

The Ironson–Woods Spirituality/Religiousness Index Is Associated With Long Survival, Health Behaviors, Less Distress, and Low Cortisol in People With HIV/AIDS

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ABSTRACT

The purpose of this study was to determine the reliability and validity of an instrument that measures both spirituality and religiousness, to examine the relation between spirituality and religiousness and important health outcomes for people living with HIV, and to examine the potential mediators of these relations. One aim was to determine whether subscales of spirituality, religiousness, or both would be independently related to long survival in people living with AIDS. The Ironson–Woods Spirituality/Religiousness (SR) Index is presented with evidence for its reliability and validity. Four factors were identified on the Ironson–Woods SR Index (Sense of Peace, Faith in God, Religious Behavior, and Compassionate View of Others). Each subscale was significantly related to long survival with AIDS. That is, the long-term survivor (LTS) group ($n = 79$) scored significantly higher on these factors than did the HIV-positive comparison (COMP) group ($n = 200$). Long survival was also significantly related to both frequency of prayer (positively) and judgmental attitude (negatively). In addition, the Ironson–Woods SR Index yielded strong and significant correlations with less distress, more hope, social support, health behaviors, helping others, and lower cortisol levels. The relation between religious behavior and health outcomes was not due to social support. Further analyses were conducted, which identified urinary cortisol

concentrations and altruistic behavior as mediators of the relation between SR and long survival.

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INTRODUCTION

The notion that spirituality, religiousness, or both may be related to health has been with us for centuries. Illness has often been seen as associated with sin (1). Conversely, reconnection to the sacred has represented a possible approach to healing (2). “Spirituality and a sense of the sacred, after being banished from medicine, are making a comeback” (3). There have been several major reviews showing a link between religion and health. Levin and Schiller (4) and Levin (5) reviewed hundreds of epidemiologic studies reporting relations between religion and health and concluded that there was an association, the association was probably valid, and there may be a causal link. These authors called for more systematic research. McCullough, Hoyt, Larson, Koenig, and Koenig (6) conducted a meta-analysis of 42 independent studies and found that people high in religious involvement were more likely to be alive at follow-up than people lower in religious involvement (odds ratio = 1.29). In their conclusions, they recommended researchers use more reliable measures of multiple dimensions of religious involvement (including public religious involvement, private religious activities, and religious beliefs). Koenig, McCullough, and Larson (7) and Larson, McCullough, and Swyers (8) pointed out the need for a clearer conceptualization of religiousness and for differentiation between spirituality and religiousness.

We, therefore, felt that a measure that would capture both spirituality and religiousness was needed. In our previous work, we found that a large proportion of people with HIV identified themselves as spiritual but not religious or as both (9). This self-identification was also true of cancer patients (but to a lesser

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extent), who identified themselves evenly between being spiritual and religious. A related question was raised by the McCullough et al. (6) meta-analytic review: Is it the positive psychological states that may be fostered by more private forms of worship or measures of public religious involvement that provide the protective health effects? Thus, we wanted to create a measure that would include items relevant to private as well as public SR and that would capture spirituality as well as religiosity.

Second, no one has looked at the association between religiousness/spirituality and health in an HIV population. The HIV population provides some unique opportunities for the study of religiousness/spirituality for a number of reasons. As noted previously, many in this population identify as spiritual rather than religious (9). Next, many have been stigmatized by their churches (10,11,12). In their ambivalence toward organized religion (13), some have been able to redefine their connection with the sacred in new terms outside of traditional religion and, therefore, have had to struggle to find a way to do so. Finally, the studied group represents wide ethnic diversity and socioeconomic backgrounds. Traditional religious institutions are places of importance both to ethnic majorities and minorities and remain an important site for community social gatherings where minorities may be supported (14).

Third, if a relation does exist between religiousness/spirituality and health in HIV or AIDS, then the exploration of potential pathways (mediators) would be needed. We previously hypothesized (15) that mediators for long survival might be due to physiologic protection (i.e., low cortisol and those associated psychological states expected to be related to reductions in stress hormones) or changes in health-related behaviors (e.g., adherence to medications, safe sex, smoking, alcohol use). Measures of psychobiological variables related to proposed benefits of spiritual and religious beliefs outlined by Covey (16) were also considered as mediators. Potential mediators suggested include social support; avoidance of drugs, cigarettes, and alcohol; and reasons to be of service and help to others.

Based on the aforementioned considerations, this study had five separate aims:

1. To develop a short form of a scale (from an existing long form of 89 items, the Ironson–Woods Spirituality/Religiousness [SR] Index, which is too long for most practical purposes) that would capture dimensions of both spirituality and religiousness.
2. To provide evidence of this scale's reliability and validity.
3. To determine whether religiousness/spirituality is related to health (in particular, long survival with AIDS).
4. To explore what the mediators of the relation between spirituality and health might be and to include an examination of whether a religious behavior–health association may be driven by social support.
5. To determine whether the measure of religiousness/spirituality would be significant beyond religious behavior alone.

Based on subsequent data analysis, we also became interested in the possibility of negative health effects of judgmental religiosity (i.e., condemning or judging others harshly).

METHODS

Participants

Two groups of HIV-seropositive participants were recruited: Long-term survivors (LTSs) of AIDS ($n = 79$) and an HIV-positive comparison (COMP) group ($n = 200$). LTSs of AIDS are defined by the Centers for Disease Control as persons who have survived twice the median survival time expected for those with AIDS. Before 1996, when this study began (which was before protease inhibitors [PIs] became available to the general public), the median survival time following the appearance of a Category C symptom (i.e., a very serious AIDS-defining opportunistic infection or neoplasm such as *Pneumocystis carinii* pneumonia [PCP] or Kaposi's sarcoma [KS]) was 18 to 20 months. To be conservative, to qualify for our LTS group, participants had to be at least 4 years past an opportunistic infection or neoplasm before starting on PIs. (This was possible before 1996 when PIs became widely available.)

The second group was an HIV-positive COMP group. Participants had to have CD4+ (T-helper/inducer) cell counts between 150 and 500/mm³ at entry to the study (and had no history of CD4 counts under 75/mm³) and never had any AIDS Category C symptoms (e.g., KS, PCP, toxoplasmosis, non-Hodgkin's lymphoma). This group was chosen for comparison because of its equivalence to the LTS group on HIV serostatus and CD4 counts. Because some of the COMP group, when followed longitudinally, may become long survivors, this represents a conservative COMP group.

Exclusion criteria. Participants were excluded if they were under 18, had another life threatening illness (e.g., cancer), were on medications thought to affect stress hormones (e.g., steroids, propranolol), had taken street drugs within the past month, were actively psychotic or suicidal, or had current alcohol or drug dependence.

Measures

Overview. In addition to the Ironson–Woods SR Index, to accomplish the goals of the study, we included measures to establish convergent validity (other established measures of religiousness/spirituality) and measures to determine the psychosocial variables (e.g., distress, optimism) and behaviors to which spirituality might be related. Furthermore, this second set of measures could help to establish discriminant validity (i.e., the Ironson–Woods SR Index should correlate lower with these than with measures of religiousness) and to explore mediators of the relation between the Ironson–Woods SR Index and long survival (i.e., pathway by which religion could affect long survival). Measures for the exploration of correlates, discriminant validity, and mediators (described in the Psychosocial Measures and Behaviors sections) included perceived stress, less affective distress (anxiety, depression), physiologic stress (cortisol), more hope (less hopelessness, more optimism), social support

(Enhancing Recovery in Coronary Heart Disease Social Support Instrument [ESSI]), health behaviors (report of practicing safe sex, adherence, telling partner HIV status, and less smoking and drinking alcohol), and helping others with HIV.

Participants filled out questionnaires for all of the measures described except for the following questions, which were asked by interview: (a) "Do you consider yourself to be religious, spiritual, both, or neither?" (b) "Do you believe in GOD?" and (c) the safe sex questions noted in the Behaviors section.

