

Looking Inside the Black Box of "Attendance at Services": New Measures for Exploring an Old Dimension in Religion and Health Research

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Citation for this version and the definitive version are shown below.

Citation to Publisher Idler, Ellen L., Boulifard, David A., Labouvie, Erich W., Chen, Yung & Contrada, Richard J. (2009).
Version: Looking Inside the Black Box of "Attendance at Services": New Measures for Exploring an Old Dimension in Religion and Health Research. *International Journal for the Psychology of Religion* 19(1), 1-20.

Citation to this Version: Idler, Ellen L., Boulifard, David A., Labouvie, Erich W., Chen, Yung & Contrada, Richard J. (2009). Looking Inside the Black Box of "Attendance at Services": New Measures for Exploring an Old Dimension in Religion and Health Research. *International Journal for the Psychology of Religion* 19(1), 1-20. Retrieved from [doi:10.7282/T3C24TSZ](https://doi.org/10.7282/T3C24TSZ).

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Looking Inside the Black Box of “Attendance at Services”:

New Measures for Exploring an Old Dimension in Religion and Health Research

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This research was supported by grants from the National Institute on Aging (AG15160 and AG16750, Richard Contrada, PI).

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Date Resubmitted: March 11, 2008

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Abstract

Research in religion and health has spurred new interest in measuring religiousness. Measurement efforts have focused on subjective facets of religiousness such as spirituality and beliefs, and less attention has been paid to congregate aspects, beyond the single item measuring attendance at services. We evaluate some new measures for religious experiences occurring during congregational worship services. Respondents (N=576) were religiously-diverse community-dwelling adults interviewed prior to cardiac surgery. Exploratory factor analysis of the new items with a pool of standard items yielded a readily interpretable solution, involving seven correlated but distinct factors and one index variable, with high levels of internal consistency. We describe religious affiliation and demographic differences in these measures. Attendance at religious services provides multifaceted physical, emotional, social, and spiritual experiences that may promote physical health through multiple pathways.

Measurement of religion, religiousness, and spirituality for the purposes of health research has been an evolving enterprise. Beginning with Durkheim's *Suicide* (1897/1951), and continuing through the 1960s and 1970s, epidemiological studies focused on mortality or health differences among religious affiliations. Studies of suicide, cardiovascular disease, and cancer deaths were based on comparisons of mortality rates of mainstream and sectarian religious groups such as Seventh Day Adventists, Mormons, and the Amish, which were often lower than those of other religious groups or standard populations (Jarvis & Northcott, 1987). Religion was treated as a characteristic of groups, not individuals. The dependent variables were rates (all-cause, or cause-specific mortality), and the mechanisms of effect remained speculative, or focused specifically on health-risk-related practices, including vegetarian diet and prohibitions against smoking or alcohol.

A second wave of studies beginning in 1979 took an entirely different approach. These studies treated religiousness as a characteristic of individuals, and conceptualized it as one type of social tie making up an individual's social network, along with families, friendships, and voluntary and community group memberships (House, Landis, & Umberson, 1988). In these studies religiousness was measured with a single item asking about attendance at services or membership in a congregation; the individual's specific religious affiliation, the basis for all of the previous research, was now usually absent. Reviews during this period of research consistently criticized the unidimensional, typically single-item operationalization of religiousness, and pointed out that lack of development in measurement of the key concept was a major barrier to progress in the field (e.g. Levin, 1994).

Since then, research on religion and health has maintained a focus at the individual level of analysis. Innovations in measurement largely have been fixed on private, subjective,

psychological aspects of religious experience, as opposed to the public, congregational, behavioral dimensions. In particular there has been increasing emphasis on spirituality and spiritual well-being. Much measurement interest also has centered on variants of Allport's concept of intrinsic religiousness (Allport & Ross, 1967; Hoge, 1972), and Pargament's concept of religious coping (Pargament, Koenig, & Perez, 2000).

The health research literature has prompted much discussion of the distinctions between religiousness and spirituality, and reviews of new developments in measurement often turn on contrasting definitions of the two (Greenwald & Harder, 2003; Paloutzian and Park, 2005). Religion is usually taken to represent a formal set of doctrines and the social institution that maintains them, whereas spirituality represents the individual's subjective experience of the sacred, which may take place inside but mostly (it is implied) outside the institution. Some have argued that this distinction is overplayed; as Hill and Pargament (2003:64) summarize the difference, there is a "...polarization of religiousness and spirituality, with the former representing an institutional, formal, outward, doctrinal, authoritarian, inhibiting expression and the latter representing an individual, subjective, emotional, inward, unsystematic, freeing expression", or to put it more bluntly: spirituality is treated as a positive characteristic of individuals and religiousness as a negative one. However, as the empirical literature attests, many survey respondents fail to distinguish religiousness from spirituality, and describe their spiritual experiences as taking place in the context of formal religious services (Marler & Hadaway, 2002; Zinnbauer et al., 1997). But regardless of whether what is being measured is called religiousness or spirituality, the social scientific research imagination, at least with respect to health research applications, has been focused on describing the noninstitutional, subjective, ostensibly solitary, introspective experiences of individuals.

A recent review discusses eight scales for measuring “religious belief and practice” most of which derive from the Allport dimension of intrinsic religiousness and which measure beliefs, attitudes toward, and the importance of one’s religion (Egbert, Mickley, & Coeling, 2004). Remarkably, only one of the eight scales contains a single item measuring attendance at services. Health researchers have extended much less interest toward Allport’s companion concept of extrinsic religiousness, which taps more directly the motivations for attending religious services and belonging to a congregation. Indeed, the authors quote Allport’s original 1967 paper, which draws the following distinction: “...the extrinsically motivated person uses his religion, whereas the intrinsically motivated lives his religion” (Egbert, Mickley, & Coeling, 2004:9-10), and go on to add that extrinsic religiousness is correlated with “traditionally negative traits such as prejudice, dogmatism, and fear of death”.

A second conceptual area in which there has been a great deal of attention to the development of measures for health research involves religious coping. Pargament’s RCOPE instrument and related religious problem-solving scales (Pargament et al., 1998) focus on cognitive, interpretive strategies individuals use in response to situations of life stress. These scales have generated a tremendous amount of health research because of their obvious relevance to situations of illness and loss. Items focus on the individual’s relationship with God, religious causal attributions, and some behaviors such as asking forgiveness, and praying. Of 21 items in the Brief RCOPE, none refer to attendance at services and just two refer to “my church”, one of which loads highly on the “negative religious coping” dimension (Pargament et al., 1998).

