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Self-Reported Health, and Illness and the Use of Conventional and Unconventional Medicine and Mind/Body Healing by Christian Scientists and Others

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Abstract

A cross-sectional national telephone survey was used to determine whether Christian Scientists ($N = 230$), a religious group that uses mind/body (including spiritual) healing, self-report more or less illness than non-Christian Scientists ($N = 589$). The primary outcome measure was the proportion of Christian Scientists and non-Christian Scientists that, during the previous 12 months: a) experienced any of 13 common medical conditions or symptoms; and b) used conventional medicine, unconventional medicine, and mind/body (including spiritual) healing. Fewer Christian Scientists experienced an illness or symptom than non-Christian Scientists (73% vs. 80%, respectively, $p = .05$). A multivariate analysis showed that Christian Scientists were less likely to have experienced illness than non-Christian Scientists (odds ratio [OR] .66, 95% confidence interval [CI] .44 to .99, $p = .04$). Similar proportions of Christian Scientists and non-Christian Scientists used some type of conventional medicine (74% vs. 78%, respectively), although Christian Scientists were less likely to take prescription medications than non-Christian Scientists ($p = .034$). Although use of unconventional medicine was similar in both groups (52% vs. 45%), more Christian Scientists than non-Christian Scientists used at least one type of mind/body medicine (67% vs. 42% $p < .00001$), notably special religious services and spiritual healing. Additional studies are needed to determine whether there are health benefits associated with the use of conventional and unconventional medicine in combination with mind/body (including spiritual) healing.

Over the past 15 years, there has been an increasing interest in the connection between religion and health. National surveys of family practice physicians (Daaleman and Frey, 1999) and laypersons (McNichol, 1996; Wallis, 1996) demonstrate that a majority of United States adults believe that religion or religious beliefs play a fundamental role in favorable health outcomes.

In the same period, there has been an increase in the number of empirical studies examining the association among improved health outcomes and religion, prayer,

and spiritual healing. Many have reported that religiosity and spirituality are associated with enhanced health and well-being (Ellison, 1991; Ellison and Levin, 1998; Koenig et al., 1988, 1998; Idler and Kasl, 1997) as well as with decreased mortality (Bryant and Rakowski, 1992; Goldman et al., 1995; Oman and Reed, 1998; Schoenbach et al., 1986; Seeman et al., 1987). Others (Sloan et al., 1999), however, assert these associations are not conclusive. Even though the weight of evidence supports that religious or spiritual activities such as church going are beneficial, there has been little exploration of the possible role of other aspects of religiosity and spirituality. These include other mind/body approaches as well as special religious services and spiritual healing.

Mind/body medicine attempts to use thought patterns to influence both the perception of health and the course of illness. Many mind/body techniques, including progressive relaxation, autogenic training, Zen, yoga, meditation, and some forms of prayer, often elicit a physiological response termed the "relaxation response" (Benson et al., 1974a). The relaxation response is characterized by decreased metabolism, heart and respiratory rate, responsivity to plasma norepinephrine, lowering of systolic and diastolic blood pressure, and slowing of alpha, theta, and delta brain waves (Benson et al., 1974b; Hoffman et al., 1982; Morrell and Hollandsworth, 1986; Wallace et al., 1971). Spiritual healing is one mind/body approach in widespread use by certain religious groups (Galanter 1997; Levin et al., 1997; Roush 1997) and may elicit the relaxation response through prayer (Benson 1996).

Although the effectiveness of spiritual healing cannot be evaluated in an observational study, we can compare self-reported perceptions of health and illness in members of religious groups that use spiritual healing with perceptions of health and illness in members of the general population. Christian Scientists were chosen as the study population because their religious convictions include the use of spiritual healing and the inclination not to utilize routine medical treatments (Skolnick 1990; Swan 1983). It was reasoned that they would be a group in whom the influence of mind/body (including spiritual) healing approaches on health could be examined without the confounding influences of conventional medical treatments.

As an initial step in the evaluation of spiritual healing, we conducted a national telephone survey of a random sample of Christian Scientists and of non-Christian Scientists to determine whether Christian Scientists self-report more or less illness than do non-Christian Scientists. Secondarily, we sought to determine whether Christian Scientists use mind/body (including spiritual) healing as well as conventional and unconventional medicine.

Methods

Study Population

Between November 1996 and February 1997, The Gallup International Institute conducted a telephone survey of a random sample of Christian Scientists and non-Christian Scientists. Because fewer than 1% of the United States population are

Christian Scientists, use of random digit dialing to select Christian Scientists from the entire United States population was considered prohibitively expensive. To achieve the required number of Christian Scientists and non-Christian Scientists, our study population was limited to individuals who lived within a 20-mile radius of a Christian Science Branch Church. The September 1996 issue of *The Christian Science Journal* (a monthly publication of The First Church of Christ, Scientist, Boston) listed 1,265 branch churches in the United States. A starting point in the list was selected at random, and every 26th church was selected until 100 churches had been selected (the entire list was covered twice in this process). The selected sample closely matched the geographic distribution of all branch churches. Using each church as a starting point, The Gallup Organization's statistical department identified a 20-mile radius around each point and drew a random digit dial telephone sample from zip codes within that radius. If a zip code extended beyond the 20-mile radius, it was retained for selection of the study sample.

Because information regarding the demographic characteristics of the Christian Scientist population reached by random digit dialing is not readily available, we elected not to weight this sample. The non-Christian Scientist sample also was not weighted, even though the demographic distribution of non-Christian Scientist population was available. We were concerned that a comparison of one weighted sample and one non-weighted sample could potentially introduce unknown biases into the study.

Study Sample

The sample size was designed to have 80% power to detect a difference of more than 10% in the proportion of Christian Scientists and non-Christian Scientists who self-reported one or more of 13 "common principal medical conditions" (Eisenberg et al., 1993) with a two-sided p -value. A ratio of 2:1 for non-Christian Scientists to Christian Scientists was selected. Using these assumptions, our target sample size was 446 non-Christian Scientists and 223 Christian Scientists.