Religiosity/spirituality measures: Ironson–Woods SR Index short form. Twenty-two items chosen from the longer 89-item form of the Ironson–Woods SR Index (17) were selected to represent the most salient proposed dimensions from the 89-item version and were grouped into seven conceptual groups of items (see Table 2). Items included those derived from interviews of 60 medically ill patients, 20 cancer, 20 HIV, and 20 cardiac, who represented people identifying themselves as spiritual, religious, or both, from a previous study by Woods and Ironson (9). They were asked a variety of questions pertaining to their spiritual or religious beliefs, behaviors, attitudes, and feelings. A key purpose of the development of this scale was to include items that were both pertinent to traditional religion and relevant for those who described themselves as spiritual only or as both religious and spiritual. We wanted to determine what people meant when they said they were spiritual or religious (i.e., to determine or dissect the dimensions of religiosity/spirituality). A secondary purpose was to capture both public and private religious or spiritual beliefs, behaviors, attitudes, and feelings. The seven subscales identified by the interviews conceptually are as follows: (a) Comfort, Strength, Meaning; (b) Feeling a Connection, Less Alone; (c) Existential/Afterlife; (d) View of God; (e) Somatic, which is related to recovery from illness; (f) Religious Behavior; and (g) View of Others/Compassion for Others. These components of religiosity/spirituality are listed in Table 2 by original cluster and by the four factors derived by the factor analysis described later in the Results section of this article.

Other measures of religiosity. The Hoge Intrinsic Religious Motivation Scale (18) is a 10-item scale. Higher scores indicate greater intrinsic religiosity. (Actually, there are 7 intrinsic and 3 extrinsic items.) Because alpha was adequate only for the Intrinsic scale, only the Intrinsic scale was used in the analysis ($\alpha = .89$ and $.35$ for the Intrinsic and Extrinsic scales, respectively). The Duke Religion Index (19) is a 5-item scale designed to capture the three major dimensions of religiosity as described by Koenig and Futterman (20). The three subscales are Organizational (frequency of attending church or other religious activities), Non-Organizational (time spent in private religious activities, e.g., prayer, meditation, or Bible study), and Intrinsic Religiosity (3 items from the Hoge, $\alpha = .75$). The COPE (21) is a series of items used to measure state or trait coping. In this study, only the subscale Turning to Religion to cope was used. The scale has 4 items and a high reliability ($\alpha = .92$). Finally, a face

valid question, "Do you believe in God?," was used to examine the validity of the Ironson–Woods SR Index.

Psychosocial measures. Perceived stress was measured by the Perceived Stress Scale (22,23), which measures "the degree to which situations in one's life are appraised as stressful" (22, p. 385). The State–Trait Anxiety Inventory (24), State version with 20 items was used for this study. The Beck Depression Inventory (25,26) 21-item version was given to participants as the measure of depression. The Beck Hopelessness Scale (27), a 20-item scale, was used to measure hopelessness. Optimism was measured by the Life Orientation Test (28). The measure of social support used was the ESSI (29). It is composed of 5 items with documented predictive validity in cardiovascular patients ($\alpha = .86$). The Cook Medley Hostility scale was derived from items from the Minnesota Multiphasic Personality Inventory (30,31).

Behaviors. Safe sex was measured by the answer to two questions ($\alpha = .88$) "Have you been practicing safe sex?" and "Have you been using condoms?" (answers were scored 0 = no, 1 = sometimes, and 2 = yes). (These questions were only used if a person answered yes to the question "Have you been sexually active in the last six months?") Adherence was measured by the AIDS Clinical Trials Group (ACTG) Questionnaire (32), which asks about medications prescribed and missed doses. This instrument was developed by the Adherence and Retention Subcommittee of the ACTG Outcomes Committee and has been used in at least nine clinical trials of combination therapy. The measure we used was the proportion of missed doses in the last 3 days. Telling partner your HIV status was determined by the answer to the interview question "Do your past and current partners know your HIV status?" (0 = no, 1 = some, and 2 = yes). Smoking was determined by a demographics question "How many packs of cigarettes do you smoke per day?" Finally, alcohol use was determined by the answer to the question "How much alcohol do you consume in a typical week?" The variable "helping others with HIV" was created from three items that related to helping others. As each of the three items were independently related to both group membership and Ironson–Woods SR Index total score, they were combined into one measure. The three items were subjected to a reliability analysis that yielded an alpha reliability coefficient of .62

Cortisol. Each participant collected urine for 15 hr (6:00 p.m.–9:00 a.m.) in plastic containers containing 1 g of sodium metabisulfate preservative. Fifteen-hr urines rather than 24-hr urines were used because compliance was much better among those who work, this collection time has been used in past stress research (33), and because it captures the most important time during which stress-related differences are observed (i.e., overnight). Participants were instructed to keep the urine refrigerated during the collection time. On delivery to the laboratory, the volume of urine was measured, and 10 mL of urine was collected in tubes and stored at -70°C until it was assayed. Urinary cortisol was determined by radioimmunoassay with Diagnostic

Products (Los Angeles) kits with 50 mL of a 500-mL sample extracted with 10 mL of dichloromethin. The 50 mL of urine was evaporated to dryness under nitrogen. I¹²⁵ (1 mL)-labeled cortisol was added to tubes coded with antibodies, incubated for 45 min, decanted, and quantified for 1 min with a gamma counter calibrated for I¹²⁵. Levels of cortisol in the sample were calculated with a standard calibration curve. Cortisol levels were expressed through a log₁₀ transformation of the value expressed as milligrams per 100 mL of urine. The log transformation was utilized to normalize the distribution.

Statistical Methodology

Selecting covariates. We performed analyses controlling for background variables on which the LTS and COMP groups differed: age, socioeconomic status (SES; education, employment, and income), and route of infection (straight sex vs. other route). Sex, a variable often related to religiousness, was not controlled for because the groups (LTS and COMP) were equivalent. To limit the loss in degrees of freedom, covariates were only retained if they contributed uniquely to the prediction of group membership (LTS vs. COMP). Because age and income did not contribute unique variance to the model, they were dropped as covariates. The remaining covariates (education, employment, and route of infection: heterosexual vs. other) were significantly related to both the Ironson–Woods SR Index ($-.13, p < .05$; $.15, p < .05$; $.16, p < .01$) and LTS status ($.18, p < .01$; $.17, p < .01$; $-.15, p < .05$; $n = 279$).

RESULTS

Characterization of the Sample: Demographics

The sample was diverse with good representation from different ethnic groups, sexes, and risk categories. As can be seen from Table 1, our sample was approximately 75% male, 25% female, 33% African American, and slightly less than 33% each White and Hispanic. There were no differences between the LTS group ($n = 79$) and the HIV-positive COMP group ($n = 200$) on sex, ethnicity, or sexual orientation, which was approximately 55% homosexual, 40% heterosexual, and 5% bisexual. There were significant differences on age and SES (education, employment, and income). The LTS group was significantly older by 3 years, $t(277) = -2.72, p < .05$; had more education, $\chi^2(3, N = 279) = 10.66, p < .02$, were more likely to be on disability and less likely to be working full time, employment $\chi^2(4, N = 279) = 24.02, p < .01$; and had a correspondingly lower income, $\chi^2(3, N = 279) = 10.41, p < .02$.

Medical Information

The LTS and COMP groups were comparable on CD4 number ($t = .69, ns$) and on viral load ($t = -1.34, ns$). The groups were also equivalent on past sexually transmitted diseases ($t = -.33$), averaging just over one, and did not differ on proportion of missed doses over the previous 3 days, a measure of adherence to medications ($t = -.33$). However, the groups did differ on prescribed medications, $\chi^2(3, N = 279) = 14.22, p < .01$, with more of the LTS group on PIs and more of

the COMP group not taking medication. This difference probably is a reflection of the entry criteria to the study: LTS members must have had a Category C symptom, whereas COMP group members must not have had a Category C symptom at entry. In terms of past drug use, the LTS group had used more hallucinogens, whereas the COMP group had used more cocaine and cannabis. For the group as a whole, roughly 50% acquired HIV by gay sex, 33% by heterosexual sex, and 5% by intravenous drug use. Acquisition by intravenous drug use was probably underrepresented in this sample because anyone with present drug dependence or any use in the last month was excluded. The two groups differed significantly in that a higher proportion of the COMP group acquired HIV by heterosexual sex, although a higher proportion of the LTS group acquired it by multiple means, $\chi^2(4, N = 279) = 14.73, p < .01$; both groups had approximately equal proportions acquiring HIV by gay sex.

