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Spirituality predicts health and cardiovascular responses to stress in young adult women

Kimberly A. Edmondson
University of Tennessee

To the Graduate Council:

I am submitting herewith a thesis written by Kimberly A. Edmondson entitled "Spirituality predicts health and cardiovascular responses to stress in young adult women." I have examined the final electronic copy of this thesis for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Arts, with a major in Psychology.

Kathleen Lawler, Major Professor

We have read this thesis and recommend its acceptance:

Accepted for the Council:
Carolyn R. Hodges

Vice Provost and Dean of the Graduate School

(Original signatures are on file with official student records.)

To the Graduate Council:

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Kathleen A. Lawler
Kathleen Lawler, Major Professor

We have read this thesis and
Recommend its acceptance:

P.A. Lawler

Deborah R. Bell

Acceptance for the Council:

Vice Provost and Dean of
Graduate Studies

SPIRITUALITY PREDICTS HEALTH AND CARDIOVASCULAR RESPONSES TO STRESS IN YOUNG ADULT WOMEN

A Thesis

Presented for the

Master of Arts

Degree

The University of Tennessee, Knoxville

Kimberly A. Edmondson

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DEDICATION

This thesis is dedicated to my sons, CJ and Timothy Edmondson. CJ believed in me when I did not believe in myself, and thus gave me the strength to continue. Timothy, with a smile and a hug, was able to keep me going when I was too exhausted to go one more day. This thesis would not have been possible without them.

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ABSTRACT

The problems associated with the pathology model have led to an increased number of studies devoted to positive psychology. Among the positive factors that have been hypothesized to promote health is spirituality. The primary focus of this study was to investigate the role of spirituality/religion in self-reported physical and mental health, and to determine whether there is an association between an individual's spirituality and cardiovascular responses to two stressors. Fifty-two females participated in both a betrayal interview and a structured interview. Using the Spiritual Well-being Scale as a measure of spirituality, blood pressure and heart rate were assessed. The existential well-being subscale was more consistently and strongly related to both physical and mental health than either the religious well-being subscale or the spiritual well-being total score. The existential subscale was also associated with lower heart rate in the recovery and structured interview periods. Diastolic blood pressure was significantly higher across all four time periods for low spiritual persons as opposed to high spiritual persons. In addition, participants low in religiousness had greater systolic blood pressure reactivity than high religious groups, and participants low in existential well-being, or spirituality had elevated levels of heart rate reactivity in response to the brief structured interview. The role of the coherence hypothesis, the moderation of hostility, and allostatic load are discussed.

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CHAPTER 1

Introduction

Positive Psychology

The advent of positive psychology marks a new and exciting time for psychology. The pathology model has characterized a majority of the research in this field until recently; however, there has been a subtle shift from the biomedical model to the recognition that positive psychological factors can promote health (Snyder & McCullough, 2000; Wallace & Forman, 1998). Based on that recognition, researchers have begun to investigate a host of psychosocial factors that promote health. While the paradigm shift has contributed to the conception that this focus on protective health factors is relatively new, the idea of positive psychology is not a new one. Seligman & Czikszentmihalyi (2000) point out that before World War II, studies focusing on positive factors (e.g. giftedness, creativity, talent) were commonplace. However, history changed the course of psychology. The war created a need for people who could heal ruined lives, hence the focus on healing what is broken.

While the pathology model has clearly dominated psychology, in 1979 Antonovsky began to voice his concern with such a one-sided view of health. He asked the critical question, "What keeps a person healthy?" He termed his concept salutogenesis. The problems associated with the pathogenic/biomedical model have led to a search for more plausible explanations including the study of factors that buffer health. Antonovsky hypothesized that there are certain positive traits called generalized resistance resources that help people combat stress-induced illnesses. These traits, or

generalized resistance resources, are described as, "any characteristic of the person, the group, or the environment that can facilitate effective tension management" (p. 99). While Antonovsky devotes a great deal of time to social support and culture, he also points to the inclusion of religion as a salutogenic trait. In this role religion is said to "strengthen the bonds of human cohesion" (p. 118).

