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The relationship between religious beliefs and behaviors and changes in spiritual health locus of control over time in a national sample of African Americans

Eddie M. Clark, PhD¹ [Professor], Jin Huang, PhD² [Senior Biostatistician], David L. Roth, PhD³ [Professor and Director], Emily Schulz, PhD, OTR/L, CFLE⁴ [Associate Professor], Beverly Rosa Williams, PhD⁵, and Cheryl L. Holt, PhD⁶ [FAAHB, Professor]

¹Department of Psychology, Saint Louis University, Morrissey Hall, 3700 Lindell Blvd., St. Louis, MO 63108, USA. clarkem@slu.edu. Phone: (314) 977-2272

²Center on Aging and Health, Johns Hopkins University, Baltimore MD, 21205, USA. jhuang75@jhmi.edu. Phone: (410) 502-6635

³Center on Aging and Health, Johns Hopkins University, Baltimore MD, 21205, USA. droth@jhu.edu. Phone: (410) 955-0491

⁴Department of Occupational Therapy, A.T. Still University, Arizona School of Health Sciences, 5850 E. Still Circle, Mesa, AZ 85206, USA. eschulz@atsu.edu. Phone: (480) 245-6255

⁵UAB Comprehensive Center for Healthy Aging, CH19 218K, 1720 2nd Ave S, Birmingham, AL 35294-1304, USA. beverlywilliams@uabmc.edu. Phone: (205) 789-5814

⁶Department of Behavioral and Community Health, 2369 School of Public Health Bldg. (255), 422 Valley Drive, School of Public Health, University of Maryland, College Park, MD 20742, USA. cholt14@umd.edu. Phone: (301) 405-6659

Abstract

Using data from a sample of African Americans, the present study examined the role of religious beliefs and behaviors in predicting changes in spiritual health locus of control (SHLOC), or beliefs about the role that God plays in a person's health. A national sample of African American adults was recruited using a telephone survey and re-contacted 2.5 years later. Overall, results indicated that both higher religious beliefs and behaviors predicted increases in active SHLOC, or the view that one collaboratively works with God to maintain one's health. However, only religious behaviors predicted increases in passive SHLOC, or the view that because God is in complete control of health that one's own behaviors are unnecessary. Among men, religious beliefs predicted strengthening active SHLOC beliefs, while religious behaviors predicted growing passive SHLOC beliefs. Among women, religious behaviors predicted strengthening active and passive SHLOC beliefs.

Keywords

religiosity; locus of control; African Americans; health

Religion's importance to African Americans perceptions of health

African Americans are both more religious (Chatters, Taylor, Bullard, & Jackson, 2009) and have poorer health outcomes (National Center for Health Statistics, 2007) than the average American. Health disparities between ethnic groups make it imperative to understand the relationship between religiosity and health among African Americans. Extant research has documented greater mortality for African Americans compared to other ethnic groups in areas such as heart disease, prostate cancer, colorectal cancer, breast cancer, and diabetes (National Center for Health Statistics, 2007; Williams, 2012).

Historically, religion has been an integral part of African American culture. Using data from the National Survey of American Life, Chatters, Taylor, Bullard, and Jackson (2009) found high levels of religious involvement among African Americans, including church membership, prayer, and reading religious material. Belgrave and Allison (2014) report data from the Barna Group indicating that African Americans were more likely to report reading the Bible every week, having attended services in the past week, and endorsing Biblical inerrancy compared to Whites, Hispanics, and Asians. Belgrave and Allison (2014) explained that African American churches provide opportunities for belonging, stability, affirmation, and connection with others. Churches often administer health-related instrumental support such as health fairs, childcare, food pantries, and counseling services for members and non-members (Belgrave & Allison, 2014).

Prior research suggests that religious involvement is positively associated with health behaviors and outcomes among African Americans (Bediako et al., 2011; Holt, Clark, & Roth, 2014; Waldron-Perrine et al., 2011). Bediako et al. (2011) found that greater positive religious coping was associated with fewer hospital admissions among African Americans with sickle-cell disease. Waldron-Perrine et al. (2011) found, in a mostly African American sample with brain injury, that those who felt a stronger connection to a higher power reported higher life satisfaction, functional ability, and less distress. In a sample of African American adults, Holt et al. (2014) found that religious beliefs and behaviors predicted higher fruit consumption, less smoking, and lower alcohol use.