Overall Religious or Spiritual Information

Background information was obtained during the interview on a number of questions relating to religiousness/spirituality. Participants were asked if they were spiritual, religious, both, or neither. Roughly 50% self-identified as spiritual and not religious, roughly 33% identified as both spiritual and religious, 8% identified as primarily religious, and 10% identified as neither. A large proportion (roughly 66%) reported a belief in God; however, another 25% reported being unsure of the existence of God. Approximately 66% believed in heaven or both heaven and hell, and a little more than 66% believed in an afterlife. In terms of organized religious background (religion in family of origin), participants were 37% Catholic, 19% Protestant, 19% Baptist, 5% Jewish, 6% no identification, and 14% other. There were no significant differences between the LTS and COMP groups on any of these background questions.

Ironson–Woods SR Index (Short Form)

The items on the short form of the Ironson–Woods SR Index together with the loadings (principal components with varimax rotation) on the factors to which each item pertains is presented in Table 2. Twenty-two items chosen from the longer 89-item form of the Ironson–Woods SR Index to reflect the composition of the longer scale were grouped a priori into seven conceptual groupings; these are presented in Table 2 (the a priori conceptual groupings are noted by the indented labels over each a priori grouping). For each item referring to their religious or spiritual beliefs and views, respondents were asked to indicate how strongly they agreed or disagreed with that statement by circling a number from 1 (*strongly disagree*) to 5 (*strongly agree*). As noted, the 22 items on the short form were given to 279 people with HIV infection (79 LTS and 200 COMP). The responses on the short form were subjected to a principal components factor analysis with a varimax rotation. The analysis yielded four factors with eigenvalues greater than 1.0, which together accounted for 73% of the variance (54.3, 8.1, 5.4, and 4.9%, respectively). The four factors were named Sense of Peace, Faith in God, Religious Behavior, and Compassionate

TABLE 1
Background Information

<i>Demographics</i>			<i>Medical Information</i>		
<i>Variable</i>	<i>LTS</i>	<i>COMP</i>	<i>Variable</i>	<i>LTS</i>	<i>COMP</i>
Sex			Immune measures		
Male	74.4%	72.4%	CD4#		
Female	25.3%	27.6%	<i>M</i>	276	300
Age*			<i>SD</i>	236.87	104.15
<i>M</i>	40.43	37.72	Viral load		
<i>SD</i>	7.76	8.52	<i>M</i>	73,277	45,464
Ethnicity			<i>SD</i>	150,555	121,812
White	31.6%	29.6%	Antiretroviral medication*		
African American	31.6%	36.2%	None	6.3%	19.5%
Hispanic	27.8%	29.6%	1 or no PI	2.5%	1.0%
Other	9.0%	4.5%	≥ 2, no PI	20.3%	30.5%
Education*			≥ 1, with PI	70.9%	49.0%
HS or less	6.3%	16.6%	Past STDs		
HS graduate	7.6%	16.7%	<i>M</i>	1.205	1.152
Some college/Trade	50.6%	39.9%	<i>SD</i>	1.28	1.18
College graduate	35.5%	26.8%	Medications doses missed in past 3 days		
Employment*			<i>M</i>	10.61%	8.80%
Full time	3.8%	17.6%	<i>SD</i>	0.23	0.21
Part time	11.4%	12.1%	History of drug use, abuse, or dependence*		
Unemployed	7.6%	16.6%	Sedatives	14.6%	22.7%
Disability	74.7%	44.7%	Cannabis*	43.7%	62.1%
Other	2.5%	9.0%	Cocaine*	29.2%	55.0%
Income*			Opioids	14.6%	16.7%
< \$5k/year	19.0%	30.5%	Hallucinogens*	23.2%	12.6%
\$5k–10k/year	48.1%	30.5%	Other drugs	20.2%	26.9%
\$10k–20k/year	22.8%	19.5%	History of alcohol abuse or dependence		
> \$20k/year	9.1%	12.0%	Abuse/Dependence	16.7%	26.9%
Sexual orientation			Route of infection*		
Homosexual	58.2%	54.0%	Gay/Bisexual sex	55.7%	53.3%
Heterosexual	35.4%	42.4%	Heterosexual sex	20.3%	36.2%
Other	6.3%	3.5%	IV drug use	5.1%	4.5%
			Multiple	11.4%	3.0%
			Other	7.6%	3.0%
<i>Religion and Spirituality Information</i>					
<i>Variable</i>	<i>LTS</i>	<i>COMP</i>	<i>Variable</i>	<i>LTS</i>	<i>COMP</i>
Belief in God			Belief in afterlife		
Yes	68.6%	70.9%	Yes	69.2%	71.7%
No	8.6%	3.9%	No	7.71%	9.0%
Unsure	22.9%	25.1%	Unsure	23.1%	19.3%
Belief in Heaven or Hell			Religious/Spiritual		
Heaven	27.6%	19.9%	Spiritual	43.8%	50.0%
Heaven and Hell	44.8%	41.0%	Religious	0.0%	10.7%
Neither	17.2%	16.7%	Both	43.8%	28.6%
Unsure	10.3%	22.4%	Neither	12.5%	10.7%

Note. LTS = long-term survivor group; COMP = comparison group; CD4 = T-helper/inducer cell counts/mm³; PI = protease inhibitor; STD = sexually transmitted disease; HS = high school; IV = intravenous; k = thousand.

*A significant difference between the groups was observed as indicated by either *t* test or chi-square test significant at $p < .1$.

TABLE 2

Items in Ironson–Woods Spirituality/Religiousness Scale With Loading on the Factor to Which Each Item Pertains

Factor 1: Sense of Peace	
Comfort, Strength, Meaning	
My beliefs give me a sense of peace.	.78
My beliefs help me to know everything will be fine.	.78
My beliefs give meaning to my life.	.76
My beliefs help me to be relaxed.	.69
Feeling a Connection, Less Alone	
My beliefs help me feel protected.	.80
My beliefs help me to feel I am not alone.	.78
My beliefs help me feel I have a relationship or a connection with a higher form of being.	.60
Existential/Afterlife	
My beliefs help me be less afraid of death.	.77
I believe my soul will live on in some form after my body dies.	.56
Factor 2: Faith in God	
View of God	
I believe God created all things in the universe.	.82
God will not turn his back on me no matter what I do.	.78
Somatic/Illness Recovery	
When I am ill, God gives me courage to cope with my illness.	.78
When I am ill, God will answer my prayers for a recovery.	.76
My beliefs are very influential in my recovery when I am ill.	.62
When I am ill, my faith gives me optimism that I will recover.	.57
Factor 3: Religious Behavior	
Religious Behavior	
I attend religious services.	.85
I participate in religious rituals.	.85
I pray or meditate to get in touch with God.	.58
I discuss my beliefs with others who share my belief.	.56
My beliefs give me a set of rules I must obey.	.49
Factor 4: Compassionate View of Others	
View of Others/Compassion for Others	
My beliefs teach me to help other people who are in need.	.86 (.85)
My beliefs help me feel compassion/love/respect for others.	.84 (.81)
I have a responsibility to help others. ^a	(.82)
My beliefs increase my acceptance and tolerance of others. ^a	(.71)
I feel I am connected to all humanity. ^a	(.68)

Note. Numbers in parentheses indicate factor loadings for Expanded Comparison subscale with resampled participants.

^aItems added after resampling of participants.

View of Others. Only 1 item had been misplaced by a priori assignment: “My beliefs help me to be relaxed” was originally derived from the somatic or illness recovery portion of the interview (9) but had a higher loading on the Sense of Peace factor. Although for the most part items loaded much higher on the fac-

tor to which they were assigned a priori, three items did not fall cleanly on one factor. The first of these, “I pray or meditate to get in touch with God,” loaded on both Factor 2 (.58 on Faith in God) and Factor 3 (.46 on Religious Behavior). It was retained on Religious Behavior because it fit better conceptually there and had a reasonably high item-to-total subscale correlation, although it makes sense that it loaded on both factors. Another item, “When I am ill my faith gives me optimism that I will recover,” loaded on both Factor 1 (.57 on Sense of Peace) and Factor 2 (.55 on Faith in God). It was retained on Factor 2 because conceptually it fit better with Faith in God and because it was derived from that portion of the interview that asked how participants’ beliefs influenced their recoveries. The third item, “My beliefs help me feel I have a relationship or a connection with a higher form of being,” loaded on both Factor 1 (.60 on Sense of Peace) and Factor 2 (.50 on Faith in God). It was retained on Factor 1 because of its higher loading and because it did not clearly fit better conceptually on either.