Historically, religion has been a topic that few psychologists attempted to study. In psychology's early years, it may have been necessary to separate psychology as a science from philosophy and religion, as a means to make it more legitimate in the eyes of the academic world (Snyder & McCullough, 2000). As recent Gallup polls have shown, psychologists can no longer ignore the influence of religion or spirituality in the lives of most Americans; in fact, many of the questions for which clients receive therapy are existential in nature, such as meaning or purpose in life and death (Worthington, Kurusu, McCullough, and Sandage, 1996). Moreover, many studies have found links between religious and spiritual factors and health (George, Larsons, Koenig, & McCullough, 2000; Miller & Thoresen, 1999); Ellis, Vinson, & Ewigman (1999) reported that a majority of physicians studied believed spiritual well-being to be an important factor in health.

Defining Spirituality

One of the major problems with studying a concept such as spirituality is the fact that it has proven to be an elusive concept to define for purposes of scientific study. Many of the definitions are vague and all-encompassing, leading to confusion. A great deal of uncertainty in the literature arises from the interchanging of the words religion and spirituality (Emblen, 1992). George et al. (2000) suggest that spirituality and religion

alike are related to the search for the sacred in beliefs, practices, and experiences. In this context, sacred is defined as, "a divine being, higher power, or ultimate reality, as perceived by the individual. For something to be sacred, it must be divine in its character or relationship to the divine" (p. 103). However, the defining point for religion is its institutionalized character, while spirituality is seen as more flexible, and individualized (Thoresen, 1998; Potts, 1998; Walsh & Vaughn, 1993; Musick, Traphagan, Koenig, & Larsen, 2000; Harris, Thoresen, McCullough, & Larsons, 1999). Finally, Potts (1998) suggests that, "spirituality may motivate, direct, and transform one's specific religious involvement" (p. 497). This definition suggests that religion is only one small part of spirituality, which will become important in the spiritual well-being literature.

According to Moberg (1979), spirituality is viewed as a multidimensional construct comprised of two dimensions, vertical and horizontal. The vertical dimension is concerned with one's relationship to God, and the horizontal dimension is concerned with a sense of life purpose and life satisfaction. The horizontal dimension is relatively independent of a religious connotation and can be viewed as a secular component.

It was from this work that Paloutzian and Ellison (1982) developed their spiritual well-being scale as a means of studying spirituality empirically. In constructing their scale, Paloutzian and Ellison included two subscales: Religious Well-Being and Existential Well-Being. Religious well-being reflects a person's relationship to God, related to Moberg's vertical dimension, while existential well-being is more concerned with a person's purpose and satisfaction in life reflecting the horizontal dimension.

Factor analysis of the Spiritual Well-being Scale indicates support for the two dimensions reported by Paloutzian and Ellison (Genia, 2001). Genia also reported that

the existential and religious subscales appear to be distinct constructs, each contributing new and important information to the overall score. Therefore, when using the Spiritual well-being scale, it is relevant to conduct tests based on the religious and existential subscales, as the total score may be ambiguous. One problem with the spiritual well-being scale, reported by Ledbetter, Smith, Vosler-Hunter, & Fischer (1991), reflects the presence of ceiling effects, especially when using this scale with a religious population.

Despite the potential presence of ceiling effects, this particular scale has been employed extensively in the literature. Mickley, Soeken, & Belcher (1992) reported that patients identified as intrinsically religious had higher spiritual well-being scores than those identified as extrinsically religious. Ellison and Smith (1991) also have reviewed a number of unpublished articles indicating the beneficial effect of religion/spirituality on health. Morris (2001) reported the results of a study relating spiritual well-being to the progression and regression of coronary heart disease. Spirituality scores were negatively correlated with the degree of progression of coronary artery obstruction over a 4-year period, while they were positively correlated with regression. In a laboratory study investigating the role of religion/spirituality in health, Lawler & Younger (2002) found that the existential subscale was more directly related to self-reported illness symptoms than the total score or the religious subscale. In fact, in a predictive model of physical health, the existential subscale accounted for 19.1% of the variance in physical symptoms of illness. However, the religious subscale was related to diastolic and mean arterial pressure both before and after relating an interpersonal betrayal.

