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A Cluster Analysis Typology of Religiousness/Spirituality Among Older Adults

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This study used cluster analysis to identify sets of individuals similar to one another across multiple measures of religiousness and then ascertained if these groups differed by sociodemographic characteristics, health risk behaviors, physical health and functional status, and mental health. The authors identified six clusters using data from 1,000 community-dwelling older adults in a $k$-means cluster analysis of a modified version of the Duke University Religion Index. Participants in the strongly religious, moderately religious, and minimally religious clusters had the highest scores on the health, functional status, and mental health variables. The privately practicing moderate attender and the privately practicing nonattender groups were similar to each other and generally had poorer health, functional status, and mental health. The typology illustrates the importance of simultaneously considering multiple measures of religiousness and the complexity of the relationships among religiousness, sociodemographic characteristics, and health and well-being.

Keywords: religiousness; cluster analysis; typology; well-being

Religiousness and its relationship to physical and mental health are topics of increasing interest and significance for gerontologists because a growing body of research indicates that religiousness is positively related to a number of physical and mental health outcomes among the elderly.
(Koenig, McCullough, and Larson 2001; Powell, Shahabi, and Thoresen 2003). These studies have resulted in the recommendation that health care personnel attend more carefully to their patients’ religiousness/spirituality (Harrison et al. 2001; Larimore, Parker, and Crowther 2002; Sulmasy 2002) and the acknowledgement of the need for better understanding of the mechanisms through which religiousness/spirituality affect physical and mental health (Chatters 2000; Hill and Pargament 2003).

Among issues needing clarification are both the conceptualization and the measurement of religiousness/spirituality (Chatters, Taylor, and Lincoln 2001; Fetzer Institute/National Institute on Aging 1999; Tsang and McCullough 2003). Social and behavioral scientists generally consider religiousness/spirituality to be a multidimensional concept (Fetzer Institute/National Institute on Aging 1999; Hill and Hood 1999; Idler et al. 2003; Koenig et al. 2001; Krause 1993; Miller and Thoreson 1999). Although there are disagreements concerning what the specific dimensions of religiousness/spirituality are and which dimensions are most relevant to the study of health and mental health in older adults (Crowther et al. 2002; Idler et al. 2003), measures of organizational involvement, nonorganizational involvement, and intrinsic religiousness (IR) are always among those identified. Koenig, Parkerson, and Meador (1997) attested to the centrality of these three indicators by basing their Religion Index for Psychiatric Research on them.¹

The question that arises is how best to use multiple indicators of religiousness in explanatory models. The most commonly used approach involves the decomposition of religiousness into its constituent elements to determine the explanatory role of each separate indicator. Musick (1996), for example, used multiple regression models in which the indicators of religiosity were predictor variables. Others (Koenig, Hays, et al. 1997; Krause 1993) have developed structural equation models that include religiousness among the latent factors. There are two potential problems with the modeling systems that have been described thus far. First, they are based on an implicit assumption that separate dimensions of religiousness operate in an additive and subtractive manner. This supposition implies (1) a compensatory model in which more of one type of religiousness will compensate for less of another and (2) an absence of interaction effects (e.g., synergy) whereby an individual’s scoring high on two or more

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dimensions of religiosity could have a larger impact than the sum of the effects taken separately.

Second, because the dimensions of religiousness appear to be correlated (Ironson et al. 2002; Koenig, Parkerson, et al. 1997; Krause 1993; Peterman et al. 2002), multicollinearity can be an issue, particularly when a researcher examines multiple interaction effects in addition to the direct effects and control variables in the same model. When multidimensional measures of religiousness are analyzed this way, the interpretation of their effects on outcome measures can become complicated (Parker et al. 2003).

Miller and Thoresen (1999) suggested locating individuals in a multidimensional religious space. This conceptualization is consistent with the current modeling systems and is also consistent with a typological or taxonomy approach to religiousness. In this latter approach, the focus is on discovering groups, sets, or clusters of individuals in a multidimensional space defined by the domains of religiousness. People are thus categorized not as being more or less religious but as being religious in different ways.

Such taxonomies not only provide useful summaries of the data but also encourage examination of the events during the life course that result in an individual’s cluster placement in a particular religious cluster at different points in time. Cluster placement could also be differentially related to sociodemographic factors, health risk behaviors, and health and mental health status and functioning, suggesting different possibilities for intervention to improve health outcomes.

