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Spiritual Health Locus of Control and Health Behaviors in African Americans

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Abstract

Objective—To examine relationships between spiritual health locus of control beliefs and various health behaviors.

Methods—A cross-sectional survey of a national sample of African Americans assessed spiritual beliefs, fruit and vegetable consumption, physical activity, and alcohol consumption.

Results—Active spiritual beliefs were positively associated with fruit consumption and negatively associated with alcohol consumption. Passive spiritual beliefs were associated with lower vegetable and increased alcohol consumption. Among male participants, passive spiritual beliefs were associated with higher alcohol consumption.

Conclusions—Findings suggest that dimensions of spiritual health locus of control beliefs have complex and varying relationships with health behaviors.

Keywords

spirituality; spiritual health locus of control; African Americans; health behaviors

In an attempt to understand the psychological processes underlying health behaviors, health locus of control has been a popular construct among researchers. Health locus of control involves attributions about the various factors that individuals believe control their health outcomes.[1] Individuals with high internal health locus of control believe that they control their health outcomes through their behaviors. For example, recovering addicts who have high internal locus of control believe that they can control their addictive behavior.[2] Recovering addicts who hold external locus of control beliefs may believe that fate predetermined their disease of addiction.

Several instruments have been developed to assess such health locus of control beliefs.[1,3-5] The Health Locus of Control Scale was developed by Wallston and colleagues[5] and later

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followed by the Multidimensional Health Locus of Control Scales (MHLC)[1] to examine multiple dimensions of this construct (eg, internal, external-chance, external-powerful others). The MHLC was used to examine the relationship between health locus of control and perceived risk for breast cancer among women.[6] Results showed that women high in internal health locus of control beliefs were more likely than women high in external health locus of control beliefs to believe that they could control whether or not they developed breast cancer. The MHLC has also been shown to be predictive of other health-related behaviors and outcomes (eg, colorectal screening, smoking, and excess drinking).[1,6-9]

Health Locus of control beliefs Attributed to a Higher Power

Research has revealed that there are additional locus of control beliefs that may be relevant for diverse populations.[10] One type in particular is control attributed to a higher power or, for some populations, God.[11] Thus, in addition to internal, external-chance, and external-powerful others (ie, doctors or health professionals) operationalized in the MHLC, health locus of control beliefs could involve a belief that a higher power (eg, God, Allah, or other spiritual being) controls an individual's health outcomes. Spiritual health locus of control and God locus of health control concepts are being used to understand such perceived sources of health control.[10-13] These constructs may be relevant for particular populations such as those high in religiosity/spirituality.

As an expansion to the MHLC, Wallston and colleagues developed the God Locus of Health Control Scale. The God Locus of Health Control Scale measures “the extent of the belief that God exerts control over one's current disease state.”[11] The God Locus of Health Control Scale has been used to determine the strength of an individual's belief that God controls his or her health status. The God Locus of Health Control Scale has been used in several studies that seek to understand the relationship between beliefs about God's control over health and individual health practices.[13-15] Kinney and colleagues[14] used the God Locus of Health Control Scale to examine the relationship between breast cancer screening behaviors and beliefs about God as a controlling force in health. Results showed that women who scored high on the God Locus of Health Control Scale were less likely than women with low scores to adhere to clinical breast examination and mammography recommendations.

Similar to the God locus of control concept, the spiritual health locus of control construct reflects the belief that a higher power has control over one's health.[10] This construct is proposed to include both an “Active” and a “Passive” dimension. In the active dimension, one may believe that a higher being empowers a person to be proactive about health behaviors or that one works in partnership with a higher power to stay in good health. The passive dimension consists of a belief that because only a higher power is in control of health outcomes, there is no reason to engage in health behaviors. The spiritual health locus of control construct was used in the current study to investigate how one's beliefs about a higher power may relate to a variety of health-related behaviors.