A third conceptual area in which there has been an even greater proliferation of instruments has been the domain of spirituality and spiritual well-being. Some instruments frequently used in, or newly developed for health research, include the 20-item Spiritual Well-Being Scale (SWB)

(Paloutzian & Ellison, 1982); the 12-item Spirituality Index of Well-Being (SIWB) (Frey, Daaleman, & Peyton, 2005); the 7-item Index of Core Spiritual Experience (INSPIRIT) (Kass et al., 1991); the 8-item Spiritual Transcendence Index (STI) (Seidlitz et al., 2002); and the Daily Spiritual Experience Scale (DSE) (Underwood & Teresi, 2002). As their titles suggest, none of these scales refer specifically to experiences in the context of religious worship services. Some refer to the individual's relationship to God, a higher power, or a divine being, or feelings of transcendence, and so do not exclude experiences some individuals would identify as religious, but none refer to congregational group experiences.

To summarize, in response to the blossoming of research on religion, spirituality, and health, sociologists and psychologists of religion have turned to existing measures of religiousness and spirituality and developed many new ones that probe the individual's consciousness of his or her own religious and/or spiritual states. Researchers appear to have taken the view that the important dimensions of religiousness/spirituality for health research are to be sought in the extent to which individuals acknowledge religiousness and/or spirituality as motivating and orienting influences in their behavior, and not in their behavior itself. One recent exception is an effort to measure various types of congregational activities other than attendance at worship services (Krause, 2006). But in the dominant pattern we see Allport's influence specifically, as well as the more general influence of American Protestantism, with its emphasis on perfectionism, identity-defining experiences exemplified by being "born again", and the search for signs of salvation in the soul. Such an emphasis also meshes neatly with the contemporary emphasis on "good" spirituality, as opposed to controversial, complicated, and perhaps unfashionable religion.

And yet this trend in the development of measures is somewhat at odds with the empirical findings in the field. In their meta-analysis of 42 independent clinical and population-based

samples reporting effect sizes for religion and all-cause mortality, McCullough et al. (2000) report odds of mortality that were 1.29 times higher (95% C.I. 1.20, 1.39) for those with low levels of religious involvement. The studies in their review characterized religious involvement variously as attendance at religious services, membership in religious groups, finding strength and comfort from one's religious beliefs, and religious orthodoxy, but inspection of their Table 1 shows that frequency of attendance at religious services is by far the most often-used measure in mortality studies, and it is also the measure showing the largest effect sizes. McCullough et al. (2000) conclude that "Studies using public measures of religious involvement yielded larger effect sizes than did those using other types of measures of religious involvement" (p. 220). A second review, featuring a levels-of-evidence approach, comes to a similar conclusion: "In healthy participants, there is a strong, consistent, prospective, and often graded reduction in risk of mortality in church/service attenders..." (Powell, Shahabi, & Thoresen, 2003:36). The Powell et al. (2003) review compares results by the way in which religion/spirituality is measured, as well as by mortality and morbidity outcome; for all measures and outcomes *other than* attendance and mortality they conclude that the strength of the evidence is less than persuasive. The most recent studies, conducted since these reviews were published, have continued to find a robust relationship between religious attendance and mortality (Dupre, Franzese, & Parrado, 2006).

Given this history of the development of measurement in this field, the relative clarity of the epidemiological findings with respect to important health outcomes, and the evidence with respect to potential causal pathways, we would argue that more attention should be directed at understanding what it is that the single item of attendance at services is capturing that other dimensions of involvement are not. Because attendance at religious worship services takes place in a specific setting, and for a specific period of time, we argue that from an epidemiological

standpoint it ought to be treated as a kind of exposure variable; but, exposure to what?.

Elements common to most worship services include vocal and/or instrumental music, silent and/or spoken prayers, readings from holy texts, teachings, rituals performed by clergy and/or congregation, and opportunities for service or monetary donations. These activities take place in a church, temple, or mosque that provides a place set aside from daily life, often in an architecturally and/or historically significant space, and they take place at a time that is explicitly set aside for these purposes. Moreover, there are opportunities for the giving and receiving of informal social support, information, and reflection on the experience with others there for the same purpose, both before and after the service is concluded. It would appear that the single item of attendance at services—usually the sole representative of the dimension of organizational religiousness—is a marker for a multidimensional experience. Most important for health research, earlier studies have shown that attendance (but *not* the nonorganizational aspects of religiousness) are related to what are considered the most important potential mediators of the relationship between religion and health: smoking, alcohol use, physical activity, and social support (Idler & Kasl, 1997).

Organizational religiousness may additionally be critical for health through physiological pathways heretofore only rarely examined (Seeman, Dubin, & Seeman, 2003). Many elements of religious worship directly involve the body and senses in ways that may promote both physical health and positive mental states and emotions. Taste is stimulated by the Jewish Seder or Christian communion, hearing by words and music, smell by incense or flowers, touch by the laying on of hands or anointing with oil or water, sight by religious symbols or architecture. Or the period of meditation, prayer, repentance, and forgiveness may reduce stress by enforcing rest or assisting individuals in resolving conflicts in their personal relationships. Singing may regulate breathing and cardiovascular functioning. Strong emotions that may at times be aroused by

participation in the service may provide release or comfort. In sum, the worship service may provide numerous opportunities for the activation and integration of sensory, cognitive, and affective processes of the mind with alterations within the physical body, and the perception of spiritual states. Moreover, this holistic experience takes place in a congregate setting, with others holding similar beliefs and performing these actions in a synchronized manner.

The purpose of the present research was to develop and evaluate a set of measures to describe the experience of the worship service. New items were examined within a pool of items from existing measures of other important dimensions of religiousness/spirituality. We expected to identify factors that approximate those identified in previous research, and also to identify several new factors for previously unmeasured constructs. The three new dimensions for which we introduced items were: (1) importance to the individual of typical worship service practices; (2) emotions that might be experienced during worship services; and (3) feelings of belonging to the specific congregation and the larger faith community.

Methods

Sample

Respondents were 576 patients in a study of open heart surgery for coronary artery bypass (CABG) or heart valve replacement/repair. These procedures took place at a major medical center in an ethnically and religiously diverse area of the northeastern United States. Interviewers recruited patients at preadmission testing or following admission for urgent or emergency surgery if the health of the patient permitted. All patients were recruited and considered eligible if they spoke English and were competent/willing to answer questions. Of 1,078 eligible patients approached, 677 (63%) agreed to participate. However, for 101 of those who agreed, an interview could not be arranged prior to surgery because of staff scheduling constraints, resulting in an initial

sample of 576 patients (53% of those approached). The study was approved by the Rutgers University and the UMDNJ – Robert Wood Johnson Medical School’s Institutional Review Boards. Interviewers were graduate students in psychology and registered nurses.