Religiosity and health locus of control

Researchers have speculated about the influence of people's religiosity and their perceived control over health outcomes (Gonnerman, Lutz, Yehieli, & Meisinger, 2008; Holt, Roth, Huang, & Clark, 2015; Karvinen & Carr, 2014; Moore, 2014; Ryan & Francis, 2012). However, most of the extant research is cross-sectional and does not examine changes in perception of control over time. Does religiosity influence change in health-related locus of control over time? Do persons relatively high in religiosity, compared to those who are less religious, decrease their belief that they control their health outcomes or strengthen their beliefs that God controls their health outcomes? Perhaps highly religious persons strengthen

their beliefs that their health outcomes are a function of their own influence as well as God's influence.

As noted, the relationship between religiosity and health-related locus of control has been examined cross-sectionally, not longitudinally. Loewenthal and Cornwall (1993) found that religious participants perceived God as a causal agent in health-related events more frequently than did nonreligious participants. In their review article, Kay, Gaucher, McGregor, and Nash (2010) suggest that religious beliefs can serve as an external form of control that compensates for lowered personal control and help protect against anxiety, confusion, or uncertainty. In a sample of adult African American Protestants, Gonnerman, Lutz, Yehieli, and Meisinger (2008) found that internal health locus of control was associated with higher overall health promotion behavior levels, better nutrition, more physical activity, higher stress management, and more spiritual growth. Further, they found that powerful others health locus was related to higher levels of physical activity and lower levels of church attendance. Health God control (attributing health to God's sovereignty) was related to higher levels of overall health promotion behavior and higher church attendance. Spiritual growth was related to higher overall health promotion, better nutrition, higher physical activity levels, higher health responsibility, and better stress management.

In a sample of older adults, Krause (2010) found that compared to less frequent church attenders, those with more frequent church attendance had stronger God-mediated control beliefs (beliefs that God and the individual work together to influence the individual's life events). Additionally, those with stronger God-mediated control beliefs had a greater sense of meaning and optimism than those with weaker God-mediated control and consequently rated their health as more favorable over time than those with lower sense of meaning and optimism (Krause, 2010).

In summary, prior research suggests a complex relationship between religiosity and health-related locus of control such that higher levels of religiosity are related to higher levels of both internal and external health-related locus of control. Usually, highly religious persons do not depend solely on a higher power to determine their health; instead the individuals take responsibility for their own health outcomes, thus using a combination of internal and external loci of control.

Spiritual health locus of control

There are several approaches to examining the perceived relationship between God and control including Pargament's conception of collaborative vs. deferring coping (Pargament & Raiya, 2007) and Krause's concept of God-mediated control (Hayward & Krause, 2013). Consistent with these approaches, Holt and colleagues developed the spiritual health locus of control scale (SHLOC), which assesses the extent to which one perceives their health outcomes as a result of their own actions, those of a higher power, or some combination of the two (Debnam, Holt, Clark, Roth, Foushee, Crowther, Fouad, & Southward, 2012; Holt, Clark, Kreuter, & Rubio, 2003; Le, Holt, Roth, Huang, & Clark, 2015). Using a sample of African American adults, Holt and colleagues (2003) found evidence for two SHLOC dimensions. Active SHLOC is the belief that God empowers the individual to take care of

one's self ("Even though I trust God to take care of me, I still need to take care of myself"). Passive SHLOC is the belief that a higher power controls one's health such that the individual does not take health protective actions ("There is no point to taking care of myself when it's all up to God anyway"). The passive SHLOC dimension is similar to the one dimensional God Health Locus of Control construct (Wallston, Malcarne, Flores, Hansdottir, Smith, Stein, Weisman, & Clements, 1999), while the active SHLOC dimension is similar to Krause (2010)'s God Mediated Locus of Control construct. Further, Active SHLOC is similar to Pargament's positive religious coping, and Passive SHLOC is comparable to his negative religious coping and spiritual struggle concepts.