Items from the spiritual health locus of control scale were previously used to investigate the relationship with breast cancer risk reduction behaviors among African American women.[16] Overweight or obese women were randomized to an integrated weight-loss/breast health intervention. The study showed African American women who hold active spiritual health locus of control beliefs were less likely than African American women who hold passive spiritual health locus of control beliefs to report making a greater change in dietary fat intake, physical activity, weight, and body mass index (BMI) after the 12-week intervention.

Terminology

We recognize the extensive debate in the literature as to definitions of religiosity and spirituality and the disagreement as to their relative meanings. The constructs have been referred to as "distinguishable yet overlapping."[17] *Religiosity* has been defined as "an organized system of beliefs, practices, rituals, and symbols," and spirituality may be characterized as "one's transcendent relationship to some form of higher power."[18] The spiritual health locus of control construct is not a direct assessment of either religiosity or spirituality. The present work contains references in survey items to a higher power (eg, God). Wishing to remain consistent with previous research with the spiritual health locus of control construct[10,19] and recognizing that the communities with which we work often recognize the term spirituality rather than religiosity,[20] we will use the term *spiritual* when referring to the construct. We will employ the term *spirituality/religiosity* in general discussions involving these constructs.

The Present Study

Research suggests a relationship between spirituality and health, which may operate through specific behaviors and beliefs like spiritual health locus of control.[21-23] The role of a higher power in health outcomes may be particularly salient for certain health behaviors and among specific populations such as those high in spirituality/religiosity, including African Americans.[10] The importance of spirituality/religiosity in the African American community is well documented.[24-26] The majority of African Americans attend religious services regularly, and older African Americans consider church a major source of social support and activity.[24] Accordingly, research has linked spirituality/religiosity with health-related behaviors and outcomes, as evidenced by an exhaustive literature review.[23] In addition, research suggests that African American women are more religiously involved than are their male counterparts.[27,28] Therefore, the associations between spirituality/religiosity and health may be different for women than for men. When religious involvement is high, religiosity and the role of a higher power are salient in all aspects of a person's life, including health cognitions, behaviors, and outcomes, as well as explanations/interpretations of why a person gets sick or stays healthy (eg, due to "clean living" or having sinned). Therefore, it was expected that associations between religious variables such as spiritual health locus of control would carry stronger associations to health-related behaviors among those who are more religiously involved, such as women, than their male counterparts, for whom religious involvement is generally lower and therefore less salient.[21,22]

Empirical studies suggest that there are relationships between spiritual health locus of control beliefs and health-related behaviors among African American women.[10,12] However, studies have not yet examined this relationship among African American men. Nor have they included a variety of health behaviors (eg, prevention vs risk) or had the opportunity to take advantage of a national probability sample. The present study sought to extend research in spiritual health locus of control by examining the relationship between spiritual health locus of control beliefs and disease prevention and health risk behaviors in a national sample of African American men and women.

The current study provides a contribution to the literature on 2 levels. The first level deals with the population being examined. The study had the opportunity to take advantage of a national probability-based sample of African Americans. The role of spiritual health locus of control beliefs has been examined in regional convenience samples previously; however, these samples have not included men. African American men and women suffer a disproportionate burden of health disparities. Cultural variables that carry associations with health behaviors are important factors to be identified for use in interventions. The second

level deals with the findings themselves. Although findings reveal modest associations with health-related behaviors, it is the pattern of findings that is complex, intriguing, and not previously reported in the literature. That active spiritual health locus of control beliefs may play a protective role in dietary behaviors and that passive spiritual health locus of control beliefs may be associated with risky alcohol use are significant. These findings are illustrative of the complex role that religious involvement plays in health-related outcomes, in a population disproportionately impacted by chronic disease. Therein lies an applied value of the current study. This study examined individual disease prevention (eg, physical activity, fruit and vegetable consumption) and health risk (eg, heavy alcohol use) behaviors important to the health of African Americans. Specifically, the following hypotheses were tested:

1. Active spiritual health locus of control beliefs will be positively associated with physical activity and fruit and vegetable consumption and negatively associated with alcohol use.
2. Passive spiritual health locus of control beliefs will be negatively associated with physical activity and fruit and vegetable consumption and positively associated with alcohol consumption.
3. Hypotheses 1 and 2 will be stronger for women than for men.

