Pastoral Psychology
https://doi.org/10.1007/s11089-022-01033-z

Expanding the Nomological Network of Religious-Based Constructs: A Structural Equation Model using the Religion, Aging, and Health Survey

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Accepted: 8 September 2022

Abstract
Despite research showing that religious-based constructs have a positive effect on older adults' health, their factor structure has not been tested using data from one sample. This study re-examined the factor structure of spiritual connectedness, positive and negative religious coping, religious music support, religious commitment, God-mediated control, private religious practices, and organizational religiousness using items from the Religion, Aging, and Health Survey (RAHS). The RAHS ($n = 1{,}500$) included 752 Christian, older African Americans and 748 older Whites residing in the United States. In addition, Wave 1 of the RAHS was split into two samples of $n = 750$. In this study, 36 items were used to conduct exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) ($n = 750$ for each). Factors with an eigenvalue greater than 1 and factor loadings greater than 0.4 were retained. Moreover, multiple imputation, modification of indices, chi-squared tests, and global fit indices of RMSEA, SRMR, and CFI were conducted. All analyses used STATA 16. Results of this study showed that the factor structure of spiritual connectedness, religious music support, and religious commitment matched what is in the literature even when analyzed with theoretically distinct religious-based constructs. Some items from positive and negative religious coping also loaded onto these factors, as shown in the literature. However, God-mediated control did not load as a factor. Moreover, items from organizational religiousness and private religious practices loaded onto a new factor, faith-building activities. In addition, RMSEA ($0.043 < 0.05$), CFI ($0.965 > 0.95$), and SRMR ($0.048 < 0.05$) showed that the model was a good fit. Overall, this study determined that it is important to expand the nomological network of religious-based constructs to further understand their factor structure. This is because the factor structure of these constructs did not match findings in the literature when analyzed together. Moreover, faith-building activities is a potential new measure to consider in the literature.

Keywords Religious-based constructs · Exploratory factor analysis · Confirmatory factor analysis · Older African-Americans · Older Whites · Nomological network

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Published online: 27 September 2022

Introduction

In research, religion has been challenged as a subject for health research (Lawrence, 2002; Sloan & Bagiella, 2002; Sloan et al., 1999, 2000). Despite religion's many critics, research has found that there are benefits of religion with regard to health. Research has found that various religious-based constructs, such as religious attendance, have been associated with longer life and greater life satisfaction as well as faster recovery from depression (Koenig et al., 1998; Levin et al., 1995; McCullough et al., 2000; Strawbridge et al., 1997). In addition to religious attendance, research has also examined factors such as forgiveness, prayer, and religious coping and their effects on physical and mental health (Koenig et al., 1995; Krause & Ellison, 2003). Among the elderly, religious-based factors are important as research has shown that religious faith is seen as the most important factor that allows the elderly to cope with illness (Koenig, 1998). In addition, church-based support has been found to have an effect on health among the elderly as older people who attend church feel their congregations are more cohesive and that they receive more spiritual and emotional support from their fellow congregants in highly cohesive congregations (Krause, 2002a). Instruments that have been used to measure constructs such as religious attendance, forgiveness, prayer, religious coping, and church-based support include the Duke Religion Index, the Heartland Forgiveness Scale, the Measure of Prayer Activity Scale, the Religious Coping Instrument, and the Religious Support Scale (Fiala et al., 2002; Koenig et al., 1997; Pargament et al., 2000; Poloma & Pendleton, 1991; Thompson et al., 2005).

Although the construct validities of many religious factors have been studied using factor analysis such as those mentioned above, previous studies usually employed small sample sizes and only considered a small number of factors at a time. Because many religious factors are intercorrelated, the relationship between items and factors (i.e., factor structures) might change when different sets of factors are considered in a factor model. So far, there has been only a limited number of studies examining the factor structure and nomological network of religious-based constructs all together using one large sample, especially those that have different theoretical underpinnings. To fill this gap, this study re-examines the factor structure of eight important religious-based constructs and their items using the Religion, Aging, and Health Survey (RAHS) as the RAHS examined the effects of religious-based factors amongst older adults. The religious-based factors that were included were spiritual connectedness, positive religious coping, religious music support, religious commitment, private religious practices, negative religious coping, God-mediated control, and organizational religiousness. Each of these constructs was selected as they each have had an effect on health amongst the elderly (Abu-Raiya et al., 2016; Krause & Hayward, 2014a, 2014b; Krause, 2005, 2006a; Lee, 2014). Moreover, each of these religious-based constructs was selected as their theoretical underpinnings of religious involvement differ as religious involvement has been theorized to occur either within a religious institution, outside of a religious institution, or from a subjective religiosity perspective (Chatters et al., 1992). Thus, this study re-examines the factor structure of these religious-based constructs and their items using exploratory and confirmatory factor analysis to determine if analyzed together, within one sample, if the factor structure identified matches what has been theorized or empirically tested in the literature. In addition, the exploratory analysis may reveal additional religious factors that have not been conceptualized before and provide direction for future research to fully understand the effect of religious factors on health amongst the elderly (Koenig et al., 1998).

Literature review

We first review the theoretical aspects of each of the religious-based constructs included in this study as well as their factor structure that was tested in previous empirical studies. Spiritual connectedness has been defined as one's need to connect with something beyond the self, which provides a sense of purpose (Bellingham et al., 1989). As a construct, spiritual connectedness has been theorized as a two-dimensional construct that includes both a horizontal as well as a vertical dimension (Stoll, 1989). The horizontal dimension assesses one's relationship with a higher power through one's beliefs, values, and interactions with other individuals, and the vertical dimension assesses one's direct experience with a higher power (Stoll, 1989). Spiritual connectedness is theorized differently from religiosity in that it does not necessarily involve a tangible, observable activity. However, religious rituals could serve as a way to promote an individual's spiritual connectedness (Lee, 2014). With regard to measurement amongst older adults, Krause (2002b) developed six items to measure spiritual connectedness that include both dimensions of this construct. Examples of some of these items are "I have a close, personal relationship with God" and "I feel that God is right here with me in everyday life" (Krause, 2002b).

With regards to religious music support, it has been a construct that has been found to be the most common trigger of deep religious experiences, even more important than reading the Bible or prayer (Greeley, 1974). This is due to the emotion that results from listening to religious music. Thus, it has been conceptualized to promote a strong sense of connectedness with other people, especially among individuals who are more emotionally involved in religious music (Krause & Hayward, 2014b). Religious music support has been assessed using four items (Krause & Hayward, 2014b). Examples of some of these items include "Religious music lifts me up emotionally" and "Religious music gives me great joy" (Krause & Hayward, 2014b).