Even with the limitations of the sample to those who lived within a 20-mile radius of a Christian Science Church, a total of 32,857 telephone numbers were necessary to achieve the target sample size for both Christian Scientists and non-Christian Scientists (Fig. 1). These 32,857 numbers were selected at random and were divided in sample sets of 100. To preserve the integrity of the sample, consecutive sets of 100 telephone numbers were called until the target sample size of Christian Scientists was achieved. Trained telephone interviewers called each telephone number a maximum of three times, at three different times of day, and at different time periods (weekday day time, weekday evening, and weekend). Only one person per household was eligible to be interviewed. The interviewer attempted to interview the youngest male subject aged at least 18 years who was at home at the time of the telephone call, followed by the oldest female subject aged at least 18 years who was at home at

the time of the call, according to routine procedures used by the Gallup Organization to balance gender and age. Of the initial 32,857 telephone numbers, 21% were unusable (disconnected or fax machines), 11% were not assigned to households, and in 48%, the usability and/or eligibility of respondents were unknown (no answer, answer machine, or busy on each of three tries; there was a language barrier; or the respondent refused to answer the survey before eligibility was established). Among the remaining 6,698 (20%) eligible participants, 6,585 (98%) respondents completed a screening interview and 113 (2%) did not. The screening interview elicited basic demographic information and was concluded with a query about the respondents' religious preference.



Fig. 1:

Representation of the study sample selection.

Of the 6,585 eligible respondents, study interviews were then completed with 242 respondents who identified themselves as Christian Scientists during the screening process. A representative sample of non-Christian Scientists ($N = 589$) was achieved by setting a geographical quota of interviews from the 6,343 respondents who did not identify themselves as Christian Scientists. Thus the non-Christian Scientists were a random sample of those living in the same geographic area as the sample of Christian Scientists.

At the close of the study, all respondents who had identified themselves as Christian Scientists were called again by a supervisor, to ascertain that this person had been interviewed and to re-ask about religious affiliation or preference and race or ethnic background. In this validation, 42 respondents who had originally chosen the response "Christian Scientist" indicated a different religious preference (other than Christian Scientist). All 42 from the original sample of Christian scientists were dropped and 30 replacements were identified using random digit dialing. The final sample included a total of 230 Christian Scientists. In addition, 100 of the non-

Christian Scientists were also contacted and asked the same two questions. None of these 100 indicated that they were Christian Scientists.

The Telephone Interview

The questionnaire used during telephone interviews was developed using available surveys that explored self-reported health and/or spirituality and through focus group discussions across a cross-section of adults to test possible responses and understandability of the questionnaire language. During development, preference was given to questionnaire wording that had been used previously, including questions asked during the SF-36 personal interview ^(Ware and Sherbourne, 1992). One section on perception of health problems was similar to that reported previously ^(Eisenberg et al., 1993). The questionnaire was pre-tested by telephone interviews of Christian Scientists and non-Christian Scientists.

The same telephone interview was administered to all study participants. Telephone interviewers introduced the survey by indicating that The Gallup International Institute was conducting a survey related to health and satisfaction with life. Initial questions asked respondents for a self-assessment of their satisfaction with life, health, and the impact of their perceived health on their daily life. Respondents were then asked for demographic information (including sex, age, education, religious affiliation, or preference), behaviors related to health (including smoking, drinking, use of prescription medications, etc.), and a series of questions on spiritual beliefs and behavior. The final questions asked respondents about frequently reported medical conditions or symptoms and use of any traditional and other treatments. The questionnaire is available from investigators on request.

Data Collection and Processing

Data collection was carried out using a Computer Assisted Telephone Interviewing System (CATI). Data were entered into a computer at the Gallup Organization's Data Processing Department and exported as an SPSS data file. Data were analyzed using BMDP Statistical Software (Los Angeles, CA), version 7.0 after conversion to a BMDP file using DBMS/Copy, Conceptual Software, Inc. (Houston, TX), version 5.0.

Statistical Analysis

The primary outcome and potential factors associated with self-reported illness were defined before the study began. Self-reported illness was defined as presence of any one of the following conditions or symptoms: headaches, allergies, sprains or strains, anxiety, dizziness, arthritis, depression, insomnia, chronic pain, digestive problems, high blood pressure, diabetes, or cancer. This list of illness was adapted from the list used by Eisenberg and colleagues ^(Eisenberg et al., 1993). The following characteristics in the Christian Scientist and non-Christian Scientist sample were compared: age, sex, race,

highest educational level, annual income, unhealthy behaviors (smoking, and drinking alcoholic beverages), healthy behaviors (exercise and limiting of cholesterol), possibly healthy behaviors (taking vitamins and minerals, buying health food store products, buying organic foods/vegetables, avoiding refined sugars, and vegetarian diet), satisfaction with life, overall perception of health compared with others, religious background, beliefs/experiences, service attendance, and practices. Self-report of illness was compared in the two groups. For respondents who had experienced an illness, physician visits, use of pre- prescription medications, hospital visits, and use of unconventional and mind/body medicine were compared. Response of Christian Scientists and non-Christian Scientists were compared using either the Fisher exact test or chi-squared test. Logistic regression analysis was performed for self-report of illness. In addition to reported religious preference (Christian Scientist vs. non-Christian Scientist), the following variables that have been previously associated with self-report of illness were included in the model: age, race, highest education level, annual income, satisfaction with life, perception of health, and religious service attendance. Analyses were performed using BMDP.

Results

Sample Characteristics

The demographic characteristics of the study sample are summarized in [Table 1](#). Although the sex and annual income of the two groups were comparable, Christian Scientists (mean age = 42.6 ± 16.1) were older ($p = .039$) than non-Christian Scientists (mean age = 39.6 ± 16.1). The Christian Science group consisted of more white individuals and fewer minorities compared with the non-Christian Scientist sample ($p = .0001$). Christian Scientist respondents had completed more education ($p = .041$) than non-Christian Scientist respondents.