Several articles document a relationship between this scale and psychological variables, and thus psychological health. Carson, Soeken, and Grimm (1988) reported a

positive correlation between hope and the spiritual well-being scale, with the existential scale more strongly correlated than the total scale score or the religious scale. Finally, Ellison (1983) found that self-esteem and spiritual well-being are positively related, while negative relationships were found between spiritual well-being and individualism, success, and personal freedom. While the above-mentioned studies suggest that this scale may be related to physical and psychological health, the relative lack of peer-reviewed research is problematic.

Literature published concerning religion/spirituality and health, using other spirituality measures, has reported similar, beneficial effects. In a review of this literature, Seybold & Hill (2001) concluded that spirituality and religion have a largely beneficial impact on mental and physical health. Religious and spiritual involvement have been related to all-cause mortality (Harris et al., 1999), as well as to the survival rate of surgical patients, depression and anxiety, suicide rates, and toward the promotion of a healthy lifestyle (see Chamberlain & Hall, 2000). Research has also documented a relationship between forgiveness, a behavioral component of spirituality, and health. Seybold, Hill Neumann, & Chi (2001) have linked forgiveness to positive health practices and lower levels of anxiety, anger, and depression. In general, studies have found positive relationships between religion and physical health, mental health, and substance abuse outcomes (Thoresen, 1998). In addition, religion and spirituality are positively correlated with coping with stress (Graham, Furr, Flowers, and Burke, 2001).

With regard to specific health outcomes, Levin and Vanderpool (1989) found many studies that focused on the effects of religion in relation to hypertension. A study of white men found that church attendance and religious importance were related to

lower diastolic blood pressure, as compared to men who did not attend church regularly and did not rate religion as important (Larson, Koenig, Kaplan, Greenberg, Logue & Tyroler, 1989). Age played an important role as well; those over the age of 55 who rated religion important had lower systolic and diastolic blood pressure than those who rated it not important. In addition, among smokers, those who rated religion as important had lower diastolic blood pressure than those who did not. Graham, Kaplan, Cornoni-Huntley, James, Becker, Hames & Heyden (1978) reported that frequent church attendance was associated with lower systolic and diastolic blood pressure levels even after controlling for demographic variables. Similarly, Koenig, George, Hays, Larson, Cohen, & Blazer (1998) found that those who attended religious services frequently and also prayed or read the Bible had a 40% lower chance of having high blood pressure, compared to similar participants who were infrequent attenders and infrequently read the Bible or prayed. Overall, the evidence of the link between cardiovascular health and blood pressure appears to support a beneficial effect of religion/spirituality on cardiovascular health.

While most of the research has documented a positive effect for religion/spirituality, it may not always be beneficial. King, Speck, and Thomas (1999) studied the clinical outcome of patients nine months after admission to a hospital. Among the cardiac and gynecology patients included in the sample, stronger spiritual beliefs were associated with a poorer clinical outcome at nine months. The authors concluded that people with more beliefs tended to report more symptoms.

Possible Mechanisms

Why does religion/spirituality seem to provide a protective health effect? George et al. (2000) reviewed a number of articles looking at the mechanisms underlying the relationship between religion and health. They hypothesized three mechanisms by which religion can be beneficial to health: health behaviors, social support, and the coherence hypothesis. There is a sizable literature on the influence of spirituality/religion on positive health practices. The rationale behind this hypothesis is that membership in a religious denomination may decrease certain unhealthy behaviors such as smoking, addictive drug use, alcohol consumption and premarital sex.

There is also a large literature on the role of social support and health. Religion may provide means of obtaining social support and may exert its effects according to the mechanisms prescribed for social support. However, Thoresen (1998) argues that many of the benefits ascribed to social support may in fact be explained by spiritual and religious factors. Some researchers have hypothesized that religion and spirituality may mediate quality of life by enhancing patients' subjective well-being through social support and coping strategies (Daaleman & VandeCreek, 2000).