This study examined data from a larger project assessing the unique nature of the religion-health connection in a national sample of African Americans. Findings from this analysis may have applied value for the development of more effective health-promotion interventions for African Americans, a group disproportionatly impacted by chronic disease. Given the significance of spirituality/religiosity in this population, interventions that aim to increase health-promoting behaviors by targeting or tailoring messages to spiritual health locus of control beliefs among African Americans may help play a role in the elimination of health disparities.

METHOD

Telephone Data Collection Methods

The study population was African Americans age 21 and older living in a private residence with a telephone, in any of the 50 states in the United States. People living in households without a telephone were not eligible, nor were those living in group quarters, dormitories, jails/prisons, nursing homes, or hospitals. A professional sampling firm (Genesys) generated a random call list, which served as the study sample. The call list is based on data aggregated from a wide variety of publicly available sources such as motor vehicle registrations. The call list comprised households randomly selected from data available to the sampling firm, based on a national representation of US census tracts, making the sample probability based. Due to response bias (discussed below), this is not a fully representative sample of African Americans.

Professional interviewers recruited participants by telephone, calling names randomly selected from the call list. When an individual answered the telephone, the interviewer introduced him/herself and asked for the individual who lived at that address to whom interviewers introduced the project. If interested, individuals were screened for eligibility criteria. If interested and eligible, participants were read the informed consent script and provided their assent to participate. The first eligible individual who provided verbal consent was interviewed. Only one individual was interviewed per household. The survey lasted an average of 45 minutes. A $25 gift card was mailed to each participant upon completing the interview.

Eligible individuals were African Americans (self-identified), age 21 and older, who had not had a diagnosis of cancer. Cancer history was an exclusion criterion in the aforementioned larger study. A total of 12,418 individuals were contacted for participation, and 2370 individuals agreed to participate. The overall response rate, therefore, was 19% (accepted/[accepted + noninterviewed]). Of those contacted who did not participate (N=10,048), 8240 refused prior to a determination of eligibility, 1658 were not eligible [81 were under age twenty-one, 444 refused to provide an age for screening purposes, 878 were not African American, 224 reported a history of cancer, and 5 refused to respond to the question about cancer history]. Twenty-six were incapable of participating in the interview. Only 150 were determined to be eligible but then refused to participate, making for an upper bound response rate of 94% (2370/2520). This study was approved by the University of Alabama at Birmingham and University of Maryland institutional review boards. A description of the participant sample can be found in Table 1.

Those who refused to participate were asked to complete a brief refusal survey (N=317 agreed to do so). Nonresponders were in general older (M=60.82, SD=16.60, vs M=53.63, SD=14.82, respectively), more likely to be men (48.3% men vs 31.1% women), less likely to have attended 4 or more years of college (16.1% vs 26%, respectively), less likely to have attended religious services in the past year (65.0% vs 83.6%, respectively), and less likely to attend religious services 4 or more times per month (36.0% vs 50.6%, respectively) than were responders.

Measures

Spiritual health locus of control—The spiritual health locus of control scale is a 13-item instrument that previously revealed 2 dimensions of spiritual health locus of control beliefs.[10] It was developed specifically for use with African American populations. The active spiritual subscale (11 items; range 11-55) involves the belief that a higher being empowers a person to be proactive about health behaviors or that one works in partnership with God to stay in good health (eg, “Even though I trust that God will take care of me, I still need to take care of myself”; “God gives me the strength to take care of myself”; “God and I share responsibility for my health”; $\alpha = .90$). The passive spiritual subscale (2 items; range 2-10) assesses the belief that because a higher power has control over one's health, the individual does not have to engage in healthy behaviors (eg, “There is no point in taking care of myself when it's all up to God anyway”; $\underline{r} = .59$). Participants respond to items using a 5-point Likert-type format (strongly disagree, disagree, neutral, agree, and strongly agree). This 2-factor structure was supported in previous research, and evidence has been provided for the predictive validity of the instrument.[10]

Health behaviors—A variety of disease prevention and health risk behaviors including physical activity, fruit and vegetable consumption, and alcohol use were examined using widely recognized and validated measures.

