



Psychometric Testing of the Daily Spiritual Experiences Scale (DSES) Among Black Gay, Bisexual, and Other Sexual Minority Men (SMM) and Black Transwomen in the Deep South: The MARI Study

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Abstract

Spirituality is a well-established protective psychosocial determinant of health. The current study examined the psychometric properties of the Daily Spiritual Experiences Scale (DSES) among Black gay, bisexual and other sexual minority men (SMM) and Black transwomen (TW) in the Deep South. Data were collected via self-interview technology and analyzed using factor analyses and correlation coefficients. We demonstrated a single-factor structure of the DSES with high internal consistency (Cronbach's $\alpha=0.96$). DSES was positively and significantly associated with multiple dimensions of religion, resilience, optimism and social support and not significantly associated with cynicism and anger expressions. Spirituality should be included in HIV prevention, treatment and care strategies focused on Black SMM and Black TW, especially those residing in the Deep South, USA.

Keywords Daily Spiritual Experiences Scale (DSES) · Sexual minority men (SMM) and transwomen · Resilience · Optimism · Social support

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Introduction

Religion and spirituality contribute to better health outcomes through behavioral, psychological and physiological mechanisms (Ellison & Levin, 1998; Koenig, 2015; Park et al., 2013; Schlundt et al., 2008) and are potentially relevant health determinants for certain segments of the United States (U.S.) population (Giger et al., 2008). Religion and spirituality are salient in the Black community, including Black gay, bisexual and sexual minority men (SMM), and are often used as healthy coping behaviors and stress reduction practices (Carter, 2002). A study found that Black SMM engaged in more organized and non-organized religious activities in the previous year and reported higher levels of spirituality than their White counterparts (Lassiter & Mims, 2021; O’Leary et al., 2007). Recent empirical studies demonstrate religion and spirituality to be inversely associated with human immunodeficiency virus (HIV) transmission and acquisition behaviors (e.g., condomless anal sex) (Billy et al., 1993; Davidson et al., 2004; Garofalo et al., 2015; Lefkowitz et al., 2004; Ross et al., 2004; Sikkema et al., 2009; Smallwood et al., 2017), HIV prevalence (Hampton et al., 2010; Watkins et al., 2016b), and positively associated with HIV viral load suppression (Kisenyi et al., 2013; Van Wagoner et al., 2014) in sexual and gender minority populations, including Black SMM and transwomen (TW).

Black SMM and TW experience the greatest burden of HIV in the US Black SMM, representing 26% of the almost 38,000 new HIV diagnoses that occurred in the U.S. in 2018. TW are 49 times more likely to be HIV-infected than the general population, with nearly one-quarter (28%) of TW living with HIV (Herbst et al., 2008). Black SMM and TW also report higher rates of tobacco (Fallin et al., 2015; Trocki et al., 2009), alcohol (Talley et al., 2010) and other drug use (King et al., 2008; Rosario et al., 2014; Trocki et al., 2009), mental health problems (King et al., 2008) and suicide ideation (Plöderl et al., 2013) than their Black heterosexual counterparts. Nonetheless, religion and spirituality may be protective factors against substance misuse, poor mental health outcomes and HIV transmission for Black SMM (Dangerfield et al., 2019; Drumhiller et al., 2018; Watkins et al., 2016a, 2016b; Winder, 2015). In a recent literature review, Lassiter and Parsons (2016) suggest that “religion and spirituality may be particularly salient for [SMM] of color and thus may influence [alcohol and drug use, mental health, and HIV acquisition and transmission] in different ways than their White counterparts.” For example, in a sample of SMM living with HIV in New York and San Francisco, Black SMM were more likely to report the importance of religion and spirituality in their daily lives than other racial/ethnic SMM (O’Leary et al., 2007). Conversely, other work has shown religiosity to be associated with psychosocial health problems among Black SMM in Nigeria (Ogunbajo et al., 2021). Black SMM oftentimes abandon religious practices (e.g., attending church services) because of discriminatory and stigmatizing messages and may rely on a personal sense of spirituality to remain resilient in spite of life’s challenges and stressors (Miller, 2007). There is a growing body of evidence that suggests the same may hold true for Black TW (Golub et al., 2010; Grossoehme et al., 2016;

Kim et al., 2017). For these reasons, theoretically sound and psychometrically robust measures are needed to adequately assess spirituality and its potential effects on the health of Black SMM and TW.