Study Design

The present research was part of a prospective study of biomedical and quality of life outcomes in heart surgery. Recruited participants were initially interviewed, on average, 5.7 days prior to surgery. Subsequent interviews took place at the surgical follow-up visit, and then three, six, and twelve months following surgery. All data analyzed for scale development come from the initial, pre-surgical interview.

Measures

Sociodemographics and health.

Data on age (years), gender, race/ethnicity (white, black, Hispanic, other), education (years), marital status, and health status were collected by interview and medical records abstracts. To measure self-reported health status, we used standardized scales from the Medical Outcomes Study (MOS) Patient Questionnaire (Stewart & Ware, 1992). The scales were drawn from several versions of MOS instruments including the Short Form General Health Survey (SF-36), and have been psychometrically evaluated in previous research (Stewart & Ware, 1992). For the present analysis, we used a four-item physical functioning index defined by self-reports of limitations in climbing stairs, bending/kneeling/stretching, walking one block, or bathing/dressing ($\alpha = .76$).

Religion.

A set of new items describing participation in congregational worship services was generated by our religiously-diverse team of researchers, who drew on their own personal and scholarly knowledge about elements of this experience. We paid particular attention to the

physical, sensory, and emotional aspects of the worship experience. We chose language appropriate for worshippers across the major faith traditions. Potential items were circulated to additional colleagues with expertise in the scientific study of religion, and revised. Items were pre-tested in a preliminary study of heart surgery patients (N=112); some were dropped because of nonresponse or lack of variance, and others revised.

The set of 44 closed-ended items used in the factor analysis is listed in Table 1, organized by conceptual categories. We proposed five separate dimensions, for worship experiences (new items), private devotions, belonging (new items), spirituality, and beliefs. Our Worship dimension is made up of items measuring frequency of attendance, worship practices, and emotions. Six new items asked respondents how important different elements of the worship service were to them, for example, listening to or performing music, participating in rituals or sacraments, listening to sermons, praying, or contemplating. Music and sermons are nearly universal features of U.S. worship services, and the other elements are practiced by the great majority of congregations (Chaves, 2004). The eight new worship emotions items asked about the frequency of the experience of various emotions in worship, several of which have a component of physical sensation. The six new belonging items emphasized the closeness of social ties to other congregation members and to others of the same faith. In addition to these newly-generated items, we included a number of religiousness/spirituality items found in the health research literature from sources including the General Social Survey (National Opinion Research Center, 1998; Smith, 1990); the Spiritual History Scale (Hays, Meador, Branch, & George, 2001), the Daily Spiritual Experiences scale (Underwood & Teresi, 2002), and the I/E scale (Gorsuch, 1995). Only by analyzing a large pool of items could we ascertain whether our new items would form separable dimensions, demonstrating discriminant validity with regard to previously-identified aspects of

religiousness, and provide reliable measurement of those new aspects of religious experience.

Scoring for all items can be found in the footnotes to Table 1.

Statistical Analysis

We used MPlus software version 3.01 (Muthén & Muthén, 1998) to perform an initial confirmatory factor analysis (CFA). This was followed by exploratory factor analysis (EFA). In order to use the full set of data, both factor analyses used expectation-maximization (EM) algorithms to estimate maximum-likelihood item variances and covariances with imputation for missing data (Enders, 2006). Imputation was necessary for the factor analyses because some respondents were missing data on a set of religion items (particularly the worship experience items) that were not asked of respondents who said *both* that they had no congregation, *and* also that they did not attend services. Listwise deletion would have eliminated a substantial portion of our sample who could contribute data on other religion or spirituality items. This method assumes ignorable missingness or nonresponse, meaning that the probabilities of missingness depend on observed data and not only on the missing data themselves. Missing values indicators as random covariates are assigned a distribution as predicted from nonmissing data. Recent evidence shows that analyses of all complete and incomplete cases tend to yield less biased parameter estimates than analyses restricted to cases with complete data (Enders, 2006).

The analyses of individual measures were performed with nonmissing data only, because the religion items and scales are the dependent variables in separate regression models, and therefore sample size for one is not tied to the others as it is with listwise deletion. To describe differences in scales by religious affiliation, we used the SAS software version 9.1 General Linear Models (GLM) program to generate scale means for each of the religious affiliations in the sample and then performed pairwise *t*-tests to detect all possible differences. Based on these results, we

then used GLM to perform ordinary least squares regression of each factor on a set of sociodemographic and health variables and an appropriately collapsed set of religious affiliations.

Results

Descriptive statistics for the sample are presented in Table 2. Although slightly over half of this sample of 576 adult heart surgery patients were Roman Catholic, the remainder were quite religiously diverse, including internally diverse groups of Jews, Protestants, and Orthodox Christians, as well as Hindus, Muslims, and other. Just 5.9% of the sample reported no religious affiliation. There were 154 women and 416 men, aged 28 to 89 years. Twelve percent of the sample were nonwhite, and 28.5% were not married. On average, they reported 13.4 years of education. Muslims were the youngest ($M = 55.7$ years) and Orthodox Christians the oldest ($M = 70.7$ years). Hindus were the most highly educated ($M = 16.9$ years of education), and Orthodox Christians the least ($M = 12.5$). Hindus and Muslims were most likely to describe themselves as nonwhite. There were no significant differences in function between religious affiliation groups. Twenty-five percent of the sample reported no limitation of function at all, and no one in the sample scored over 3 on a functional limitation scale with a maximum of 6; moreover, 37.5 percent rated their health as very good or excellent. Thus, although this was a sample of patients facing surgery, many respondents were middle-aged and many felt quite healthy.

