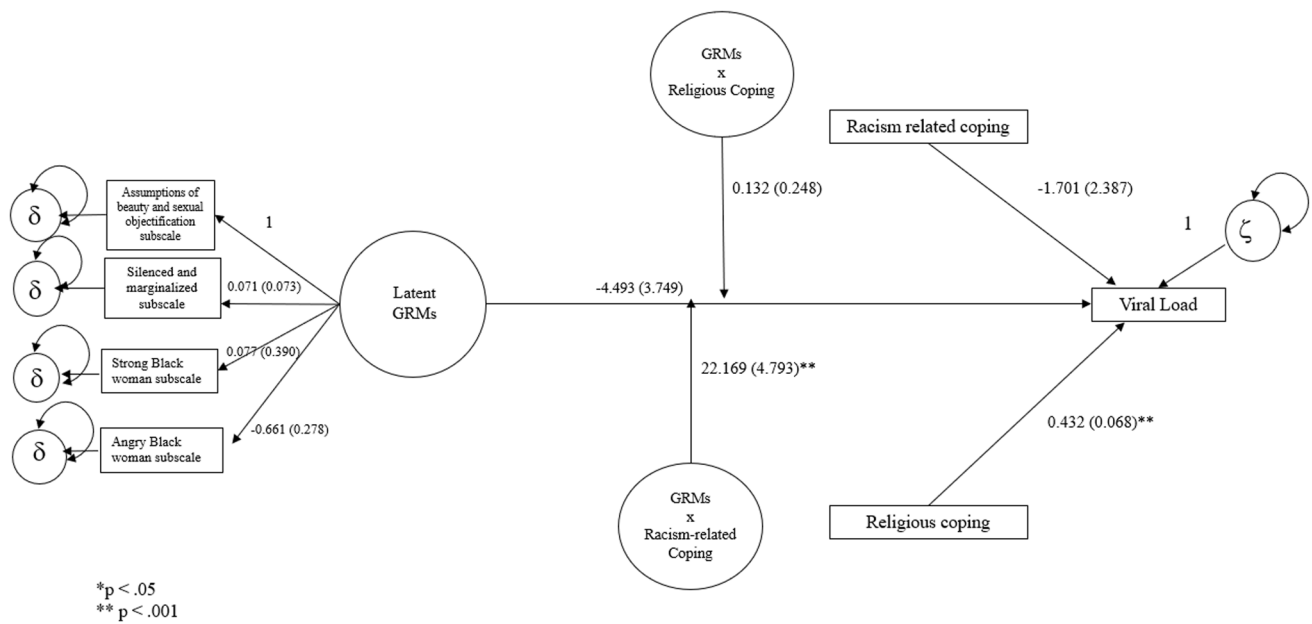


Fig. 5 Final structural regression model assessing outcome of viral load

Table 2 Factor Loadings of the Hypothesized Two-Factor Model

	β	b	SE	p value
<i>Latent gendered racial microaggressions</i>				
ABSO	0.810	1.000	0.129	0.000
SM	0.036	0.338	0.134	0.787
SBW	0.532	0.489	0.117	0.000
ABW	-0.279	-3.212	0.127	0.028
<i>Latent coping</i>				
Racism-related coping	0.647	1	0.130	0.000
Religious coping	-0.461	-22.705	0.117	0.000

ABSO Assumptions of Beauty and Sexual Objectification; SM Silenced and Marginalized; SBW Strong Black Woman stereotype; ABW Angry Black Woman stereotype

Table 3 Factor Loadings of the Respecified Single-Factor Model

	β	b	SE	p value
<i>Latent gendered racial microaggressions</i>				
ABSO	2.023	1.000	3.644	0.579
SM	0.019	0.071	0.073	0.795
SBW	0.210	0.077	0.390	0.591
ABW	-0.143	-0.661	0.278	0.606

ABSO Assumptions of Beauty and Sexual Objectification; SM Silenced and Marginalized; SBW Strong Black Woman stereotype; ABW Angry Black Woman stereotype

adherence in the past week ($\beta = -0.959, b = -0.432, SE = 0.033, 95\% CI [-1.023, -0.895], p < .01$) and lower Wisepill adherence in the past two weeks ($\beta = -0.815, b = -9.360, SE = 0.087, 95\% CI [-0.986, -0.645], p < .01$). Latent GRMs \times racism-related coping did not show significant effects on outcomes of self-report adherence in the past week or Wisepill adherence. Similarly, latent GRMs \times religious coping did not significantly predict viral load. Ironically, the interaction between latent GRMs and racism-related coping significantly predicted higher self-report adherence in the past two weeks ($\beta = 0.549, b = 35.246, SE = 0.100, 95\% CI [0.353, 0.745], p < .01$) and viral load ($\beta = 0.729, b = 22.169, SE = 4.793, 95\% CI [12.775, 31.564], p < .01$). However, GRMs \times racism-related coping did not significantly predict self-report adherence in the past week nor Wisepill adherence.