The third explanation for the role of religion in health outcomes puts forth the hypothesis that this relationship exists because religion "provides a sense of coherence and meaning so that people understand their role in the universe, the purpose of life, and develop the courage to endure suffering" (George et al., 2000; p. 108). This hypothesis may also apply to spirituality, as well as religion, as these concepts reflect spiritual pursuits.

Summary

A review of the literature addressing the role of religion/spirituality in health appears to support the idea that these factors may be associated with an overall beneficial effect on psychological and physical health. Although there are a number of studies supporting the role of religion and spirituality in health, many of these studies focus on the elderly and the terminally ill. Spirituality is presented as an issue that becomes progressively more important as one ages, or as one approaches death. However, these issues may also play a role in younger, healthier populations. Similarly, only one of these studies looked at acute physiological responses to a stressor. It has been suggested that the development of cardiovascular disorders may be predicted through laboratory studies in which cardiovascular measures are assessed in reaction to a stressor. Thus, the primary focus of this study was to investigate the role of spirituality/religion in self-reported physical and mental health, including the relationship to forgiveness, and to determine whether there is an association between an individual's spirituality and cardiovascular responses to two stressors, a betrayal interview and a structured interview.

Hypotheses

(a) It is expected that those who score high on spirituality will report fewer physical symptoms and better mental health in comparison to their low spirituality counterparts.

(b) It is expected that those who score high on spirituality will display lower blood pressure and heart rate levels across all phases of the study in comparison to low spirituality individuals.

(c) It is expected that there will be a positive relationship between spirituality and forgiveness.

CHAPTER 2

METHOD

Design

The present study was part of a larger investigation on the physiology of forgiveness. Each participant was given a short baseline/rest period and then was subjected to a social stressor operationalized as a betrayal interview, followed by a recovery period, and ending with a brief structured interview. Cardiovascular responses were measured across the time intervals, including systolic blood pressure (SBP), diastolic blood pressure (DBP), mean arterial pressure (MAP), and heart rate (HR).

Participants

Fifty-two female college students participated in the study. Participants ranged in age from 18 to 43 years old with a mean age of 21.24, sd = 5.09. Forty-one of the participants were Caucasian (78.8%), 7 were African-American (13.5%), 3 were Asian (5.8%). The participants were recruited through a sign-up sheet on a bulletin board and given extra credit for participation.

Setting

This experiment was performed in the health psychology laboratory at a large southern university. The room in which the experiment took place is equipped with cardiovascular monitoring devices, 2 chairs, a television, and a VCR.

Measures

Cardiovascular Measures. Blood pressure was measured noninvasively with a Critikon Dinamap Vital Signs Monitor, Model 1846SX (Johnson & Johnson, Tampa, FL). A

blood pressure cuff was placed on the participant's nondominant arm, and measurements were activated by a research assistant in the adjacent equipment room. Following cuff deflation, systolic, diastolic, mean arterial pressure, and heart rate were printed out. Blood pressure was measured at minutes 5, 7, and 9 during the baseline period; 15 seconds into the betrayal interview and at 2 minute intervals until 3 measures were taken; 15 seconds into the recovery and at 2 minute intervals until 4 measures were taken, and 15 seconds into the structured interview and at 1 minute intervals.

Spirituality. The Spiritual Well-being Scale (SWBS; Paloutzian & Ellison, 1982) is a measure of spirituality that consists of two subscales. The existential subscale (EWB) is conceptualized as reflecting a person's sense of purpose and satisfaction in life, independent of religion. The religious subscale (RWB) addresses a person's well-being in relationship to God. Test-retest coefficients were .93 (total scale), .96 (RWBS) and .86 (EWBS). Internal consistency is adequate with alpha coefficients ranging from .78 to .89.