The Daily Spiritual Experiences Scale (DSES) is a multidimensional measure of an “...individual’s perception of the transcendent (God, the divine) in daily life and the perception of interaction with, or involvement of, the transcendent in daily life,” or how spiritual experiences are an important aspect of one’s daily life (Underwood & Teresi, 2002). The DSES is not limited to any particular religious denomination or tradition and includes dimensions consisting of awe, gratitude, mercy, compassion, wholeness and a sense of connection with and support from the transcendent. The DSES is one of the most widely used scales to capture spirituality in health studies (Underwood, 2011), including the landmark Jackson Heart Study—the largest cardiovascular epidemiologic study of cardiovascular disease among Black adults in Jackson, MS (Loustalot et al., 2011; Reeves et al., 2012), and has been translated into more than 40 languages, including Spanish, Korean and Arabic (Kalkstein & Tower, 2009; Lo et al., 2016). The DSES has not been used widely among Black SMM and TW. To our knowledge, no empirical studies have assessed the psychometric properties of the DSES among Black SMM and TW in the Deep South.

The Deep South is a five-state region (Alabama, Georgia, Louisiana, South Carolina, and Mississippi) in the Southeastern U.S. that is known as the *Bible Belt*, contains the largest population of Black adults. The Deep South has the highest HIV diagnosis rate and the highest number of individuals diagnosed with HIV in the U.S. Of note, the percentage of new HIV diagnoses among SMM in the Deep South has been increasing in recent years (Reif et al., 2017), suggesting the need for culturally appropriate approaches to end the HIV epidemic by 2030. Thus, we examined the construct and discriminant (convergent, divergent) validity of the DSES among a large, population-based sample of Black SMM and TW in Jackson, MS and Atlanta, GA. Also, we tested variation in psychometric properties of the DSES by age, HIV serostatus and study site.

Methods

Study Population

The present study is a secondary data analysis of a cross-sectional study of Black SMM and TW, called *The Ecological Study of Sexual Behaviors and HIV/STI among African American MSM in the Southeastern U.S. (The MARI Study)*. The *MARI Study* was a population-based cohort study initiated in 2013 in two metropolitan areas in the Deep South: Jackson, MS and Atlanta, GA. The study aimed to typify the HIV environmental “riskscape” of Black SMM and TW in the Deep South and to investigate the multi-level correlates of HIV risk and sexual behaviors (Hickson et al., 2015). Eligibility criteria were as follows: (1) being 18 years or older, (2) self-identifying as African-American or Black, (3) residence in Jackson, MS or Atlanta, GA, (4) assigned biological male sex at birth and (5) engaging in oral or anal sex with another man in the six months prior to study enrollment. Recruitment

took place between July 2013 and December 2015. Participants were recruited from the community through: (1) the distribution of printed advertisements at local colleges and universities, adult bookstores, bars, clubs and organizations that service African-American SMM; (2) face-to-face recruitment from local bars and clubs frequented by African-American SMM, and HIV prevention interventions, community events and other activities conducted by the partnering community-based organizations; (3) social networking Web sites/applications (“apps”), including Facebook and Twitter; (4) geospatial sexual networking “apps,” including Jack’d and Grindr; and (5) word-of-mouth referrals. The study visit included several health screenings and a study questionnaire, which lasted approximately 1.5 hours. Study protocols, including recruitment activities, have been described in detail elsewhere (Hickson et al., 2015; McNair et al., 2018). Ethical consideration was obtained from the Sterling Institutional Review Board, and all participants provided written informed consent.

Daily Spiritual Experiences Scale (DSES)