| | Christian Scientists (N = 200) | | Non-Christian Scientists (N = 200) | | p Value | No. of respondents who completed | |
|-----------------------------------|-----------------------------------|-----|---------------------------------------|-----|---------|----------------------------------|--------------------------|
| | N | % | N | % | | Christian Scientists | Non-Christian Scientists |
| Age (yr) | | | | | | | |
| 18-24 | 26 | 13 | 104 | 52 | .009 | 0 | 0 |
| 25-34 | 53 | 27 | 140 | 70 | | | |
| 35-44 | 27 | 14 | 104 | 52 | | | |
| 45-54 | 35 | 18 | 71 | 35 | | | |
| 55-74 | 35 | 18 | 43 | 21 | | | |
| > 74 | 8 | 4 | 31 | 15 | | | |
| Sex | | | | | | | |
| Male | 101 | 51 | 179 | 90 | .56 | 0 | 0 |
| Female | 129 | 65 | 121 | 61 | | | |
| Race | | | | | | | |
| White | 226 | 115 | 362 | 182 | .0001 | 0 | 10 |
| African American | 4 | 2 | 26 | 13 | | | |
| Hispanic | 0 | 0 | 30 | 15 | | | |
| Other | 0 | 0 | 36 | 18 | | | |
| Education | | | | | | | |
| Less than high school | 0 | 0 | 46 | 23 | .041 | 0 | 0 |
| High school graduate | 67 | 34 | 162 | 81 | | | |
| High school technical/vocational | 12 | 6 | 20 | 10 | | | |
| Some college | 45 | 23 | 134 | 67 | | | |
| College graduate | 60 | 30 | 143 | 72 | | | |
| Postgraduate | 42 | 21 | 75 | 38 | | | |
| Annual Income | | | | | | | |
| < \$10,000 | 13 | 7 | 34 | 17 | .100 | 0 | 0 |
| \$10,000-\$19,999 | 26 | 13 | 135 | 68 | | | |
| \$20,000-\$29,999 | 26 | 13 | 79 | 40 | | | |
| \$30,000-\$39,999 | 30 | 15 | 71 | 35 | | | |
| \$40,000-\$49,999 | 32 | 16 | 74 | 37 | | | |
| > \$50,000 | 33 | 17 | 67 | 34 | | | |
| Unhealthy Behaviors | | | | | | | |
| Smokes cigarettes or cigars | 45 | 23 | 171 | 86 | .001 | 0 | 1 |
| Smoking alcohol | 37 | 19 | 129 | 64 | .01 | 4 | 2 |
| Drinks alcohol | | | | | | | |
| Smokes | 154 | 77 | 162 | 81 | .660 | 7 | 6 |
| Doesn't | 174 | 87 | 138 | 69 | | 1 | 0 |
| Possibly Healthy Behaviors | | | | | | | |
| Takes vitamins/minerals | 101 | 51 | 162 | 81 | .000 | 0 | 0 |
| Buy health food store products | 61 | 31 | 132 | 66 | .001 | 7 | 1 |
| Buy organic fruits/vegetables | 65 | 33 | 137 | 68 | .75 | 6 | 7 |
| Buy organic bread/vegetables | 71 | 36 | 146 | 73 | .001 | 0 | 0 |
| Buy refined sugar | 28 | 14 | 78 | 39 | .14 | 0 | 0 |
| Buy refined oil | | | | | | | |

TABLE 1:

Characteristics of Study Subjects

Healthy and Unhealthy Behaviors

Table 1 also shows the distribution of self-reported healthy and unhealthy behaviors in the two study groups. Surprisingly, there was no difference in the usage of tobacco products and consumption of alcohol between the groups. Overall, Christian Scientists reported fewer healthy (and possibly healthy) behaviors such as exercising, limiting cholesterol intake, use of vitamins/minerals, and avoiding refined sugar.

Respondents' Perception of Life and Health

Table 2 shows the self-reported perception of life and health. Christian Scientists were more likely to report that they were satisfied with their life than non-Christian Scientists ($p = .0001$). Indeed, more than one half of Christian Scientists (52%) confirmed they were very satisfied with their life, compared with only 37% of non-Christian Scientists. There was no difference among the groups in their attitude toward health; however, 71% of Christian Scientists reported excellent or very good health compared with 61% of non-Christian Scientists.

| | Christian Scientists (n = 100) | | Non-Christian Scientists (n = 100) | | p-value | Christian Scientists | Non-Christian Scientists |
|-------------------------------------|--------------------------------|----|------------------------------------|----|---------|----------------------|--------------------------|
| | N | % | N | % | | | |
| Overall perception of life | | | | | | | |
| Level of satisfaction | | | | | | | |
| Very satisfied | 52 | 52 | 37 | 37 | .0001 | * | * |
| Satisfied | 32 | 32 | 48 | 48 | | | |
| Not satisfied | 13 | 13 | 35 | 35 | | | |
| Very dissatisfied | 3 | 3 | 10 | 10 | | | |
| Overall perception of health | | | | | | | |
| Health consistent with others | | | | | | | |
| Excellent | 44 | 44 | 30 | 30 | .122 | * | * |
| Very good | 26 | 26 | 30 | 30 | | | |
| Good | 18 | 18 | 20 | 20 | | | |
| Fair | 10 | 10 | 14 | 14 | | | |
| Poor | 2 | 2 | 8 | 8 | | | |

TABLE 2:

Respondents' Perceptions of Life and Health

Religion and Spirituality

Table 3 summarizes the religious preference, background, and practices of all study respondents. The non-Christian Scientist sample was 39% Protestant, 33% Roman Catholic, 5% Jewish; .1% to .8% were either Muslim, Mormon, Greek/Russian Orthodox, Seventh-Day Adventist; 1.8% reported "other" as their religious background; and 18% reported no religious background. Ninety-four percent of Christian Scientists and 90% of non-Christian Scientists indicated that they believed that religion and health were connected. Furthermore, 87% of Christian Scientists and 77% of non-Christian Scientists believed religion was important in their lives ($p = .0009$), believed in God (88% vs. 92%) and more than 80% of all respondents believed in the power of prayer. Religious service attendance differed across the groups ($p = .0001$) with 62% percent of Christian Scientists and 46% of non-Christian Scientists attending a religious service at least a few times per month. Christian Scientists were more likely than non-Christian Scientists to take part, at least once per month, in solitary or group religious practices ($p < .00001$) and to take part in evangelical out-reach or mission work ($p < .00001$). Finally, 82% of Christian Scientists compared with 71% of non-Christian Scientists ($p = .002$) prayed or meditated alone at least once per month.

| | Christian Scientists (N = 246) | | Non-Christian Scientists (N = 545) | | p Value | No. of participants with this experience | |
|---|-----------------------------------|------|---------------------------------------|------|---------|---|--------------------------|
| | N | % | N | % | | Christian Scientists | Non-Christian Scientists |
| Religious Background | | | | | | | |
| Christian Scientist | 236 | 95.9 | 45 | 8.3 | <.0001 | 0 | 46 |
| Protestant | 0 | 0 | 260 | 47.7 | | | |
| Roman Catholic | 0 | 0 | 493 | 91.3 | | | |
| Jewish | 0 | 0 | 3 | 0.5 | | | |
| Muslim | 0 | 0 | 3 | 0.5 | | | |
| Hinduist | 0 | 0 | 0 | 0 | | | |
| Orthodox Church, Greek or Russian | 0 | 0 | 4 | 0.7 | | | |
| Spiritualist/Other | 0 | 0 | 2 | 0.4 | | | |
| Other | 0 | 0 | 36 | 6.6 | | | |
| None | 0 | 0 | 46 | 8.4 | | | |
| Evangelical Christian | 44 | 18 | 142 | 26.1 | | 3 | 4 |
| Member of an organized religious group | 157 | 63.8 | 261 | 47.9 | | 2 | 4 |
| Religious Beliefs/Experiences | | | | | | | |
| Believe in a connection between religion and health | 210 | 85.4 | 363 | 66.4 | <.0001 | 7 | 14 |
| Religion important in life | 203 | 82.5 | 449 | 82.4 | | 4 | 4 |
| Religion as food or sustenance | 183 | 74.4 | 322 | 59.1 | | 0 | 23 |
| Religion in the practice of religion | 197 | 80 | 475 | 87.1 | | 11 | 0 |
| Religious Service Attendance | | | | | | | |
| Study | 0 | 0 | 40 | 7.3 | <.0001 | 1 | 1 |
| Five times a week | 0 | 0 | 121 | 22.2 | | | |
| Five times a month | 0 | 0 | 133 | 24.4 | | | |
| Five times a year | 0 | 0 | 133 | 24.4 | | | |
| Not at all | 0 | 0 | 104 | 19.1 | | | |
| Religious practices - at least once a month | | | | | | | |
| Take part in small group/religious study groups | 0 | 0 | 137 | 25.1 | <.0001 | 0 | 1 |
| Take part in evangelism, outreach or service work | 0 | 0 | 74 | 13.6 | <.0001 | 0 | 0 |
| Pray or meditate alone | 106 | 43 | 432 | 79.3 | | 2 | 2 |