Four Factors: Items and Reliabilities

Peace I leave with you. ... Do not let your hearts be troubled and do not be afraid. (New International Version; John 14:27)

When [man's] soul is in peace, he is in peace, and then his soul is in God. In cold or in heat, in pleasure or in pain, in glory or disgrace, he is ever in Him. (Bhagavad Gita 6:7)

The first factor was labeled Sense of Peace. Other names considered for this factor were Serenity, Spiritual Comfort, Security, and Sense of Well-Being. One of the definitions of *peace* from Webster's dictionary (34) is “freedom from disquieting feelings and thoughts: serenity” (p. 516). This factor includes items from three a priori subscales: Comfort, Strength, Meaning; Feeling a Connection, Less Alone; and Existential/Afterlife. This factor contains notions that life has meaning and that everything will be all right. As can be seen in Table 2, factor loadings on the first factor were all above .56, and six of the nine items had primary loadings above .76. Except for the “connection” item mentioned in the previous paragraph, which loaded on two factors, the highest secondary loading was .33.

Now faith is being sure of what we hope for and certain of what we do not see. (Hebrews 11:1).

Faith gives the wisdom and grace of knowing that, however conditions and appearances may change, the trueness of life remains always unchanged. (The Teaching of Buddha)

You shall love the Lord your God with all your heart, and with all your soul, and with all your might. (Deuteronomy 6:5)

God is the source of your strength. (Psalm 68:29)

The second factor, Faith in God, was composed from two a priori subscales: View of God and Somatic (how God plays a

role in recovery). The lowest primary factor loading was .55, and four out of seven items had factor loadings above .76. Except for the faith item mentioned previously, all secondary loadings were below .37.

Pray continually ... give thanks in all circumstances. (1 Thessalonians 5:17, 18)

Observe the Sabbath day and keep it holy. (Deuteronomy 5:12)

The third factor, Religious Behavior, was defined by the two items with very high loadings: participating in religious rituals and attending religious services. As noted previously, the prayer item loaded on two factors. The remaining two items also loaded somewhat on other factors, although their highest loading was on Factor 3.

Deeds of kindness are equal in weight to all the commandments. (Talmud)

Finally, all of you, live in harmony with one another; be sympathetic; love as brothers; be compassionate and humble. (Peter 3:8)

Deal kindly with your parents and your kinsfolk, and the poor, as well with the neighbor near of kin as the neighbor not your kin. (Koran 4:36)

The final fourth factor, Factor 4, was labeled Compassionate View of Others. Although there were only two items on this factor, the alpha reliability was high (.88), and the items clearly had high loadings (> .84) on this factor and lower loadings (maximum = .32) on secondary factors.

Reliability

An overall total was also calculated (the sum of all 22 items). Alpha for the total was .96. Alphas for each of the factors were quite high as well: .94 for Sense of Peace, .93 for Faith in God, .85 for Religious Behavior, and .87 for Compassionate View of Others. Robinson, Shaver, and Wrightsman (35) noted that alphas of this size are considered "exemplary" (p. 12). Because the fourth factor only contained two items on the factor analysis, further data collection was done (described in the Expansion of Factor 4, Very Long Survival, and Additional Judgment Factor section). For completeness, the extra items added are listed in Table 2 followed by a superscript *a*, and their factor loadings are listed in parentheses.

Test-retest reliability calculated from initial assessment to the first assessment after the appearance of a Category C AIDS symptom (average of 18 months) for participants developing a Category C symptom ($n = 20$) was .88** for the total scale, .78** for Sense of Peace, .76** for Faith in God, .62* for Religious Behavior, and .54* for Compassionate View of Others. Robinson et al. (35) rated test-retest reliabilities of this size as excellent.

Convergent-Discriminant Validity and Correlation With Associated Variables

The Ironson-Woods SR Index total score and each of the four factors were correlated with the Hoge and Duke Religiosity scales and the Use of Religion to Cope subscale from the COPE (see Table 3). First, an omnibus test was done to control for overall error rate through the correlation of the Ironson-Woods SR Index Total score with a composite of the Hoge, Duke, and Cope-Religion; a significant correlation of .50** was obtained.

The Ironson-Woods SR Index total was significantly correlated with the Hoge Intrinsic scale, the Duke scale, and the Use of Religion to Cope separately as well. In all three cases, the most highly correlated factors from the Ironson-Woods SR Index with the other religion scales were Religious Behavior and Faith in God. (Note that through examination of the correlation between the Ironson-Woods SR Index and the subscales on the Duke scale, it became apparent that organized religion on the Duke was most related to religious behavior on the Ironson-Woods SR Index. Nonorganized religion on the Duke [private religious activities, e.g., prayer, meditation, or Bible study] was correlated much more evenly with the four factors on the Ironson-Woods SR Index.) Finally, the Intrinsic subscale on the Duke was most correlated with Religious Behavior on the Ironson-Woods SR Index. The Hoge Intrinsic subscale correlated most highly with Faith in God followed by Religious Behavior, Sense of Peace, and Compassionate View of Others. Belief in God was most highly correlated with Factor 2 (Faith in God) on the Ironson-Woods SR Index and next with Religious Behavior. Thus, Factors 2 (Faith in God) and 3 (Religious Behavior) appeared to be more closely associated with traditional measures of religiousness, including a belief in God, than did Factors 1 (Sense of Peace) and 4 (Compassionate View of Others).

Discriminant Validity and Associated Variables

The Ironson-Woods SR Index and its subscales were then correlated with other variables that religiousness/spirituality might be associated with both to determine discriminant validity and to determine what variables might serve as mediators between religiousness/spirituality and health (i.e., long survival). Convergent or discriminant validity was supported by the higher correlations of the Ironson-Woods SR Index with the three measures of religiousness noted previously as compared with correlations of the Ironson-Woods SR Index with other variables. Because of the large number of psychosocial measures (six), an omnibus test was done first to correlate the Ironson-Woods SR Index total score with a psychosocial composite score (the sum of all of the psychosocial measures), $r = -.31$, $p < .01$, which was then followed by a test of individual correlations. The Ironson-Woods SR Index did correlate significantly and fairly strongly with less distress (perceived stress, less affective distress [anxiety, depression], less physiologic stress [cortisol]), more hope (less hopelessness, more optimism), more social support (ESSI), better health behaviors (report of practicing safe sex, telling partner HIV status [Factor 4 only], and less smoking and drinking alcohol), and help-

TABLE 3
Correlations of Ironson–Woods Spirituality/Religiousness Index With Religious Measures, Psychosocial Measures, Health Behaviors, and Cortisol

Variable	Ironson–Woods Spirituality/Religiousness Index				Multiple R	Factors	
	Total	F1: Peace	F2: Faith	F3: Behavior			F4: Compassion
Religious Measures							
Hoge ^a	.66**	.47**	.67**	.61**	.44**	.71	2, 3
Duke ^a	.60**	.41**	.42**	.71**	.35**	.74	3
Organized Rel.	(.34*)	(.15)	(.18)	(.68**)	(.10)		
Non-organized Rel.	(.48**)	(.42**)	(.36*)	(.41**)	(.37*)		
Intrinsic	(.57**)	(.37*)	(.40**)	(.64**)	(.32*)		
COPE–Religion	.70**	.62**	.63**	.67**	.39**	.72	3, 1, 2
Belief in God	.27**	.19**	.33**	.27**	.00	.40	2, 4
Psychosocial measures							
Perceived stress	-.21**	-.28**	-.10	-.14**	-.16**	.34	1, 2
Hopelessness	-.45**	-.48**	-.40**	-.30**	-.21**	.49	1
Optimism	-.38**	-.43**	-.30**	-.25**	-.22**	.44	1
Anxiety	-.30**	-.36**	-.20**	-.23**	-.21**	.39	1, 2
Depression	-.29**	-.34**	-.21**	-.18**	-.16**	.35	1
Social support (ESSI)	.33**	.33**	.32**	.24**	.16*	.34	1
Behaviors							
Helping others	.24**	.21**	.17**	.28**	.32**	.37	4
Safe sex	.25**	.25**	.21*	.21*	.12	.29	1
Tell partner HIV+	.04	.01	.06	.01	.14*	.18	4
Smoking	-.44**	-.43**	-.53**	-.27**	.01	.59	2, 4
Drinking alcohol	-.24**	-.26**	-.22**	-.10	-.22**	.34	1
Biologic							
Cortisol	-.19*	-.27**	-.16*	-.14	-.13	.22	1

Note. Numbers in parentheses represent subscale correlations. F = factor; Hoge = Hoge Intrinsic Religious Motivation Scale; Duke = Duke Religion Index; Intrinsic = Intrinsic Religiosity; ESSI = Enhancing Recovery in Coronary Heart Disease Social Support Instrument.