Stress. The Perceived Stress Scale (Cohen, Kamarck, & Mermelstein, 1983) consists of 14 questions on a five point scale from Never to Very often. Each question is in reference to experiences of stress in the last month. Coefficient alpha reliability was reported as .86, with a test-retest reliability as .85.

Health. The Cohen-Hoberman Physical Symptoms Checklist (CHIPS; Cohen & Hoberman, 1983) contains a list of 33 symptoms that the participant may have experienced in the last month. It was scored as a 4-point Likert scale, ranging from "not at all" to "very much" a part of my life. The coefficient alpha was reported at .88 and was significantly correlated with use of Student Health Facilities over a 5-week interval.

Forgiveness. The Acts of Forgiveness scale (Drinnon & Jones, 1999) consists of 45 items relating to a specific time when one has been betrayed by someone else. It has adequate internal reliability at .96; as well as satisfactory test-retest reliability of .90. It employs a 5-point Likert-type scale, ranging from Strongly disagree to Strongly agree. Forgiveness was also measured with the Transgression-related Interpersonal Motivations Inventory (TRIM; McCullough, Rachal, Sandage, Worthington, Brown, & Hight, 1998). The TRIM consists of 12 items on which participants are asked to rate the offender, using a 5-point Likert scale. The TRIM also includes two subscales, Revenge and Avoidance. The subscales have adequate internal reliability ranging from .86 to .93. In this study, only the subscales were used.

Mental Health. The Satisfaction with Life Scale (SWLS; Diener, Emmons, Larsen, & Griffen, 1985) consists of 5 items measuring the participant's overall satisfaction with life, using a 7-point Likert-type scale. Test-retest reliability is found to be adequate at .82; Cronbach alpha is reported at .87.

Procedure

Participants were contacted by telephone and reminded of the time for which they had signed up, and the location. Upon arrival, the participants were given an informed consent form and instructed to read it carefully. The informed consent form explained the study, including the option to discontinue the experiment if the procedure proved unacceptable. If electing to continue, the participant was given a packet of questionnaires which included the Spiritual Well-being Scale, the Cohen-Hoberman Physical Symptoms Checklist, the Perceived Stress Scale, the Satisfaction with Life Scale, a demographics

questionnaire, and instructions to recall a time when they had been betrayed by a parent or primary caregiver.

Following the completion of the questionnaires, the participants were taken into the experimental room and fitted with a blood pressure cuff. After testing for signal clarity and comfort of the participants, they were asked to sit comfortably in the chair and watch a relaxing video of tropical fish accompanied by soft music (Piferi, Kline, Younger, and Lawler, 2000). Following the 10-minute rest period, the experimenter reentered the room. All interviews were videotaped, although participants were given the option of not allowing this. The betrayal interview began with the statement, "I would like you to recall a time when a parent or primary caregiver betrayed or deeply hurt you. Take a moment to remember the event and then describe it in as much detail as you can (all interview questions can be found in Appendix B)." Immediately following the interview, participants were given the Acts of Forgiveness Scale and the Transgression-related Interpersonal Motivations Inventory to complete. This recovery period lasted approximately 7 minutes. Finally, the participants were given a brief structured interview, which typically lasted approximately 4 minutes. While the betrayal interview was necessarily different for every participant, this brief structured interview was given in an attempt to measure blood pressure during an interpersonal stressor that was the same for everyone. This structured interview is based on a Type A interview in which participants are asked questions such as, "How do you feel about waiting in lines?" and "When you get angry or upset, do people around you know about it?". These questions, as well as the manner in which the experimenter questioned the participant, were designed to elicit angry reactions on the part of the participant.

Data Quantification

All of the questionnaires were hand-scored and entered into an SPSS file. Where blood pressure levels were used, they were based on the average of the blood pressure values across the time period. Correlational and regression analyses were used to examine the relationships between spirituality, stress and physical symptoms. Physiological responses and change scores, calculated by subtracting the mean recovery blood pressure readings from the mean structured interview readings, were assessed with correlational analyses and repeated measures design. Finally, correlational analysis was used to assess the relationship between spirituality and forgiveness.