As a follow up to the significant interaction effect for religious coping, racism-related coping, and GRMs, simple slopes were examined for those with high religious and racism-related coping (i.e. 1 SD above the mean) and low religious and racism-related coping (1 SD below the mean). Results showed that, among women with high religious coping scores, latent GRMs significantly predicted lower Wisepill adherence in the past two weeks ($\beta = -0.603, b = -13.651, SE = 0.180, 95\% CI [-0.956, -0.250], p < .01$). Among women low in religious coping, latent GRMs also significantly predicted lower Wisepill adherence

in the past two weeks ($\beta = -0.693$, $b = -9.255$, $SE = 0.076$, 95% CI $[-0.842, -0.545]$, $p < .01$) and lower self-report adherence in the past week ($\beta = -0.373$, $b = -0.147$, $SE = 0.076$, 95% CI $[-0.523, -0.224]$, $p < .01$). Among women high in religious coping, latent GRMs did not significantly predict self-report adherence in the past week. Furthermore, among women high in racism-related coping, latent GRMs significantly predicted higher self-report adherence in the past two weeks ($\beta = 0.490$, $b = 12.366$, $SE = 3.499$, 95% CI $[0.215, 0.764]$, $p < .01$). Among women low in racism-related coping, latent GRMs significantly predicted lower self-report adherence in the past two weeks ($\beta = -0.066$, $b = -1.315$, $SE = 0.011$, 95% CI $[-0.087, -0.045]$, $p < .01$). In addition, among women high in racism-related coping, latent GRMs significantly predicted higher viral load ($\beta = 0.727$, $b = 4.344$, $SE = 1.280$, 95% CI $[1.834, 6.853]$, $p < .01$). Similarly, among women low in racism-related coping, latent GRMs significantly predicted higher viral load ($\beta = 0.727$, $b = 4.344$, $SE = 1.281$, 95% CI $[1.834, 6.854]$, $p < .01$). These results indicate a strong and positive relationship between GRMs and viral load among women high in racism-related coping and women low in race-related coping. In sum, the results showed that the simple slopes of GRMs and (a) Wisepill and (b) self-report adherence significantly differed between women with high religious coping and the women with low religious coping. Similarly, the simple slopes of GRMs and (a) self-report adherence and (b) viral load significantly differed between women who reported high racism-related coping and women who reported low racism-related coping (see Table 4).

Effect size estimates

Effect size estimates were derived from coefficients of determination (r^2), which has been used conventionally as an appropriate estimate of effect size (Lakens, 2013). Results showed that the model explained 14.6% of the variance in Wisepill adherence, 59.6% of the variance in self-report adherence in the past week, 42.7% of the variance in self-report adherence in the past two weeks, and 64.3% of the variance in viral load.

Discussion

This study is the first of its kind to investigate among BWLWH the moderating role of both religious and racism-related coping in the context of gendered racial microaggressions, ART adherence, and viral load, which is important given BWLWH's experiences of racism and sexism. Furthermore, the present study is also the first to demonstrate a moderating role of both religious coping and racism-related

coping in the relationship between gendered racial microaggressions, self-report and electronic adherence, and viral load. Previous work has focused on self-report adherence (Boarts et al., 2008; Omosanya et al., 2014b). However, the current study has incorporated two methods of data collection which allowed for useful comparisons and found consistent effects across both methods. Gendered racial microaggressions have also been explored in previous research as a predictor of barriers to HIV care (Dale et al., 2019), but has not been examined in the context of a moderation analysis in relation to ART adherence or viral load, thus bringing attention to the negative impact of this specific form of subtle discrimination that is particularly salient for BWLWH.