TABLE 3:

Religious Background, Religious Beliefs/Experiences, Religious Service Attendance, and Religious Practices of All Respondents

Self-Reported Illness and Symptoms

Table 4 displays the respondents' self-report of illnesses and symptoms. Respondents were first asked if they had experienced any of the listed illnesses or symptoms during the last 12 months. Overall, Christian Scientists indicated significantly fewer illnesses or symptoms than non-Christian Scientists ($p = .05$). Specifically, 167 Christian Scientists (73%) reported that in the previous 12 months they experienced one or more of the 13 specific conditions about which they were queried, compared with 473 of the non-Christian Scientists (80%).

| | Christian Scientists (N = 246) | | Non-Christian Scientists (N = 545) | | p Value | No. of participants with this experience | |
|--------------------------------|-----------------------------------|------|---------------------------------------|------|---------|---|--------------------------|
| | N | % | N | % | | Christian Scientists | Non-Christian Scientists |
| Any illness or symptoms | | | | | | | |
| No illness or symptoms | 82 | 33.3 | 124 | 22.8 | .05 | 0 | 0 |
| Only one | 49 | 19.9 | 131 | 24.0 | | | |
| Two | 40 | 16.3 | 113 | 20.7 | | | |
| More than two | 76 | 30.8 | 280 | 51.3 | | | |
| Headaches | | | | | | | |
| Always | 0 | 0 | 276 | 50.6 | | 0 | 0 |
| Sometimes or often | 0 | 0 | 144 | 26.4 | | 0 | 0 |
| Seldom | 0 | 0 | 129 | 23.7 | | 0 | 0 |
| Never | 0 | 0 | 135 | 24.8 | | 0 | 0 |
| Stomach | | | | | | | |
| Always | 0 | 0 | 17 | 3.1 | | 0 | 0 |
| Sometimes or often | 0 | 0 | 104 | 19.1 | | 0 | 0 |
| Seldom | 0 | 0 | 104 | 19.1 | | 0 | 0 |
| Never | 0 | 0 | 134 | 24.4 | | 0 | 0 |
| Chronic pain | | | | | | | |
| Always | 0 | 0 | 120 | 22.0 | | 0 | 0 |
| Sometimes or often | 0 | 0 | 104 | 19.1 | | 0 | 0 |
| Seldom | 0 | 0 | 104 | 19.1 | | 0 | 0 |
| Never | 0 | 0 | 115 | 21.1 | | 0 | 0 |
| High blood pressure | | | | | | | |
| Always | 0 | 0 | 73 | 13.4 | | 0 | 0 |
| Sometimes or often | 0 | 0 | 127 | 23.3 | | 0 | 0 |
| Seldom | 0 | 0 | 134 | 24.4 | | 0 | 0 |
| Never | 0 | 0 | 135 | 24.8 | | 0 | 0 |

TABLE 4:

Self-Report of Illnesses and Symptoms

Because age, race, education, income, satisfaction with life, perception of health, religious preference, and attendance of religious services have been associated with self-report of illness, all of these factors were included in the multivariate analysis. Only perception of health and religious preference (Christian Scientist or not) were independently associated with self-report of illness (Table 5).

| Variable | Odds ratio | 95% Confidence Interval | p Value |
|---------------------------------------|-----------------|-------------------------|---------|
| Health associated with illness | | | <.0001 |
| Excellent | 1.0 (reference) | | |
| Very Good | 0.33 | 0.07-1.69 | |
| Good | 0.40 | 0.10-1.66 | |
| Fair/Poor* | 0.30 | 0.13-0.69 | |
| Religious preference | | | .04 |
| Not a Christian Scientist | 1.0 (reference) | | |
| Christian Scientist | 0.62 | 0.44-0.88 | |

TABLE 5:

Final Model of Characteristics Associated with Self-Report of Illness

Use of Conventional and Unconventional Medicine and Mind/Body (Including Spiritual) Healing by Respondents with a Primary Condition

Table 6 shows the proportion of respondents that used conventional and unconventional medicine and mind/body (including spiritual) healing to treat their most bothersome or primary condition (results refer to 73% of Christian Scientist sample and 80% of non-Christian Scientist sample who experienced illness). There were no differences in the percentage of respondents reporting physician or hospital admissions in the previous 12 months. Fewer Christian Scientists used prescription medications than non-Christian Scientists ($p = .034$), but of individuals who report a primary medical illness, the vast majority of both Christian Scientists and non-Christian Scientists (74% and 78% respectively) used some form of conventional medicine ($p > .10$).