The initial confirmatory factor analysis was based on dimensions indicated in Table 1. This 5-factor model did not fit the data well, χ^2 (df 892) = 3,783.70, $p < .001$, Root Mean Square Error of Approximation (RMSEA) = .075 (95% CI: .073, .078); our initial expectations regarding dimensions underlying responses to the pool of items were not supported. Tables 3 and 4 show the results of the subsequent exploratory factor analysis (EFA), including item loadings, internal consistency measures, and correlations between factors. Our initial EFA with PROMAX rotation

produced an eight factor solution with RMSEA = .039 (90% C.I.: .036, .043). An RMSEA of less than .05 indicates a close fit of the model in the population. Two items (How religious are you? How spiritual are you?) had loadings of .30 or greater on two factors, and therefore were not clear indicators of any one factor. We decided to retain these as individual items for further analysis, but to exclude them from the factor analysis. We then ran a second EFA without these two items, and the results are displayed in Table 3. The RMSEA for the 8 factor model is .037 (90% C.I.: .033, .041). Four of the six worship practices items and two of the spirituality items did not load on any factor. Because Factor 8, with the smallest Eigenvalue, had only two items (reading scripture and sermons), we dropped it and instead summed scores from all six worship practices items, yielding an index that measures the overall importance of worship practices.

Factor 1 contains the frequency of attendance at services item, although the highest loading item for the factor is “Do you have a congregation?” The other two items loading on this factor concern how much the particular congregation means to respondents, and the anticipated sense of loss were one to leave a congregation. We labeled this factor Congregation Involvement. Cronbach’s alpha for Factor 1 was .79. Its highest correlations are with the Worship Practices Index and How Religious (both .52), and lowest with Purpose (.20).

Factor 2 is made up of four of the worship emotion items, which ask about feelings of energy, calm, being healed, and joy. We labeled this factor Positive Worship Emotions; its Cronbach’s alpha is .88. It is most highly correlated with the Worship Practices Index (.60), and least highly with Purpose (.40).

Factor 3, Daily Devotional Activities, comprises seven items probing the place of religiousness in daily life, including reading the Bible or other religious texts, listening to religious programs on radio or TV, praying, having had a life changing experience, participating in other

activities at a place of worship, rating religion as important compared to other things (reverse coded), and saying grace. Cronbach's alpha is .78; its highest correlations are with the Worship Practices Index and How Religious (.56) and lowest with Sad Worship Emotions (.23).

Factor 4, Belonging, is made up of five items, including enjoying meeting others of one's faith, feeling a special bond with others of the same faith, feeling connected to others on the holidays, feeling that congregation members are like family, and having a lot of good friends in the congregation. Cronbach's alpha is .85; this factor is most highly correlated with Worship Practices Index (.58) and least with Sad Worship Emotions (.32).

Factor 5, Beliefs, has seven items, including believing in a Divine Being, believing in life after death, believing in the doctrines of one's religion, striving for spiritual growth, feeling one's life is part of a larger spiritual force, feeling that religion shapes one's whole approach to life, and having a relationship with a Divine Being outside of religion. Cronbach's alpha is .84; this factor is most highly correlated with How Religious (.58), and least with Sad Worship Emotions (.32).

Factor 6, Purpose, is made up of three items indicating a sense of purpose in life, meaning in life, and a philosophy of life. Cronbach's alpha is .78; its highest correlation is with Belonging (.45), and its lowest is with Sad Worship Emotions (.15).

Factor 7, Sad Worship Emotions, included frequency of crying, feeling sad, feeling goose bumps, and feeling choked up during worship services. Cronbach's alpha is .85; this factor is most highly correlated with Positive Worship Emotions (.41), and least with Purpose (.15).

The Worship Practices Index captures the overall importance to the respondent of the worship service elements: music, prayer, reading, sermons, rituals, and the setting. Despite the fact that these items did not factor together, Cronbach's alpha is .81. The index is most highly correlated with Positive Worship Emotions (.60) and least with Sad Worship Emotions (.36).

The two single items that did not load cleanly on any factor, How Religious and How Spiritual the respondent is, have their highest correlations with each other (.65). The lowest correlation for both is with Sad Worship Emotions (.25).

To summarize, all Cronbach's alphas indicated good to very good internal consistency, ranging from .72 to .88. Correlations between factors ranged from .15 to .65. One of the two highest correlations at .60 and above is for the correlation between How Religious and How Spiritual, items conventionally treated separately. The other is for the correlation between Positive Worship Emotions and Worship Practices, two factors with clearly distinct content and patterns of associations with other variables. Overall, the Worship Practices Index tended to have a pattern of the highest correlations with other factors, and Sad Worship Emotions the lowest.

All factors were scored by averaging their items after the item response categories had been scaled to range uniformly from 1 to 5. If one third or fewer of the items were missing for an individual, we imputed the mean score of nonmissing items to missing items. If more than one-third of items were missing, the factor score remained missing for that respondent.

Analysis of variance examined mean scores for each variable by religious groups, followed by individual comparisons using *t*-tests. Given the large number of comparisons (45), we report only differences that are significant at the $p < .01$ level. Results are presented in Table 5. Each set of rows shows a scale, each column shows a religious group. Religious groups appear in a row only if their mean score is significantly different from the column group for the scale in that row. Groups having the lowest and highest scores for each scale are indicated. For example, the upper left hand cell in the body of the table shows that the mean score for Congregational Involvement among Roman Catholic respondents was 2.96 and that Roman Catholics are significantly different on Congregational Involvement only from Jewish respondents, who had the lowest score of any

religious affiliation on this dimension. Continuing across Row 1, Congregation Involvement is highest for conservative Protestants. Catholics and conservative Protestants score significantly higher on this scale than Jews or mainstream Protestants. If a cell is empty, it means that the group in the column heading is not significantly different from any other group on that dimension.

Some factor means showed very few significant between-group differences. For Belonging, Roman Catholics scored significantly lower than conservative Protestants, but otherwise all groups were statistically indistinguishable, and had relatively high scores. Also, Jewish respondents scored significantly lower on Purpose (a factor on which all groups including Jews had relatively high scores) compared with Roman Catholics, Hindus, and Orthodox Christians, but they did not differ from Muslims, or mainstream or conservative Protestants. And there were no significant differences at all between groups on Sad Worship Emotions, on which there were generally low scores overall.

The factors for which there was the most diversity of scoring among the religious affiliation groups were Positive Worship Emotions, Daily Devotional Activities, Beliefs, How Religious, and How Spiritual. Jewish respondents had the lowest score for Positive Worship Emotions, and were significantly lower than Orthodox Christians (who had the highest scores), Roman Catholics, Hindus, Others, and conservative Protestants. Mainstream Protestants also scored low on this scale, significantly lower than Orthodox Christians and Roman Catholics. The highest score for Daily Devotional Activities was for conservative Protestants, who were significantly higher on this dimension than every other religious group except Muslims; those with no religion scored lowest. The dimension with the greatest amount of explained between-group variation, as shown by the highest model R^2 (.21), was Beliefs. Orthodox Christians scored highest on this factor; Jewish respondents and those with no religion scored lowest and were significantly

different from virtually all other groups. The Worship Practices Index had somewhat less diverse scoring, with high scores for Orthodox Christians and Muslims and low scores for Jewish respondents. Jewish respondents scored significantly lower on the importance of worship than Orthodox Christians, Catholics, and both Protestant groups. When respondents assessed How Religious they were, Orthodox Christians and conservative Protestants scored the highest; those with no religion scored the lowest. Jewish respondents again scored the lowest among the religious groups. Responses to How Spiritual were a bit different; here the high scores were for conservative Protestants and others (a group including Unitarians, Bahà'í, Buddhist, Pagan, and New Age respondents). The low scores were for no religion and Jewish respondents.