The DSES is a 16-item instrument designed to measure spiritual experiences such as feeling God’s presence and love (Underwood & Teresi, 2002). It was selected for use in the current study because of its previous use and psychometric properties in the Jackson Heart Study (Loustalot et al., 2011), which will allow for comparisons across populations in future studies. Participants were asked to rate the frequency of daily spiritual experiences on a 6-point scale from 1 = “never” to 6 = “many times a day.” In the current study, Item 4 (I feel strength in my religion.) and Item 5 (I feel comfort in my religion.) from the original scale were unintentionally combined during the programming of the ACASI survey, resulting in a 15-item measure (see Table 1). These two items have been shown to be highly correlated (Underwood, 2011) and have been included as a double-barreled item in a shortened 6-item DSES scale (Loustalot et al., 2011). The final question (In general, how close do you feel to God?) contained a 4-point response scale ranging from 1 = “not at all” to 4 = “as close as possible.” The total DSES scores ranged from 15 to 88 (original scale: 16 to 94), with higher scores indicating higher spirituality. The Cronbach’s α of the DSES in general and Black populations ranges from 0.86 to 0.96 (Loustalot et al., 2006, 2011; Skarupski et al., 2010), indicating excellent internal consistency.

Multiple Dimensions of Religiosity

Dimensions of religiosity included organized (i.e., attending church services) and non-organized (i.e., private prayer) religious activities as well as religious coping. The frequency (not at all, less than once a year, a few times a year, a few times a month, at least once a week or nearly every day) of organized religious activities was assessed using the question “In general, how often do you attend the main worship service of your church or otherwise participate in organizational religion?” (Koenig et al., 2001). Responses were coded from 1 to 6, respectively, with higher scores indicating more frequent organized religious activity participation. Non-organized religious activity

Table 1 Items and maximum likelihood factor analysis of the Daily Spiritual Experiences Scale among Black SMM and TW: The MARI Study, 2013–2014

Dimension	Items	Factor loadings
Transcendent Connection	DSES 1. I feel God's presence	0.796
Transcendent Support	DSES 2*. I feel strength and comfort in my religion	0.879
Wholeness	DSES 3. I feel deep inner peace and harmony	0.803
Longing for the Transcendent	DSES 4. I desire to be closer to or in union with God	0.836
Transcendent Support	DSES 5. I feel God's love for me directly	0.919
Transcendent Support	DSES 6. I feel God's love for me through others	0.815
Awe	DSES 7. I am spiritually touched by the beauty of creation	0.829
Transcendent Connection	DSES 8. I experience a connection to all of life	0.794
Transcendent Sense of Self	DSES 9. During worship, or at other times when connecting with God, I feel joy which lifts me out of my daily concerns	0.880
Transcendent Support	DSES 10. I ask for God's help in the midst of daily activities	0.860
Transcendent Support	DSES 11. I feel guided by God in the midst of daily activities	0.894
Gratitude	DSES 12. I feel thankful for my blessings	0.793
Compassion	DSES 13. I feel a selfless caring for others	0.540
Mercy	DSES 14. I accept others even when they do things I think are wrong	0.644
Longing for the Transcendent	DSES 15. In general, how close do you feel to God?	0.613

SMM gay, bisexual and other sexual minority men, *TW* transwomen

*This item was mistakenly included as a double-barreled item, rather than two separate items, during the programming of the audio computer-assisted self-interview (ACASI) survey, resulting in a 15-item DSES measure

was assessed by the question “Within your religious or spiritual tradition, how often do you pray privately or meditate in places other than at church, mosque, temple, or synagogue?” Participants reported the frequency of this practice on an 8-point scale (never, less than once a month, once a month, a few times a month, once a week, a few times a week, once a day or more than once a day), with a higher score indicating more frequent non-organized religious activity participation (Plante & Sherman, 2001). Religious coping (i.e., use of religious beliefs or practices in adapting to difficult life situations and stressful events; Pargament, 2001) was assessed using the question: “To what extent is your religion or spiritual tradition involved in understanding or dealing with stressful situations in any way?” on a 4-point scale (not involved at all, not very involved, somewhat involved and very involved) and coded from 1 to 4.

Psychosocial Resources Measures

The Connor-Davidson Resilience Scale (CD-RISC), a 25-item multidimensional instrument, assessed individual-level resilience, or the adaptive processes in

response to adversity, stress or the physiological consequences that may result from repeated or chronic exposures to such stressors or situations (e.g., I am able to adapt to change) (Connor & Davidson, 2003). Participants rated the accuracy of one's ability to adapt to adversity with a 5-point scale ranging from "not true at all" to "true all the time." Responses were coded from 0 to 4 and summed. The CD-RISC score ranged from 0 to 100, with higher scores denoting greater resilience. In the MARI Study, the Cronbach's α of the CD-RISC has been shown to be 0.97, suggesting exceptionally high internal consistency (McNair et al., 2018).