Riley et al. (1998) used cluster analysis to develop a spiritual well-being classification in a study of people with chronic illness. They identified three clusters: religious \((n = 146)\), existential \((n = 37)\), and nonspiritual \((n = 30)\), which were differentially related to quality-of-life indicators. Their study demonstrated the use of cluster analysis as a tool in understanding spirituality and religiousness and suggested that people with different kinds of spirituality might respond differentially to treatment interventions. Sears et al. (1994) also used cluster analysis to integrate measures of religious orientation and religious coping in a sample of cardiac transplantation candidates. The cluster analysis revealed three different religious coping profiles, each differing significantly from the others in trait anxiety.

The current study had two primary aims: to determine whether it was possible to identify meaningful sets of community-dwelling older adults similar to each other across multiple measures of religiousness using cluster analysis techniques and to ascertain whether the clusters differed by sociodemographic characteristics, health risk behaviors, measures of physical health and functional status, and measures of mental health.
Methods

Sample Description

Data were collected during in-home interviews conducted from 1999 to 2001 with 1,000 adults aged 65 to 106 years recruited from a stratified, random sample of Medicare beneficiary lists of five central Alabama counties. Two counties were classified as urban and three as rural. The study oversampled African Americans, men, and rural residents to provide a balanced sample in terms of race, gender, and urban-rural residence. The study protocol was reviewed and approved by the Institutional Review Board of the University of Alabama at Birmingham. The cluster analysis was based on participants with data for all measures of religiousness \((n = 997)\). An additional 18 participants missing data on one or more of the other study variables were excluded from the second phase of the analysis, which examined differences among clusters \((n = 979)\).

Measures

Religiousness. We based the cluster analysis on a modified version of the Duke University Religion Index (Koenig, Parkerson, et al. 1997), which captures the three major dimensions of religiousness that emerged from a National Institute on Aging/Fetzer Institute conference on methodological issues in the study of aging, religion, and health (Koenig and Futterman 1995). Organizational religiousness was assessed using a single-item measure of frequency of attendance at church or other religious meetings. Scores were coded from 1 (never) to 6 (more than once a week). Nonorganizational religiousness measured the frequency with which a respondent spent time in private religious activities, such as prayer, meditation, or Bible study. Scores on this single-item measure were coded from 1 (never) to 6 (more than once a week). IR was measured with a three-item index. These three items asked respondents to rate how true each of the following statements was for them: “In my life, I experience the presence of the Divine (i.e., God),” “My religious beliefs are really what lie behind my whole approach to life,” and “I try hard to carry my religion over into all other dealings in life.” Scores on the IR variable could range from 15 (high IR) to 3 (low IR). Because cluster analysis is sensitive to differences in ranges, the total score was rescaled such that 15 = 6 and 3 = 1. Cronbach’s index of internal consistency for the IR index was .83.

Items measuring the help and importance of religion to participants were used in a partial validity check of the clusters obtained. These three
single-item measures of help and importance were “To what extent is participation in religious meetings and/or activities a source of help and comfort to you?” (4 = a great deal, 1 = not at all), “To what extent is prayer or meditation a source of help and comfort to you?” (4 = a great deal, 1 = not at all), and “How important is your religious faith or spirituality to you?” (5 = very important, 1 = very unimportant).

Sociodemographic characteristics. Sociodemographic variables included age, gender, race (White and African American), educational attainment, rural or urban residence, married or nonmarried status, and income sufficiency. Educational attainment was measured on a scale ranging from 6 or fewer to 17 or more years of school completed (completed professional or graduate degree). Income sufficiency was measured by asking a participant whether his or her income “is not enough to make ends meet,” “gives you just enough to get by,” “keeps you comfortable but permits no luxuries,” or “allows you to do more or less what you want.” Responses were coded 1 to 4, with higher values representing better income sufficiency.

Health risk behaviors. Participants were asked about their cigarette-smoking status (1 = never smoked, 4 = current smoker). Lifetime cigarette smoking was measured in pack-years (the mean number of packs smoked per day during the course of a year times the number of years smoked). Participants reported whether they had ever consumed alcoholic beverages. Participants’ weight and height were measured. If participants were unable to stand, weight was calculated using midarm circumference and knee height. Body mass index was calculated from these measurements as body weight (kg) divided by the square of height (cm) (Garrow and Webster 1985), and obesity was defined as having a body mass index of 30 or greater.