Religious commitment as a construct has been defined as an individual's commitment to one's religious beliefs, and it has been theorized as a multidimensional construct due to Glock's Model of Religious Commitment (Glock, 1962; Williams, 1999). These dimensions are the ideological, ritualistic, experiential, intellectual, and consequential dimensions (Glock & Stark, 1970). In addition, the construct of religious commitment is rooted in the work by Allport and Ross (1967) on extrinsic and intrinsic motivation. This is because an individual who is intrinsically motivated is involved in religion because they see religion as a motivating factor in life, and thus they incorporate their faith into everything in their life (Allport & Ross, 1967). However, an individual who is extrinsically motivated is involved in religion because it meets alternate needs (Allport & Ross, 1967). Although many researchers agree that religious commitment is a multidimensional concept, researchers have attempted to capture the most important dimensions that impact health status, including intrinsic aspects of the construct. This is because intrinsic religiousness captures the widespread impact of religious influence in daily life (Williams, 1999). Since intrinsic religiousness encompasses a general orientation to all aspects of life as well as social relationships, it has been regarded as a measure of religious commitment (Williams, 1999). Thus, regarding measurement, researchers have used three items to assess religious commitment amongst older Mexican Americans (Krause & Hayward, 2014a). Examples of some of these items are "My faith shapes how I think and act each and every day" and "I try hard to carry my religious beliefs over into all my other dealings in life" (Krause & Hayward, 2014a).

Religious coping has been defined as efforts to understand and handle stressors in life in ways that are related to what is sacred (Pargament, 1997). The "sacred" refers to the aspects of life that deal with the divine or have divine-like qualities (Pargament & Mahoney, 2005). Pargament's theory of religious coping focuses on the idea that: (1) religious coping serves to search for meaning, control, reduction of anxiety, intimacy with others, transformation, and a search for the spiritual or sacred, (2) religious coping is multifaceted in that it includes behaviors, emotions, cognitions, and relationships, (3) religious coping changes over time, context, and situations, (4) religious coping is a process that leads to helpful or harmful outcomes, (5) religious coping adds a unique area to the coping process as it focuses on the sacred, and (6) religious coping can help add important information to people's understanding of religion and its impact on health.

With regards to measurement, the RCOPE instrument has been developed to measure religious coping based on Pargament's theory of religious coping. However, due to its length, its use is limited, which led to the development of the Brief RCOPE instrument. After a factor analysis of the full RCOPE was conducted with college students experiencing stress, it was constrained to two factors, positive and negative religious coping (Pargament et al., 2000). Thus, the Brief RCOPE is divided into two subscales, seven items for positive religious coping and seven items for negative religious coping. With regard to psychometric properties, the Brief RCOPE has been tested across many populations and studies, including elderly patients and older Whites living in residential care facilities (Pargament et al., 1998, 2011; Schanowitz & Nicassio, 2006). Examples of some of these items for positive and negative religious coping are "Tried to put my plans into action together with God" and "Wondered whether God had abandoned me" (Pargament et al., 2011).

God-mediated control, as a construct, can be defined as the idea that problems can be overcome and goals in life can be met by working together with God (Krause, 2005). In addition, God-mediated control has been analyzed as a construct that can be exercised in two ways: a person can work collaboratively with God or God controls all aspects of an individual's life (Pargament, 1997). Despite it being theorized as its own construct, it is important to note that overlap exists between this construct's definition and religious coping. This is due to religious coping being defined as efforts to understand and handle stressors in life in ways that are related to the sacred (Pargament, 1997). This is similar to the notion that problems can be overcome and goals can be met by working with God, as theorized within God-mediated control (Krause, 2005).

With regard to measurement, God-mediated control has been measured using a scale with seven items and has shown good test-rest reliability (Berrenberg, 1987). Krause (2005) later revised the scale to measure one of the ways of exercising God-mediated control, and that was in working collaboratively with God, using three items. These three items were not meant to reflect the second way of exercising God-mediated control, where God is in control of all aspects of one's life (Krause, 2005). Krause (2005) tested this amongst older African American and White adults. Examples of some of these items are "I rely on God to help me control my life" and "I can succeed with God's help" (Krause, 2005).

Private religious practices is a construct that represents a subset of behaviors that make up the larger construct of religious involvement (Levin, 1999). Research has shown that there are three dimensions of religious involvement—organizational, nonorganizational, and subjective religiosity—amongst older African Americans (Chatters et al., 1992). Private religious practices, as a construct, is different from public religious behavior and is nonorganizational in that these practices occur outside of what is considered organized religion (Levin, 1999). They are also informal as there is not a fixed time or place for them to occur (Levin, 1999).

With regard to measurement, seven scales have been developed, with the number of items used to measure this construct being as high as 45 items (Levin, 1999). The most widely used measures were developed by Glock and Stark, Faulkner and DeJong, and King and Hunt (Levin, 1999; Robinson et al., 1973). Items developed by Glock and Stark as well as by Faulkner and DeJong included items about praying in private and saying grace as well as reading the Bible and other religious literature (Robinson et al., 1973). Measures developed by King and Hunt also included items about praying in private and reading the Bible as well as reading religious literature. Despite these measures being developed, the coding schemes have been noted to not be comparable or to be imprecise, and thus other measures have been discussed to measure this construct (Levin, 1999). As a result, researchers have tested three items to measure this construct amongst older African Americans (Krause, 2006a). Examples of some of these items are "How often do you pray by yourself?" and "When you are at home, how often do you read the Bible?" (Krause, 2006a).

In contrast to private religious practices, organizational religiousness is a construct that assesses the involvement of the respondent with a formal public religious institution and includes behavioral as well as attitudinal components (Idler, 1999). Organizational religiousness is indicated by attendance at religious services or membership in a congregation, how well an individual fits into the religious church, and the experience of public religious worship such as reading texts, prayer, or music (Idler, 1999). Although items such as attendance at religious services have been used as a reliable item for decades in the Gallup Poll, researchers have included other activities such as choir practice, youth group activity, and an individual's fit with a church as a measure of organizational religiousness (Idler, 1999; Pargament et al., 1979; Strawbridge et al., 1997; Wingrove & Alston, 1974). Krause (2006a) has tested the construct validity and reliability of a three-item scale for this construct amongst older African Americans (Krause, 2006a). Examples of some of these items are, "How often do you attend religious services?" and "How often do you attend Sunday School or Bible study groups?" (Krause, 2006a).