Fruit and vegetable consumption—An adaptation of the National Cancer Institute's 5 A Day Survey was used to assess fruit and vegetable consumption among participants.[29] This instrument has been used with an African American study population.[30] It includes items that separately assess the number of servings of fruit and vegetables consumed in a typical day (eg, “In a typical day, about how many times do you have...a piece of fresh fruit, like an apple, orange, banana, or pear?). The range was 0-8 for fruit and 0-6 for vegetables.

Physical activity—The International Physical Activity Questionnaire (IPAQ) short form was used to assess participants’ physical activity in the last 7 days. The short and long versions of IPAQ questionnaires have been validated in 14 centers across 12 countries,[31]

and the instrument has been validated with an African American population in the United States.[32] The short version of the questionnaire used in this study contains 7 items that ask participants to report the number of days they performed various types of physical activities. Participants are asked to provide the number of days spent engaging in physical activity at each intensity: vigorous, moderate, and walking. Examples of activities can include leisure-time physical activity, domestic and gardening (yard) activities, work-related physical activity, and transport-related physical activity. A standardized scoring method was used, and the range was 0-180 for each.

Alcohol use—Alcohol use was assessed using items from the BRFSS.[33] The alcohol use module consists of 4 items to measure current use and binge drinking behaviors. It included the following items: "During the past 30 days, how many days did you have at least one drink of any alcoholic beverage?" "During the past 30 days, on the days when you drank, about how many drinks did you drink on the average?" "Considering all types of alcoholic beverages, how many times during the past 30 days did you have 4/5 or more drinks on an occasion?" "During the past 30 days, what is the largest number of drinks you had on any occasion?"

Demographics—Demographic data were collected, including participant sex, race, date of birth, marital status, years of education, employment status, and self-rated health status. Self-rated health status was assessed using an item from the SF-12[34] that asked participants to rate their health on a 5-point scale from excellent, very good, good, fair, or poor. This method has been recognized as a reliable and valid indicator of health status.[35,36]

Design/Analysis

Linear regressions were conducted to examine predictors of all health behaviors (ie, physical activity, fruit and vegetable consumption, and alcohol use). Age, education, and health status were entered in the first block followed by the spiritual health locus of control subscale scores in the second block. To determine whether spiritual health locus of control beliefs played a differential role in health behaviors for men than for women, separate regressions were also conducted among men and women for the physical activity, fruit and vegetable consumption, and alcohol use. Interaction terms were used to substantiate the gender-difference analyses. Due to the large number of comparisons (eg, to avoid type II error), interaction terms were examined only where gender differences existed. Regression coefficients, F change values, significance levels, and variance accounted for were calculated for regression models.

RESULTS

Participant Characteristics

Telephone interviews were completed by 1464 women and 906 men and were included in the analysis. Participants had a mean age of 54 (SD = 14.82), 45% completed at least 1 year of college, and the majority either worked full-time (38%) or were retired (26%). Additional demographic information can be found in Table 1. Overall, participants exhibited strong active spiritual health locus of control beliefs (M = 44.76; SD = 7.33; out of a possible score of 55) and weak passive spiritual beliefs (M = 3.72; SD = 1.67; out of a possible score of 10). Men and women demonstrated similar spiritual health locus of control beliefs on the 2 subscales. An examination of the internal consistency for the spiritual health locus of control subscales revealed adequate internal consistency (Active, α = .92 & .88; Passive, $\underline{r}$ = .59 & .58; men and women, respectively). In addition, separate factor analysis for both genders confirmed the 2-factor structure (data not shown).