| | Christian Scientists | | Non-Christian Scientists | | p Value | No. of Respondents who experienced | |
|--|----------------------|----|--------------------------|----|---------|------------------------------------|--------------------------|
| | N | % | N | % | | Christian Scientists | Non-Christian Scientists |
| Use of conventional medicine in the last 12 months (only respondents reporting an illness or symptom) | | | | | | | |
| Used a physician in last 12 months | 101 | 64 | 102 | 73 | .111 | 9 | 4 |
| Hospital admission in last 12 months | 30 | 19 | 28 | 20 | .884 | 2 | 4 |
| Prescription medication in last 12 months | 17 | 11 | 36 | 26 | .034 | 6 | 10 |
| Nonprescription conventional medicine | 120 | 76 | 106 | 76 | .20 | 5 | 4 |
| Use of unconventional medicine in the last 12 months (only respondents reporting an illness or symptom) | | | | | | | |
| Relaxation response techniques | 37 | 24 | 40 | 29 | .27 | 10 | 16 |
| Visual imagery | 10 | 6 | 15 | 11 | .27 | 11 | 18 |
| Biofeedback | 10 | 6 | 4 | 3 | .666 | 2 | 3 |
| Hypnosis | 26 | 17 | 36 | 26 | .20 | 12 | 21 |
| Use of special religious services | 34 | 22 | 18 | 13 | .001 | 11 | 18 |
| Use of spiritual healing | 23 | 15 | 36 | 26 | .09 | 12 | 21 |
| Use of life-style diets (e.g., macrobiotics) | 102 | 65 | 107 | 77 | .007 | 10 | 16 |
| Self-help groups | 19 | 12 | 11 | 8 | .062 | 12 | 21 |
| Acupuncture | 13 | 8 | 24 | 17 | .17 | 12 | 21 |
| Conventional weight loss programs | 11 | 7 | 27 | 20 | .14 | 14 | 24 |
| Nonprescription unconventional medicine | 79 | 51 | 109 | 78 | .14 | 14 | 24 |
| Use of mind/body medicine in the last 12 months (only respondents reporting an illness or symptom) | | | | | | | |
| Relaxation response techniques | 37 | 24 | 40 | 29 | .27 | 10 | 16 |
| Visual imagery | 10 | 6 | 15 | 11 | .27 | 11 | 18 |
| Biofeedback | 10 | 6 | 4 | 3 | .666 | 2 | 3 |
| Hypnosis | 26 | 17 | 36 | 26 | .20 | 12 | 21 |
| Use of special religious services | 34 | 22 | 18 | 13 | .001 | 11 | 18 |
| Spiritual healing | 14 | 9 | 27 | 20 | .00001 | 10 | 16 |
| Nonprescription mind/body medicine | 101 | 67 | 109 | 78 | .00001 | 9 | 15 |

TABLE 6: Use of Conventional and Unconventional Medicine and Mind/Body (Including Spiritual) Healing Approaches by Respondents Reporting an Illness or Symptom

Most unconventional medicines (such as chiropractic care, massage therapy, and acupuncture) were used by similar proportions of Christian Scientists and non-Christian Scientists ($p > .10$), although Christian Scientists used more megavitamin therapy, homeopathy, life-style diets (e.g., macrobiotics), and self-help groups.

Two-thirds of Christian Scientists (67%) used at least one form of mind/body medicine (defined in this study as relaxation response techniques, visual imagery, biofeedback, hypnosis, use of special religious services, and spiritual healing) in the past 12 months compared with 42% of non-Christian Scientists ($p < .00001$). Indeed, a higher proportion of Christian Scientists reported using biofeedback ($p = .006$), special religious services ($p < .00001$), and spiritual healing ($p < .00001$).

Discussion

The rationale for comparing the health status of Christian Scientists to non-Christian Scientists was the prevailing belief that Christian Scientists use spiritual healing, but not routine medical care. We thought that this group would provide an ideal one in which to examine the influence of mind/body (including spiritual) healing approaches on health without the confounding influences of conventional medicine.

To our surprise and in contrast to widespread perception ^(Skolnick 1990; Swan 1983), almost three-quarters of Christian Scientists who experienced one or more principal medical conditions used some form of conventional medicine. In this study, conventional medicine was defined as physician visits, use of prescribed medications, and hospital admissions. Similar proportions of Christian Scientists and non-Christian Scientists report physician visits and hospital admissions in the previous 12 months. However, Christian Scientists did take fewer prescription medications than non-Christian Scientists.

About half of both Christian Scientists and non-Christian Scientists used at least one type of unconventional medicine during the last 12 months. Mind/body medicine (defined as relaxation response techniques, biofeedback, visual imagery, hypnosis, and spiritual healing) was in widespread use by both Christian Scientists and non-Christian Scientists, although, as expected, spiritual healing was predominantly used by Christian Scientists. We did not ask why or when respondents used conventional and unconventional and mind/body medicine. This question was addressed in a study of college-aged Christian Scientists, who were asked how they would respond to several hypothetical illnesses. The Christian Scientist college students preferred home remedies and over-the-counter medications for "mild" illnesses, whereas spiritual healing and other mind/body approaches, as well as conventional medicine, were reserved for more serious illnesses ^(Nudelman and Nudelman, 1972).

Christian Scientists tended to experience fewer common illnesses than non-Christian Scientists. The common illnesses were similar to those used in a previous telephone survey examining the use of conventional and unconventional medicine ^(Eisenberg et al., 1993). All of the conditions, except hypertension, cause symptoms that are easily recognized by most patients. To determine whether a symptomless disease diagnosed by health care providers might account for the difference between the two groups, we excluded hypertension from the self-reported illnesses. Even after excluding hypertension, Christian Scientists still report fewer illnesses than non-Christian Scientists. Thus, the difference between Christian Scientists and non-Christian Scientists cannot be explained solely on the basis of possible lack of diagnosis and self-report of hypertension.

Although it is interesting to speculate about the difference in self-report of illness between the two groups, there are several limitations of the conclusions of this cross sectional study. First, could demographic characteristics of the two samples alone explain the perceived differences in reported illness? For example, several studies report that African-Americans have poorer health than whites ^(Manton et al., 1987; Otten et al., 1990; Ren and Amick, 1996), and poorer health status has been associated with lower educational attainment ^(Guralnik et al., 1993; Pincus et al., 1987). To address this concern, we conducted multivariate analysis to determine whether previously reported risk factors for poor health might explain the observed differences. We found that only perceived health status and religious preference (being a Christian Scientist) were independently associated with self-report of illness. There is an impressive increase in risk of illness as self-report

of health status (compared with others) worsens from very good to fair/poor. The results of the multivariate analysis are in accord with a recent report showing that religious service attendance was not independently associated with the frequency or seriousness of illness (Schmied and Jost, 1994).

Second, could observed differences in the demographic characteristics between the non-Christian Scientists and the overall United States population explain the results? When compared with data from the 1990 U.S. Census (U.S. Bureau of the Census, 1990), the non-Christian Scientist sample was younger, more highly educated, consisted of more racial minorities, and had a higher annual income than the averages from the overall United States population. Although it is difficult to be sure that the attitudes expressed by our sample reflect those of the overall United States population, all these factors, except for the increase in racial minorities, are associated with fewer rather than more illnesses. Thus, like the Christian Scientist sample, the demographic makeup of the non-Christian Scientist sample is biased toward the self-report of fewer illnesses than would be expected in the overall United States population.

Third, could the two groups have different thresholds for reporting that a condition or symptom was either present or bothersome, and might Christian Scientists self-report fewer illnesses as a way of defending their religious beliefs? Although these biases may have occurred, questions about life satisfaction and health were asked *before* the questions about religious preference were asked. Questions about illnesses were asked *after* religious preference, so this bias is possible. However, the questionnaire was never described as evaluating the relationship between religious beliefs and self-report of illness.