Although all of the constructs included in this study have not been analyzed within one nomological network, there is evidence within the literature that shows a nomological network may exist amongst them due to the similarities in their definitions as well as in their interdependence in application. Specifically, this can be noted through the many forms in which positive and negative religious coping can be demonstrated. According to Pargament et al. (1998), positive religious coping can be shown by seeking control through a partnership with God, which overlaps with the definition of God-mediated control as it has been defined as an individual's goals being met by working together with God (Krause, 2005). Moreover, positive religious coping can be shown by seeking relief from stressors through having a religious focus (Pargament et al., 1998). This shows an interrelatedness amongst religious coping and religious commitment as being committed to religion may assist in seeking relief from stressors. Moreover, positive religious coping can be demonstrated through religious purification where spiritual cleaning can come through carrying out religious actions (Pargament et al., 1998). This illustrates an interrelatedness amongst religious coping and organizational religiousness, private religious practices, and religious music support as the latter three constructs are focused on carrying out religious actions. Lastly, positive religious coping can be shown by seeking a sense of connectedness with transcendent forces (Pargament et al., 1998). This definition overlaps with spiritual connectedness's definition of one's need to connect with something beyond one's self (Bellingham et al., 1989).

In addition to the similarities in their definitions, these constructs may also be interrelated through application as an individual who is religiously coping in a positive way may experience more spiritual connectedness, religious commitment, religious music support,

God-mediated control, private religious practices, or organizational religiousness as they are looking to God for strength, and these other constructs may help during that time. With regards to negative religious coping, it too is interrelated with these constructs as "wondering whether God has abandoned one's self," an item of this construct, illustrates a condition where an individual may not feel they are spiritually connected to God in that moment. In addition, an individual being in this condition may not want to continue being religiously committed, or to carry out private religious practices, or seek support from religious music. Moreover, the individual may not experience God-mediated control at that time, nor feel connected enough to seek the organizational aspect of religiosity. Lastly, an individual who feels abandoned by God might not immediately seek positive religious ways to cope as they are experiencing doubt. Thus, despite the different theoretical underpinnings of these constructs, their definitions and how they are applied illustrate how they may be interrelated.

Similar to this study, Neff (2006) examined a smaller set of theoretically distinct religious-based constructs using items from the Fetzer Multidimensional Measure based on data from the General Social Survey. This study included items of perceived religiosity, daily spirituality, positive and negative coping, forgiveness, religious involvement, and spiritual values and beliefs (Neff, 2006). After re-examining the items using confirmatory factor analysis, the study found that combining the daily spirituality and values/beliefs dimensions of the Fetzer Multidimensional Measure into a single factor provided a simpler model compared to the Fetzer model, which separated these dimensions apart (Neff, 2006). A limitation of this study was that it was able to examine religiosity and spirituality only with the items available in the brief versions of the Fetzer Multi-Dimensional Measure included in the General Social Survey (Neff, 2006). However, despite these limitations, this study highlighted the need for further research to address other theoretically derived multidimensional measures using large and diverse samples (Neff, 2006).

Although smaller studies have been done to examine the factor structure of the constructs included in this study, individually or in small nomological networks, research has yet to examine a more comprehensive nomological network of these religious-based constructs that have been demonstrated to be associated with health. This is important as research has noted that a construct only has meaning in the context of a nomological network (Schwab, 1980). Hence, as the context changes, the factor structures found in previous studies might change. The investigation of the relations among measures of constructs in a comprehensive nomological network can result in the modification of a measure and, as a result, a construct, leading to the modification of a theory that connects a construct to other constructs or a lack of (Schwab, 1980). Research on the congruence of variables and constructs notes that conclusions about the congruence of two variables, as well as construct validity, logically depends on which other variables are considered within a nomological network (Franke et al., 2021). Moreover, the literature has discussed that as research advances in an area, how a theoretical construct is understood depends on elaborating the nomological network in which it occurs or the definiteness of its components (Cronbach & Meehl, 1955). Therefore, although this exploratory factor analysis/confirmatory factor analysis (EFA/CFA) study uses secondary data from 2001, this study is the first study that expands the nomological network to provide a more complete picture of the construct validity and interrelationship of these religious-based constructs.

Thus, this study will (1) re-examine the factor structure of these religious-based constructs and their items using exploratory and confirmatory factor analysis to determine if analyzed together, within one sample, if the factor structure identified matches what has been theorized in the literature and, in doing so, (2) examine the nomological network of the religious constructs.

Study population and data sources

This study used data collected from the 2001 Religion, Aging, and Health Survey (RAHS) that analyzed religion, self-rated health, depression, and psychological well-being amongst older Blacks and Whites (65 and over) residing in the United States. Participants in this study were noninstitutionalized, English-speaking, and residents of any U.S. state except Alaska or Hawaii (Krause, 2006b). Questions were asked regarding religious status and activities as well as beliefs among those who used to be Christian, those who were practicing Christianity, and those who had never been associated with religion. Participants who practiced other religions were not included as part of this study.

The sampling frame for the RAHS consisted of eligible persons in the Health Care Financing Administration (HCFA) Medicare Beneficiary Eligibility List (HCFA is now called the Centers for Medicare and Medicaid Services-CMS) (Krause, 2006b). The study design and survey instrument for the RAHS was constructed by Neal Krause, and the data was collected by Louis Harris and Associates (Harris Interactive). First contact was made with participants from March to August 2001 by sending them a letter informing them of the purpose and nature of the study. The response rate for the baseline study was 62% and 1,500 interviews, in total, were conducted. Participants were compensated $30 for participating in the study, and 752 older Blacks and 748 older Whites were sampled. For the purpose of this study, Wave 1 data was the only data that was used as the Wave 2 data of the RAHS had fewer participants and did not include all of the religious-based constructs that were in Wave 1 of the data.

Measures

In total, the RAHS assessed 1,547 items that looked at religion, self-rated health, depression, and psychological well-being within their sample. In this study, only 36 items were included as these items were pertinent to the following religious-based constructs: spiritual connectedness, religious coping, religious music support, religious commitment, God-mediated control, private religious practices, and organizational religiousness. In addition, these items are derived from various psychometric instruments that are included in the RAHS, which include the Brief RCOPE instrument, the Multidimensional Measurement of Religiousness/Spirituality instrument, as well as instruments developed by the principal investigator of the RAHS, as previously stated (Berrenberg, 1987; Ellison et al., 2011; Fetzer Institute/National Institute on Aging Working Group, 1999; Krause, 2002b, 2003; Pargament, 1997). In addition, Table 1 in the Appendix shows the constructs and their items that were used in this study.

Methods

Each item that was included in this study had varying levels of responses, ranging from 4 to 9 categories. Responses of "No answer," "Not sure," "Decline to answer," and "Not applicable" (i.e., values such as 99, 98, 97, −9, −8, −7) were changed to missing values. Items were recorded to ensure their order was uniform across all items. All the items were treated as continuous variables.