Physical health. Participants rated their health on a 5-point scale, where 5 = excellent and 1 = poor. A modified comorbidity index was created by giving 1 point for each disease category identified on the Charlson comorbidity index (Charlson et al. 1986), without consideration of the severity of the conditions. Another health measure was the Physical Health subscale of the 12-Item Short Form Health Survey (SF-12; Ware, Kosinski, and Keller 1995), which ranged from 0 (poor health) to 100 (excellent health). The SF-12 is derived from the Medical Outcomes Study 36-Item Short-Form Health Survey (Ware, Kosinski, and Keller 1996). Test-retest correlations for the instrument ranged from .76 to .89, and the median relative validity estimates ranged from .43 (musculoskeletal symptom cluster) to .77 (comorbid conditions) (Ware et al. 1996). Additional
physical health measures included whether a participant had been hospitalized in the past six months, the frequency of pain experienced in the past four weeks (5 = always, 1 = never), pain description (1 = no pain, 5 = agonizing), and whether a participant’s activities were limited by pain.

*Functional status.* Measures included the number of difficulties with activities of daily living difficulties (ADLs), the number of difficulties with instrumental ADLs (IADLs), the Short Physical Performance Battery (Guralnik et al. 1994), the University of Alabama at Birmingham Study of Aging Independent Life-Space Assessment (Baker, Bodner, and Allman 2003), and the number of kilocalories expended per week in leisure time physical activity (Taylor et al. 1978). Kilocalories were computed on the basis of self-report data of the frequency and duration of 15 different types of activities during the previous two weeks, taking into account the participant’s body weight. This activity assessment was based on a modified Minnesota Leisure Time Activity Questionnaire (Siscovick et al., 1997; Taylor et al., 1978).

*Mental health.* Measures of mental health were the Geriatric Depression Scale (GDS; Sheikh and Yesavage 1986) and the Mental Health subscale of the SF-12 (Ware et al. 1995). The GDS is a count of the number of symptoms of depression a participant reports and ranges from 0 to 15. The Mental Health subscale provides a measure of global mental health ranging from 0 to 100, with higher scores indicating better mental health.

**Analysis Plan**

We analyzed the data using a four-step procedure. First, to ascertain the optimum number of clusters for the typology of religiousness, we used a v-fold cross-validation algorithm (StatSoft 2004) with the organizational religiousness, nonorganizational religiousness, and IR variables. This technique involved dividing the original sample into v subsamples at random, calculating the cluster solution for k clusters using the observations from v – 1 of the samples (training sample), and then determining the distance of the observations in the sample not used from the cluster centers. The process was repeated using each of the v subsamples as a validation sample and then calculating the average error across the v replications for the k of clusters, k + 1 clusters, and so forth, until there was a sharp decrease in the average error for a solution. Second, we used k-means clustering to identify the religiousness typology. Third, we used stepwise multivariate analysis of variance (MANOVA) and multivariate analysis of covariance (MANCOVA)
to ascertain whether respondents in the different religiousness categories differed on sociodemographic characteristics, health risk behaviors, health and functional status measures, and mental health. We examined cluster differences in sociodemographic characteristics (Shahabi et al. 2002), then health risk behaviors controlling for sociodemographic characteristics, then health and functional status variables controlling for sociodemographic characteristics and health risk behaviors, and finally mental health differences controlling for all previously mentioned variables. Fourth, we used least significant difference contrasts to compare the categories in the typology on each of the characteristics that were statistically significant in the MANCOVA.

Results

Cluster Analysis

The $v$-fold cross-validation algorithm with $v = 10$ suggested that the optimum number of clusters for these data was six. The average cluster error declined by approximately .07 between adjacent solutions for the two-through six-cluster solutions but declined by .02 from the six- to seven-cluster solution. The cluster centroids derived using $k$-means are reported in Table 1 and shown graphically in Figure 1. The clusters were as follows.