Fourth, could the two groups have different risks for developing illness? Surprisingly, Christian Scientists were *less* likely to exercise, limit cholesterol intake, take vitamins/minerals, and avoid refined sugar than the non-Christian Scientists. Contrary to expectation, cigarette and cigar smoking and drinking of alcoholic beverages were similar in the two groups. "Good health" in other religious groups, such as Seventh Day Adventists, has been attributed to less alcohol and tobacco use as well as dietary restrictions (Armstrong et al., 1977; Jensen, 1983). The Christian Scientists in this study do not seem to exhibit particularly healthy behavior compared with non-Christian Scientists, and therefore seem to be *at greater* not lower risk of developing illness. However, religious preference may be associated with other factors not measured in this study that protect against or increase the risk of illness (CDC, 1991a).

Our data add to the limited published information on health of Christian Scientists. Simpson has previously reported that graduates from a Christian Scientist college had higher mortality than graduates of a non-Christian Scientist college (Simpson, 1989) and higher than graduates from a predominantly Seventh-Day Adventist university (CDC, 1991b). Both use spiritual healing, but Seventh-Day Adventists are required to refrain from drinking alcohol or smoking tobacco products and observe a strict lacto-ovo-

vegetarian diet (Ullmann et al., 1991). The increase in mortality among Christian Scientists was attributed to use of spiritual healing without use of conventional medicine, although a lower mortality among Seventh-Day Adventists could be attributed to dietary differences (Ullmann et al., 1991). It is important to note, however, that the results of our study and those of Simpson should not be compared because the outcome was different (self-reported illness vs. mortality), and it is likely that the study populations were different. For example, many of our self-identified Christian Scientists did not abstain from smoking and drinking, used conventional medicine, and 38% did not attend religious services at all or only attended a few times a year. Our study is the first that has reached a sample of Christian Scientists through random digit dialing, not through Churches or Christian Science colleges, and may be more representative of the Christian Science population.

Conclusions

The present findings are at odds with the perception that Christian Scientists do not use conventional medicine or are less healthy than non-Christian Scientists. We found that similar proportions of Christian Scientists and non-Christian Scientists use conventional medicine and unconventional medicine. However, there were notable differences. Unlike non-Christian Scientists, Christian Scientists take fewer prescribed medications and use much more mind/body medicine (including spiritual healing). Furthermore, we report a preliminary but intriguing observation that Christian Scientists, in our sample, report having fewer medical illnesses or symptoms and greater satisfaction with life than non-Christian Scientists. Is it possible that conventional and unconventional medicine combined with mind/body (including spiritual) healing offers important health benefits? We believe that well-designed studies to directly address this question are urgently needed.

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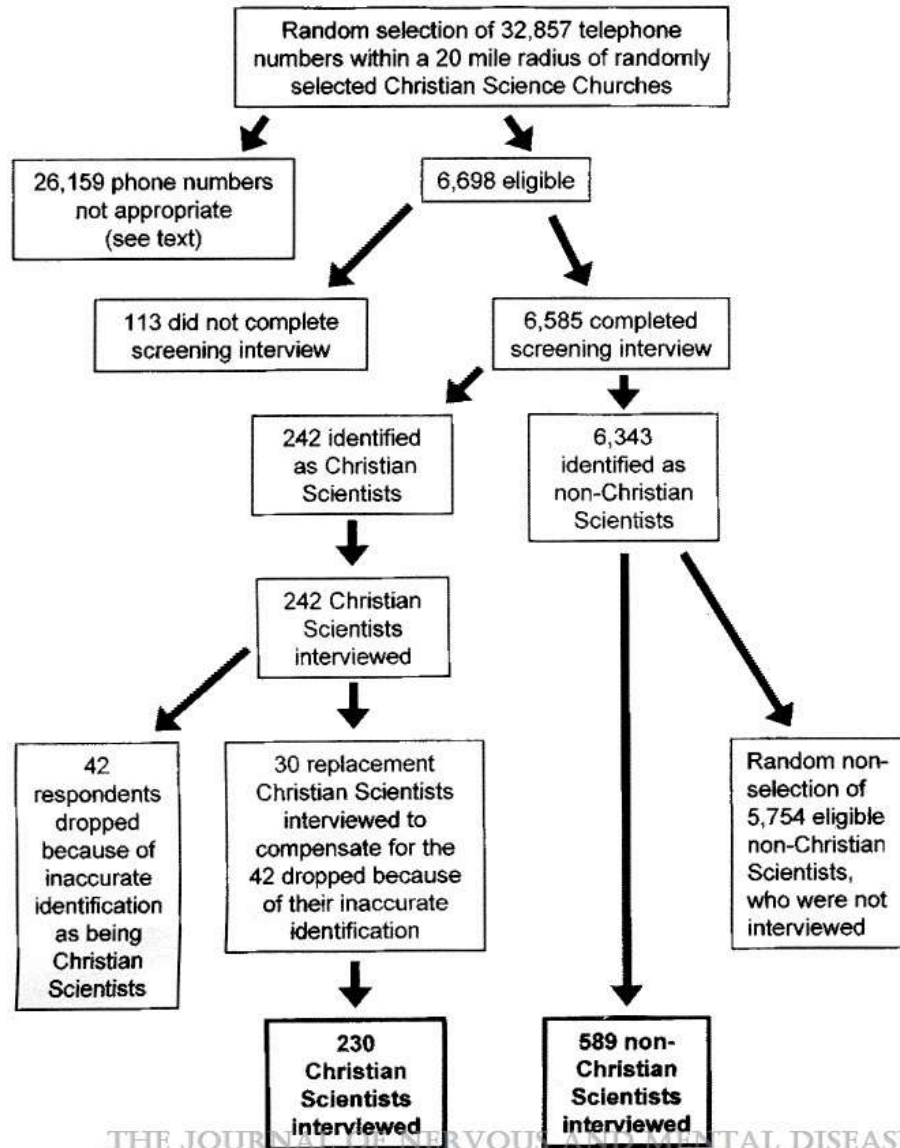
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Fig. 1



[Self-Reported Health, and Illness and the Use of Conventional and Unconventional Medicine and Mind/Body Healing by Christian Scientists and Others](#)

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Representation of the study sample selection.