The 1,500 observations were split into two datasets of 750 observations. Thus, 750 observations were used to conduct the EFA, and 750 observations were used to carry out the CFA. First, the Bartlett test of Sphericity (Bartlett, 1950) and the Kaiser–Meyer–Olkin's Measure of Sampling Adequacy (Kaiser, 1974) were conducted to examine the suitability of the data for factor analyses. Then, exploratory factor analysis was used to determine the underlying factor structure of the items (Brown, 2015). In order to determine the number of factors, factors with an eigenvalue greater than 1 were retained. Eigenvalues are important to assess as they are a measure of how much of the variance of observed variables is explained by a factor (Kaiser, 1960). In addition, it is important to note that factors with an eigenvalue greater than 1 explain more variance than a single observed variable (Kaiser, 1960). Although scree plots are also suggested as a method in helping to retain factors, scree plots have been found to underestimate the number of factors when there are more than two factors, and as a result they can be unreliable (Streiner, 1998). This is an issue as underextraction in the number of factors can result in factors containing large error components (Comrey & Lee, 2013). As a result, the Kaiser criterion was used to extract factors. Although some have questioned whether Kaiser's criterion overestimates the number of factors in finite samples, research has also shown that when the sample to variable ratio is large this is an appropriate measure to use (Horn, 1965; Robbins, 1980).

In this study, items with factor loadings greater than 0.4 were retained as these factor loadings are considered important (Tabachnick & Fidell, 2001). Items that cross-loaded were assessed for their alignment with constructs in the literature. However, if their factor loadings were less than the factor loading criteria they were removed. In addition, promax factor rotations were used to provide a more realistic representation of how factors are interrelated (Brown, 2015). Also, Cronbach's alpha was used to measure how closely related a set of items were as a group (Cronbach, 1951).

In addition, the 36 items included in this study had a missing data rate of 3.53%. After conducing Little's MCAR test, the results were found to be significant ($p < 0.05$), which showed that the data was either missing at random or missing not at random. However, since the missing rate was low, the results may not be highly impacted by missingness. Thus, in order to address the missing data issue, maximum likelihood estimation via the expectation maximization algorithm was used to obtain the maximum likelihood point estimates of means, variance, and covariances of the data. The expectation maximization correlation matrix was then derived and used as the input matrix for the EFA (Weaver & Maxwell, 2014).

Once the EFA was complete, CFA was conducted to examine whether the hypothesized factor structure was supported by the data. In addition, full information maximum likelihood estimation was used in the CFA as it is an estimation method used to determine the model parameter estimates that maximize the probability of observing the data if the data were collected from the same population again (Brown, 2015). In order to assess whether the model was a good fit, a chi-squared test was conducted and global fit indices of RMSEA, SRMR, and CFI were analyzed. In addition, in order to improve the model fit, modification indices were examined and residuals of items that had similar wording were correlated. Moreover, paths were not added that would result in cross-loadings or that added correlations between residuals from two items that loaded onto two different factors. All analyses were conducted using the Stata 16 statistical software.

Results

The Bartlett Test of Sphericity (df = 630, $\chi^2 = 1.02X10^5$, $p < 0.05$) and the Kaiser-Meyer Olkin Measure of Sampling Adequacy (0.943) both indicated that the data were suitable for factor analysis. Six factors were retained as they were the only factors that had an eigenvalue greater than 1. Table 2 in the Appendix shows the eigenvalues of the six factors retained in this exploratory factor analysis. With regard to the factor loadings, only items with factor loadings greater than 0.4 were retained in this study. Thus, the items "I realize the devil makes hard times happen," "I rely on God to help me control my life," "I can succeed with God's help," "All things are possible when I work together with God," "How often do you watch formal church services on TV or listen to them on the radio?" "When you are at home, how often are prayers or grace said at mealtime?" and "How often do you listen to religious music outside church—like when you are home or driving your car?" were deleted. As shown in Table 3 in the Appendix, one item did cross-load on two factors—"How often do you listen to religious music outside church—-like when you are home or driving your car?"—but since its factor loadings were less than 0.4, it was deleted. Table 3 shows that each factor had at least three items loaded onto each factor.

Based on the six factors identified in the EFA, as shown in Table 4 in the Appendix, each factor had an internal consistency greater than 0.7, which shows that the items have a high internal consistency (Cronbach, 1951). Based on these results, CFA was used to evaluate the hypothesized structures of the latent constructs identified in the EFA. Figure 1 in the Appendix shows the hypothesized structure of the latent constructs and their items. The hypothesized model had a statistically significant chi-squared test (df = 362; $\chi^2 = 1143.545$, $p < 0.05$), indicating that the model is significantly worse than a perfect fit. Since the chi-squared test is impacted by sample size, it can in turn cause the model to be rejected even though the model could be a good fit (Bearden et al., 1982). Hence other fit indexes were examined. According to Hu and Bentler (1998), the global fit index of RMSEA (0.066) indicates a fair fit and SRMR (0.055) indicates a good fit.

Modification indices

The modification indices suggested correlating the residuals of the following items that had very similar wording in order to improve the model fit:

1. "I feel that God is right here with me in everyday life" (Q603A2) and "When I talk to God, I know he listens to me" (Q603A3),
2. "I look to God for strength in a crisis" (Q1003A1) and "I look to God for guidance when difficult times arise" (Q1003A2),
3. "Religious music lifts me up emotionally" (Q707A1) and "Religious music gives me great joy" (Q707A2),
4. "When you are at home, how often do you read religious literature other than the Bible?" (Q804) and "How often do you read religious newsletters, religious magazines, or church bulletins when you are home?" (Q806),
5. "I have a close personal relationship with God" (Q603A1) and "I feel that God is right here with me in everyday life" (Q603A2),

6. "I have a close personal relationship with God" (Q603A1) and "When I talk to God, I know he listens to me" (Q603A3),
7. "My faith helps me see the common bond among all people" (Q603A4) and "My faith helps me appreciate how much we need each other" (Q603A5),
8. "My faith helps me appreciate how much we need each other" (Q603A5) and "My faith helps me recognize the tremendous strength that can come from other people" (Q603A6),
9. "My faith helps me see the common bond among all people" (Q603A4) and "My faith helps me recognize the tremendous strength that can come from other people" (Q603A6), and.
10. "When you are at home, how often do you read the Bible? (Q802) and "When you are at home, how often do you read religious literature other than the Bible?" (Q804).

As a result, these unique variances were correlated with one another. This improved the overall fit of the model. In this model, the chi-squared test ($df = 352$; $\chi^2 = 673.71$, $p < 0.05$) indicates that the model cannot be a perfect fit. However, the global fit index of RMSEA was 0.043, which is less than 0.05 and indicates a good fit. Moreover, this model's CFI was 0.965, which is greater than 0.95 and also indicates a good fit. Lastly, SRMR was reported to be 0.048, which is less than 0.05 and indicates a good fit. Overall, this model's global fit indices show that the model is a good fit.