^an = 49 for correlations between Ironson–Woods Spirituality/Religiousness Index, Hoge, and Duke. All other correlations, n = 279, except cortisol n = 179 and safe sex n = 160.

*p < .05. **p < .01.

ing others with HIV. The Ironson–Woods SR Index was not correlated significantly with medication adherence (not included in table). The unique contribution of each different factor is discussed later.

Differences Between the LTS and COMP Groups on Ironson–Woods SR Index and Religious Behaviors

Table 4 shows the comparison of the two groups (LTS and COMP) on the Ironson–Woods SR Index and on religious behaviors and addresses the question of whether the long survivors were higher on SR than the HIV-positive COMP group. The LTS group was significantly higher on total score (p = .02), Faith in God (p = .04), Ironson–Woods SR Index Religious Behavior (p = .01), and Compassionate View of Others (p = .02) on two-tailed tests and on Sense of Peace on a one-tailed test (p = .05). (We felt justified in using a one-tailed test because the direction of the hypothesis tested—namely, higher religiousness—would be related to longer survival and could be stated a priori based on the McCullough et al. [6] review.) We performed these analyses controlling for background variables on which the LTS and COMP groups differed: SES (education, employment) and route of infection

(straight sex vs. other route). The groups were also compared on the frequency (in the last month) of religious behaviors (praying, meditating, and going to services). The LTS group was significantly higher on the frequency of these reported behaviors. A post hoc analysis of each behavior separately showed the LTS group was significantly higher than the COMP group on reported prayer (23.54 vs. 18.94; partial r = .15; t = 2.37, p = .02). There was a nonsignificant trend for meditating (14.94 vs. 11.14, p = .15) and attending services (5.14 vs. 2.82; t = 1.81, p = .07, two-tailed, significant on a one-tailed test at p = .035). The remainder of Table 4 is covered in the Expansion of Factor 4, Very Long Survival, and Additional Judgment Factor section.

Consideration of Mediators

Next, mediators of the relation between the Ironson–Woods SR Index and long survival (i.e., group membership, LTS vs. COMP) were explored with regression analysis as detailed by Baron and Kenny (36). We previously hypothesized that mediators for long survival might be due to physiologic protection (i.e., low cortisol and those psychological states that might be expected to be related to reductions in stress hormones) or changes in health-related behaviors (adherence to medications,

TABLE 4
Means and Standard Deviations for LTS^a and COMP^b Groups on Ironson–Woods Spirituality/Religiousness Index and Specific Reported Religious/Spiritual Behaviors

	No. of Items	LTS	COMP	<i>t</i> ^c	<i>p</i>
Index total	22			–2.43*	.02
<i>M</i>		89.33	84.04		
(<i>SD</i>)		(19.38)	(20.77)		
Factor 1: Sense of Peace	9			–1.67	.05 ^d
<i>M</i>		37.50	35.78		
(<i>SD</i>)		(7.63)	(9.35)		
Factor 2: Faith in God	6			–2.07*	.04
<i>M</i>		29.63	23.64		
(<i>SD</i>)		(6.63)	(6.75)		
Factor 3: Religious Behavior	5			–2.81**	.01
<i>M</i>		17.91	15.94		
(<i>SD</i>)		(5.80)	(6.00)		
Factor 4 (short): Compassionate View of Others	2			–2.36*	.02
<i>M</i>		9.19	8.69		
(<i>SD</i>)		(1.49)	(1.78)		
Factor 4 (long): Compassionate View of Others ^e	5			–2.08*	.04
<i>M</i>		22.10	19.89		
(<i>SD</i>)		(2.97)	(4.31)		
Reported religious behaviors last month ^f	3			–2.13*	.04
<i>M</i>		44.33	32.77		
(<i>SD</i>)		(41.36)	(35.67)		

Note. LTS = long-term survivor group; COMP = comparison group.

^a*n* = 79. ^b*n* = 200. ^cControlling for background variables (education, employment, route of infection). ^dOne-tailed test (all others are two-tailed). ^eData from the very-long-term survivor subsample (*n* = 21) and the COMP subsample (*n* = 49) obtained 1 to 3 years later (October–November 2000). ^fPrayer/meditation/services.

safe sex, smoking, and alcohol use). We also considered as mediators measures of variables related to proposed benefits of spiritual and religious beliefs outlined by Covey (16). These included social support; avoidance of drugs, cigarettes, and alcohol; and reasons to be of service and to help others. The first prerequisite for consideration as a mediator was that the mediator had to be related to both the predictor (in this case, the Ironson–Woods SR Index) and to the outcome (long survival operationalized as group membership: LTS = 1 vs. COMP = 0). Table 3 lists 12 of the variables (psychosocial measures, behaviors, and cortisol) included as part of the examination of convergent or discriminant validity. These 12 variables were also considered as potential mediators. Of the 10 variables significantly related to the Ironson–Woods SR Index, only 3 were also significantly related to long survival. Thus, only 3 variables (urinary cortisol concentration, helping others with HIV, and optimism) were significantly correlated with both long survivor status (LTS vs. COMP group membership) and total score on the Ironson–Woods SR Index and therefore were examined as putative mediators of that relation (see Figure 1).

After it is determined that a mediator is significantly related both to the predictor (Ironson–Woods SR Index) and the dependent variable (long survival status), there is the final test of a mediator: When the independent variable (Ironson–Woods SR Index) and the mediator are both in the regression equation predicting the dependent variable (long survival), the independent

variable (Ironson–Woods SR Index) is no longer significant (36). When group membership was regressed on cortisol concentration and the Ironson–Woods SR Index, the relation between the Ironson–Woods SR Index and group membership became nonsignificant, $t(176) = .21, p > .05$, and the relation between cortisol and group membership maintained its significance, $t(176) = -2.36, p < .05$. Therefore, cortisol was a mediator. When group membership was regressed on both helping others with HIV and the Ironson–Woods SR Index total score, the direct relation between Ironson–Woods SR Index and group membership was no longer significant, $t(276) = 1.10, p > .05$, and the significance of the relation between helping others with HIV and group membership was maintained, $t(276) = 3.51, p < .01$. Therefore, helping others with HIV also met the criteria for a mediator. When group membership was regressed on optimism and Ironson–Woods SR Index total score, the direct relation between the Ironson–Woods SR Index and long survival status was no longer significant, $t(223) = 1.79, .05 < p < .10$, but the relation between optimism and group membership was also no longer significant, $t(223) = 1.31, p > .05$. Consequently, optimism did not meet the criteria for mediation.