In a sample of African American adults, Debnam et al. (2012) found that active SHLOC beliefs were associated with higher fruit consumption and lower alcohol use. Higher passive SHLOC beliefs were associated with lower vegetable intake and higher alcohol consumption. In a study of African American church parishioners' health, Holt, Lewellyn, & Rathweg (2005) found that SHLOC was mentioned as important to the relationship between religiosity and health. Holt, Roth, Huang, and Clark (2015) suggest that gender differences may be important, finding that among African American women, religious behaviors were associated with lower alcohol use and this effect was more pronounced among those with a higher active SHLOC. However, they found that among African American men, the combination of lower religious beliefs and higher passive SHLOC was associated with higher alcohol consumption.

Expectancy value theory

Expectancy value theory may help explain the relationship between religious beliefs and behaviors and changes in health locus of control over time. Expectancy value theory suggests that behavior is a function of one's *learned expectancies*, which includes one's confidence in their ability to succeed in accomplishing a task (e.g., self-efficacy) and *value* or one's perception of the usefulness, enjoyment, or relevance of the behavior (Chen & Chen, 2012; Eccles, 1983; Gibbons, Houlihan, & Gerrard, 2009). Lefcourt (1976) states that locus of control is a generalized expectancy for an individual's perceptions of what is controlled by him/her (internal locus) or by the environment including powerful others (external locus). Jacobs-Lawson, Waddell, and Webb (2011) suggest that some persons, such as older adults, may partially relinquish perceptions of internal control and recognize that others may impact their health. These changes in perceptions allow people to maintain self-esteem and take responsibility for their own health while realizing that other entities (e.g., health professionals, God) or situational factors can positively or negatively impact their health.

Expectancy value theory explains how beliefs develop over time through a person's experiences. The theory may explain how a person's health locus of control beliefs could change over time due to their reinforcement experiences and consequently change their expectancies. In addition, religious beliefs and behaviors play an important role in shaping such experiences and expectancies (Coursey, Kenworth, & Jones, 2013; Ryan, 2012), so we predict that they will have an impact on health locus of control beliefs over time. Expectancy value theory would suggest that religious beliefs may influence one's perceptions of how

confident they are in determining their own health outcomes and the value, usefulness, and relevance of such outcomes. This, in turn, may influence one's perceptions of their own control and God's control over their health.

Present study

Most prior studies indicate a relationship between religious involvement and health-related locus of control beliefs involving God. Based on an expectancy-value theory conception of locus of control, we predict a relationship between religious involvement and change in SHLOC beliefs over time in our adult African American sample. We could not locate any prior research examining the relationship between religious involvement and changes in health locus of control over time. Such information may have implications for developing health-related interventions, especially for churches and other faith communities. It also will add to our knowledge of the possible influence of religious involvement on locus of control among African Americans who, on average, view religion as central to their lives and also suffer from poorer health outcomes compared to some other ethnic groups. It should be noted that the original data collection (at Time 1) did not include a planned follow-up assessment. However, once funding became available, these participants were re-contacted and asked about a possible follow-up (see Method below for more details). The present study examines if and how religious beliefs and behaviors are associated with changes in SHLOC beliefs over time, using two waves of data from a national longitudinal study of African American adults.

Hypotheses

Since prior studies suggest that religiosity may be related to both higher internal locus of control and higher external locus of control (e.g., Coursey, Kenworthy, & Jones, 2013; Krause, 2010), we predicted higher religious involvement (beliefs and behaviors) will predict an increase in both active and passive SHLOC from Time 1 to Time 2. While we do not know of any research on religiosity and changes in locus of control, we speculate that most churches teach a combination of "God-self collaboration" (active SHLOC) and "God in complete control" (passive SHLOC) regarding health issues, leading participants to report a combination of active and passive SHLOC beliefs. Given the evidence that both the patterns of religious involvement and the relationship between religious involvement and SHLOC differ by gender (Flannelly, Galek, Kytte, & Sifton, 2010; Holt, Roth, Huang, & Clark, 2015), we also examined women and men separately but did not propose specific hypotheses.