Table 5 in the Appendix shows the factors and the factor loadings of the items that loaded onto each factor, and Table 6 in the Appendix shows the correlations of the six factors included in this study.

Discussion

It is important to note that no publications were found, within the literature, that focused on a similar research question related to expanding the nomological network of religious-based constructs. Instead, articles that have been recently published have focused on the effects of the religious-based constructs included in this study, such as religious coping, God-mediated control, organizational religiousness, and religious commitment, on outcomes of interest to researchers across varying populations (Counted et al., 2022; Gamache et al., 2022; Jankowski et al., 2022; Krause & Rainville, 2022; Upenieks, 2022).

Thus, this study re-examined the factor structure and relationship of religious-based constructs in a more comprehensive nomological network within a large sample from the RAHS. Based on the factor structures identified through exploratory and confirmatory factor analysis, spiritual connectedness, religious music support, religious commitment, and positive religious coping, were found to have the factor structure that matched what is in the literature (Krause & Hayward, 2014a, 2014b; Krause, 2002a). Although only five items were used to measure positive religious coping in RAHS as opposed to the original seven items in the Brief RCOPE scale, all five items were adequately loaded on the designated factor (Pargament et al., 2011). This showed that the factor structure of these constructs was stable even when they were examined in the context of a broad range of theoretically different religious-based constructs.

On the other hand, a few constructs showed different factor structures. First, for the construct of negative religious coping, the item "I realize the devil makes hard times happen" (Q1003A9) had a low factor loading. The other four items all directly point to doubt regarding God's intention or power, whereas item Q1003A9 is directly related to Satan, which might have caused the item to have a low factor loading. It is also possible that because only five items were included in the RAHS as opposed to the original seven items in the Brief RCOPE scale, differences between Q1003A9 and the other four items became more prominent. Although not included in the RAHS, other items for this construct within the Brief RCOPE also focus on God and not on Satan, such as "Felt punished by God for my lack of devotion" and "Wondered what I did for God to punish me," and could further separate item Q1003A9 from this construct; however, further research is needed. Overall, further research is needed to determine whether the four-item factor structure of negative religious coping identified through this EFA/CFA study is comparable to the Brief RCOPE's psychometric properties.

Second, with regard to God-mediated control, the three items included in this EFA/CFA study did not load on a common factor but had cross-loadings on the factor of positive religious coping. As previously mentioned, God-mediated control has been analyzed to be a construct that can be exercised in two ways: a person can work collaboratively with God or God controls all aspects of an individual's life (Pargament, 1997). The three items that were included in this EFA/CFA study focused on measuring God-mediated control through an individual working collaboratively with God. When comparing this theoretical definition with the items that cross-loaded onto positive religious coping (i.e., items Q1103A2 & Q1103A3), this could allude to God-mediated control having some overlapping with positive religious coping. This is because items from positive religious coping, such as "I look to God for strength in crisis" as well as "I look to God for guidance when difficult times arise," are similar to the idea of working collaboratively with God to overcome a hardship. Similarly, items such as "When I'm faced with a difficult experience, I try to think about the good things God has given me" as well as "I try to realize that God never gives us more than we can handle" and "When hard times arise, I try to realize that it's just God's way of testing my faith" are similar to how God-mediated control is theorized in that God controls all aspects of an individual's life. These findings supported previously theorized literature on collaborative positive religious coping as individuals with a stronger sense of God-mediated control experience greater well-being as they are able to cope with life more effectively when compared with people who do not believe that God is working with them to solve their life issues (Pargament, 1997).

Third, items used to measure private religious practices and organizational religiousness did not load as two separate factors as seen in the literature (Ellison et al., 2011; Levin, 1999). Instead, items from both constructs loaded onto one factor, faith-building activities. Private religious practices and organizational religiousness are theorized as being two distinct factors as one occurs publicly within the context of a religious-based setting and the other occurs in private, away from a religious-based setting. However, this EFA/CFA study found that when examined with other religious-based constructs, their items come together as one factor. This is important to note because even though some practices may fall within a religious institution, such as attending Sunday School or prayer groups in church, others may occur outside a religious institution, such as reading the Bible or other religious literature at home. Ultimately, however, they are activities that may help an individual advance

their faith. This is important to note as these items could note the intersection between these two distinct constructs. Thus, further research is needed to determine whether these two constructs should no longer be theorized separately or whether items used to assess the two are more related than they are distinct. This is especially true as the multidimensional measure that was validated to distinguish organizational religiosity, non-organizational religiosity, and subjective religiosity was conducted only with a sample of African Americans and did not include other demographic groups (Chatters et al., 1992).

Before discussing faith-building activities further, it is important to briefly discuss how faith itself has been defined and theorized. Faith has been defined as an integral, centering process that underlies the formation of beliefs, values, and meanings that: (1) gives coherence and direction to persons' lives, (2) links them in shared trust and loyalties with others, (3) grounds their personal stances and communal loyalties to a larger frame of references, and (4) enables them to face and deal with the challenges of human life and death (Fowler & Dell, 2004). In the literature, faith has been identified as a topic that has been neglected in research (Jones, 1994; Kirkpatrick & Spilka, 1989). However, researchers have become more aware of the importance of religious faith on human behavior and have even found that individuals who have an open and internalized faith as opposed to those who have a detached faith had a positive relationship with their mental health (Jones, 1994; Ventis, 1995). In addition, researchers have found that terminally ill cancer patients at more mature stages of religious faith reported a higher overall quality of life, higher quality of family life, and higher quality of psychological and spiritual life (Swensen et al., 1993).

Although existing scales measure faith-building activities, such as the Santa Clara Strength of Religious Faith Questionnaire (Plante & Boccaccini, 1997), Fowler's (1981) stages of faith, and the faith activities in the home scale (FAITHS), these scales are limited. This is because the Santa Clara Strength of Religious Faith Questionnaire and Fowler's stages of faith focus on the stage of where an individual's faith is as well as where their faith stands (Fowler, 1981; Plante & Boccaccini, 1997). Moreover, the FAITHS scale is a multi-faith-based instrument (i.e., Judaism, Islam, and Christianity) that focuses on the stage of where an individual's faith is. It is not specific to measuring faith-building activities from a one-faith Christian perspective. Moreover, the FAITHS scale only includes activities a family does within their home to help build their faith and does not include activities that could be done within a religious-based institution (Lambert & Dollahite, 2010). Our findings showed that items covering both organizational and nonorganizational faith-building activities could potentially be used to measure the frequency of faith-building activities amongst elderly White and African American Christians, but further research needs to be conducted to analyze the psychometrics of this factor and its items. This is important as research has shown that incorporating faith-building activities into health promotion programs within the church, helps create successful health programs, specifically in the African American community (Gandara et al., 2022).