TABLE 1

| | Christian Scientists (N = 230) | | Non-Christian Scientists (N = 589) | | p-Value | No. of questions with no response | |
|---------------------------------------|-----------------------------------|----|---------------------------------------|----|---------|-----------------------------------|--------------------------|
| | N | % | N | % | | Christian Scientists | Non-Christian Scientists |
| Age (yr) | | | | | | | |
| 18-24 | 26 | 11 | 101 | 17 | .039 | 0 | 0 |
| 25-34 | 53 | 23 | 165 | 28 | | | |
| 35-49 | 78 | 34 | 184 | 31 | | | |
| 50-64 | 47 | 20 | 77 | 13 | | | |
| 65-74 | 16 | 7 | 41 | 7 | | | |
| > 74 | 10 | 4 | 21 | 4 | | | |
| Sex | | | | | | | |
| Male | 101 | 44 | 279 | 47 | .39 | 0 | 0 |
| Female | 129 | 56 | 310 | 53 | | | |
| Race | | | | | | | |
| White | 226 | 98 | 363 | 63 | .0001 | 0 | 13 |
| African-American | 4 | 2 | 98 | 17 | | | |
| Hispanic | 0 | 0 | 55 | 10 | | | |
| Other | 0 | 0 | 60 | 10 | | | |
| Education | | | | | | | |
| Less than high school | 8 | 4 | 46 | 8 | .041 | 0 | 3 |
| High school graduate | 57 | 25 | 162 | 28 | | | |
| Trade / technical / vocational school | 12 | 5 | 20 | 3 | | | |
| Some college | 45 | 20 | 134 | 23 | | | |
| College graduate | 66 | 29 | 149 | 25 | | | |
| Postgraduate | 42 | 18 | 75 | 13 | | | |
| Annual income | | | | | | | |
| < \$10,000 | 13 | 7 | 54 | 11 | .156 | 41 | 94 |
| \$10,000-\$29,999 | 36 | 19 | 121 | 24 | | | |
| \$30,000-\$39,999 | 34 | 18 | 78 | 16 | | | |
| \$40,000-\$49,999 | 39 | 21 | 71 | 14 | | | |
| \$50,000-\$74,999 | 35 | 18 | 84 | 17 | | | |
| > \$75,000 | 32 | 17 | 67 | 18 | | | |
| Unhealthy behaviors | | | | | | | |
| Smoke cigarettes or cigars | 63 | 28 | 177 | 30 | .60 | 5 | 1 |
| Drinking alcoholic beverages | 97 | 43 | 259 | 44 | .81 | 4 | 2 |
| Healthy behaviors | | | | | | | |
| Exercise | 161 | 72 | 462 | 79 | .049 | 7 | 4 |
| Limit cholesterol | 104 | 46 | 331 | 57 | .009 | 5 | 3 |
| Possibly healthy behaviors | | | | | | | |
| Take vitamins/minerals | 107 | 48 | 352 | 60 | .003 | 8 | 2 |
| Buy health food store products | 61 | 27 | 182 | 31 | .35 | 7 | 3 |
| Buy organic fruits/vegetables | 95 | 42 | 237 | 41 | .75 | 4 | 7 |
| Avoid refined sugar | 71 | 32 | 260 | 45 | .001 | 6 | 8 |
| Vegetarian diet | 28 | 12 | 52 | 9 | .14 | 4 | 4 |

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Characteristics of Study Subjects

TABLE 2

[Self-Reported Health, and Illness and the Use of Conventional and Unconventional Medicine and Mind/Body Healing by Christian Scientists and Others](#)

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| | Christian Scientists (N = 230) | | Non-Christian Scientists (N = 589) | | p-Value | No. of questions with no response | |
|-------------------------------------|-----------------------------------|----|---------------------------------------|----|---------|-----------------------------------|--------------------------|
| | N | % | N | % | | Christian Scientists | Non-Christian Scientists |
| Overall perception of life | | | | | | | |
| Level of satisfaction | | | | | | | |
| Very satisfied | 120 | 52 | 215 | 37 | .0001 | 0 | 4 |
| Satisfied | 92 | 40 | 320 | 55 | | | |
| Mostly dissatisfied | 13 | 6 | 30 | 5 | | | |
| Very dissatisfied | 5 | 2 | 20 | 3 | | | |
| Overall perception of health | | | | | | | |
| Health compared with others | | | | | | | |
| Excellent | 84 | 37 | 167 | 28 | .115 | 0 | 1 |
| Very good | 78 | 34 | 196 | 33 | | | |
| Good | 46 | 20 | 160 | 27 | | | |
| Fair | 18 | 8 | 51 | 9 | | | |
| Poor | 4 | 2 | 14 | 2 | | | |

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Respondents' Perceptions of Life and Health

TABLE 3

[Self-Reported Health, and Illness and the Use of Conventional and Unconventional Medicine and Mind/Body Healing by Christian Scientists and Others](#)

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| | Christian Scientists (N = 230) | | Non-Christian Scientists (N = 589) | | p-Value | No. of questions with no response | |
|---|-----------------------------------|-----|---------------------------------------|-----|----------|-----------------------------------|--------------------------|
| | N | % | N | % | | Christian Scientists | Non-Christian Scientists |
| Religious background | | | | | | | |
| Christian Scientist | 230 | 100 | 0 | 0 | n/a | 0 | 99 |
| Protestant | 0 | 0 | 189 | 39 | | | |
| Roman Catholic | 0 | 0 | 164 | 33 | | | |
| Jewish | 0 | 0 | 23 | 5 | | | |
| Muslim | 0 | 0 | 5 | 0.1 | | | |
| Mormon | 0 | 0 | 4 | 0.8 | | | |
| Orthodox Church, Greek or Russian | 0 | 0 | 4 | 0.8 | | | |
| Seventh-Day Adventist | 0 | 0 | 3 | 0.6 | | | |
| Other | 0 | 0 | 9 | 1.8 | | | |
| None | 0 | 0 | 89 | 18 | | | |
| Evangelical Christian | 64 | 29 | 141 | 25 | .24 | 9 | 16 |
| Member of an organized religious group | 137 | 60 | 293 | 50 | .015 | 2 | 8 |
| Religious Beliefs/Experiences | | | | | | | |
| Believe in a connection between religion and health | 210 | 94 | 500 | 90 | .07 | 7 | 34 |
| Religion important in life | 201 | 87 | 448 | 77 | .0009 | 0 | 8 |
| Believe in God or universal | 195 | 88 | 522 | 92 | .09 | 9 | 23 |
| Believe in the power of prayer | 197 | 86 | 475 | 81 | .11 | 0 | 0 |
| Religious Service Attendance | | | | | | | |
| Daily | 23 | 10 | 40 | 7 | .0001 | 1 | 1 |
| Few times a week | 79 | 35 | 111 | 19 | | | |
| Few times a month | 39 | 17 | 119 | 20 | | | |
| Few times a year | 39 | 17 | 124 | 21 | | | |
| Not at all | 49 | 21 | 194 | 33 | | | |
| Religious practices—at least once a month | | | | | | | |
| Take part small prayer/religious study groups | 92 | 41 | 137 | 23 | < .00001 | 3 | 1 |
| Take part in evangelism, outreach or mission work | 82 | 36 | 73 | 13 | < .00001 | 2 | 5 |
| Pray or meditate alone | 186 | 82 | 415 | 71 | .002 | 2 | 2 |