The Revised Life Orientation Test (LOT-R) is one of the most commonly used scales in measuring dispositional optimism (Scheier & Carver, 1985). Participants indicated the extent of their agreement with statements about positive expectations for future outcomes with a 5-point scale (from strongly disagree to strongly agree). The total LOT-R score ranged from 0 to 24, with higher scores indicating greater optimism. The Cronbach's α of the LOT-R in the current sample was 0.79, suggesting acceptable internal consistency.

Social support from three sources (family, friends, and a special person) was measured using the Multidimensional Scale of Perceived Social Support (MSPSS; Zimet et al., 1988). Participants rated their agreement with the availability of support on a 5-point scale ranging from "strongly disagree" to "strongly agree," that was coded from 1 to 5. The MSPSS score is an equally weighted sum of the 12 items, with scores ranging from 12 to 60. In the current study, one item was omitted during the programming of the ACASI and another item was included as a double-barreled item. This resulted in a 10-item scale with scores ranging from 10 to 50; the higher the total MSPSS score, the greater the perceived social support. The Cronbach's α in the current sample was 0.93, suggesting excellent internal consistency.

Cynicism

Items 1–13 of the Cook-Medley Hostility Scale (Barefoot et al., 1989) measured cynicism, where participants were asked to answer "true or false" on such items "... It is safer to trust nobody." We calculated a total score (range 0–13), where higher scores indicate higher distrust ($\alpha = 0.76$).

Anger

Anger expression was assessed using a validated scale that measured anger-in and anger-out (both 8 items) (Spielberger et al., 1988). Participants were asked how often they reacted to such items as "I express my anger" that were rated from almost never (1) to almost always (4). Anger-in and anger-out scores ranged from 0 to 23 (anger-in; $\alpha = 0.77$) and 0 to 22 (anger-out; $\alpha = 0.77$), where higher scores indicate higher anger.

Statistical Analysis

First, to establish construct validity, confirmatory factor analysis (CFA) was conducted to validate the a priori structure of the DSES (Barrett, 2007). We conducted the chi-squared test to assess the fit between the sample covariance matrix and the matrix implied by the models. Next, we computed the root-mean-square error of approximation (RMSEA; i.e., a measure of how well the observed variables in combination serve as measuring instruments for all latent variables jointly) as well as the goodness-of-fit index (GFI), comparative fit index (CFI), and normed (NFI) and non-normed fit (NNFI) indices to measure model fit. A chi-squared p value ≥ 0.05 and values ≤ 0.06 for the RMSEA, ≥ 0.90 for the GFI and CFI, and ≥ 0.95 for the NFI and NNFI indicated acceptable model fit (Barrett, 2007; Lance et al., 2006; Sivo et al., 2006). Next, secondary exploratory factor analysis (EFA) with varimax rotation was conducted to detect survey items with low and inadequate factor loadings that would otherwise be deleted, or interpreted with caution. Standardized path coefficients for the items that exceeded 0.30 were considered meaningful and indicate the resultant structure of the DSES (Peterson, 2000). Subsequently, the Tucker and Lewis reliability coefficient was used to assess the reliability of the final factor structure. The internal consistency estimate was determined by using Cronbach's α , a statistical measure that assesses the extent to which items in an index measure the same construct.

Discriminant (convergent and divergent) validity, was assessed by calculating Pearson and Spearman correlation coefficients among the DSES, multiple dimensions of religion, psychosocial resources cynicism and anger.

Descriptive statistics of the DSES were then computed by age category (18–24, 25–29, and 30+ years), HIV serostatus at enrollment (living or not living with HIV) and study site (Jackson, MS and Atlanta, GA). Differences in DSES scores across categories were tested using analysis of variance, chi-squared tests and t-tests.

Hypothesis testing was two-sided with a nominal type I error rate of 0.05. Descriptive statistics and correlation coefficients were performed in IBM SPSS (Statistical Package for the Social Sciences) Version 22. CFA and EFA were performed in SAS (Statistical Analysis Software) Version 9.3 (SAS Institute, Inc.; Cary, NC).