Overall, the highest means for the sample as a whole were for Purpose, Beliefs, and Belonging; the lowest were for Sad Worship Emotions and Daily Devotional Activities. Among the religious groups, Jewish respondents and those with no religion showed consistent patterns of low levels of religious involvement and expression. The high-involvement, high-expressiveness groups are the conservative Protestants and to a lesser extent, the Orthodox Christians. Of equal interest is that some dimensions, notably Sad Worship Emotions and Belonging, showed few or no differences between groups, while others, particularly Positive Worship Emotions, Daily Devotional Activities, and Beliefs, showed a polarization of scores.

In a final effort to characterize these new dimensions, we performed ordinary least squares regression on each of the new scales with sociodemographic factors, physical functioning, and religious affiliation differences as our independent variables. We adjust for differences in physical functioning to be sure the associations were not confounded by selection; it is important to know if respondents were (for example) less likely to attend worship services because they were unable to attend due to their health. For this analysis, we collapse some religious affiliation groups because

of small numbers. From the results of the previous detailed analysis in Table 5, it was clear that conservative and mainstream Protestants were sometimes significantly different from each other, and therefore should not be grouped together, but that Muslim, Hindu, and Orthodox Christian respondents were never significantly different from each other on these dimensions, and therefore could reasonably be added to the “other” category. Jewish and no religion respondents were coded with separate dummy variables, with Roman Catholics as the reference.

Results show that women are more religious than men on every single dimension, in accordance with most research on gender differences in religiousness. Unmarried respondents are less likely than married respondents to report high levels of Congregational Involvement and Beliefs; they also report fewer Daily Devotional Activities, score lower on Beliefs, have a lower sense of Purpose, and report themselves to be less religious. Hispanics are not different from whites on any dependent variable. However, black respondents and those of other races report higher levels of Daily Devotional Activities than whites, and blacks report marginally lower Congregational Involvement. Respondents with higher levels of education report a greater sense of Purpose, that they are more Spiritual, and that they have fewer Sad Worship Emotions. Older respondents have higher levels of Congregational Involvement, Daily Devotional Activities, a greater sense of Belonging, report more importance of Worship Practices, and rate themselves as more religious. Religious affiliation differences, now that they are adjusted for sociodemographic factors, again show that Jewish respondents score significantly lower than Roman Catholics on every dimension except Belonging and Sad Worship Emotions. Our measure of physical functioning was associated with only two of the religion measures. Poor physical function was associated with lower levels of Congregation Involvement, and with fewer feelings of Belonging. Comparing across the standardized coefficients, one would conclude that being female and being

Jewish are the two strongest and most consistent correlates of these dimensions of religiousness. Jewish respondents score lower than the comparison category of Roman Catholic respondents on almost every dimension; the two exceptions are Belonging and Sad Worship Emotions, on which there are no differences among religious groups. Model R^2 's show that Daily Devotional Activities, Beliefs, and How Religious are somewhat better explained by demographics, health, and religious affiliation than are the other dimensions.

Discussion

In this paper we have reported on the fielding and testing of a set of new measures to explore the underspecified domain of the experience of worship services. We focus on this area because our reading of the health research literature suggests that attendance at religious worship services is centrally important among the dimensions of religiousness, and because there are identifiable physical and sensory aspects of the experience that could plausibly be linked to health outcomes. Our analysis produced ten measures of religiousness/spirituality, four of which are composed entirely of new items. Cronbach's alphas for these new measures are all above .80. They measure aspects of religious experience that have not been measured heretofore; specifically, they focus on the complex physical, sensory, behavioral, emotional, and cognitive experiences to which people are exposed when attending religious worship services.

The new scales we derived from the exploratory factor analysis have good or very good internal consistency. They also have content and face validity, in that they refer to identifiable feelings and behaviors relevant to the experience of attending worship services, were easily understood and responded to by self-identified members of each of the world's major religious traditions, and tap an area of content that has not been measured previously by any other instruments. Discriminant validity is assessed by examining the intercorrelations of the factor

scores, to be certain that factors are measuring distinct characteristics. By some standards, several of the correlations for our factor scores are moderately high, with two at .60 or above, and eight at .55 or above. However, the variable that has the most consistently high correlations with other scores is the new Worship Practices index, which assesses distinct activities not covered elsewhere among the scales. Indeed, the centrality of this new measure confirms the validity of the others. For example, people who find the most importance in worship activities are the most highly involved in their congregations, tend to experience more positive emotions, practice more devotional activities outside of worship services, and feel the strongest sense of belonging to their faith community. It might be said to empirically confirm the finding from the National Congregations Study that the most significant, frequent, and central activity of U.S. congregations of all faiths is their worship service (Chaves, 2005).

One potential limitation of the study is its nonrandom sample. We have a far larger proportion of Roman Catholics in the sample than would be found in the U.S. population (almost 54% compared with 25.5% nationally), and a much smaller proportion of Protestants (21% compared with 52.4%) (Smith & Kim, 2005). Nonetheless, our sample is richly heterogeneous in other respects, with almost 12% Jewish (compared with 1.5% nationally), 1% Muslim, 3% Hindu, and more than 3% Orthodox and Other religions, considerably more than the 0.45% Muslim and 0.2% Hindu reported by the General Social Survey (Smith, 2002). Our larger percentages of these groups are based on a modestly sized sample, resulting in small numbers of respondents in the Hindu, Muslim, and Orthodox Christian groups. However, the descriptive data in Table 5 permitted us to make appropriate groupings for our final regression analysis. As Smith points out, the U.S. is home to all of the world's religions; one might conclude that this region of the country particularly represents that diversity (Smith & Kim, 2005). The sample is also more religiously

affiliated than the U.S. population, with just 5.9% reporting no religious affiliation; by comparison, U.S. respondents reporting “No religion” have increased to 14% (Hout & Fischer, 2002).