In addition, this EFA/CFA study examined the nomological network of the religious-based constructs. The findings indicate that spiritual connectedness, religious music support, religious commitment, faith-building activities, and positive religious coping all had a moderate to high positive relationship with one another. This is important to note as this reinforces the interrelatedness of these constructs, as previously described, as these constructs are similar not only in definition but also through application. Thus, an individual who has moderate to high spiritual connectedness may have moderate to high positive

religious coping, religious music support, religious commitment, God-mediated control, private religious practices, and organizational religiousness.

However, negative religious coping had a weak negative correlation with spiritual connectedness, religious music support, religious commitment, faith-building activities, and positive religious coping. This is also important to note as this indicates that people who are more spiritually connected and committed, as well as those who engage in faith-building activities, religious music support, and positive religious coping, are as likely to use negative coping as those who are less spiritually connected, religiously committed, engage in faith-building activities, religious music support, have God-mediated control, or cope in a religiously positively way. This could be due to the nature of humans in retracting away quickly from religious- and spiritual-based practices due to life and its hardships, which results in moving away from God. However, further research is needed to explore this finding.

Practical and theoretical implications

The findings of this study are important for academics and scholars who study the science of religion as well as for religious and spiritual leaders as it shows the importance of critically re-examining theoretically distinct, religious-based constructs using one sample. This is because when theoretically distinct religious-based constructs were all examined within the same nomological network and within one sample, differences were noted in the factor structure of these religious-based constructs from what is in the literature. Thus, further religious-based constructs could be explored that could be lying within previously theorized religious-based constructs. As a result, this study posits new conversations around the factor structure of some of the constructs included in this study, such as organizational religiousness, private religious practices, God-mediated control, and negative religious coping, as their factor structure varied from what is in the literature when the nomological network that these constructs had been theorized in expanded.

In addition, this study solidifies the conceptualization of some previously theorized constructs such as spiritual connectedness, religious music support, religious commitment, and positive religious coping as the factor structure for these constructs matched what is in the literature even though the nomological network that they had been theorized in had expanded. This study also allows for those who are interested in measuring faith-building activities from a Christian faith perspective to be able to do so. This is important as many religious-based factors included in this study, such as religious coping, religious music support, and spiritual connectedness, have been found to have a positive effect on health and faith-building activities could be another such factor.

Thus, further research could assess the impacts of faith-building activities on health as the nomological network findings of this study showed it to have a positive relationship amongst the religious-based constructs included in this study with the exception of negative religious coping. By assessing the effect of faith-building activities on health, faith-building activities could be incorporated into the design of a faith-based health promotion program's curriculum to help improve congregational health, specifically within elderly African American and White congregations. Moreover, researchers could also further explore the psychometric properties of using five items to assess positive religious coping

as well as four items for negative religious coping as identified in this EFA/CFA study. Also, research could explore trying to measure exercising God-mediated control in a collaborative way using three items or even caution researchers from doing so. Moreover, further research could explore God-mediated control's factor structure with larger and diverse nomological networks. In addition, further research could explore the intersection of private religious practices and organizational religiousness since the items from both factors, in theory, should have been distinct but instead loaded onto one factor, faith-building activities, in the current study. Also, further research could examine measuring faith-building activities within other populations as the data in the current study only included African Americans and Whites residing in the United States.

Limitations

A limitation of this study is that its findings might not be generalizable to other demographic groups as the population of this study was only older Whites and African Americans residing in the United States. In addition, it is important to note that not all of the items from validated instruments such as Brief RCOPE were collected as part of the RAHS, which could impact the factor structure identified through this EFA/CFA study. Lastly, since the data was published in 2001, the findings of this study may not be applicable to how older African Americans and Whites theorize these religious-based constructs in the present day.

Conclusion

This study found that in re-examining previously theorized distinct religious-based constructs, all within the same nomological network and within one sample, differences were noted in the factor structure of these previously theorized religious-based constructs. One key difference was that when analyzed with all of the religious-based factors included in this study, God-mediated control did not load onto a factor. In addition, items from private religious practices and organizational religiousness loaded onto a new factor, faith-building activities. This finding is contrary to the literature as, theoretically, these two constructs occur in different settings. Private religious practices is theorized as occurring outside of a religious-based setting while organizational religiousness is set to occur within a religious-based institution. Lastly, this study noted that the nomological network of spiritual connectedness, religious music support, religious commitment, faith-building activities, and positive religious coping were in positive relationship with one another. In contrast, negative religious coping had a negative relationship with each of these constructs. Overall, this study found the importance of re-examining religious-based factors using one sample in order to reassess how religious-based constructs are theorized and measured in order to help further the work that will be done within the fields of religion and health.

Appendix

Table 1 Study Factors and Corresponding Items' Descriptive Statistics

Factor:	Items	Mean	SD
Religious coping	"I look to God for strength in crisis" (Q1003A1)	3.60	0.796
	"I look to God for guidance when difficult times arise" (Q1003A2)	3.61	0.792
	"When I'm faced with a difficult experience, I try to think about the good things God has given me" (Q1003A3)	3.55	0.783
	"I try to realize that God never gives us more than we can handle" (Q1003A4)	3.52	0.814
	"When hard times arise, I try to realize that it's just God's way of testing my faith" (Q1003A5)	2.99	1.071
	"I think about how stressful situations are God's way of punishing me for the things I have done wrong" (Q1003A6)	1.83	1.081
	"When problems arise in my life, I wonder whether God has abandoned me" (Q1003A7)	1.48	0.862
	"When I'm faced with stressful situations, I question the power of God" (Q1003A8)	1.48	0.883
	"I realize the devil makes hard times happen" (Q1003A9)	2.57	1.201
	"When problems arise in my life, I question whether God really exists" (Q1003A10)	1.34	0.817
Spiritual connectedness	"I have a close personal relationship with God" (Q603A1)	3.51	0.652
	"I feel that God is right here with me in everyday life" (Q603A2)	3.55	0.618
	"When I talk to God, I know he listens to me" (Q603A3)	3.53	0.621
	"My faith helps me see the common bond among all people" (Q603A4)	3.45	0.644
	"My faith helps me appreciate how much we need each other" (Q603A5)	3.52	0.589
	"My faith helps me recognize the tremendous strength that can come from other people" (Q603A6)	3.44	0.637
Religious music support	"Religious music lifts me up emotionally" (Q707A1)	3.45	0.583
	"Religious music gives me great joy" (Q707A2)	3.45	0.581
	"Religious music helps strengthen or renew my faith" (Q707A3)	3.34	0.654
	"Religious music makes me feel closer to God" (Q707A4)	3.42	0.629
	"How often do you listen to religious music outside church—like when you are at home or driving your car?" (Q702A1)	4.98	2.46