Results

Of the 465 participants enrolled in the study, 103 were excluded because of unavailable ACASI survey data and missing or incomplete DSES data, leaving 362 (78%) participants in the analytic sample. The mean (SD) age of study participants was 30.5 (11.2) years and 68% self-identified as homosexual/gay (Table 2). At the enrollment visit, 34% were previously diagnosed with HIV and 4% were newly diagnosed with HIV. The distribution of the DSES, dimensions of religion, psychosocial resources, and cynicism and anger measures are displayed in Table 2.

The chi-squared statistic was significant, $\chi^2(90) = 615.43$ $p < 0.001$, but Hu and Bentler (1999) caution against the sole use of the chi-squared value in assessing the fit of the model because of its sensitivity to sample size. The CFA also produced a

Table 2 Demographic Characteristics of Black SMM and TW in The MARI study, 2013–2014 (N = 362)

Variables	%	N/mean (standard deviation)
Age, years*	30.5 (11.2)	
18–24	42.0	152
25–29	19.6	71
> 30	38.4	139
Hispanic ethnicity	2.2	8
Transgender identity	7.7	42
Sexual Orientation		
Homosexual/Gay	68.0	246
Bisexual	26.8	97
Other ^a	5.2	19
HIV status		
Previously diagnosed with HIV	34.3	121
Newly diagnosed with HIV	3.7	13
Not living with HIV	62.0	219
Study Site		
Jackson, MS	59.1	214
Atlanta, GA	40.9	148
Daily Spiritual Experiences Scale*		54.3(17.8)
Organized Religion*		3.4 (1.4)
Non-organized Religion*		5.7 (1.3)
Religious Coping*		2.9 (0.8)
Resilience*		80.3 (18.1)
Dispositional Optimism*		17.8 (2.6)
Social Support*		48.3 (5.1)
Cynicism		4.3 (1.9)
Anger expressions		
Anger-in		9.5 (0.7)
Anger-out		9.3 (0.9)

SMM gay, bisexual and other sexual minority men, *TW* transwomen

*Data are mean (standard deviation)

^aIncludes Heterosexual/Straight, Questioning, and Do Not Identify with any of these categories

factor structure with marginal model fit (RMSEA = 0.1265). Although the CFI suggested acceptable model fit (0.90), the GFI (0.82), NNI (0.89) and NNFI (0.89) did not meet the acceptable criteria for model fit. The mixed model fit criteria suggested the need for EFA to determine the proper factor structure and item composition.

The secondary EFA yielded three initial factors (eigenvalues: 40.715, 1.654, and 1.158, respectively). After varimax rotation, the factor loadings for several of the items exceeded 0.50 in the three-factor solution (Table 3), suggesting that these items are correlated with more than one factor and that a reduced structure is

Table 3 Factor loadings: three-factor structure of the Daily Spiritual Experiences Scale

Item	Factor 1	Factor 2	Factor 3
DSES 1. Feel God's presence	0.707	0.373	0.184
DSES 2. Find strength and comfort in my religion*	0.709	0.458	0.269
DSES 3. Feel deep inner peace and harmony	0.743	0.274	0.286
DSES 4. Desire to be closer to God	0.680	0.400	0.286
DSES 5. Feel God's love for me directly	0.723	0.492	0.290
DSES 6. Feel God's love for me through others	0.662	0.386	0.281
DSES 7. Spiritually touched by the beauty of creation	0.721	0.302	0.349
DSES 8. Experience a connection to all of life	0.661	0.362	0.280
DSES 9. Feel joy when connecting	0.635	0.499	0.343
DSES 10. Ask for God's help in the midst of daily activities	0.452	0.770	0.266
DSES 11. Feel guided by God in the midst of daily activities	0.506	0.733	0.310
DSES 12. Feel thankful for my blessings	0.430	0.571	0.414
DSES 13. Selfless caring for others	0.270	0.261	0.522
DSES 14. Accept others even when they do things I think are wrong	0.257	0.208	0.941
DSES 15. How close do you feel to God	0.407	0.419	0.213

The MARI study, 2013–2014

*This item was unintentionally included as a double-barreled item, rather than two separate items, during the programming of the audio computer-assisted self-interview (ACASI) survey, resulting in a 15-item DSES measure

Factors loading higher than 0.5 are bolded and suggest significance

needed to ensure that survey items loaded highly onto a single factor. The two-factor structure also produced evidence of cross-loading (Table 4). The factor loadings of the one-factor solution ranged from 0.540 to 0.919 and were highly significant (Table 1), suggesting appropriate construct validity. Although the correlation coefficients between the items of the DSES and the religion measures were statistically significant ($P_s < 0.05$), they maintained only weak to moderately strong correlations (0.122 to 0.500). In addition, the Cronbach's α for the one-factor structure was 0.96 (95% CI 0.95–0.97), suggesting a highly acceptable internal consistency reliability.