We repeated the previous analyses controlling for background variables (SES [education and employment] and route of infection) on which the groups differed significantly (see Methods section, Statistical Methodology: Selecting Covariates). Measures of the direct relation between the

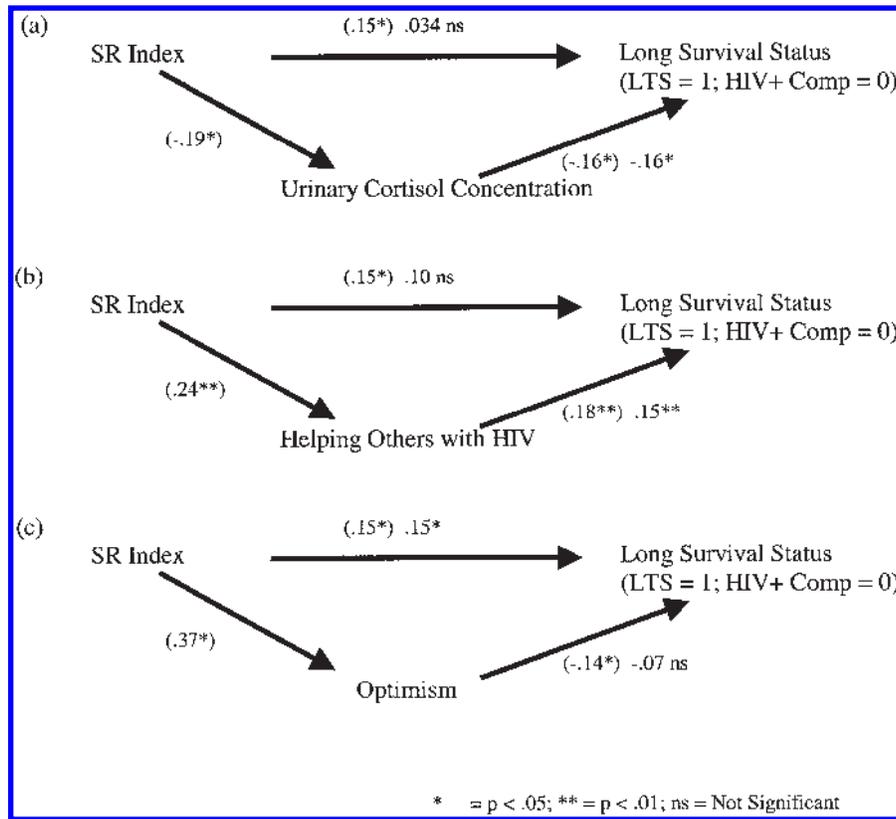


FIGURE 1 (a) Cortisol, (b) helping others, and (c) optimism as mediators of the relationship between spirituality and long survivor status (i.e., long-term survivor [LTS] group or the HIV-positive comparison [Comp] group) when significant background variables (education, employment, and route of infection) were controlled.

The numbers in parentheses are partial correlations indicating the unique contribution of the independent and mediator variables when the variance associated with background variables has been removed. The numbers outside parentheses are standardized Beta coefficients in the model with Long Survival (Group Membership LTS vs. Comp) as the dependent variable and spirituality and the respective mediator as the independent variables.

Ironson–Woods SR Index and group membership were provided with the standardized beta coefficients from the regression equation when the control variables (education, employment, and route of infection) were entered as the first block and the Ironson–Woods SR Index was entered as the second block. The significance of the direct relation between the Ironson–Woods SR Index and group membership was maintained, $t(272) = 2.43, p < .05$. Similarly, the significance of the relations between the mediators and group membership was also maintained for cortisol, $t(174) = -2.33, p < .05$, helping others with HIV, $t(272) = 3.09, p < .01$, and optimism, $t(220) = 2.14, p < .05$.

For the final test of mediation, the standardized beta coefficients were calculated separately when group membership was regressed on the socioeconomic and route of infection variables, the Ironson–Woods SR Index, and the respective mediator variable. Urinary cortisol met the criteria for mediation as the direct relation between the Ironson–Woods SR Index and group membership was no longer significant, $t(174) = .46, p > .05$, and the significance of the relation between cortisol and group membership was maintained, $t(174) = -2.33, p < .05$. Similarly, helping others with HIV also met the criteria for mediation; the direct relation between the Ironson–Woods SR Index and group membership was no longer significant, $t(271) = 1.07, p > .05$, and the relation

between helping others with HIV and group membership maintained its significance, $t(272) = 3.09, p < .01$. Optimism failed to meet the requirements for mediation. When group membership was regressed on the demographic and medical variables, optimism, and the Ironson–Woods SR Index, the direct relation between the Ironson–Woods SR Index and group membership was maintained, $t(219) = 2.18, p < .05$, and the relation between optimism and group membership was no longer significant, $t(220) = 1.08, p > .05$. The results of these analyses confirmed that both urinary cortisol concentration and helping others with HIV mediated the relation between the Ironson–Woods SR Index total score and group membership. It was not possible to specify the directionality of these findings.

Expansion of Factor 4, Very Long Survival, and Additional Judgment Factor

Because the factor analysis showed a fourth factor (Compassionate View of Others) with only 2 items, the items relevant to a view of others from the long Ironson–Woods SR Index were given to a subsample of LTS and COMP groups who could be relocated in October 2000. This was roughly 3.5 years after the initial administration, which began in February 1997. There were

13 items on the long Ironson–Woods SR Index Compassionate View of Others scale and an additional 8 items relevant to a view of others. To do a factor analysis on 21 items, we reasoned that we needed a minimum of 70 people (roughly 3.5 times the number of items). We contacted as many of the original LTS participants as we could ($n = 21$) and 49 members of the COMP group to fill out the longer questionnaire. (The recontacted LTS participants are referred to as very-long-term survivors [VLTSSs] because the timing represented an average of 3 years [38.6 months] after the original assessment, so they were now all at least 7 years past their initial opportunistic infection or neoplasm.) We expanded the original 2-item Compassionate View of Others scale to 5 items by choosing items with high item-to-total correlations. Because the 2 items were also both heavily endorsed and high on social desirability, an additional consideration was to add items with lower means to maintain reliability and increase variability. The difference between the LTS and the COMP groups on the 5-item measure was then retested with the VLTS ($n = 21$) versus COMP ($n = 49$) group comparison and found to maintain its significance ($t = -2.08, p = .04$; see Table 4). The factor analysis of the 21 items revealed a strong first factor explaining 39% of the variance and a second factor explaining 11% of the variance. The first factor corresponded to Compassionate View of Others; the factor loadings for the 5-item scale with the new 3 items are presented in Table 2.

“Judge not lest ye be judged” (*Matthew 7:1*). The second factor was named Judgmental. The Judgmental items were as follows, with their respective factor loadings: “Some people will go to hell when this life is over” (.83), “Only those who believe what I believe will go to heaven when they die” (.85), and “God will condemn those who do wrong someday” (.83). This factor was also significantly related to long survival in a negative direction; respective means for the VLTS and COMP groups were 6.14 ($SD = 3.28$) and 8.57 ($SD = 3.52$); $t = 2.67, p = .01$. Thus, the VLTS group was significantly lower on being judgmental than the HIV-positive COMP group. The Judgmental factor had good internal consistency ($\alpha = .82$). Interestingly, the factors (Compassionate View of Others and Judgmental) were not correlated ($r = -.05$), indicating it is possible to be compassionate toward some people and condemning and judgmental of others. Of additional interest, the Judgmental factor was highly correlated with hostility ($r = .49, p < .01, n = 70$), whereas Compassionate View of Others was negatively correlated with hostility ($r = -.14, ns$).

An additional item from the long form of the Ironson–Woods SR Index was also related to judgment, but judgment of self rather than of others. This item reads, “God will judge me harshly one day.” Its correlation with the three-item Judgmental scale was .58. Adding this statement to the three-item scale resulted in a four-item Judgmental scale with an alpha of .83. This four-item Judgmental factor was also significantly related to long survival in a negative direction; respective means for the VLTS and COMP groups were 8.38 ($SD = 4.80$) and 10.96 ($SD = 4.38$), $t = 2.17, p = .03$. Thus, religiously based harsh self-judgment may also have negative health consequences.

Which Comes First: The Chicken or the Egg?

Are people who are more spiritual or religious more likely to become long survivors, or do people become more religious when they get sick? Because the data presented are cross-sectional in nature, one might raise the question as to whether when one develops a serious AIDS symptom (i.e., Category C), one becomes more religious. (Recall our long survivors all had a Category C symptom, whereas none of the COMP group did.) This question can only be answered longitudinally. Fortunately, the COMP group is being followed longitudinally. Twenty-two of the 200 people in the COMP group (who initially had no past or present Category C symptoms) did develop Category C symptoms over the course of the study. We have post-Category-C data on 20 of these people. There was no significant change from initial assessment to the post-Category-C assessment for the total Ironson–Woods SR Index score ($t = -.61, ns$) or the Sense of Peace ($t = -.66, ns$), Faith in God ($t = -.39, ns$), Religious Behavior ($t = -.34, ns$), or Compassionate View of others ($t = -.72, ns$) subscales. Thus, it is not likely that the major findings of higher Ironson–Woods SR Index and its factors (Faith in God, Religious Behavior, and Compassionate View of Others on two-tailed tests and Sense of Peace on a one-tailed test) were due to changes in participants after they got sick.