Method

Participants

All participants were part of the Religion and Health in African Americans study (RHIAA) and were African American adults living in the United States who were 21 or more years of age at the Time 1 interview. The study sample was assembled by Opinion America, an external contractor.

Telephone survey methods

Using probability-based methods, a professional sampling firm generated a list of households from publicly available data such as motor vehicle records from all 50 United States. Trained interviewers dialed telephone numbers from this call list, asking to speak to an adult who lived in the household. Telephone calls were attempted and 19% of those contacted agreed to participate at Time 1. Most of those who refused did so before the study was explained and eligibility was determined. Of those who were determined to be eligible, 94% agreed to participate in the study. The interviewers introduced the project and if the individual spoke English and expressed interest, then the interviewer administered a brief eligibility screener to determine whether they self-identified as African American and age 21 or older. Eligible individuals were screened for cancer history since cancer diagnosis was an exclusion criterion. Eligible contacts provided verbal assent after hearing an informed consent script. Upon completion of the Time 1 interview, participants received a \$25 gift card by mail.

A total of 3,173 participants (1281 men, 1892 women) completed measures at Time 1 and 1,251 of these participants (456 men, 795 women) completed the Time 2 interview, resulting in a retention rate of 39.4%. While the retention rate may seem low, it should be noted that the original study (at Time 1) did not include a planned follow-up assessment. However, once funding became available, these participants were re-contacted and asked about a possible follow-up. Time 2 interviews were conducted approximately 2.5 years after the Time 1 interviews. As we did after the Time 1 interview, we mailed participants a \$25 gift card after the Time 2 interview. In addition to the gift card incentive, we also mailed participants an unexpected small gift (e.g., letter opener, tote bag) as an additional thank you for their participation at Time 2. Previous analyses of retention in the RHIAA study found that the retained participants were slightly but significantly older, more educated, more likely to be female, and less likely to report “poor” self-rated health status than those who were not retained from Time 1 to Time 2 (Holt, Le, et al., 2015).

Measures

Religious involvement—Religious involvement was assessed using an instrument previously validated for use with African Americans (Lukwago, Kreuter, Bucholtz, Holt, & Clark, 2001; Roth, Mwase, Holt, Clark, Lukwago, & Kreuter, 2012). This 9-item instrument assesses two components: *religious beliefs* (e.g., “I feel the presence of God in my life.”; “I have a close personal relationship with God.”; Cronbach’s $\alpha = .91$ in present sample) and *religious behaviors* (e.g., church service attendance, involvement in other church activities; talking openly about faith with others; Cronbach’s $\alpha = .73$ in present sample). Seven items use a 5-point Likert-type format, and two monthly service attendance items use a 3-point response format. Scores can range from 4 to 20 for religious beliefs and 5 to 21 for religious behaviors, with higher scores indicating higher religious involvement.

Spiritual health locus of control—The SHLOC scale is a 13-item measure that, as described above, has two dimensions. Active SHLOC (11 items) involves the belief that God empowers the individual to be proactive about health behaviors or works in partnership with God to maintain good health ($\alpha = 0.91$). Passive SHLOC (2 items) measures the belief that

because God has control over one's health, the individual does not have to engage in health protective behaviors ($r = 0.57$). While the Passive SHLOC scale has only two items, both reliability and predictive validity have been confirmed in previous research (e.g., Debnam et al., 2012; Holt et al., 2003). Participants responded to these items on a 5-point Likert-type format (strongly disagree, disagree, neutral, agree, strongly agree). The two factor structure and predictive validity has been demonstrated for this instrument (Debnam et al., 2012; Holt et al., 2003). Scores can range from 11 to 55 for active SHLOC and 2 to 10 for passive SHLOC, with higher scores indicating stronger beliefs.

Demographics—Standard interview questions were used to assess demographic characteristics including age, gender, education, health status, and marital status.