The statistical package "Statistical Procedures for the Social Sciences (SPSS) 10.0" was used to analyze these data. Given the exploratory nature of this study, a p-value of .10 was adopted as the criterion for significant differences. When group comparisons are used, the participants were divided into high and low groups according to the median for the spiritual well-being scale, the existential well-being subscale, and the religious well-being scale. For the total scale, participants were divided into groups based on the median total score of 95. The low spiritual group ranged from 51-95 with a mean of 83.56 (11.90 sd). The high spiritual group ranged from 97-120 with a mean of 105.35 (6.17 sd). For the EWB subscale, the participants were divided into groups based on the median existential (mdn =49) score. The low existential group (n = 25) included scores ranging from 23-49 (m=42.04, 6.5 sd), while the high existential group (n=25) scores ranged from 50-60 (m=54.48, 3.23 sd). For the RWB subscale (mdn=46), the low group (n=25) scores ranged from 24-46 (m=38.17, 7.02 sd) while the high group (n=25) scores ranged from 47-60 (m=52.84, 3.27 sd).

CHAPTER 3

RESULTS

Spirituality and Health

A number of measures were used to assess the relationship of the spirituality scales to health (see Table 1; all tables and figures can be found in Appendix A). Given the fact that stress is a well-known factor that adversely affects health, we included stress as an additional factor. Scores on the SWB scale were negatively correlated with stress ($r = -.47$, $p < .01$); higher total spirituality was associated with less stress. This relationship also held with scores from the EWB ($r = -.51$, $p < .01$) and the RWB ($r = -.30$, $p < .05$) subscales.

In order to test the relationship between spirituality and health, correlation coefficients were computed with self-reported physical health, mental health, medications and medical conditions. Only the EWB subscale was significantly related to the measure of physical health ($r = -.46$, $p < .01$). The subjective well-being scale was also strongly associated with the EWB subscale ($r = .71$, $p < .001$), as well as the SWB scale ($r = .65$, $p < .001$) and the RWB subscale ($r = .37$, $p < .01$). Lower SWB scores were associated with medication use ($r = -.30$, $p < .05$), and scores on the EWB subscale were related to number of chronic illnesses reported ($r = -.25$, $p < .10$).

As existential well-being is predictive of both stress and health, and stress is a known correlate of health, the relative contributions of both factors were analyzed with hierarchical regression, shown in Table 2. After controlling for stress, the EWB subscale contributed significantly to the model predicting health ($r^2 = .22$, R-squared change =

.12, p<.05). Thus, the EWB score accounted for 12% of the variance above that of stress; the EWB x stress interaction was not significant.

Physiological Correlates of Spiritual Well-being

Table 3 shows the mean values for each dependent variable (SBP, DBP, MAP, and HR) by measurement interval (baseline, betrayal interview, recovery, and structured interview). In order to test the relationship between spirituality and blood pressure levels, correlational analyses of spirituality scales and BP levels were computed (see Table 4). It is readily apparent that blood pressure levels are relatively independent of spirituality scores across the baseline, and the interpersonal betrayal periods. During the recovery period the high and low EWB groups begin to differentiate, and a single effect emerged. As scores on the EWB subscale rise, heart rate decreases ($r = -.28$, $p<.10$). Similarly, during the structured interview, heart rate was negatively correlated with scores on the SWBS ($r = -.36$, $p<.05$) and the EWB subscale ($r =-.42$, $p<.01$). For purposes of illustration, Figure 1 displays the heart rate means across all measurement intervals for the EWB groups. Heart rate is relatively undifferentiated until the end of the recovery period, when the low existential group is slightly more elevated than the high existential group, which continues throughout the structured interview. Finally, during the structured interview, lower DBP and MAP levels were associated with higher RWB scores ($r = -.26$, $p<.10$; $r = -.25$, $p< .10$) and lower MAP scores were associated with higher SWB scores ($r = -.26$, $p< .10$).