Table 1 (continued)

Factor:	Items	Mean	SD
Religious commitment	"My faith shapes how I think and act each and every day" (Q1503A1)	3.337	0.671
	"I try hard to carry my religious beliefs over into all my other dealings in life" (Q1503A2)	3.366	0.648
	"My religious beliefs are what lie behind my whole approach to life." (Q1503A3)	3.345	0.686
God-mediated control	"I rely on God to help me control my life" (Q1103A1)	3.319	0.758
	"I can succeed with God's help" (Q1103A2)	3.467	0.621
	"All things are possible when I work together with God" (Q1103A3)	3.481	0.666
Private religious practices	"When you are at home, how often do you read the Bible?" (Q802)	4.511	2.551
	"When you are at home, how often do you read religious literature other than the Bible?" (Q804)	3.889	2.435
	"How often do you read religious newsletters, religious magazines, or church bulletins when you are home?" (Q806)	3.696	2.134
	"How often do you watch formal church services on TV or listen to them on the radio?" (Q808)	4.00	2.218
	"How often do you watch or listen to religious talk shows or shows that report the news from a Christian perspective?" (Q810)	2.973	2.217
	"When you are at home, how often are prayers or grace said at mealtime?" (Q812)	6.883	2.199
Organizational religiousness	"How often do you attend adult Sunday School or Bible study groups?" (Q302)	3.664	3.069
	"How often do you participate in prayer groups that are not part of regular worship services or Bible study groups? (Q304)	2.875	2.801
	"How often do you attend religious services?" (Q306)	5.736	2.736

Table 2 Summary of Eigenvalues

Factor	Eigenvalue	Difference	Proportion	Cumulative
Factor 1	13.98597	12.58068	0.6509	0.6509
Factor 2	1.40529	−0.32423	0.0654	0.7163
Factor 3	1.72952	0.46417	0.0805	0.7967
Factor 4	1.26535	−0.41229	0.0589	0.8556
Factor 5	1.67764	0.25279	0.0781	0.9337
Factor 6	1.42485		0.0663	1.0000

Table 3 EFA Model Factor Loadings

Variable	Spiritual connectedness (Factor 1)	Positive religious coping (Factor 2)	Religious music support (Factor 3)	Religious commitment (Factor 4)	Faith-building activities (Factor 5)	Negative religious coping (Factor 6)	Uniqueness
Q1003A1		0.9423					0.1718
Q1003A2		0.9987					0.1148
Q1003A3		0.7075					0.3657
Q1003A4		0.6050					0.4511
Q1003A5		0.4227					0.6710
Q1003A6						0.5875	0.6411
Q1003A7						0.7255	0.4662
Q1003A8						0.7911	0.3641
Q1003A9							0.7618
Q1003A10						0.7069	0.4777
Q1103A1							0.3955
Q1103A2		0.3151					0.4358
Q1103A3		0.3020					0.3786
Q603A1	0.7944						0.2550
Q603A2	0.9111						0.1824
Q603A3	0.8925						0.1885
Q603A4	0.7777						0.2780
Q603A5	0.8636						0.2551
Q603A6	0.7008						0.3824
Q302					0.5756		0.6413
Q304					0.4326		0.8006
Q306					0.4841		0.5811
Q802					0.7321		0.3584
Q804					0.8647		0.2984
Q806					0.8129		0.3603
Q808					0.3388		0.6792
Q810					0.4701		0.7142
Q812							0.9738
Q702A1			0.3026		0.3767		0.5675
Q707A1			0.8642				0.2125
Q707A2			0.8593				0.1628

Table 3 (continued)

Variable	Spiritual connectedness (Factor 1)	Positive religious coping (Factor 2)	Religious music support (Factor 3)	Religious commitment (Factor 4)	Faith-building activities (Factor 5)	Negative religious coping (Factor 6)	Uniqueness
Q707A3			0.8410				0.1701
Q707A4			0.7995				0.1660
Q1503A1				0.7757			0.2478
Q1503A2				0.8517			0.1748
Q1503A3				0.7994			0.1662

Table 4 Cronbach's Alpha Test Results

Factor #/Factor Name	Cronbach's alpha
Factor 1 (Spiritual connectedness) (ξ_1)	$\alpha = 0.9461$
Factor 2 (Positive religious coping) (ξ_2)	$\alpha = 0.8971$
Factor 3 (Religious music support) (ξ_3)	$\alpha = 0.9483$
Factor 4 (Religious commitment)	$\alpha = 0.9286$
Factor 5 (Faith-building activities)	$\alpha = 0.8518$
Factor 6 (Negative religious coping)	$\alpha = 0.7637$

$\alpha > 0.7$, suggests high internal consistency

Table 5 Item Factor Loadings per Factor

Factor	Items	Factor Loading	P-value	Mean	SD
Spiritual connectedness	"I have a close personal relationship with God" (Q603A1)	0.777	< 0.001	3.514	0.657
	"I feel that God is right here with me in everyday life" (Q603A2)	0.827	< 0.001	3.555	0.620
	"When I talk to God, I know he listens to me" (Q603A3)	0.795	< 0.001	3.522	0.636
	"My faith helps me see the common bond among all people" (Q603A4)	0.839	< 0.001	3.430	0.636
	"My faith helps me appreciate how much we need each other" (Q603A5)	0.827	< 0.001	3.480	0.605
	"My faith helps me recognize the tremendous strength that can come from other people" (Q603A6)	0.771	< 0.001	3.438	0.626
Religious music support	"Religious music lifts me up emotionally" (Q707A1)	0.819	< 0.001	3.445	0.580
	"Religious music gives me great joy" (Q707A2)	0.862	< 0.001	3.443	0.597
	"Religious music helps strengthen or renew my faith" (Q707A3)	0.906	< 0.001	3.354	0.644
	"Religious music makes me feel closer to God" (Q707A4)	0.915	< 0.001	3.428	0.620
Religious commitment	"My faith shapes how I think and act each and every day" (Q1503A1)	0.849	< 0.001	3.296	0.666
	"I try hard to carry my religious beliefs over into all my other dealings in life" (Q1503A2)	0.897	< 0.001	3.317	0.671
	"My religious beliefs are what lie behind my whole approach to life." (Q1503A3)	0.900	< 0.001	3.289	0.689
Faith-building activities	"How often do you attend adult Sunday School or Bible study groups?" (Q302)	0.694	< 0.001	3.641	3.063
	"How often do you participate in prayer groups that are not part of regular worship services or Bible study groups?" (Q304)	0.552	< 0.001	2.859	2.820
	"How often do you attend religious services?" (Q306)	0.647	< 0.001	5.722	2.711
	"When you are at home, how often do you read the Bible?" (Q802)	0.675	< 0.001	4.389	2.570
	"When you are at home, how often do you read religious literature other than the Bible?" (Q804)	0.661	< 0.001	3.723	2.407
	"How often do you read religious newsletters, religious magazines, or church bulletins when you are home?" (Q806)	0.647	< 0.001	3.496	2.050
	"How often do you watch or listen to religious talk shows or shows that report the news from a Christian perspective?" (Q810)	0.360	< 0.001	2.944	2.225