While there were no overall significant differences across age categories, participants living with HIV [71.6 (standard deviation (SD)= 14.4) versus participants not living with HIV 67.7 (17.8), $p=0.033$] and participants at the Jackson, MS study site [71.7 (14.3) versus participant at the Atlanta, GA study site 65.3 (19.1), $p < 0.001$] reported greater daily spiritual experiences, compared to their respective counterparts (Table 5). In addition, mean differences in the individual survey items were observed by age, HIV serostatus and study site (Table 5).

Table 4 Factor loadings: two-factor structure with varimax rotation

Item	Factor 1	Factor 2
DSES 1. Feel God's presence	0.672	0.447
DSES 2. Find strength and comfort in my religion*	0.692	0.546
DSES 3. Feel deep inner peace and harmony	0.751	0.376
DSES 4. Desire to be closer to God	0.686	0.485
DSES 5. Feel God's love for me directly	0.709	0.585
DSES 6. Feel God's love for me through others	0.664	0.477
DSES 7. Spiritually touched by the beauty of creation	0.752	0.412
DSES 8. Experience a connection to all of life	0.669	0.450
DSES 9. Feel joy when connecting	0.643	0.597
DSES 10. Ask for God's help in the midst of daily activities	0.422	0.823
DSES 11. Feel guided by God in the midst of daily activities	0.475	0.820
DSES 12. Feel thankful for my blessings	0.461	0.670
DSES 13. Selfless caring for others	0.374	0.387
DSES 14. Accept others even when they do things I think are wrong	0.467	0.438
DSES 15. How close do you feel to God	0.388	0.486

The MARI study, 2013–2014

*This item was unintentionally included as a double-barreled item, rather than two separate items, during the programming of the audio computer-assisted self-interview (ACASI) survey, resulting in a 15-item DSES measure

Factors loading higher than 0.5 are bolded and suggest significance

Discriminant Validity

DSES scores were weak to moderately, positively and significantly correlated with organized religion ($r=0.167$ – 0.449 , all $ps < 0.05$), non-organized religion ($r=0.297$ – 0.511 , all $ps < 0.001$) and religious coping ($r=0.167$ – 0.345 , all $ps < 0.05$) across age categories, HIV serostatus, and study site. The DSES was also weak to moderately, positively and significantly correlated with resilience (0.373 and 0.249, $p < 0.01$), optimism (among younger participants only: 0.267, $p < 0.001$) and social support (0.151 and 0.288, $ps < 0.05$). The DSES was positively correlated with resilience ($r=0.253$, $p < 0.01$) and optimism ($r=0.209$, $p < 0.05$) among participants living with HIV, whereas the DSES was positively correlated with social support ($r=0.280$, $p < 0.001$), resilience ($r=0.398$, $p < 0.001$) and optimism ($r=0.239$, $p < 0.001$) among participants not living with HIV. The DSES was positively correlated with resilience ($r=0.341$) and optimism ($r=0.237$) among participants in Jackson, MS, and positively correlated with social support ($r=0.234$ and $r=0.206$, $p < 0.01$) among participants in Jackson, MS, and Atlanta, GA. The DSES was negatively associated with cynicism (0.033–0.080, $ps > 0.05$) and anger (0.016–0.025, $ps > 0.05$), but these correlations were not statistically significant (data not shown).

Additional sensitivity analyses were performed to evaluate the robustness of our findings. Results omitting Black TW ($n=42$) did not markedly differ from the primary results (data not shown).