Disease Prevention and Health Risk Behavior Models

Bivariate correlations between all study variables are shown in Table 2. Regression coefficients and odds ratios are summarized in Tables 3 and 4. The overall models were significant in predicting vigorous physical activity ($F(5, 1607) = 7.99$, $P < .001$), moderate physical activity ($F(5, 1567) = 3.17$, $P < .01$), walking ($F(5, 1999) = 10.52$, $P < .001$), daily fruit servings ($F(5, 2308) = 22.15$, $P < .001$), daily vegetable servings ($F(5, 2308) = 29.42$, $P < .001$), consumption of 4/5 or more alcoholic beverages in the past 30 days ($F(5, 910) = 2.83$, $P < .05$), and the largest number of drinks in the last month ($F(5, 908) = 8.29$, $P < .001$). In reference to the spiritual health locus of control variables, active spiritual beliefs were positively associated with daily fruit servings ($P < .05$) and negatively associated with number of days consuming alcohol in the last month ($P < .05$). Passive spiritual beliefs were negatively associated with daily vegetable servings ($P < .001$) and positively associated with largest number of drinks in the last month ($P < .05$).

Gender-Specific Models

Among men (see Tables 5 & 6), the overall models were significant in predicting vigorous physical activity ($F(5, 681) = 3.95$, $P < .01$), walking ($F(5, 761) = 5.17$, $P < .001$), daily fruit servings ($F(5, 876) = 6.96$, $P < .001$), daily vegetable servings ($F(5, 876) = 7.59$, $P < .001$), consumption of 4/5 or more alcoholic beverages in the last month ($F(5, 420) = 2.93$, $P < .05$), and largest number of alcoholic drinks consumed in the last month ($F(5, 418) = 4.91$, $P < .001$). Active spiritual beliefs were negatively associated with number of days in the last month consuming an alcoholic beverage ($P < .01$) and the average number of drinks consumed ($P < .05$). Passive spiritual beliefs were negatively associated with daily vegetable servings ($P < .05$), and positively associated with 4/5 alcoholic drinks consumed in the last month ($P < .01$) and the largest number of drinks consumed on any occasion during the last month ($P < .001$).

Among women, the overall models were significant in predicting vigorous physical activity ($F(5, 925) = 4.73$, $P < .001$), walking ($F(5, 1237) = 5.53$, $P < .001$), daily fruit servings ($F(5, 1431) = 15.74$, $P < .001$), daily vegetable servings ($F(5, 1431) = 23.69$, $P < .001$), and largest number of drinks consumed on any occasion during the last month ($F(5, 489) = 6.83$, $P < .001$). Active spiritual beliefs were not predictive of any of the outcomes. Passive spiritual beliefs were negatively associated with daily vegetable servings ($P < .01$).

DISCUSSION

The present study makes a unique contribution to the literature in health locus of control, by examining the role of spiritual health locus of control beliefs across a variety of disease prevention and health risk behaviors, in both African American men and women across the United States. Results from the present study provide partial support for the association of spiritual health locus of control beliefs and disease prevention and health risk behaviors in the study sample. Hypothesis one, that active spiritual health locus of control beliefs would be positively associated with disease prevention behaviors and negatively associated with health risk behaviors, was partially supported in reference to fruit consumption and alcohol use. Holding active beliefs was positively associated with daily fruit servings in the overall sample. As predicted, the active beliefs were also inversely associated with alcohol use. Specifically, in the overall population of the current study, number of days in the last month consuming an alcoholic beverage was significantly related to active spiritual beliefs.

Hypothesis 2, that passive spiritual health locus of control beliefs would be negatively associated with disease prevention behaviors and positively associated with health risk behaviors was partially supported in reference to vegetable consumption and alcohol use. In

the overall sample, these beliefs were associated with lower vegetable consumption and higher number of drinks consumed on any occasion. Across hypotheses one and 2, however, the physical activity outcomes were not associated with the spiritual health locus of control dimensions. This is notable because it illustrates that beliefs about the role of a higher power in one's health are complex, differing along risk vs prevention behaviors and even within prevention behaviors (eg, fruit/vegetable consumption vs physical activity). The current findings suggest that religious/spiritual dimensions have different effects on certain health behaviors. A recent study found a significant relationship between religious social support and moderate physical activity among African Americans.[37] Increasing or promoting physical activity may require more extrinsic beliefs or behaviors than are reflected by locus of control beliefs.