Our findings consistently showed main effects such that higher religious coping predicted higher self-report and Wisepill adherence and expands the current body of research which previously focused on HIV biomarkers such as viral load and CD4 count and have found both positive and negative associations of religiosity and viral load (Doolittle et al., 2018; Ironson et al., 2016; Szaflarski, 2013). The fact that religious coping predicted ART adherence and viral load is not surprising, given the consistent evidence of religious coping's effect on HIV health outcomes and its prevalence in the Black community (Dalmida et al., 2009; Doolittle et al., 2018; Ironson et al., 2016; Kelso et al., 2014).

The present study also showed significant interaction effects of religious coping \times GRMs on self-report adherence and Wisepill adherence. Beyond these significant interactions, our findings showed that, regardless of high or low levels of religious coping, GRMs predicted lower ART adherence based on both electronic monitoring and self-report in the past two weeks. It is possible that, although religious coping is generally associated with more ART adherence, this type of coping may buffer against the harmful effects of gendered racial microaggressions only to a certain degree. Significant interaction effects of racism-related coping \times GRMs on viral load were also found in the present study such that, among women with high and low racism-related coping, GRMs significantly predicted higher viral load. One potential explanation is that GRMs are harmful regardless of racism-related coping strategies, given that GRMs result from not only on racism, but also sexism. This reiterates the need to address GRMs and its impact given its implications for viral suppression.

Similarly, the present study showed significant interaction effects of racism-related coping \times GRMs on self-report adherence. Interestingly, among women high in racism-related coping, gendered racial microaggressions significantly predicted higher self-report adherence. However, among women low in racism-related coping, gendered racial microaggressions significantly predicted lower self-report adherence. A potential reason for this is that women who are already mobilizing coping skills

Table 4 Parameter Estimates Testing the Main and Interaction Effects of Coping and GRMs on Adherence and Viral Load

	Main effects				Interaction effects			
	β	<i>b</i>	<i>SE</i>	<i>p</i>	β	<i>b</i>	<i>SE</i>	<i>p</i>
1 WK SR Adherence on								
Latent GRMs	0.008	0.034	0.035	0.821	–	–	–	–
Religious coping	0.773	0.427	0.051	0.000	–	–	–	–
Racism-related coping	0.015	0.253	0.081	0.858	–	–	–	–
2 WK SR Adherence on								
Latent GRMs	–0.317	–5.233	0.205	0.121	–	–	–	–
Religious coping	0.552	0.380	0.081	0.000	–	–	–	–
Racism-related coping	–0.056	–1.208	0.111	0.617	–	–	–	–
WP Adherence on								
Latent GRMs	0.005	0.331	0.052	0.930	–	–	–	–
Religious coping	0.398	3.285	0.102	0.000	–	–	–	–
Racism-related coping	0.168	43.658	0.116	0.148	–	–	–	–
VL Log on								
Latent GRMs	–0.284	–4.493	3.749	0.231	–	–	–	–
Religious coping	0.588	0.432	0.068	0.000	–	–	–	–
Racism-related coping	–0.076	–1.701	2.387	0.476	–	–	–	–
1 WK adherence on latent GRMs × religious coping	–	–	–	–	–0.959	–0.432	0.033	0.000
1 WK adherence on latent GRMs × racism-related coping	–	–	–	–	–0.008	–0.119	0.012	0.490
2 WK adherence on latent GRMs × religious coping	–	–	–	–	0.125	0.255	0.064	0.052
2 WK adherence on latent GRMs × racism-related coping	–	–	–	–	0.549	35.246	0.100	0.000
WP adherence on latent GRMs × religious coping	–	–	–	–	–0.815	–9.360	0.087	0.000
WP adherence on latent GRMs × racism-related coping	–	–	–	–	–0.020	–7.142	0.008	0.016
VL Log on latent GRMs × religious coping	–	–	–	–	0.138	0.132	0.248	0.596
VL Log on latent GRMs × racism-related coping	–	–	–	–	0.729	22.169	4.793	0.000
High religious coping:								
WP adherence on latent GRMs					–0.603	–13.651	0.180	0.001
1 WK SR adherence on latent GRMs					–0.282	–0.193	0.158	0.075
Low religious coping:								
WP adherence on latent GRMs					–0.693	–9.255	0.076	0.000
1 WK adherence on latent GRMs					–0.373	–0.147	0.076	0.000
High racism-related coping:								
2 WK SR adherence on latent GRMs					0.490	12.366	3.499	0.000
Low racism-related coping:								
2 WK SR adherence on latent GRMs					–0.066	–1.315	0.011	0.000
Low racism-related coping:								
VL log on latent GRMs					0.727	4.344	1.281	0.001
High racism-related coping:								
VL log on latent GRMs					0.727	4.344	1.280	0.001