In addition to the correlation matrices, diastolic blood pressure levels were also analyzed in a repeated measures design using the means from baseline, the interpersonal betrayal, recovery, and the structured interview, according to high (median-split) and low

SWB scale groups. There was a main effect for groups, such that diastolic blood pressure was higher across all intervals for those in the low spirituality group as compared to the high spirituality group ($F(1, 196)=3.888$, $p<.06$). Figure 2 illustrates these differences. Although the correlations may suggest otherwise, repeated measures analysis with RWB groups was not significant ($F(1, 191)=.899$, $p>.10$).

Physiological Reactivity to the Structured Interview

The literature suggests that reactivity may add unique predictive information above levels; thus, it seems reasonable to follow-up the correlations reported above by analyzing reactivity scores. Given that all of the findings with blood pressure levels appeared to be centered on the structured interview, only those reactivity scores were analyzed. As shown in Table 5, ΔSBP was negatively related to the RWB subscale ($r = -.33$, $p<.05$), as well as ΔDBP ($r = -.25$, $p<.10$). Heart rate reactivity was negatively related to scores on the SWB scale ($r = -.40$, $p<.01$) and the EWB subscale ($r = -.50$, $p<.01$). Thus, individuals with lower scores on the RWB subscale had larger SBP and DBP increases during the structured interview. Furthermore, lower self-reports of overall spirituality and EWB were associated with larger increases in HR.

Spirituality & Forgiveness

In order to test the relationship between spirituality and forgiveness, correlational analyses were conducted. As shown in Table 1, scores on both the EWB subscale ($r = .28$, $p<.05$) and the SWB scale ($r=.27$, $p<.10$) were positively related to scores on the forgiveness scale, indicating that those people who scored higher on the spirituality scales were more likely to have forgiven the offender (the parent in this case). However, the correlation between the RWB subscale and forgiveness was not significant ($r =.21$,

p=.14), indicating no relationship between forgiving the parent in this particular case and religious well-being. All of the well-being scales were negatively correlated with the revenge subscale of the TRIM, meaning that high scores on the well-being scales were associated with lower feelings of revenge. In addition, the SWB scale and the EWB subscale were both significantly related to the avoidance subscale, indicating that higher scores on these two scales are associated with lower levels of avoidance ($r = -.40$, $p < .01$; $r = -.32$, $p < .05$).

CHAPTER 4

DISCUSSION

The current study investigated the relationship between spirituality and self-reported physical and mental health. We also sought to determine whether spirituality would be related to cardiovascular responses to two stressors, an interpersonal betrayal and a brief structured interview. Finally, we assessed the relationship between spirituality and forgiveness. Using the Spiritual Well-being Scale as a measure of spirituality, we assessed blood pressure and heart rate in response to an interpersonal stressor in which participants were instructed to relate a time of parental conflict or hurt. In addition, after a short recovery period, blood pressure and heart rate were assessed during a brief structured interview.

While there is one study in the literature describing the relationship between spirituality and acute blood pressure response to a stressor, the sample consists of older adults (Lawler & Younger, in press). We sought to determine if those findings would be replicable with a college-aged sample. Thus, our hypotheses were based on previous research suggesting the importance of religion and existential factors on certain measures of health, including blood pressure.

Spirituality, Stress and Health

The relationship of the spirituality scales to measures of stress and health were analyzed in a correlational matrix. Interestingly, the EWB subscale was more consistently and strongly related to both physical and mental health than either the RWB subscale or the SWB total score. The EWB subscale was also more strongly related to

stress, and contributed to a predictive model of health controlling for perceived stress. Thus, it appears that existential factors play a more salient role in health and overall well-being than strictly religious factors, at least in a college student sample. Again, this finding mirrors the results reported by Lawler & Younger (2002) with a sample of older adults, in which the EWB subscale was more consistently associated with measures of health and stress. Considering the close relationship between the definition of existential well-being and coherence, it is likely that these findings are related to the coherence hypothesis, as defined by George et al. (2000). They suggest that religion confers health benefits by providing a means of understanding and even finding meaning in suffering. Although this hypothesis may have been exclusively designed to explain the effects of religiousness on health, the characteristics of finding meaning and purpose in life are a hallmark of the EWB subscale. Thus, even though people with an existential orientation toward life may endure the same sorts of stressors as others, they are able to take them in stride and thus may be better prepared to deal with them.