It was anticipated that spiritual health locus of control beliefs would carry stronger relationships with health-related behaviors for African American women than for men (hypothesis 3). This did not appear to be the case when examining the current data. In fact, there appeared to be more relationships with the study outcomes among men than among women. For women, passive spiritual beliefs were associated with lower vegetable consumption. Interestingly for men, passive spiritual beliefs were associated with both decreased disease prevention behaviors (ie, daily vegetable servings) and increased alcohol-related behaviors. The alcohol findings in the overall sample appear to be driven by the men in the study, who also had higher rates of consumption. The passive spiritual relationship with vegetable consumption is consistent with the proposed hypothesis. Although this is the first use of this scale with a male African American population, the instrument appears to perform adequately among men (as evidenced by adequate internal consistency and equivalent factor structure). However, the beliefs appear to be more salient for health risk behaviors among men than for women. Previous research has supported that African American men and women differ in levels of religious involvement[27,28]; it is possible that these differences carry into their relationships with health risk behaviors as well. Future qualitative research could help clarify these complex relationships and further elucidate the nature of this construct for male and female populations.

The current findings revealed complexity and opened doors for further inquiry. As previously discussed, this is the first study to provide an examination of the role of spiritual health locus of control beliefs with a variety of both disease prevention and health risk behaviors. The insights gained contribute to the literature in terms of the analyses with men and the ability to examine the role of these beliefs in both positive and negative health behaviors. That a variety of patterns emerged reflects the complexity of research in the scientific study of religion and health. Even when one question begins to be answered, others continue to unfold.

The current findings support previous research associating dimensions of spiritual health locus of control beliefs with health behaviors. Swinney[38] found that African Americans viewed God as capable of influencing their health and guiding the physician in their cancer treatment. Similarly, in the present study, participants reported high scores on the active dimension of the of the spiritual health locus of control scale. However, Swinney[38] observed only the relationship of self-rated health status and locus of control. The present study investigated the role of spiritual health locus of control beliefs in specific disease prevention and health risk behaviors.

Limitations

There are some limitations of the current study that should be recognized. Similar to other studies, findings are based on self-reported data from participants. It is possible that participants may have offered socially desirable answers to the health behavior questions,

did not completely understand the questions, or had difficulty recalling information needed to answer the questions. Another limitation is related to the generalizability of the data to other populations and African Americans. The current sample consisted of African Americans who were relatively well educated (53% some college or higher), and most regularly attended church. Due to response bias, though the sample was selected based on probability-based methods, it cannot be deemed a representative sample of African Americans. The nonrespondent survey suggested some differences from the respondents, including lower rates of church attendance. These results may not generalize to African Americans who do not attend church or are less educated. The large sample in the current study may have also influenced significance of the model in the face of modest effect sizes. Yet, the current study does include a substantial sample of African American male participants, thus making a unique contribution to the literature in this area. Even though the passive dimension comprises only 2 items, the alpha coefficient and factor analysis support its unique perspective. Finally, the current study is a cross-sectional analysis, and no conclusions can be drawn about causality of the observed relationships.

Future Research

The results of the current study can be applied by health education professionals working with African Americans. Spiritually based interventions that address the role of a higher power or God in health promotion could empower African Americans to engage in healthy behaviors. For example, studies have shown the intervention that includes spiritual concepts may be more effective than traditional health knowledge interventions for African Americans.[39,40] African Americans may also be more responsive to faith-based interventions.[24] Both dimensions of the spiritual health locus of control scale were significantly related to participants' health risk and disease prevention behaviors but in different ways. This study supports the notion that religious involvement is multidimensional and that different dimensions of beliefs and behaviors may operate in different ways in the context of the religion-health connection.[22,23,25,41] Before the current study, the scale had been used only with African American female samples. The current findings suggest that spiritual health locus of control beliefs may operate differently in men and may be particularly salient in the context of health risk behaviors. It may be appropriate for health education interventions to target active and passive beliefs to increase fruit and vegetable consumption and decrease alcohol use. These beliefs may not be as influential in increasing physical activity. The current findings among men suggest that additional qualitative research may be needed in order to fully understand the complex role that these beliefs play in health behaviors across these different subpopulations. The high value of spirituality/religiosity in the African American community in conjunction with the role of spiritual health locus of control beliefs may provide a promising path to understanding health behaviors in this population.