Religious Background, Religious Beliefs/Experiences, Religious Service Attendance, and Religious Practices of All Respondents

TABLE 4

[Self-Reported Health, and Illness and the Use of Conventional and Unconventional Medicine and Mind/Body Healing by Christian Scientists and Others](#)

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| | Christian Scientists (N = 230) | | Non-Christian Scientists (N = 589) | | p-Value | No. of questions with no response | |
|-------------------------------|-----------------------------------|----|---------------------------------------|----|---------|-----------------------------------|--------------------------|
| | N | % | N | % | | Christian Scientists | Non-Christian Scientists |
| Any illness or symptom | | | | | | | |
| No illness or symptom | 63 | 27 | 116 | 20 | .05 | 0 | 0 |
| Only one | 48 | 21 | 131 | 22 | | | |
| Two | 48 | 21 | 113 | 19 | | | |
| More than two | 71 | 31 | 229 | 39 | | | |
| Headaches | 94 | 41 | 308 | 52 | .004 | 0 | 0 |
| Allergies | 60 | 26 | 176 | 30 | .3 | 0 | 0 |
| Sprains or strains | 58 | 25 | 148 | 25 | .99 | 0 | 0 |
| Anxiety | 52 | 23 | 130 | 22 | .87 | 0 | 0 |
| Dizziness | 39 | 17 | 77 | 13 | .18 | 0 | 0 |
| Arthritis | 37 | 16 | 100 | 17 | .84 | 0 | 0 |
| Depression | 34 | 15 | 128 | 22 | .03 | 0 | 0 |
| Insomnia | 31 | 13 | 104 | 18 | .17 | 0 | 0 |
| Chronic pain | 29 | 13 | 94 | 16 | .28 | 0 | 0 |
| Digestive problems | 27 | 12 | 99 | 17 | .08 | 0 | 0 |
| High blood pressure | 15 | 7 | 72 | 12 | .017 | 0 | 0 |
| Diabetes | 10 | 4 | 20 | 3 | .54 | 0 | 0 |
| Cancer | 8 | 3 | 19 | 3 | .83 | 0 | 0 |

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Self-Report of Illnesses and Symptoms

TABLE 5

[Self-Reported Health, and Illness and the Use of Conventional and Unconventional Medicine and Mind/Body Healing by Christian Scientists and Others](#)

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| Variable | Odds ratio | 95% Confidence interval | p-Value |
|------------------------------------|-----------------|-------------------------|-------------------|
| Health compared with others | | | < .0001 |
| Excellent | 1.0 (reference) | | |
| Very Good | 2.13 | 1.37-3.29 | |
| Good | 3.43 | 2.00-5.88 | |
| Fair/Poor ^a | 11.60 | 3.51-38.40 | |
| Religious preference | | | .04 |
| Not a Christian Scientist | 1.0 (reference) | | |
| Christian Scientist | 0.66 | 0.44-0.99 | |

^aCategories collapsed because only 18 respondents classified their health as poor.

Final Model of Characteristics Associated with Self-Report of Illness

TABLE 6

[Self-Reported Health, and Illness and the Use of Conventional and Unconventional Medicine and Mind/Body Healing by Christian Scientists and Others](#)

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doi:

Use of Conventional and Unconventional Medicine and Mind/Body (Including Spiritual) Healing Approaches by Respondents Reporting an Illness or Symptom

| | Christian Scientists | | Non-Christian Scientists | | p-Value | No. of questions with no response | |
|--|----------------------|----|--------------------------|----|----------|-----------------------------------|--------------------------|
| | N | % | N | % | | Christian Scientists | Non-Christian Scientists |
| Use of conventional medicine in last 12 months (only respondents reporting an illness or symptom) | N = 167 | | N = 473 | | | | |
| Visited a physician in last 12 months | 101 | 64 | 332 | 71 | .110 | 9 | 4 |
| Regularly take prescribed medications | 55 | 33 | 201 | 43 | .034 | 2 | 6 |
| Hospital admission in last 12 months | 17 | 11 | 38 | 8 | .34 | 8 | 10 |
| Summary—any conventional medicine | 120 | 74 | 366 | 78 | .33 | 5 | 4 |
| Use of unconventional medicine in last 12 months (only respondents reporting an illness or symptom) | N = 167 | | N = 473 | | | | |
| Home cures | 37 | 24 | 80 | 18 | .10 | 15 | 26 |
| Herbal remedies | 31 | 20 | 73 | 16 | .27 | 13 | 20 |
| Megavitamin therapy | 29 | 19 | 37 | 8 | .0005 | 14 | 22 |
| Massage therapy | 26 | 17 | 96 | 21 | .25 | 12 | 21 |
| Chiropractic care | 24 | 15 | 59 | 13 | .50 | 11 | 22 |
| Homeopathy or naturopathy | 23 | 15 | 38 | 9 | .03 | 12 | 26 |
| Life-style diets such as macrobiotics | 22 | 15 | 37 | 8 | .027 | 16 | 23 |
| Self-help group | 19 | 12 | 31 | 7 | .042 | 12 | 23 |
| Acupuncture | 13 | 9 | 24 | 5 | .17 | 12 | 20 |
| Commercial weight-loss programs | 13 | 9 | 27 | 6 | .26 | 14 | 19 |
| Summary—any unconventional medicine | 79 | 52 | 199 | 45 | .16 | 14 | 29 |
| Use of mind/body medicine in the last 12 months (only respondents reporting an illness or symptom) | N = 167 | | N = 473 | | | | |
| Relaxation response techniques | 41 | 27 | 151 | 33 | .13 | 12 | 20 |
| Visual imagery | 27 | 17 | 58 | 13 | .18 | 11 | 20 |
| Biofeedback | 15 | 10 | 17 | 4 | .006 | 14 | 24 |
| Hypnosis | 7 | 5 | 55 | 5 | .99 | 13 | 21 |
| Special religious service | 35 | 23 | 30 | 7 | < .00001 | 13 | 21 |
| Spiritual healing | 49 | 29 | 46 | 10 | < .00001 | 10 | 23 |
| Summary—any mind/body medicine | 105 | 67 | 189 | 42 | < .00001 | 9 | 19 |

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