Our initial confirmatory factor analysis, based on the dimensions specified in Table 1, was not supported. However, the factors derived from our exploratory factor analysis bore a strong resemblance to the theoretically-specified model, with the following three differences. First, the items that were expected to form a single worship dimension factored into four separate dimensions. The first dimension was the traditional frequency of attendance/organizational involvement, with an emphasis on the respondents’ ties to their own congregation; this is a measure of exposure to the congregation and worship experience. Our worship emotion items factored into two dimensions, one with the positive feelings of energy, joy, and healing, and the other made up of sad feelings with a strong physical component. While the two factors are moderately correlated with each other, indicating a tendency of some respondents to experience both positive and sad feelings during worship services, the positive feelings are much more highly correlated with all other factors than are the sad feelings. In retrospect, the emergence of two emotion factors is not surprising given considerable evidence that affective phenomena can be described in terms of separable positive and negative dimensions (Watson & Tellegen, 1985). And finally, while the remaining items from our original worship experiences dimension failed to factor together, the count or indicator variable achieved a high level of internal consistency; this measure, then, indicates overall importance to the individual of the many facets of the worship experience. Our exploratory factor analysis produced a more complex picture of the worship experience than we tested initially.

A second notable difference between what was proposed and what emerged was the grouping of the Spirituality items (Underwood & Teresi, 2002), (that we thought of as “spiritual

but not religious”) with other belief and commitment items that clearly are “religious”. What they have in common is a focus on the subjective and cognitive aspects of experience. We found the blurring of the line between intrinsic religiousness and spirituality in this diverse but relatively observant sample quite interesting. In fact, the considerable overlap between self-reported religiousness and self-reported spirituality in our sample is also manifested in the close correspondence in the correlations each of these two individual indicators had with most of the other factors; for example, both have correlations of .25 with sad worship emotions, and .43 and .45 with belonging. The only factor for which there are very different correlations for these two is congregation involvement; its correlation with how religious is .52 and with how spiritual it is .36. A third difference was that the items measuring sense of purpose factored together, separately from the other belief items. To summarize the differences between the theoretical model and our exploratory factor analysis: one dimension we thought of as one (worship experience) became four; one that we thought of as one (beliefs) became two; and two that we thought of as separate (intrinsic religiousness and spirituality) became one. Nevertheless, the structural similarity of the resulting EFA factors to those specified in the CFA provides some substantive support for our theoretical model.

Our findings regarding functional health status and religiousness again speak to the validity of the measures. As noted previously, although this is a patient sample, health and function levels were relatively good. We used the Medical Outcomes Study physical function measure as a summary indicator of the impact of the chronic conditions and co-morbidities on the respondent’s ability to perform basic functions; poor physical function consistently predicts mortality and simultaneously indicates current quality of life. The potential selection effect of poor physical function on attendance at religious services has been a constant topic of debate in this field of

research. Our findings show that poor physical function is associated with somewhat lower levels of congregational involvement and feelings of belonging, indicating that the respondents in our sample who were in poorer health were indeed less likely to be attending services and feeling tied to their congregation. We would expect adverse selection effects of health to be manifested only in associations with measures of religiousness that require physical mobility, and in fact this is the pattern we see, a further indication of the validity of the measures. Moreover, there are no significant associations of physical functioning with internal, subjective, or nonorganizational dimensions which are not limited by physical mobility, additional evidence of validity. However, it is important to note that, even in the two cases where there are significant associations, the parameter estimates for congregational involvement and belonging indicate at best a minor association between physical functioning and religiousness, certainly by comparison with those for gender or age. It is also important to note that the age and gender associations in these models are net of and thus not confounded by physical health status.

Conclusion

We have reported on the development and testing of a set of self-report measures of religiousness that we hope will contribute to the understanding of the relationship between religion and health. While the literature in the field has clearly suggested that attendance at religious worship services is the dimension of religiousness that has the strongest association with physical health, research attention has largely focused on other aspects, particularly those involving the solitary individual's perception of inner states. Our goal was to draw attention to specific, never-before measured aspects of the experience of public religious worship services that may have effects on health because such experiences are at least partly absorbed through the body and its five senses. Members of congregations participating in worship services are exposed to ritual

practices that, as Durkheim (1912/1995) observed, generate a collective consciousness, an awareness of the religious group as a singular entity, and a transformed sense of the self as an integrated part of the whole. The strong correlation between our measure of the importance of worship practices and almost all of the other measures, new and old, is testimony to the centrality of the concept. Our data have limitations with respect to sample size and region, but there are also strengths of considerable religious and demographic diversity. We regard this attempt to open the experience of attendance at religious services to the scrutiny of health researchers as just a start of new initiatives to understand the association between religion and health through more adequate conceptualization and measurement of this complex, multidimensional phenomenon of religion.

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Table 1. Full Set of Religion Items and Proposed Dimensions

Preference / Affiliation

PREFERENCE What is your religious preference? (open-ended)

Worship Experiences

CONGREGATION Do you have a congregation?¹

CHURCH MATTERS The particular church/synagogue I attend matters a great deal to me.²

ATTEND How often do you usually attend religious services?³

ACTIVITIES How often do you take part in the activities or organizations at a church or place of worship?³

MUSIC Listening to or performing music.⁴

PRAY Praying for yourself or others.⁴

LISTEN Reading or listening to Scripture or Torah.⁴

SERMON Listening to the sermon or drasha.⁴

RITUAL Participating in rituals or sacraments, such as communion, baptism, or lighting candles.⁴

BEAUTY Thinking about the beauty of the surroundings and/or sitting in silence.⁴

JOY How often does attending religious services make you feel elated or joyful?⁵

CHOKED UP How often does attending religious services make you feel choked-up?⁵

GOOSEBUMPS How often does attending religious services give you goose bumps or make your spine tingle?⁵

SAD How often does attending religious services make you feel sad?⁵

CRY How often does attending religious services make you feel like crying?⁵

CALM How often does attending religious services make you feel peaceful and calm?⁵

HEALED How often does attending religious services make you feel cleansed or healed?⁵

ENERGY How often does attending religious services make you feel renewed or energized?⁵

Private Devotions

PRAY	How often do you pray or meditate? ⁶
READ BIBLE	How often do you read the Bible or other religious literature? ⁶
RELIGIOUS TV	How often do you watch or listen to religious programs on TV or radio? ⁷
GRACE	How often are prayers or grace said before or after meals in your home? ⁸