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Table 1

Participant Demographic Characteristics

		Overall	Men	Women
Characteristic	**Categories**	**(N=2370)**	**(N=906)**	**(N=1464)**
Age, mean(SD)		53.63 (14.82)	52.58 (14.64)	54.28 (14.90)
Relationship status	Never married	13.3%	17.2%	10.9%
	Single	17.2%	19.6%	15.8%
	Married or living w/partner	36.9%	41.2%	34.2%
	Separated or Divorced	18.8%	14.6%	21.4%
	Widowed	13.8%	7.3%	17.7%
Education	Grades 1-8	2.7%	3.1%	2.5%
	Grades 9-11	9.4%	7.7%	10.5%
	Grade 12 or GED*	32.8%	35.0%	31.5%
	1-3 yrs college	29.3%	27.2%	30.7%
	4+ yrs college	25.7%	27.1%	24.8%
Work status	Full-time	38.3%	40.5%	37.0%
	Part-time	11.8%	11.8%	11.7%
	Not currently	12.6%	10.4%	13.9%
	Retired	26.2%	27.2%	25.6%
	Receiving disability	11.2%	10.1%	11.8%
Income	< $5,000	8.7%	6.6%	10.0%
	$5,000-$10,000	12.4%	10.4%	13.7%
	$10,000-$20,000	14.8%	11.9%	16.6%
	$20,000-$30,000	13.4%	13.8%	13.1%
	$30,000-$40,000	11.6%	12.0%	11.3%
	$40,000-$50,000	9.3%	10.9%	8.6%
	$50,000-$60,000	8.3%	9.0%	7.9%
	>$60,000	21.4%	25.7%	18.7%
Self-rated health status	Poor	5.1%	4.5%	5.4%
	Fair	21.3%	21.1%	21.4%
	Good	34.8%	34.2%	35.2%
	Very good	26.2%	26.7%	25.9%
	Excellent	12.6%	13.5%	12.0%

Table 2

Participant Spiritual Health Locus of Control Beliefs and Health Behaviors

Characteristic	Categories	Overall (N=2370)	Men (N=906)	Women (N=1464)
Spiritual Health Locus of Control beliefs, mean(SD)	Active	44.76 (7.33)	44.14 (8.21)	45.14 (6.71)
	Passive	3.72 (1.67)	3.67 (1.69)	3.76 (1.66)
Vigorous Activity, mean(SD)		71.17 (60.30)	83.51 (61.62)	62.05 (57.67)
Moderate Activity, mean(SD)		63.53 (58.85)	74.08 (61.61)	55.95 (55.59)
Walking Activity, mean(SD)		57.95 (56.33)	62.78 (59.10)	54.94 (54.34)
Fruit Servings, mean(SD)		2.44 (1.37)	2.34 (1.35)	2.51 (1.37)
Vegetable Servings, mean(SD)		2.15 (0.97)	2.07 (0.98)	2.20 (0.96)
Alcohol use - drinking days per month, mean(SD)		5.91 (7.60)	7.22 (8.38)	4.98 (6.85)
Alcohol use - average drinks per month, mean(SD)		2.70 (5.67)	3.12 (6.61)	2.34 (4.67)
Alcohol use - days more than 4/5 drinks, mean(SD)		1.48 (4.05)	1.69 (4.25)	1.29 (3.87)
Alcohol use - largest number of drinks in month, mean(SD)		3.05 (2.83)	3.61 (2.99)	2.55 (2.57)

Note.

Numbers may not sum to 2370 or 100% due to missing data.