Statistical analysis

Pearson correlations and ordinary linear regression analyses were used to examine the relationship between religious beliefs, religious behaviors, and change in active and passive SHLOC. The control variables of Time 1 (T1) SHLOC, age, gender, education, health status, and marital status were also entered into the equations. In addition, we examined these results separately for males and females so gender was omitted as a control variable in these latter analyses.

Results

Demographics

As noted above, 1,251 participants (456 men, 795 women) completed both the Time 1 and Time 2 interviews. Participants' average age at T1 was 57.6 years ($SD = 13.3$). Over twenty-nine percent (29.3%) had four years or more of college, 27.8% had 1–3 years of college, 32.0% had a high school diploma or GED, and 10.9% had less than a high school education. Thirty-eight percent were currently married or living with a partner. The median income was \$30,001–\$40,000. Seventy-three percent (73.0%) of the sample rated their health as “good”, “very good”, or “excellent”.

Correlations

Table 1 contains the means and standard deviations of the primary variables. Table 2 contains intercorrelations for the study variables, and Table 3 contains the intercorrelations for men and women separately (women's correlations are above the diagonal and men's correlations are below the diagonal). As shown in Table 2, religious beliefs and behaviors are correlated with active SHLOC and change in active SHLOC. The correlations of religious beliefs and religious behaviors with passive SHLOC and change in passive SHLOC are either small or nonsignificant. Active SHLOC and passive SHLOC are slightly but significantly and positively correlated, and these trends hold for both men and women (Table 3).

Regression analyses

All participants—Table 4 contains the regression analyses for all participants (men and women combined; left side of the table). The first analysis examined the relationship

between religious beliefs and behaviors on change in active SHLOC controlling for T1 active SHLOC, age, gender, education, health status, and marital status. Consistent with our hypotheses, religious beliefs at T1 were associated with an increase in active SHLOC from T1 to T2 ($\beta = .09, p = .01$). Similarly, religious behaviors scores at T1 were associated with an increase in active SHLOC ($\beta = .10, p < .01$).

We then performed similar analyses on change in passive SHLOC. Consistent with our hypotheses, religious behaviors scores predicted an increase in passive SHLOC over time ($\beta = .11, p < .01$). However contrary to our hypotheses, religious beliefs scores were marginally related to a decrease in passive SHLOC ($\beta = -.05, p = 0.07$).

Men and Women Separately—Similar analyses were performed separately for men and women on change in SHLOC (Table 4, right side of the table). For men, religious beliefs scores predicted an increase in active SHLOC over time ($\beta = .20, p < .01$), while religious behaviors were not significantly related to changes in active SHLOC. Further, for men, religious behaviors predicted an increase in passive SHLOC over time ($\beta = .17, p < .01$) whereas religious beliefs were not related to changes in passive SHLOC. For women, religious behaviors were related to an increase in active SHLOC over time ($\beta = .16, p < .01$), but religious beliefs were not significantly related to changes in active SHLOC. In addition, for women, religious beliefs were related to a decrease in passive SHLOC ($\beta = -.10, p < .01$) and higher religious behaviors scores at T1 were related to an increase in passive SHLOC at T2 ($\beta = .07, p = .03$).

Discussion

The present study examines if and how religious beliefs and behaviors are associated with changes in spiritual health locus of control beliefs over time, using two waves of data from a national longitudinal sample of African American adults. While there is extant research on the relationship between religiosity and health (e.g., Bediako et al., 2011; Waldron-Perrine et al., 2011), religiosity and locus of control (e.g., Krause, 2010; Loewenthal and Cornwall, 1993), and locus of control and health (e.g., Holt, Roth, Huang, & Clark, 2015), there is no research on whether religiosity predicts changes in health-related locus of control over time.