Table 5 Distribution of the Daily Spiritual Experiences Scale by Age and HIV status among Black SMM and TW in the Deep South

	Total				HIV status	
	Age (in years)				HIV +	HIV-
	18–24	25–29	30+			
Total score	69.1 (16.7)	69.2 (17.8)	67.6 (16.6)	71.6 (14.4)*	67.7 (17.8)*	
1. Feel God’s presence	4.60 (1.47)	4.57 (1.49)	4.74 (1.38)	4.86 (1.31)*	4.48 (1.54)*	
2. Find strength and comfort in my religion	4.72 (1.37)	4.68 (1.41)	4.71 (1.41)	4.95 (1.14)*	4.58 (1.48)*	
3. Feel deep inner peace and harmony	4.50 (1.46)	4.42 (1.50)	4.47 (1.45)	4.73 (1.27)*	4.37 (1.55)*	
4. Desire to be closer to God	4.91 (1.24)	4.82 (1.37)	4.73 (1.31)	5.02 (1.15)	4.85 (1.30)	
5. Feel God’s love for me directly	4.82 (1.32)	4.82 (1.38)	4.73 (1.31)	4.96 (1.16)	4.74 (1.41)	
6. Spiritually touched by the beauty of creation	4.69 (1.44)	4.89 (1.37)	4.74 (1.29)	5.05 (1.11)*	4.75 (1.41)*	
7. Experience a connection to all of life	4.86 (1.31)	4.73 (1.43)	4.65 (1.36)	4.95 (1.18)*	4.56 (1.52)*	
8. During worship or other times connecting with God, feel joy which lifts me out of my daily concerns	4.70 (1.42)	4.64 (1.49)	4.56 (1.40)	4.90 (1.19)*	4.49 (1.57)*	
9. Ask for God’s help in the midst of daily activities	4.64 (1.45)	4.84 (1.50)	4.78 (1.34)	5.03 (1.22)*	4.71 (1.50)*	
10. Feel guided by God in the midst of daily activities	4.82 (1.41)	4.72 (1.51)	4.68 (1.38)	4.98 (1.20)**	4.54 (1.54)**	
11. Feel thankful for my blessings	4.69 (1.44)	5.23 (1.19)	4.93 (1.20)	5.17 (1.10)	5.05 (1.26)	
12. Selfless caring for others	5.10 (1.20)	4.45 (1.66)***	4.00 (1.84)***	4.36 (1.76)	4.50 (1.64)	
13. Accept others even when they do things I think are wrong	4.42 (1.70)	4.85 (1.46)**	4.34 (1.48)**	4.76 (1.34)	4.67 (1.46)	
14. Feel God’s love for me through others	4.69 (1.42)	4.70 (1.52)	4.49 (1.46)	4.76 (1.32)	4.65 (1.50)	
15. How close do you feel to God	2.99 (0.88)	3.08 (0.92)	3.05 (0.87)	3.14 (0.82)*	2.90 (0.90)*	

The MARI Study, 2013–2014

SMM gay, bisexual and other sexual minority men, TW transwomen

Bolded text signifies a statistically significant difference. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Discussion

This study provides the first known investigation of the psychometric properties (construct and discriminant validity) of the DSES in a large population-based sample of Black SMM and TW in the Deep South. Although the CFA revealed mixed model fit, the EFA indicated a one-factor solution that exhibited excellent internal consistency reliability, which suggests construct validity and alignment with the singular construct of the original DSES (Underwood & Teresi, 2002).

The convergent validity of the DSES demonstrates that total scores are weak to moderately and positively correlated with organizational and non-organizational religion, as well as with religious coping. This key result is in line with previous research that suggests, while religion and spirituality are related, they are distinct from each other (Mattis, 2000; Zinnbauer et al., 1997). DSES scores were also significantly and positively correlated with resilience, optimism and social support, which reinforced the idea that spirituality could function as a protective factor against adverse experiences and is associated with a positive disposition (Foster et al., 2011). Also, the constructs selected to assess divergent validity (anger and cynicism) were not significantly correlated with DSES scores, suggesting divergent validity of the DSES. Future research should include a more robust assessment of convergent and divergent validity with the DSES.

The study results provided an opportunity to characterize spirituality among Black SMM and TW in the Deep South. The overall mean for the DSES was 69.1 (range 15–88), suggesting relatively high levels of spirituality. This finding is consistent with results of other studies which have found that the Black community, in general, report higher levels of religiosity and spirituality compared to their racial/ethnic counterparts (Chatters et al., 2008; Cotton et al., 2006b). Also, the Deep South is widely regarded as the “Bible Belt” in the U.S., and national studies have documented higher levels of spirituality and religiosity in this region of the U.S. compared to other regions.