**Strongly religious** ($n = 529$). All of the older adults in this category scored high on all dimensions: 100% attended religious services at least weekly, 95% prayed more than weekly, and 82% scored at the top of the IR index. Also, 87% reported that attendance was a great deal of comfort and help to them, 90% said that prayer or meditation was a great deal of comfort and help to

<table>
<thead>
<tr>
<th>Cluster</th>
<th>$n$</th>
<th>Attend</th>
<th>Pray</th>
<th>Intrinsic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly religious</td>
<td>529</td>
<td>5.54</td>
<td>5.95</td>
<td>5.86</td>
</tr>
<tr>
<td>Moderately religious</td>
<td>82</td>
<td>4.79</td>
<td>4.40</td>
<td>5.54</td>
</tr>
<tr>
<td>Privately practicing moderate attenders</td>
<td>157</td>
<td>3.55</td>
<td>5.92</td>
<td>5.70</td>
</tr>
<tr>
<td>Privately practicing nonattenders</td>
<td>123</td>
<td>1.23</td>
<td>5.77</td>
<td>5.51</td>
</tr>
<tr>
<td>Intrinsically involved only</td>
<td>62</td>
<td>2.32</td>
<td>1.27</td>
<td>5.30</td>
</tr>
<tr>
<td>Minimally religious</td>
<td>26</td>
<td>2.08</td>
<td>1.35</td>
<td>2.17</td>
</tr>
</tbody>
</table>
to them, and 95% indicted that their religious faith or spirituality was very important to them.

*Moderately religious* (*n = 82*). None of these participants prayed more than weekly, 77% attended religious services weekly or more often, and 61% scored at the top of the IR index. The moderately religious found religion and religious activities to be less important than the strongly religious. Sixty-two percent reported attendance to be a great deal of help and comfort, 60% found prayer or meditation to be a great deal of comfort, and 72% found religion to be very important.

*Privately practicing moderate attenders* (*n = 157*). All reported attending religious services a few times each month or less often. Ninety-two percent said that they prayed more than weekly, and 79% had the maximum score on the measure of IR. Eighty-five percent found prayer to be a great deal of comfort and help, 79% said that religion was very important in their lives, and 66% reported attendance at services to be a great deal of comfort and help.
Privately practicing nonattenders (n = 123). These older adults all reported attending religious services a few times a year or less, 83% prayed more than weekly, and 62% scored the maximum on the measure of IR. Also, 71% reported prayer to be a great deal of comfort and help, and 71% also reported that religion was very important in their lives. Only 39% said that attending services was a great deal of comfort and help.

Intrinsically involved only (n = 62). These older adults scored moderately high on the IR scale and low on the other two indicators. All reported praying or meditating no more than a few times each month, and only 11% reported attending religious services weekly or more often. Thirty-seven percent scored at the maximum on the IR index. Half (50%) reported that religion was very important in their lives, 25% indicated that attending religious services provided a great deal of help and comfort, and 19% reported that prayer and meditation provided a great deal of help and comfort.

Minimally religious (n = 26). This group scored low on all three dimensions. None in this category prayed as often as weekly, none scored at the maximum on the measure of IR, and only one person attended religious services weekly or more often. None of the minimally religious found prayer or meditation to be a great deal of comfort and help, only one person reported attending religious services to be a great deal of help, and two persons reported religion played a very important part in their lives.

As a partial test of the validity of the clusters, we examined the relationship of each cluster to the three measures of the help and importance of religion (see Table 2). As expected, the strongly religious scored higher than the moderately religious, and the moderately religious scored higher than the minimally religious on all three measures of the help and importance of religion. The remaining three clusters had complex relationships with the help and importance of religion that may best be understood in the context of additional information.

Cluster Differences

We found differences among the clusters in each of the four stages of the analysis (see Table 3). Specifically, a MANOVA suggested differences among the clusters on the sociodemographic measures, F(35, 4,070) = 5.83, p < .001. Of the seven measures examined, the religiousness typology had statistically significant relationships with all except age. The MANCOVA of cluster differences among measures of health risk behaviors controlling
Table 2
Differences Among Cluster Means by Help and Importance of Religion

<table>
<thead>
<tr>
<th>Help and Importance of Religion</th>
<th>Privately Practicing Religious</th>
<th>Privately Practicing Nonattenders</th>
<th>Intrinsically Involved Only</th>
<th>Intrinsically Minimally Religious</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Strongly Practicing Attenders</td>
<td>Moderate Attenders</td>
<td>Nonattenders</td>
<td>Only</td>
</tr>
<tr>
<td></td>
<td>(n = 529)</td>
<td>(n = 157)</td>
<td>(n = 123)</td>
<td>(n = 62)</td>
</tr>
<tr>
<td>Participation helps</td>
<td>3.85\text{a}</td>
<td>3.40\text{b}</td>
<td>2.63\text{c}</td>
<td>2.17\text{d}</td>
</tr>
<tr>
<td>Prayer helps</td>
<td>3.89\text{a}</td>
<td>3.79\text{a}</td>
<td>3.58\text{c}</td>
<td>1.85\text{d}</td>
</tr>
<tr>
<td>Religion important</td>
<td>4.95\text{a}</td>
<td>4.76\text{b}</td>
<td>4.68\text{c}</td>
<td>4.36\text{e}</td>
</tr>
</tbody>
</table>