Beliefs

LIFE CHANGE	Have you had a religious or spiritual experience that changed your life? ¹
BELIEVE DIVINE	I believe in a Divine Being who watches over me and to whom I am accountable. ²
ETERNAL LIFE	I believe in life after death. ²
DOCTRINES	I believe honestly and wholeheartedly in the doctrines and teachings of my religious community. ²
RELIGIOUS	How religious would you say you are? ⁹
FAITH	My faith shapes how I think and act every single day. ²
IMPORTANCE	Although I believe in my religion, many other things are more important in life. ²
PURPOSE	I believe there is some real purpose for my life. ²
MEANING	My personal beliefs give meaning to my life. ²
PHILOSOPHY	I have a clear philosophy in how I approach life. ²

Spirituality

SPIRITUAL	How spiritual would you say you are? ⁹
DIVINE	I have a relationship with a Divine Being, but it is not through organized religion. ²
GROWTH	Spiritual growth is an important aim in my life. ²
PEACE	I feel deep inner peace or harmony. ²
NATURE	My spirit is touched by the beauty of nature. ²
LIFE FORCE	I feel my life is part of a larger spiritual force. ²

Belonging

CHURCH FAMILY	My congregation members are something like a family to me. ²
LOSS IF CHANGE	If I had to change to a different church or temple, I would not feel a great sense of loss. ²
FRIENDS	I have a lot of good friends at my church or temple. ²
BOND	I feel a special bond with others of my faith, even if I have never met them face to face. ²
MEET OTHERS	I enjoy meeting and talking with new people who share my religious or spiritual beliefs. ²
HOLIDAYS	I feel especially connected to members of my religion on the holidays. ²

¹ 1=Yes, 2=No

² 1=Strongly agree, 2=Agree, 3=Not sure, 4=Disagree, 5=Strongly disagree

³ 1=Never, 2=Once or twice a year, 3=Three to ten times per year, 4=Once or twice a month, 5=Once a week, 6=More than once a week

⁴ 1=Extremely important, 2=Very important, 3=Somewhat important, 4=Of slight importance, 5=Not important at all

⁵ 1=More than once per service, 2=Once per service, 3=Regularly but not every service, 4=Occasionally, 5=Never

⁶ 1=Never, 2=Only occasionally, 3=Several times a week, 4=Once a day, 5=Twice a day, 6=Three or more times a day

⁷ 1=Never, 2=Less than once a month, 3=Once a month, 4=A few times a month, 5=Once a week, 6=A few times a week, 7=Once a day, 8=More than once a day

⁸ 1=At all meals, 2=Once a day, 3=At least once a week, 4=Only on special occasions, 5=Never

⁹ 1=Not at all, 2=Only slightly, 3=Fairly, 4=Deeply

Table 2. Sample Demographic Characteristics, Percent or Mean

Religious Affiliation	Male %	Age	Education	White %	Married %	Physical function	Sample %	N
Roman Catholic	68.1	66.0	12.7	94.5	69.3	1.60	53.8	310
Conservative Protestant ¹	73.5	61.0	12.9	58.8	58.8	1.78	5.9	34
Mainstream Protestant ²	77.0	65.9	13.3	87.4	69.0	1.65	15.1	87
Jewish ³	72.1	67.2	15.1	100.0	80.9	1.55	11.8	68
Muslim	100	55.7	14.0	33.3	100.0	1.83	1.0	6
Hindu	88.9	57.8	16.9	5.6	94.4	1.43	3.1	18
Orthodox ⁴	70.0	70.7	12.5	100.0	80.0	1.52	1.7	10
Other ⁵	88.9	59.8	15.9	77.8	88.9	1.33	1.6	9
None	91.2	64.0	14.1	85.3	67.7	1.61	5.9	34
Total	72.9	65.3	13.4	87.9	71.5	1.60	100.0	576

¹ Includes: Baptist=18, Assembly of God=5, Evangelical Christian=4, 1 each: 7th Day Adventist, Bible Church, Church of Christ, Fundamentalist United Church of God, Holiness, Protestant Pentecostal, Reborn Christian

² Includes: Methodist=19, Protestant=19, Episcopalian=15, Lutheran=13, Presbyterian=8, Reformed=6, Nondenominational Christian=5, African Methodist Episcopal=1, Congregationalist=1

³ Includes: Conservative=27, Reform=25, Jewish (unspecified)=13, Orthodox=2, Synagogue Jewish=1

⁴ Includes: Greek Orthodox=5, Russian Orthodox=2, Orthodox Christian=2, Byzantine Catholic=1

⁵ Includes: 1 each: Bahá'í, Buddhist, Buddhist and Baptist, Pagan, Jewish Reconstructionist/New Age Pagan, Solitary Pagan, Protestant/Roman Catholic, Unitarian, Unitarian Universalist

Table 3. Exploratory Factor Analysis (EFA)¹, N=575

Item	Congrega tion Involvem ent	Positive Worship Emotion	Daily Devotio nal Activity	Belong ing	Beliefs	Sad Worship Emotion	Purpose
CONGREGATION	.83						
CHURCH	.65						
MATTERS							
ATTEND	.72						
LOSS IF CHANGE	.42						
JOY		.55					
CALM		.88					
HEALED		.84					
ENERGY		.88					
ACTIVITIES			.44				
PRAY			.55				
READ BIBLE			.69				
RELIGIOUS TV			.55				
GRACE			.41				
LIFE CHANGE			.48				
IMPORTANCE			.47				
BOND				.69			
MEET OTHERS				.77			
HOLIDAYS				.63			
CHURCH				.58			
FAMILY							

FRIENDS								.57
BELIEVE DIVINE								.90
ETERNAL LIFE								.74
DOCTRINES								.69
FAITH								.45
DIVINE								.40
GROWTH								.50
LIFE FORCE								.45
CHOKED UP								.68
GOOSEBUMPS								.70
SAD								.83
CRY								.83
PURPOSE								.75
MEANING								.98
PHILOSOPHY								.71
Eigenvalue	15.32	2.62	2.47	1.80	1.52	1.24	1.09	
α for scale	.79	.88	.72	.85	.84	.85	.78	

¹ All items are shown with factor on which they had highest loading. Loadings lower than .40 were excluded. The following items from Table 1 do not appear: RELIGIOUS and SPIRITUAL loaded on several factors and will be analyzed separately as individual items. PEACE and NATURE did not load on any factor at the .40 level. Of the six worship practices items (LISTEN, SERMON, MUSIC, RITUAL, BEAUTY, PRAYER), four did not load on any factor, and two factored with each other only. As an alternative, we constructed an index of importance of all six worship practices; α for scale = .81.