Are Four Separate Factors Necessary on the Ironson–Woods SR Index?

Two factors capture spirituality (Sense of Peace and Compassionate View of Others), and two factors capture religiousness in the more traditional sense (Faith in God and Religious Behavior). In addition, one of the religious factors is more private (Faith in God), whereas the other (Religious Behavior) is more public, and both of the other factors (Sense of Peace and Compassionate View of Others) can be viewed as more private and relevant for people high in either spirituality or religiousness. In addition to content differences, differences in relevance to spiritual or more traditionally religious orientations, and differences in private versus public orientation, the factors are also related uniquely to different outcomes. Factor 1 (Sense of Peace) is the factor most strongly related to physiologic stress (low cortisol), affective distress (perceived stress, anxiety), and hope (optimism, hopelessness). Factor 2 (Faith in God) is most strongly related to a traditional belief in God and is also related to less distress, more hope, lower cortisol (although less strongly than Factor 1 but through a more traditional religious orientation) and long survival. Factor 3 (Religious Behavior) is most strongly traditionally religious and is significantly related to long survival. Factor 4 (Compassionate View of Others), a dimension that can be regarded as relevant to being either spiritual or religious, is significantly related to long survival (and to very long survival) and is most strongly related to helping others and to telling one’s partner of one’s HIV status.

The same pattern of factors being related to outcomes is reflected in the Regression Factors column of Table 3. We obtained a forward regression for each outcome, adding in only those factors contributing significantly to the model. What is most striking about the data is that in 9 of 12 psychological and health out-

comes, Factor 1 (Sense of Peace) was the first factor entered. A second interesting observation is that religious behavior did not contribute uniquely to the relation with outcomes when the other factors (Sense of Peace, Faith in God, and Compassionate View of Others) were present. However, this analysis was repeated for long survival status (data from Table 4). Here, the factors contributing significantly to the model were Factors 3 (Religious Behavior) and 4 (Compassionate View of Others).

Next, a series of regression analyses were conducted to determine if the individual factors added any variance over the total score. In 12 of the 16 regressions, the individual factors added significant variance over what was explained by the total Ironson–Woods SR Index score alone (compare the Multiple *R* column in Table 3 to the Total column to estimate the size of the effect). (No variance was added for social support, safe sex, drinking alcohol, or cortisol.) Thus, the individual factors did contribute, but for many variables, the total Ironson–Woods SR Index captured most of the variance.

Is Asking About Religious Behavior Alone Sufficient?

Another question that arises from the literature is whether asking about religious behavior alone is sufficient (6,8). For the 12 psychosocial, behavioral, and physiologic (cortisol) variables in Table 3, regressions were done to determine whether the three other factors (Factors 1, 2, and 4) added beyond religious behavior in the prediction of the 12 variables. For 9 of the 12 regressions, at least one factor added to religious behavior, and in 8 of these it was Factor 1 (Sense of Peace). Thus, asking about religious behavior alone left out significant variance, and that variance particularly seemed to be related to the sense of peace with which spiritual or religious beliefs may be associated.

Are the Benefits of Religious Behavior Accounted for by Social Support?

One might hypothesize that attending services and participating in the activities of a religious community could be associated with more social support than private aspects of spirituality (peace, faith, compassion). To test whether the religious behavior–health relations might be driven by social support, we examined the association of Religious Behavior with the 12 outcomes in Table 3 controlling for social support. Most (6 of the 8 that were significant before, not including social support) of these relations were not driven by social support (i.e., they remained significant when social support was controlled; partial *r*s = $-.25^{**}$ for hopelessness, $-.19^{**}$ for optimism, $-.16^{*}$ for anxiety, $.25^{**}$ for helping others, $.19^{*}$ for safe sex, and $-.24$ for smoking). Only perceived stress ($-.07$, *ns*) and depression ($-.11$, *ns*) were driven at least partially by social support. In addition, the relation between Religious Behavior and long survival remained significant when social support (partial *r* = $.17^{**}$) was controlled. Thus, the social support associated with religious behavior may help people to be less distressed, but social support associated with religious behavior does not appear to drive most of the religious behavior–health relations studied.

DISCUSSION

One main purpose of the study was to attempt to develop a measure that would capture both spirituality and religiousness and that would include both private and public aspects of spirituality and religiousness. The four dimensions appear conceptually and statistically to achieve this objective. Of the four separate factors on the Ironson–Woods SR Index instrument, two capture aspects of spirituality and/or religiousness (Sense of Peace and Compassionate View of Others) and two capture aspects of religiousness in the more traditional sense (Faith in God, Religious Behavior). In addition, one of the religious factors is more private (Faith in God), whereas the other (Religious Behavior) is more public, and both of the other factors (Sense of Peace, Compassionate View of Others) can be viewed as private and are relevant for those who might consider themselves both spiritual and religious.

Our finding that long survivors were significantly higher than the HIV-positive COMP group on religious behavior is very consistent with prior reviews of the literature. However, our study extended this finding to an AIDS population (6) and to factors other than religious behavior alone. This prior literature has looked at the religion–mortality association primarily in healthy, community-dwelling populations. Thus, those with private religious or spiritual feelings, such as faith or compassion for others, also had an associated long survival. In addition, having a sense of peace was strongly related to (lower) cortisol, suggesting that physiologic benefits might accrue from beliefs that are not necessarily a part of any organized religion. Thus, health benefits might come from both organized and nonorganized spiritual or religious beliefs and behaviors.

In regard to the question raised by the McCullough et al. (6) meta-analytic review, “Is it the positive psychological states that may be fostered by more private forms of worship or measures of public religious involvement that provide the protective health effects?,” our answer may be “both.” In particular, peace was associated with both more positive psychological states (optimism, lower hopelessness, less distress and anxiety) and with lower cortisol (and with long survival on a one-tailed test). Faith was also associated with more positive psychological states, lower cortisol, and long survival. Public religious involvement was associated with both long survival and one of the mediators (i.e., helping others). In conclusion, our correlations, the regression analyses, and the analysis of mean differences between the long survivors and the COMP group made it clear that much is added by the measurement of other factors besides religious behavior alone and that protective effects on health are associated with other dimensions of religiousness/spirituality besides religious behavior. This is particularly noteworthy because many prior studies have used a single-item measure of church attendance.

Another related question from the literature raises the question of whether social support (i.e., a behavioral aspect of religiousness) versus non-social-support-related religiousness/spirituality (e.g., faith) is a critical component of the longevity or health outcomes. If social support were a critical component of religious or spiritual effects on health, one would expect the more private aspects of religion (faith) not to relate to health,

whereas the more public aspect would. The observation that both public and private aspects of religion relate equally strongly suggests that the religion–health effects are not primarily accounted for by social support. Our additional analysis, showing that the religious behavior–health (long survival and other outcomes) association remained significant even when social support was controlled, lends further support to the notion that religious or spiritual effects on health do not appear to be driven primarily by social support. However, our analyses also showed that the social support associated with religious behavior may help people to be less distressed.