Consistent with expectancy-value theory, we found that higher religious beliefs and religious behaviors scores predicted greater change in active SHLOC over 2.5 years, such that higher religious beliefs and behaviors scores predicted stronger belief that the person and God work together to maintain their health (active SHLOC). However, less consistent with expectancy-value theory, the results differed by gender. A positive relationship between religious involvement and increased active SHLOC is driven by religious beliefs among men but by religious behaviors among women. These gender differences may be due to the tendency of women to be more active in church than men (e.g., attend services and Bible study classes, actively engage in various ministries) and learn from others in their faith community (Flannelly, Galek, Kytte, & Sifton, 2010). Gilkes (2001) explains that organizational involvement and interpersonal engagement historically have been empowering for African American women, used as a way to shape social change, and reflect their collectivism as well as their autonomy. In contrast, African American men's lower attendance may result in

fewer active connections to congregational activities even though men still have a collaborative view of themselves and God when it comes to health behaviors. Perhaps men use religious belief related cognitions of prayer and introspection (e.g., pray for guidance in healing, awareness of presence of God) to cultivate the God-self collaborative view reflected in active SHLOC. Additionally, perhaps men engage in more practical non-congregational behaviors to cultivate active SHLOC. Taylor, Chatters, Bullard, Wallace, and Jackson (2009) found that even though older African American women reported higher levels of religious participation than older African American men, the men reported more hours per week at places of worship than women. Taylor et al. (2009) speculate that this is due men engaging in volunteer, non-congregational tasks at the church such as cleaning, mowing the lawn, opening and closing the buildings, and repair work in addition to congregational activities such as choir and Bible study.

In addition, religious behaviors (but not religious beliefs) predicted a greater increase in passive SHLOC for both men and women over 2.5 years, such that those who reported more religious behaviors predicted greater increases in the view that God is in complete control of one's health such that personal health protective behaviors are not necessary. However, for women, religious beliefs predicted a decrease in passive SHLOC while there was no significant relationship for men. These results for women's religious beliefs predicting lower passive SHLOC may be due to a statistical suppression effect since, in general, religious beliefs and behaviors are positively correlated with both passive and active SHLOC (see correlation matrix - Table 2).

Limitations and future research

There are several limitations to the present study. First, we rely on self-report data. Participants' responses regarding their religious or health behaviors may have been influenced by social desirability concerns or affected by inaccurate recall. Second, like most longitudinal studies, we were not able to collect follow-up data on all participants (e.g., persons with poorer health status were less likely to be retained), so it is not known how that may have affected our results. Third, our sample cannot be considered representative of the entire African American population since, as noted in the Method section, prior analyses of retention in the RHIAA study found that the retained participants were slightly but significantly older, more educated, more likely to be female, and less likely to report "poor" self-rated health status than those who were not retained from Time 1 to Time 2 (Holt, Le, et al., 2015). Therefore, the findings should be interpreted cautiously since they may be less applicable to those who are younger, less educated, and/or in poor health. Fourth, also as acknowledged in the Method section, our response rate at T1 was relatively low, further hindering the sample's representativeness. However, the sample was comprised of was a very large national sampling of African Americans chosen using probability-based methods and unlike many other studies, included a large number of African American men. Finally, we could not experimentally manipulate religious involvement and randomly assign participants to religious involvement groups, so we cannot definitively conclude that religious involvement causes changes in SHLOC. However, since this was a longitudinal study, we now have more information about possible causal processes that we would not have gathered from a cross-sectional study.