*GED = general equivalency diploma

Table 3

Linear Regressions for Spiritual Health Locus of Control Subscales and Health Prevention Behaviors

	Vigorous physical activity	Moderate physical activity	Walking activity	Daily fruit servings	Daily vegetable servings
Model data	**F(5,1607)=7.99, p<.001, R^2 =.02 ΔR^2 =.001**	**F(5,1567)=3.17, p<.01, R^2 =.01 ΔR^2 =.001**	**F(5,1999)=10.52, p<.001, R^2 =.03 ΔR^2 =.001**	**F(5,2308)=22.15, p<.001, R^2 =.05 ΔR^2 =.002**	**F(5,2308)=29.42, p<.001, R^2 =.06 ΔR^2 =.01***
Block 1-Controls	β	β	β	β	β
Age	-.05*	-.03	-.12***	.15***	.15***
Education	-.11***	-.05	-.04	.09***	.13***
Health status	.12***	.08**	.09***	.13***	.11***
Block 2-Spiritual health locus of control beliefs					
Active	-.01	.02	.03	.05*	.01
Passive	.02	.02	.00	-.02	-.08***

Note.

* P < .05

** P < .01

*** P < .001

Table 4

Linear Regressions for Spiritual Health Locus of Control Subscales and Alcohol Behaviors

	Alcohol days/mo.	Avg drinks/mo.	Days/mo >4 or 5 drinks	Largest drinks/mo.
Model data	**F(5,605)=1.49, p=.19, R^2 =.01 ΔR^2 =.01***	**F(5,921)=1.50, p=.19, R^2 =.01 ΔR^2 =.004**	**F(5,910)=2.83, p<.05, R^2 =.02 ΔR^2 =.01**	**F(5,908)=8.29, p<.001, R^2 =.04 ΔR^2 =.01***
Block 1 - Controls	β	β	β	β
Age	.04	-.05	-.02	-.11**
Education	-.02	-.04	-.08*	-.14***
Health status	.02	-.01	.01	.01
Block 2-Spiritual health locus of control beliefs				
Active	-.10*	-.06	.03	.01
Passive	.00	.03	.06	.08*

Note.

*P < .05

**P < .01

***P < .001

Table 5

Linear Regressions for Spiritual Health Locus of Control Subscales and Health Prevention Behaviors Among Men and Women

	Vigorous physical activity		Moderate physical activity		Walking activity		Daily fruit servings		Daily vegetable servings	
	β		β		β		β		β	
	M	F	M	F	M	F	M	F	M	F
Block 1- Controls R square	.03	.02	.01	.01	.03	.02	.04	.05	.04	.07
Age	-.06	-.05	-.08*	.03	-.13***	-.11***	.13***	.16***	.12**	.16***
Education	-.11**	-.10**	-.04	-.06	-.03	-.05	.06	.11***	.09*	.16***
Health status	.14***	.10**	.07	.09**	.10**	.09**	.14***	.12***	.12**	.12***
Block 2 - Spiritual health locus of control beliefs R square	.03	.03	.02	.01	.03	.02	.04	.05	.04	.08
Active	.01	.00	.06	.00	.05	.02	.06	.03	.04	-.03
Passive	-.01	.06	.01	.04	.04	-.02	.01	-.04	-.07*	-.09**

Note.

M = Male participants; F = Female participants

*P < .05

**P < .01

***P < .001

Table 6

Linear Regressions for Spiritual Health Locus of Control Subscales and Alcohol Behaviors Among Men and Women

	Alcohol days/mo.		Avg drinks/mo.		Days/mo >4 or 5 drinks		Largest drinks/mo	
	β		β		β		β	
	M	F	M	F	M	F	M	F
Block 1- Controls R square	.01	.00	.01	.01	.02	.01	.03	.06
Age	.03	.04	-.05	-.07	-.01	-.05	-.11*	-.14**
Education	-.02	-.01	-.05	-.01	-.09	-.07	-.07	-.20***
Health status	.07	-.03	-.06	.05	-.01	.02	-.01	.00
Block 2 - Spiritual health locus of control beliefs R square	.04	.01	.02	.01	.03	.01	.06	.07
Active	-.18**	-.02	-.11*	-.00	-.02	.07	-.04	.08
Passive	.05	-.04	.04	.01	.14**	-.02	.18***	-.03

Note.

M = Male participants; F = Female participants

*P < .05

**P < .01

***P < .001