We found that levels of spirituality differed by HIV status and study site, with higher DSES scores reported by participants living with HIV and those living in the Jackson, MS metropolitan area. These findings are consistent with previous research. First, spirituality has been shown to be an important coping mechanism for persons living with HIV. In a study by Cotton et al. (2006a), people living with HIV indicated that spirituality was an important component in their lives. Furthermore, Black Americans living with HIV/AIDS tended to believe in the positive effect of religion and spirituality on their longevity more than their white counterparts (Cotton et al., 2006b). Second, rural–urban differences have also been noted wherein those who reside in more rural areas report higher religiosity than those who reside in urban areas (Carlson et al., 1981; Rogers et al., 1988). Although both Jackson, MS, and Atlanta, GA, are capitals of their respective states and centers of their respective metropolitan statistical areas (MSAs), the Jackson MSA is considerably smaller in population and the areas surrounding it are significantly more rural.

Results of the present study provide support for the use of the DSES in measuring spirituality among Black SMM and TW, especially in light of the salience of

spirituality in the HIV environmental riskscape of these populations. In our study and throughout the literature, spirituality has been associated with factors that can protect against HIV infection and increase positive health outcomes among people living with HIV. Therefore, spirituality should be strongly considered as a key component of interventions designed to promote HIV testing, risk behavior modification, medication adherence and disclosure (Lassiter et al., 2020). For example, positive spiritual coping has been associated with an undetectable viral load, medication adherence and higher CD4 counts among people living with HIV in contrast to individuals who demonstrate negative spiritual coping (Ironson & Kremer, 2009; Kremer et al., 2015). These findings support the utility of incorporating spirituality into the development and implementation of culturally specific HIV prevention and care initiatives for Black SMM and TW.

There is also a critical public health need for religious, spiritual and other community leaders to explore the use of spirituality as a means to challenge anti-LGBTQ+ stigma and prejudice and promote legislation that protect the LGBTQ+ community, specifically in the Deep South. Previous research has shown that state-level pro-LGBTQ+ policies are associated with better mental and physical outcomes for SMM (Hatzenbuehler et al., 2009, 2012). Progressive faith-based organizations may be especially interested in assessing spirituality among this population in order to identify ways to foster spiritual development and, consequently, resilience and coping skills (Hill & McNeely, 2011; Woods-Jaeger et al., 2015). Because spirituality is a unique context for the health and well-being of Black SMM and TW, it is important to utilize psychometrically sound, survey-based measures to adequately assess this protective factor in empirical research. The present study provides support for the use of the DSES as one such measure.

This study is not without limitations. First, the use of a cross-sectional design does not allow us to determine the durability (state versus trait) of spirituality as a protective psychosocial factor. Second, this study did not consider other scales specifically designed to empirically measure spirituality among Black Americans (e.g., The Spirituality Scale; Jagers & Smith, 1996). Third, this study only included Black SMM and TW living in two MSAs in the Deep South, which limits our ability to generalize to SMM of other races, ethnicities and geographical locations. Fourth, this study sampled both Black SMM and TW. While Black SMM and TW face many of the same issues in faith-based settings and conceal their sexual and gender identity in these contexts, they also have unique challenges and differentially impacted by stigma, discrimination and violence. Further work is needed to longitudinally measure differences in the quantification of spirituality among Black SMM and TW over time.

In conclusion, findings from the current study suggest that the DSES is a reliable, valid measure for assessing religiosity and spirituality and may be an important context for high-impact HIV prevention, treatment and care efforts among Black SMM and TW in the Deep South. Future research should further examine differences in experiences of spirituality among Black SMM and TW based on HIV serostatus as well as rural and urban dwelling. Such investigations may yield new insights into the lived experiences of Black SMM and TW, which will inform the development and implementation of faith-based and mindfulness interventions designed to reduce

HIV incidence, increase positive coping skills and achieve viral suppression among this population.

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Availability of Data and Material Due to the sensitivity of the subject matter and the study population, the data are not publicly available.

Code Availability Not applicable.

Declarations

Conflict of interest We have no known conflict of interest to disclose.

Ethical Statement This manuscript is not currently being considered for publication at any other journal. The study protocols were approved by Sterling Institutional Review Board.

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