How might greater religiousness/spirituality be affecting health in those with HIV? We explored a number of possible mediators. Only three were related to both religiousness/spirituality and long survival status: cortisol, helping others with HIV, and optimism. The strongest support was found for low cortisol and helping others as links between religiousness/spirituality and long survival. This link is supported by literature showing that cortisol, a neurohormone associated with stress, enhances the ability of HIV to infect normal human lymphocytes (37) and is also associated with down-regulation of the immune system (38,39). The second mediator, helping others with HIV, is very consistent with literature showing that both strength and comfort from religion and social participation are associated with health outcomes (40). The combination of social participation and religious comfort may be a particularly potent one, especially for people with HIV who are often stigmatized and may have to redefine new social networks and “families.” Helping others with HIV/AIDS may get one involved in a network of supportive people where one is accepted for who one is. There are many studies supporting an association between social support and better health outcomes. Religion may also provide another route for increased social participation because religious coping is frequent among people with HIV (41). Finally, although optimism was significantly related to both SR and long survival status, it did not meet the statistical criteria for a mediator. Additionally, hostility remains a potential mediator (negatively) to be investigated by future studies. In our sample, harsh judgment was significantly correlated both with long survival (negatively) and higher hostility. A similar construct, punishing God reappraisals, was found to be associated with poorer adjustment in another sample (42). Furthermore, although hostility was not directly (negatively) related to long survival, we previously showed that in those with distressing life events, high hostility was longitudinally (over 6 months) related to faster disease progression (greater decline in CD4 cells and greater increase in viral load [43]). Thus, hostility does remain a viable candidate for a mediator, and both this variable and the others should continue to be considered and tested as mediators in longitudinal studies.

Beyond hostility is the related Judgmental factor, through which religion, perhaps better termed in this case *religiosity*, may be negatively associated with health outcomes. Others have identified negative mental and physical health consequences of some aspects of religion. Schumaker (44) listed 10 ways in which religion can be deleterious to mental health—for example, by encouraging guilt or self-denigration. Negative religious coping has

been defined as seeing a crisis as punishment from God or as calling into question God’s power or love (42). Such negative effects of religion on attitudes and affect, particularly guilt and shame, may be especially applicable to persons with HIV/AIDS. It has been documented that a minority of ministers, generally those older and less well educated, believe that AIDS is a punishment from God and that people with AIDS deserve their illness (12). Correspondingly, 17% of an AIDS population felt that the illness represented punishment from God (41). Thus, our finding of a negative association between religion-based judgmentalness and survival is in concert with other observations of potentially negative health effects of aspects of religion.

A key question in this research was whether people who survived longer were more religious to begin with or whether they became more religious when they got sick (the chicken-or-the-egg question). Fortunately, we had a small group of people whom we were able to ask about their religiousness/spirituality before and after getting sick with a serious AIDS symptom. It is not likely that the major findings of higher religiousness/spirituality being associated with long survival was due to changes in these variables after sickness appeared because, in our sample, no factors changed (increased) after sickness (a Category C symptom) appeared. However, in view of the importance of this question, Gail Ironson and David Larson recontacted the LTS participants and the next 20 people in the COMP group being seen as part of a longitudinal study and asked them to fill out questionnaires assessing their religiousness and spirituality at different times in their lives, including the year before they found out they were HIV positive, the year after they became HIV positive, and the years before and after they were diagnosed with AIDS (on a scale of 1 to 10, where 1 represents *not religious/spiritual at all* and 10 represents *very religious/spiritual*). Our preliminary data ($n_s = 23$ and 20 for the LTS and COMP groups, respectively) showed that the LTS group was more religious or spiritual than the COMP group in the year before contracting HIV ($M_s = 5.8$ and 3.7 for the LTS and COMP groups, respectively; $t = -2.27, p = .03$). In addition, only the LTS group increased significantly in religiousness in the year after becoming HIV positive ($M_s = 7.2$ and 4.3 for the LTS and COMP groups, respectively; $t = -3.09, p = .01$; increase for LTS, $t = -3.30, p = .01$; change for COMP, $t = -.74, ns$). No further change occurred in the LTS group after getting AIDS ($M = 7.1, t = .83, ns$). The two findings (prospectively showing there was not an increase in religiousness after an AIDS-defining Category C symptom and the retrospective finding just noted) together suggest the big increase in religiousness/spirituality may come in the year after finding out one is HIV positive rather than after the appearance of a Category C AIDS-defining symptom. So the preliminary answer is “both”; the long survivors were more religious to begin with, and they became more religious when they discovered they had a serious illness (HIV). Future research is certainly needed in this area, particularly because it may represent a time when interventions may be helpful to facilitate a turn to religion as a source of comfort.

Another time when people may turn to spirituality and religion relevant to HIV is during bereavement. Folkman and col-

leagues (45) found that spirituality increased in 77% of a caretaking cohort after the loss of a partner from AIDS. These participants' spiritual beliefs and experiences provided emotional and cognitive resources for coping with the high levels of distress associated with the loss.

Religious institutions might be a particularly good venue to engage low-SES people where they can be reached. Low SES has long been associated with poorer health (46). Confirming this, in this study, higher education was related to long survival. However, lower education was related to higher religiosity. Taken together, these findings suggest that religion is one factor that low-SES people may use that is protective of their health. Religious settings may be a place to reach low-SES people to have a positive protective impact on their health.

Further Issues and Limitations

There are a number of limitations to this study. First, we had to select a small number of 22 items from the longer Ironson–Woods SR Index (17), which has 89 items, to give to our original sample due to practical considerations (participant burden). Therefore, although the four subscales, which were derived, are correlated with both psychological and physical health outcomes, they may not cover the gamut of dimensions of the complex concept of religiousness/spirituality (see 9 for a more complete description). As we noted, further work with a subset of 21 items from the 89-item version having to do with compassion for others and view of others uncovered another dimension (Judgmental). When a large enough sample is obtained with the full 89 items, more dimensions may be discovered. Second, although we included the Hoge (18) and Koenig, Meador, and Parkerson (19) scales for cross-validation purposes, many other scales could not be included, partly due to practical considerations (i.e., participant burden or scale not available at time our study began in 1996). These include (but are not limited to) two that may be of particular interest in health psychology: Pargament's scale measuring methods of religious coping (42) and the Daily Spiritual Experience Scale developed by a Fetzer–National Institute on Aging effort (47). The similarities and differences between our scale and these scales and concurrence in outcomes prediction could be a topic for future research.

A third limitation of this study is that cross-sectional data (i.e., cross-group comparison of the LTS vs. COMP groups) do not lend themselves to statements about causality. Thus, psychosocial factors (e.g., optimism) that might influence survival could also shape the responses on the spirituality questionnaire. Those psychosocial variables could be the drivers rather than the results of the levels of SR. Similarly, a fourth limitation is that in an attempt to determine whether people become more spiritual or religious as a result of the illness or whether more spiritual or religious people are more likely to stay healthy, we used a combination of retrospective and prospective reporting. Retrospective reporting is subject to obvious possible biases as subsequent events may shape the participant's memory. Prospective reporting is much sounder but harder to do.

A fifth limitation of the study is that these results are limited to the HIV population. It is important to note that the questions

for the instrument were developed from interviews with HIV, cancer, and cardiac patients (9,17) and, therefore, are seen as relevant to other health populations as well. However, whether our findings with the HIV population extend to other health populations remain for future studies to determine. Although there are important differences between the populations (e.g., in terms of religiousness/spirituality, the AIDS population is more alienated from traditional religion than cancer or cardiac patients [9]), we hypothesize that similar relations would be found for other health groups as well and are currently testing this in a cancer population. A final limitation is that we could not examine all possible explanations for a religion–health relation. Although individuals may hope divine intervention is possible, the effects of social support, dietary practices, and the possibility that healthier people are better able to attend religious services need to be ruled out as alternative explanations.

Finally, it is noteworthy that dimensions of religiousness/spirituality are related not just to long survival but to a large number of beneficial psychosocial measures (distress, hope, optimism, less anxiety), beneficial behaviors (safe sex, less use of alcohol, less smoking, more willingness to tell partner of HIV status), and physiology (less cortisol). Future research should look at how and under what conditions inner transformation toward increased religiousness/spirituality occurs. Such research can also address further the question of how becoming more responsible (e.g., safe sex, less use of drugs or alcohol), being more compassionate and optimistic, and feeling more at peace may be associated with improved health. The occurrence of a major medical illness such as HIV may represent a time when people, thinking about their own mortality, may turn to religion for comfort. It may also represent a potential time for change to occur.

In conclusion, both religiousness and spirituality, although rarely assessed, remain an important force in the lives of those with HIV, regardless of many of these people having been rejected by traditional religion. They still remain religious or spiritual, and this religiousness/spirituality is related to a number of beneficial outcomes including less affective distress, lower cortisol, and long survival.

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