Note: Means in the same row with different subscripts differ significantly at $p < .05$ using Fisher’s least significant difference test. Higher scores represent perceptions of higher levels of the help and importance of religion.
for the influences of sociodemographic characteristics was also statistically significant, $F(20, 3,195) = 3.62, p < .001$. There were statistically significant differences among the clusters on all four measures of health risk characteristics. The MANCOVA of cluster differences among measures of health and functional status, with controls for sociodemographic and health risk characteristics, was statistically significant, $F(60, 4,457) = 1.72, p = .001$. Cluster membership did not have a statistically significant relationship with the three measures of pain, hospitalization within the past year, comorbidity, and kilocalories expended. The relationship of cluster membership to mental health controlling for all of the remaining variables was also statistically significant, $F(10, 1,898) = 2.98, p = .001$. Cluster membership was statistically significantly related to GDS score, $F(5, 950) = 4.21, p = .001$, but not to the Mental Health subscale of the SF-12, $F(5, 950) = 0.65, p = .662$.

Table 4 reports statistically significant differences among clusters on variables found to be statistically significant in the MANOVA and MANCOVA analyses and suggests distinguishing characteristics for each of the six clusters.

Strongly religious people tended to be female, married, and well-educated, and they reported having incomes sufficient to meet their needs. They were in good health, had few ADL and IADL difficulties, and had high independent life-space mobility and high physical performance scores. They also scored low on the depression index.

Moderately religious people were similar to the strongly religious in that they were well educated, had sufficient income, had good health, had few ADL and IADL difficulties, had high independent life-space mobility and high physical performance scores, and had low depression. They differed from the strongly religious in that they were more likely to be male (60%).

Privately practicing moderate attenders tended to be unmarried (59%), rural (59%), and African American (67%). They had low educational attainment and income sufficiency. About two thirds had ever used alcohol. They were in poorer health and scored higher on depression than the strongly religious and moderately religious.

Privately practicing nonattenders were substantially different from both the strongly religious and the moderately religious. Like the privately practicing moderate attenders, they had low education, low income sufficiency, poorer health, and higher numbers of ADL and IADL difficulties than the strongly religious and moderately religious. Unlike the privately practicing moderate attenders, they tended to be White and to have smoked cigarettes.
Intrinsically involved only participants were similar to strongly and moderately religious people in that they had good health and functional...
Table 4
Differences Among Cluster Means by Sociodemographic Characteristics, Health Risk Behaviors, Health and Physical Functioning, and Mental Health