Future research should continue examining the relationship between religious beliefs and behaviors on locus of control over time. On average, we followed participants for 2.5 years, but it would be helpful to extend this time period. Also, more research is needed on the differential effects of religious beliefs and behaviors among men and women and to identify the underlying mechanisms accounting for these differences (e.g., higher religious involvement of women compared to men). Additionally, more research is needed to examine how individuals cognitively and affectively conceptualize active vs. passive SHLOC. We speculate that participants are reporting a combination of perceptions of “God-self collaboration” and “God in complete control” when it comes to their health, with the former being more prevalent. The results are also consistent with Jacobs-Lawson, Waddell, and Webb (2011) who state that persons may take responsibility for their own health while realizing that other factors (like God in our study) may impact their health, which may facilitate self-esteem maintenance. Relatedly, it would be interesting to examine the content and effects of church teachings about the relationship between God, self, and health on congregants’ health behaviors. Consistent with our results, perhaps many churches teach a combination of “God-self collaboration” (e.g., “I can do all things through Christ who strengthens me” - Philippians 4:13) and “God is in complete control” (e.g., “...if you diligently heed the voice of the Lord your God...I will put none of the diseases on you that I have brought on the Egyptians...” – Exodus 15:26) regarding health issues. Further, it is important to examine possible moderators of this relationship. For example, perhaps church teachings and participants’ subsequent beliefs reflect the salience of more active SHLOC beliefs in some situations (e.g., coping with minor or everyday health issues such as the common cold, diet, physical activity) and the salience of more passive SHLOC beliefs in severe situations where the person objectively is little control (e.g., after the individual has tried medical treatments for a serious health condition that have been ineffective, so there is more reliance on God being in control).

Potential Applications

Finally, applied research is needed on crafting health education interventions using participants’ religious beliefs, behaviors, and their perceptions of control, in particular targeting those who are part of faith communities. Given the importance and prevalence of religious beliefs and behaviors among African Americans, such information could help churches as well as lay health educators better tailor their interventions to this population (Kreuter, et al., 2005). For example, Kreuter et al. (2005) have included religiosity in tailoring cancer prevention health information to African American adults. Clergy and medical professionals can help people with low active or high passive SHLOC realize that even with religious faith that it is important to take responsibility for one’s health and to take advantage of the resources around them, using scriptures from religious texts (Clark, Holt, Wang, Williams, & Schulz, 2013). Clergy and health ministries may be able to develop programs that may shape parishioners’ perceptions of SHLOC to aid them in increasing health-enhancing and decreasing health compromising behaviors.

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Table 1

Means and standard deviations for religious involvement and spiritual health locus of control at Time 1 and Time 2

Variable	All participants, M $\pm$ SD (n=1251)	Men, M $\pm$ SD (n=456)	Women, M $\pm$ SD (n=795)
Religious beliefs (T1)	17.73 $\pm$ 2.88	17.07 $\pm$ 3.52	18.10 $\pm$ 2.37
Religious behaviors (T1)	16.10 $\pm$ 3.45	15.28 $\pm$ 3.65	16.56 $\pm$ 3.24
Active SHLOC (T1)	45.15 $\pm$ 7.27	44.61 $\pm$ 8.44	45.45 $\pm$ 6.50
Passive SHLOC (T1)	3.77 $\pm$ 1.60	3.69 $\pm$ 1.70	3.82 $\pm$ 1.54
Religious beliefs (T2)	17.73 $\pm$ 2.81	17.10 $\pm$ 3.44	18.09 $\pm$ 2.31
Religious behaviors (T2)	16.25 $\pm$ 3.49	15.23 $\pm$ 3.84	16.83 $\pm$ 3.13
Active SHLOC (T2)	45.32 $\pm$ 7.56	45.12 $\pm$ 8.99	45.44 $\pm$ 6.60
Passive SHLOC (T2)	3.83 $\pm$ 1.68	3.82 $\pm$ 1.82	3.83 $\pm$ 1.60
Change in active SHLOC	0.29 $\pm$ 6.65	0.63 $\pm$ 6.79	0.10 $\pm$ 6.56
Change in passive SHLOC	0.06 $\pm$ 1.85	0.14 $\pm$ 1.85	0.01 $\pm$ 1.85

Note: SHLOC = spiritual health locus of control. T1 = Time 1. T2 = Time 2. Scores can range from 4–20 for religious beliefs and 5–21 for religious behaviors, with higher scores indicating higher religious involvement. Scores can range from 11–55 for active SHLOC and 2–10 for passive SHLOC, with higher scores indicating more of the respective construct.