Table 5 (continued)

Factor	Items	Factor Loading	P-value	Mean	SD
Positive religious coping	"I look to God for strength in crisis" (Q1003A1)	0.695	< 0.001	3.613	0.771
	"I look to God for guidance when difficult times arise" (Q1003A2)	0.760	< 0.001	3.595	0.784
	"When I'm faced with a difficult experience, I try to think about the good things God has given me" (Q1003A3)	0.760	< 0.001	3.556	0.764
	"I try to realize that God never gives us more than we can handle" (Q1003A4)	0.650	< 0.001	3.488	0.836
	"When hard times arise, I try to realize that it's just God's way of testing my faith" (Q1003A5)	0.479	< 0.001	3.007	1.086
Negative religious coping	"I think about how stressful situations are God's way of punishing me for the things I have done wrong" (Q1003A6)	0.515	< 0.001	1.788	1.061
	"When problems arise in my life, I wonder whether God has abandoned me" (Q1003A7)	0.717	< 0.001	1.492	0.880
	"When I'm faced with stressful situations, I question the power of God" (Q1003A8)	0.849	< 0.001	1.461	0.877
	"When problems arise in my life, I question whether God really exists" (Q1003A10)	0.759	< 0.001	1.308	0.744

Table 6 Factor Co-Variance Matrix

Factors	Spiritual connectedness	Religious music support	Religious commitment	Faith-building activities	Positive Religious Coping	Negative religious coping
Spiritual connectedness	1	0.652	0.649	0.491	0.635	−0.165
Religious music support	0.652	1	0.571	0.450	0.544	−0.032
Religious commitment	0.649	0.571	1	0.445	0.559	−0.136
Faith-building activities	0.491	0.450	0.445	1	0.415	−0.176
Positive religious coping	0.635	0.544	0.559	0.415	1	−0.051
Negative religious coping	−0.165	−0.032	−0.136	−0.176	−0.051	1

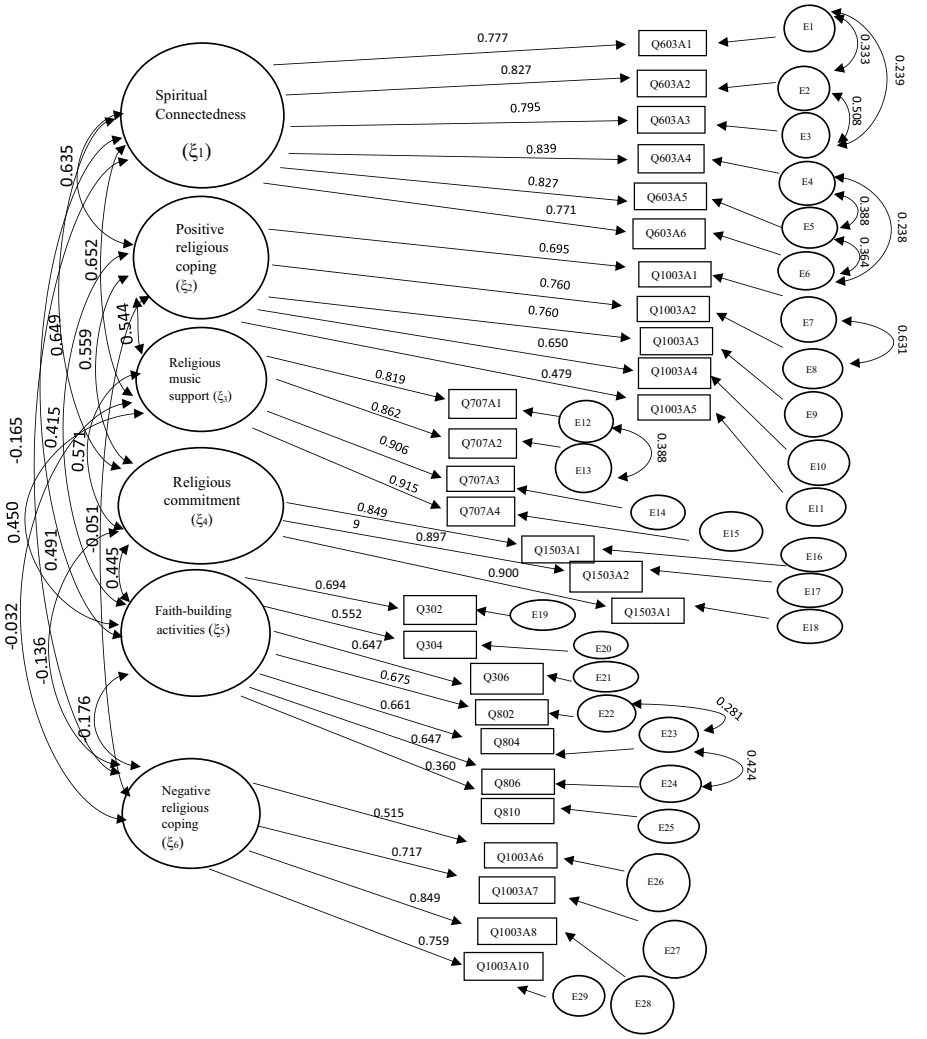

Fig. 1 Religious constructs and items with standardized factor loadings

Acknowledgements The data from this study was secondary data from the Religion, Aging, and Health Survey that was conducted from 2001-2004 and was accessed through the Inter-University Consortium for Political and Social Research (ICPSR). No funding sources were used to conduct this research.

Author contributions Dr. Eduardo Gandara contributed to the study's conception and design. Data analysis was performed by Dr. Gandara and Dr. Wen Luo. The first draft of the manuscript was written by Dr. Eduardo Gandara and all authors commented on previous versions of the manuscript. Moreover, all authors read and approved the final manuscript.

Funding The authors did not receive support from any organization for the submitted work.

Availability of data and material The data and materials presented in this article comply with field standards.

Consent, data, materials, and/or code availability Since human subjects were not recruited for this study, consent to participate was not asked. Code availability is not applicable in this study.

Declarations

Ethics approval The IRB Office determined that this study was not research involving human subjects and received a "Not Human Research Determination."

Conflicts of interest/competing interests The authors have no conflicts of interest to declare that are relevant to the content of this article.

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