that directly address experiences of racism may be better equipped to maintain their medication regimen in the face of microaggressions based on racism and gender, while women with less of those coping resources may find it more difficult to maintain ART adherence in the context of these microaggressions. This further highlights a

challenge as BWLWH contend with the emotional labor and distress associated with combating these isms through coping resources, while there is great need to intervene at the structural level to decrease microaggressions and oppression in general. Overall, the significant interactions involving religious and racism-related coping make

sense conceptually given that both types of coping have historically been used in the context of various forms of discrimination and oppression in the Black community. This investigation of racism-related and religious coping properly acknowledges their role in BWLWH's response to microaggressions given that no prior study has quantitatively examined religious and racism-related coping in the context of ART adherence, viral load, and gendered racial microaggressions experienced by BWLWH.

The benefits and limitations of the methodology are to be acknowledged. The sample size ($n = 119$) utilized for this research study was relatively small and the power to detect additional significant effects may be improved by a larger sample size. Methodologically, the use of convenience sampling may limit the generalizability and a cross-sectional design limits the ability to determine causality. Further, the use of self-report measures of coping and microaggressions may have introduced social desirability bias in participant responses. In addition, due to known associations between key demographic variables (e.g., income, housing) with gendered racial microaggressions, adherence, and viral load, future research efforts may consider structuring the model to include covariates to account for demographic variables (Sue, 2010; Wright et al., 2022). This will allow for analyses to account for any unmeasured shared variance. However, the findings of this study must also be evaluated in the context of its strengths. The use of SEM in the current study provided an added benefit of allowing for the incorporation of a confirmatory factor analysis prior to tests of moderation. In contrast to tests of moderation in a generalized linear model approach, SEM allows for an understanding of the underlying factor structure and allows for the exploration of complex and multi-faceted relationships. Thus, the current body of research in this area has been expanded by using an SEM framework.

In conclusion, the current study assessed the differential roles of religious coping and racism-related coping as a moderator in the relationship between gendered racial microaggressions and ART adherence as well as viral load. The findings indicate that not only are racism-related and religious coping important predictors of HIV-related outcomes of adherence and viral load, but that racism-related and religious coping moderate the relationship between latent microaggression and self-report and electronic ART adherence, as well as viral load. Furthermore, the findings highlight the crucial need for interventions at the structural level to address GRMs, given that, even in the presence of coping resources, these microaggressions may still compromise BWLWH's ability to adhere to their ART regimen and achieve viral suppression. For example, the implementation of policies and laws to address racism and sexism faced by BWLWH may minimize the probability

of microaggressions and its sequelae (Dale et al., 2022). Nonetheless, our findings that the utilization of religious and racism-related coping by BWLWH may help to buffer against the effect of gendered racial microaggressions on adherence and VL highlights that these coping resources should be capitalized in interventions to enhance coping in the face of gendered racial microaggressions and improve ART adherence and VL among BWLWH. This study provides additional evidence base for beneficial coping strategies for BWLWH who face microaggressions at the intersection of racism and sexism. By extending these research efforts and gathering more data on the specific ways in which racism-related and religious coping interact with GRMs, interventions may be developed to improve adherence and viral suppression among BWLWH.

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Author contribution All persons listed as an author have participated adequately in this work and take responsibility for the content of this manuscript. Rachele Reid participated in the collection, analysis and interpretation of data, writing and revisions of the manuscript. As PI, Dr. Sannisha Dale conceptualized the design of the study and oversaw and participated in data collection, participated in the analysis and interpretation of the data, and provided revisions and guidance on drafts of the manuscript.

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Data availability The details and findings of the clinical trial, under which these research findings are subsumed, are available for open access at clinicaltrials.gov (Trial Registration Number: NCT02764853; Date of Registration: May 3, 2016).

Code availability N/A.

Declarations

Conflict of interest Unrelated to data in this manuscript, Dr. Dale is a co-investigator on a Merck & Co. funded project on "A Qualitative Study to Explore Biomedical HIV Prevention Preferences, Challenges and Facilitators among Diverse At-Risk Women Living in the United States" and has served as a workgroup consultant on engaging people living with HIV for Gilead Sciences, Inc. All other authors declare that they do not have relevant financial, non-financial interests nor competing interests to disclose.

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