<table>
<thead>
<tr>
<th>Variable</th>
<th>Strongly Religious (n = 529)</th>
<th>Moderately Religious (n = 82)</th>
<th>Privately Practicing Moderate Attenders (n = 157)</th>
<th>Privately Practicing Nonattenders (n = 123)</th>
<th>Intrinsically Involved Only (n = 62)</th>
<th>Minimally Religious (n = 26)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sociodemographic characteristics</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Proportion female</td>
<td>0.59&lt;sub&gt;a&lt;/sub&gt;</td>
<td>0.40&lt;sub&gt;b&lt;/sub&gt;</td>
<td>0.45&lt;sub&gt;b&lt;/sub&gt;</td>
<td>0.44&lt;sub&gt;b&lt;/sub&gt;</td>
<td>0.19&lt;sub&gt;c&lt;/sub&gt;</td>
<td>0.15&lt;sub&gt;c&lt;/sub&gt;</td>
</tr>
<tr>
<td>Proportion married</td>
<td>0.54&lt;sub&gt;ad&lt;/sub&gt;</td>
<td>0.50&lt;sub&gt;ab&lt;/sub&gt;</td>
<td>0.41&lt;sub&gt;b&lt;/sub&gt;</td>
<td>0.46&lt;sub&gt;bd&lt;/sub&gt;</td>
<td>0.53&lt;sub&gt;abc&lt;/sub&gt;</td>
<td>0.69&lt;sub&gt;c&lt;/sub&gt;</td>
</tr>
<tr>
<td>Proportion rural</td>
<td>0.52&lt;sub&gt;abc&lt;/sub&gt;</td>
<td>0.49&lt;sub&gt;abc&lt;/sub&gt;</td>
<td>0.59&lt;sub&gt;b&lt;/sub&gt;</td>
<td>0.52&lt;sub&gt;abc&lt;/sub&gt;</td>
<td>0.37&lt;sub&gt;c&lt;/sub&gt;</td>
<td>0.35&lt;sub&gt;c&lt;/sub&gt;</td>
</tr>
<tr>
<td>Proportion African American</td>
<td>0.47&lt;sub&gt;a&lt;/sub&gt;</td>
<td>0.48&lt;sub&gt;a&lt;/sub&gt;</td>
<td>0.67&lt;sub&gt;b&lt;/sub&gt;</td>
<td>0.47&lt;sub&gt;a&lt;/sub&gt;</td>
<td>0.40&lt;sub&gt;ac&lt;/sub&gt;</td>
<td>0.19&lt;sub&gt;c&lt;/sub&gt;</td>
</tr>
<tr>
<td>Educational attainment</td>
<td>11.25&lt;sub&gt;a&lt;/sub&gt;</td>
<td>10.94&lt;sub&gt;a&lt;/sub&gt;</td>
<td>9.50&lt;sub&gt;b&lt;/sub&gt;</td>
<td>9.49&lt;sub&gt;b&lt;/sub&gt;</td>
<td>9.86&lt;sub&gt;bc&lt;/sub&gt;</td>
<td>10.92&lt;sub&gt;c&lt;/sub&gt;</td>
</tr>
<tr>
<td>Income sufficiency</td>
<td>2.88&lt;sub&gt;a&lt;/sub&gt;</td>
<td>2.83&lt;sub&gt;a&lt;/sub&gt;</td>
<td>2.50&lt;sub&gt;bc&lt;/sub&gt;</td>
<td>2.46&lt;sub&gt;b&lt;/sub&gt;</td>
<td>2.76&lt;sub&gt;ac&lt;/sub&gt;</td>
<td>3.08&lt;sub&gt;a&lt;/sub&gt;</td>
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<tr>
<td>Health risk behaviors</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ever smoked cigarettes</td>
<td>0.49&lt;sub&gt;a&lt;/sub&gt;</td>
<td>0.46&lt;sub&gt;a&lt;/sub&gt;</td>
<td>0.50&lt;sub&gt;a&lt;/sub&gt;</td>
<td>0.67&lt;sub&gt;b&lt;/sub&gt;</td>
<td>0.66&lt;sub&gt;b&lt;/sub&gt;</td>
<td>0.69&lt;sub&gt;b&lt;/sub&gt;</td>
</tr>
<tr>
<td>Pack-years</td>
<td>16.76&lt;sub&gt;a&lt;/sub&gt;</td>
<td>13.78&lt;sub&gt;a&lt;/sub&gt;</td>
<td>17.12&lt;sub&gt;a&lt;/sub&gt;</td>
<td>21.56&lt;sub&gt;a&lt;/sub&gt;</td>
<td>33.86&lt;sub&gt;b&lt;/sub&gt;</td>
<td>36.01&lt;sub&gt;b&lt;/sub&gt;</td>
</tr>
<tr>
<td>Proportion use alcohol</td>
<td>0.50&lt;sub&gt;a&lt;/sub&gt;</td>
<td>0.58&lt;sub&gt;ab&lt;/sub&gt;</td>
<td>0.66&lt;sub&gt;b&lt;/sub&gt;</td>
<td>0.68&lt;sub&gt;b&lt;/sub&gt;</td>
<td>0.62&lt;sub&gt;b&lt;/sub&gt;</td>
<td>0.73&lt;sub&gt;b&lt;/sub&gt;</td>
</tr>
<tr>
<td>Health and physical functioning</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SF-12</td>
<td>41.26&lt;sub&gt;a&lt;/sub&gt;</td>
<td>41.62&lt;sub&gt;a&lt;/sub&gt;</td>
<td>37.05&lt;sub&gt;bc&lt;/sub&gt;</td>
<td>35.42&lt;sub&gt;b&lt;/sub&gt;</td>
<td>39.49&lt;sub&gt;bc&lt;/sub&gt;</td>
<td>41.56&lt;sub&gt;c&lt;/sub&gt;</td>
</tr>
<tr>
<td>Self-rated health</td>
<td>3.11&lt;sub&gt;a&lt;/sub&gt;</td>
<td>3.09&lt;sub&gt;a&lt;/sub&gt;</td>
<td>3.41&lt;sub&gt;bc&lt;/sub&gt;</td>
<td>3.53&lt;sub&gt;b&lt;/sub&gt;</td>
<td>3.18&lt;sub&gt;ac&lt;/sub&gt;</td>
<td>3.02&lt;sub&gt;c&lt;/sub&gt;</td>
</tr>
<tr>
<td>ADL limitations</td>
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<td>1.67&lt;sub&gt;c&lt;/sub&gt;</td>
<td>1.74&lt;sub&gt;c&lt;/sub&gt;</td>
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<td>1.20&lt;sub&gt;abc&lt;/sub&gt;</td>
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<td>IADL limitations</td>
<td>0.96&lt;sub&gt;a&lt;/sub&gt;</td>
<td>0.93&lt;sub&gt;a&lt;/sub&gt;</td>
<td>1.39&lt;sub&gt;b&lt;/sub&gt;</td>
<td>1.42&lt;sub&gt;b&lt;/sub&gt;</td>
<td>1.11&lt;sub&gt;ab&lt;/sub&gt;</td>
<td>0.92&lt;sub&gt;abc&lt;/sub&gt;</td>
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</table>