Table 4. Correlations for 7 EFA Factors, Index of Worship Practices, and single items How Religious and How Spiritual^{1,2}

	Congregati on Involveme nt	Positive Worship Emotions	Daily Devotional Activities	Belonging	Beliefs	Purpose	Sad Worship Emotion	Worship Practices	How Religious	How Spiritual
Congregation	1.00									
Positive Emotions	.41	1.00								
Daily	.45	.44	1.00							
Belonging	.44	.51	.52	1.00						
Beliefs	.45	.47	.48	.49	1.00					
Purpose	.20	.40	.30	.45	.39	1.00				
Sad Emotions	.22	.41	.23	.32	.32	.15	1.00			
Worship	.52	.60	.56	.58	.55	.39	.36	1.00		
Religious	.52	.45	.56	.45	.58	.29	.25	.55	1.00	
Spiritual	.36	.42	.55	.43	.57	.37	.25	.50	.65	1.00

¹ Correlations reflect pairwise deletion; Ns for cells vary from 296 to 568. Missing data were due to skip patterns: respondents who (both) did not have a religious affiliation and did not attend services were not asked Belonging, Worship Emotion, or Worship Practice questions.

² All correlations are significant at $p < .05$

Table 5. Religiousness Scales' Means and T Tests for Differences by Religious Preference

	Roman Catholic	Conservative Protestant (ConsP)	Mainstream Protestant (MainP)	Jewish	Muslim	Hindu	Orthodox	Other	None	Overall mean
Congregation Involvement N=372 Column group significantly differs from:	2.96	3.17	2.67	2.40	2.46	2.60	3.03	2.95	NA	2.86
	Jewish	Jewish		Catholic ConsP						
Positive Worship Emotions N=386 Column group significantly differs from:	3.03	3.14	2.64	2.26	2.62	3.40	3.66	3.37	NA	2.93
	Jewish MainP	Jewish	Orthodox Catholic	Orthodox Catholic Hindu Other ConsP		Jewish	Jewish MainP	Jewish		
Daily Devotional Activities	2.08	2.78	2.06	1.69	2.52	2.08	2.02	1.86	1.54	2.04

N=568 Column group significantly differs from:	Jewish None ConsP	Orthodox Catholic Hindu Jewish None Other MainP	Jewish ConsP None	Catholic Muslim ConsP MainP	Jewish None	None ConsP	ConsP	ConsP	Catholic Hindu Muslim ConsP MainP	
Belonging N=305 Column group significantly differs from:	3.64 ConsP	4.17 Catholic	3.71	3.65	3.87	4.05	4.10	3.90	NA	3.72
Beliefs N=558 Column group significantly differs from:	4.01 Jewish None	4.01 Jewish ConsP	3.82 None	3.26 Orthodox Catholic Hindu None ConsP	3.57	3.79 Jewish None	4.18 Jewish None	3.80 None	2.70 Orthodox Catholic Hindu Jewish Other ConsP MainP	3.81

Purpose N=569 Column group significantly differs from:	4.21 Jewish	4.22	4.25	4.00 Orthodox Catholic Hindu	4.07	4.39 Jewish	4.60 Jewish	4.44	4.11	4.20
Sad Worship Emotions N=392 Column group significantly differs from:	2.00	2.30	2.05	1.87	2.75	1.81	2.19	1.71	NA	2.02
Worship Practices N=395 Column group significantly differs from:	3.80 Jewish	3.97 Jewish	3.64 Jewish	3.21 Orthodox Catholic ConsP MainP	4.08	3.56	4.08 Jewish	3.36	NA	3.71
How Religious N=563 Column group	2.93 Jewish	3.09 Hindu	2.71 Jewish	2.12 Orthodox	2.67	2.47 None	3.22 Jewish	2.62 None	1.77 Orthodox	2.73

significantly differs from:	None	Jewish None	None	Catholic ConsP MainP		ConsP	None		Catholic Hindu Other ConsP MainP	
How Spiritual N=552	2.77	3.24	2.62	2.12	2.40	2.65	3.00	3.14	1.98	2.65
Column group significantly differs from:	Jewish None ConsP	Catholic Jewish None MainP	Jewish None ConsP	Orthodox Catholic Other ConsP MainP			Jewish None	Jewish None	Orthodox Catholic Other ConsP MainP	

Table 6. Regression of Religiousness Scales on Sample Demographic Characteristics and Health

Demographic Characteristic	Congreg ation Involve ment	Positive Worship Emotion	Daily Devotional Activities	Belonging	Beliefs	Purpose	Sad Worship Emotion	Worship Practices	How Religious	How Spiritual
	B	B	B	B	B	B	B	B	B	B
Age	.22***	.03	.10*	.20**	-.04	.06	.02	.11*	.12**	.08
Female	.25***	.20***	.20***	.17**	.12**	.09*	.23***	.22***	.14**	.14**
Education	.09	-.05	.08	.03	-.01	.15**	-.12*	-.01	-.00	.13**
Not married	-.19***	-.06	-.09*	-.09	-.09*	-.11*	.02	-.07	-.11**	-.04
Hispanic ¹	-.08	-.03	-.02	-.03	.01	.01	-.04	-.05	.01	.06
Black ¹	-.13*	.06	.15***	.05	.03	.07	.04	.00	.05	.06
Other race ¹	-.00	-.02	.14**	-.01	-.05	-.03	.07	-.03	.04	-.02
MOS Physical Function	-.12*	-.08	.01	-.13*	.05	-.06	.03	-.03	.02	.03
Jewish ²	-.26***	-.24***	-.22***	.01	-.30***	-.16***	-.02	-.26***	-.32***	-.26***
Conservative Protestant ²	.18**	.02	.22***	.22**	.01	-.01	.09	.08	.04	.11*
Mainstream Protestant ²	-.07	-.13*	-.03	.06	-.08*	.02	.04	-.07	-.09*	-.07
Other religion ^{2,3}	-.08	.13*	-.08	.15*	-.02	.08	-.01	-.00	-.08	.01

No religion	---	---	-.20***	----	-.36***	-.04	---	---	-.30***	-.21***
N	368	382	559	301	549	560	388	391	554	543
R ²	.19	.13	.24	.11	.22	.07	.10	.13	.22	.15

¹ Reference category: White race

² Reference category: Roman Catholic.

³ “Other” religious denomination includes Hindu, Muslim, Orthodox, Other.