Table 2

Pearson correlation matrix for all participants (n=1251)

	Religious beliefs (T1)	Religious behaviors (T1)	Active SHLOC (T1)	Passive SHLOC (T1)	Religious beliefs (T2)	Religious behaviors (T2)	Active SHLOC (T2)	Passive SHLOC (T2)	Change in active SHLOC	Change in passive SHLOC
Religious beliefs (T1)	-									
Religious behaviors (T1)	.56***	-								
Active SHLOC (T1)	.52***	.42***	-							
Passive SHLOC (T1)	-.04	-.01	.14***	-						
Religious beliefs (T2)	.56***	.40***	.42***	.01	-					
Religious behaviors (T2)	.42***	.65***	.38***	.05	.58***	-				
Active SHLOC (T2)	.40***	.35***	.59***	.13***	.61***	.47***	-			
Passive SHLOC (T2)	-.01	.09**	.20***	.37***	.00	.06*	.16***	-		
Change in active SHLOC	-.13***	-.07*	-.43***	-.01	.22***	.10***	.48***	-.03	-	
Change in passive SHLOC	.02	.08**	.05	-.53***	-.02	.01	.03	.59***	-.02	-

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

Table 3

Pearson correlation matrix among men (n=456) and women (n = 795)

	Religious beliefs (T1)	Religious behaviors (T1)	Active SHLOC (T1)	Passive SHLOC (T1)	Religious beliefs (T2)	Religious behaviors (T2)	Active SHLOC (T2)	Passive SHLOC (T2)	Change in active SHLOC	Change in passive SHLOC
Religious beliefs (T1)	-	.50***	.40***	-.13***	.38***	.30***	.23***	-.11**	-.16***	.01
Religious behaviors (T1)	.61***	-	.36***	-.04	.33***	.58***	.30***	.01	-.05	.05
Active SHLOC (T1)	.65***	.49***	-	.12***	.26***	.28***	.49***	.14***	-.50***	.02
Passive SHLOC (T1)	.04	.03	.17***	-	-.06	.02	.10**	.31***	-.01	-.56***
Religious beliefs (T2)	.69***	.44***	.57***	.08	-	.55***	.49***	-.11**	.22***	-.05
Religious behaviors (T2)	.49***	.70***	.49***	.07	.58***	-	.40***	-.01	.10**	-.02
Active SHLOC (T2)	.55***	.41***	.68***	.16***	.72***	.56***	-	.10**	.50***	-.00
Passive SHLOC (T2)	.10*	.19***	.27***	.45***	.12*	.15**	.23***	-	-.03	.61***
Change in active SHLOC	-.07	-.08	-.33***	-.00	.24***	.13**	.47***	-.02	-	-.02
Change in passive SHLOC	.06	.15**	.11*	-.47***	.04	.08	.08	.57***	-.01	-

Correlations for women are above the diagonal and the correlations for men are below the diagonal.

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

Change in Spiritual Health Locus of Control (SHLOC) as a Function of Time 1 (T1) Religious Beliefs and Behaviors

Table 4

All Participants				By Gender					
Measure	Effect	β	<i>p</i>	Men		Women			
				β	<i>p</i>	β	<i>p</i>		
Change in Active SHLOC	Religious beliefs	.09	.01			.20	<.01	-.02	.59
	Religious behaviors	.10	<.01			.02	.70	.16	<.01
	T1 Active SHLOC	-.52	<.01			-.46	<.01	-.56	<.01
	Age	.01	.85			.00	.95	-.00	.91
	Gender	-.05	.08			-	-	-	-
	Education	-.04	.12			-.00	.94	-.06	.07
	Health status	-.02	.48			.01	.88	-.02	.54
	Marital status	.01	.61			.03	.50	.00	.96
Change in Passive SHLOC	Religious beliefs	-.05	.07			-.03	.59	-.10	<.01
	Religious behaviors	.11	<.01			.17	<.01	.07	.03
	T1 Active SHLOC	-.57	<.01			-.52	<.01	-.60	<.01
	Age	.05	.05			.04	.37	.06	.06
	Gender	-.03	0.22			-	-	-	-
	Education	-.18	<.01			-.21	<.01	-.15	<.01
	Health status	.05	.04			.06	.15	.05	.11
	Marital status	-.05	.04			-.10	.01	-.02	.53

Note: T1 = Time 1