(continued)
Table 4  
(continued)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Strongly Religious ($n = 529$)</th>
<th>Moderately Religious ($n = 82$)</th>
<th>Privately Practicing Moderate Attenders ($n = 157$)</th>
<th>Privately Practicing Nonattenders ($n = 123$)</th>
<th>Intrinsically Involved Only ($n = 62$)</th>
<th>Minimally Religious ($n = 26$)</th>
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</thead>
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<tr>
<td>Independent life-space mobility</td>
<td>3.72&lt;sub&gt;a&lt;/sub&gt;</td>
<td>3.52&lt;sub&gt;ac&lt;/sub&gt;</td>
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<td>2.73&lt;sub&gt;b&lt;/sub&gt;</td>
<td>3.36&lt;sub&gt;ad&lt;/sub&gt;</td>
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<td>Physical performance score</td>
<td>7.34&lt;sub&gt;a&lt;/sub&gt;</td>
<td>7.49&lt;sub&gt;a&lt;/sub&gt;</td>
<td>6.31&lt;sub&gt;b&lt;/sub&gt;</td>
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<tr>
<td>Mental health</td>
<td></td>
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<td>GDS</td>
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<td>2.00&lt;sub&gt;acd&lt;/sub&gt;</td>
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Note: Means in the same row with different letter subscripts differ significantly at $p < .05$ using Fisher’s least significant difference test. SF-12 = 12-Item Short Form Health Survey; ADL = activity of daily living; IADL = instrumental ADL; GDS = Geriatric Depression Scale.
status. They were similar to privately practicing nonattenders and privately practicing moderate attenders in their physical performance scores and their higher depression. They tended to be male (81%), urban (63%), and less well educated. They also tended to smoke and to have used alcohol.

Minimally religious people were predominantly male (85%), married (69%), urban (65%), White (81%), and well educated, and they had good incomes. They were among the study participants who smoked the most and were most likely to have used alcohol. Like strongly and moderately religious people, they had good health, few ADL and IADL difficulties, and low depression scores.

**Discussion**

Investigators have recently called for increasing sophistication in the conceptualization and measurement of religiousness and spirituality so that the emerging pathways between these constructs and physical and mental health can be more clearly profiled (Hill and Pargament 2003). There is considerable agreement that the constructs of religiousness and spirituality are multidimensional and cannot be simply combined into a single scale (Idler et al. 2003). Thus, researchers have developed several approaches to incorporating indicators into a model to explain health and well-being. Some have examined the effects of each of a variety of separate measures of religiousness/spirituality on health and mental health while controlling for the effects of the other variables using regression models (e.g., Krause 2003; Musick 1996). Other investigators have emphasized the structure of relationships among multiple indicators of religiousness/spirituality, sometimes including interaction effects, because these indicators affect health and mental health in structural equation models (e.g., Kelley-Moore and Ferraro 2001; Koenig, Parkerson, et al. 1997; Krause 2004).

In this study, we developed a typology of religiousness/spirituality on the basis of cluster analysis procedures among community-dwelling older adults. First, we identified sets of individuals similar to one another on three dimensions of religiousness. Next, we examined differences among these clusters by sociodemographic characteristics, health risk behaviors, physical health and functional status, and mental health. We found that community-dwelling older adults could be separated into six distinct and meaningful clusters on the basis of the frequency of their attendance at religious services, the frequency of their prayer, and their scores on an IR measure. The clusters were partially validated by participants’ responses to other religiosity indicators not used in the development of the clusters.
Members of the various clusters also differed from those in other clusters on sociodemographic status, health risk behaviors, health and functional status variables, and depression.

The profiles of differing sociodemographic, health risk, health, and mental health characteristics that varied by cluster (Table 4) raise some intriguing issues. For example, there was a complex relationship between religious service attendance and health and mental health. Being strongly religious was associated with good physical and mental health, higher levels of educational attainment, higher levels of income sufficiency, and refraining from health risk behaviors. Being minimally religious was associated with good physical and mental health, higher levels of educational attainment, higher levels of income sufficiency, being male, residing in urban areas, and engaging in health risk behaviors. Being in the intrinsically involved category was associated with good physical health, poorer mental health, higher levels of educational attainment, higher levels of income sufficiency, being male, residing in urban areas, and engaging in health risk behaviors. Thus, in some circumstances, low attendance (and low religiousness generally) and high attendance (and high religiousness generally) were both associated with good physical health. Also for some participants low attendance was associated with good physical health but poorer mental health.

The study also contributes to our understanding about how poor health can be a barrier to service attendance (Ainlay, Singleton and Swigert 1992; Kelley-Moore and Ferraro 2001). We identified two groups (privately practicing moderate attenders and privately practicing nonattenders) in similarly poor health and functional status that differed on religious service attendance. Privately practicing moderate attenders went to religious services a few times a month to a few times a year, whereas privately practicing nonattenders reported attending once a year or less frequently. These clusters were similar in socioeconomic status, gender, and marital status. They differed in that privately practicing moderate attenders were predominantly African American (67% vs. 47%), prayed more often, and were more likely than privately practicing nonattenders to believe that attendance and prayer were sources of help and comfort. This suggests cultural differences between the two groups, which result in higher religious service attendance for one group despite similarly poor health status. Poor health may be less of a barrier to attendance for African Americans than for Whites. This may also reflect intriguing questions about the physical proximity of churches and transportation issues.

This study was limited in that data were gathered at a single point in time from a single location. African Americans, men, and rural residents were oversampled. Thus, the respondents, collectively, were likely more “religious” than the overall American public. Consequently, there is no reason...
to expect that the frequency of cluster memberships is representative of that which would be found in the general population of adults aged 65 years or older. What is less clear is whether using a more representative sample would have changed the clusters identified. We expect that the size of the minimally religious and intrinsically involved only groups would be larger in a more representative sample, particularly considering that our data were gathered in Alabama, a southern state with a strong Protestant religious tradition. We would be surprised, however, if these categories did not emerge in a more representative sample.

A second limitation of this study is the restricted range of measures of religiousness/spirituality included. Although most researchers in this field acknowledge that service attendance, prayer frequency, and IR are central components in any study of religiousness, additional dimensions (e.g., religious coping, daily spiritual experiences, spirituality) not measured in this study are also recognized as important (Hill et al. 2000; Idler et al. 2003; Shahabi et al., 2002; Zinnbauer et al. 1997). If we had added different measures of religiousness/spirituality, different clusters may have emerged, or we may have been able to describe more precisely the characteristics of these six clusters. Particularly intriguing is the possibility that the intrinsically involved only category might be better delineated using a more explicit measure of spirituality.

One of the assumptions underlying cluster analysis is that all variables are measured without error. This assumption is unlikely to be true and thus represents a third limitation of this study.

The primary contribution of this exploratory study was to propose a typology of religiousness that simultaneously takes into account three central dimensions of the phenomenon. The typology identified six patterns of religious behavior and belief that were differentially related to sociodemographic characteristics and to a number of measures of physical and mental health, suggesting that these differing patterns of religious behavior and belief affect health and well-being in a complex manner. If this typology can be verified and refined in more representative samples of older people with a wider range of measures of spirituality and religiosity, it could be used to develop faith- and nonfaith-based interventions useful in health care settings.

**Note**

1. Religiousness and spirituality are often distinguished from each other in the social science literature (Hill et al. 2000; Zinnbauer et al. 1997). The predictor variable for the current study was developed as an index of religion. Thus, we refer to our findings as relating to religiousness, while noting that religiousness encompasses spiritual dimensions.
References


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