Blood pressure levels and spirituality

We initially proposed that blood pressure levels would be inversely related to spirituality scores throughout the recalled interpersonal betrayal and the brief structured interview. We found that high scores on the EWB subscale were associated with lower HR, beginning in the recovery period, and extending into the structured interview. We also found that diastolic blood pressure was significantly higher across all four time periods for low spiritual persons as opposed to high spiritual persons. This finding was not accounted for by BMI, age, ethnicity, family history of heart trouble, or taking oral contraceptives.

Thus, it appears that higher levels of spiritual and existential well-being are associated with blood pressure and heart rate levels, even in a sample of young, healthy women. It is possible that these differences in blood pressure levels are responsible for the positive associations found between spirituality and health previously in this study. Elevated DBP has been associated with such negative emotions as anger, hostility and anxiety (Suinn, 2001; Linden, Chambers, Maurice, & Lenz, 1993; Smith & Allred, 1989; Helmers & Krantz, 1996). It is possible that those people who display this particular spiritual approach to life may have lower levels of anger, and hostility. In fact, anxiety and anger have been associated with vulnerability to illness, a weakened immune system, and increased risk of cardiovascular disease all related to cardiovascular reactivity (Suinn, 2001). Therefore, a spiritual orientation toward life may influence blood pressure through attenuating anger and hostility responses. Future studies would profitably explore the relationship between spirituality and psychological reactions to stress, such as anger and hostility.

Spirituality and Cardiovascular Reactivity

Based on the finding that blood pressure levels were not significantly different until recovery and into the structured interview, cardiovascular reactivity was assessed only in the structured interview. Systolic blood pressure reactivity was significantly higher in those participants who scored low on the RWB subscale. Heart rate reactivity was also higher in those participants who scored low on the EWB subscale and the total SWB score. Together, these findings suggest that participants low in religiousness have greater systolic blood pressure reactivity than the higher religiousness group, and participants low in existential well-being, or spirituality have elevated levels of heart rate

reactivity in response to the brief structured interview. Overall, these findings suggest a greater sympathetic nervous system response to stressors for the low spiritual group. These types of responses are implicated in various cardiovascular disorders, including hypertension and may be related to hostility and anxiety as well.

Structured Interview

A visual inspection of the distribution across the measurement intervals indicates that the spirituality groups were equally reactive to the betrayal interview; therefore, the differences emerged only during the recovery period and continued into the structured interview. This effect could be satisfactorily explained by the concept of allostatic load. Allostasis is defined as "the ability to achieve stability through change" (McEwen & Seeman, 1999). Normally the body responds to stress and attempts to normalize body functions in response to that stressor. If, however, stress becomes sustained, this is called allostatic load. One of the causes of allostatic load is repeated stressors. The majority of the time, people can respond to the stressful situation and adjust their bodily reactions accordingly or they may habituate to the repeated stressor. However, some people do not have this ability to the same degree. It is possible that the addition of the second stressor rendered certain participants unable to adjust their cardiovascular responses to the sustained stress. Thus, participants higher in existential well-being may have an increased capacity to regulate their cardiovascular functions in response to repeated stressors due to their particular orientation toward life, meaning the ability to find meaning and purpose.

Spirituality and Forgiveness

Finally, we sought to determine if the scores on the spirituality scale, as well as both the subscales, would be related to a behavioral component of spirituality such as forgiveness, given the relationship between forgiveness and positive health. In this case, only the EWB subscale was related to the forgiveness scale. Those participants who scored higher on the EWB subscale were more likely to forgive the offender (the parent in this case). Although the correlation was only moderate in this case, it is possible that forgiveness and existential well-being overlap to a certain extent. It would be worthwhile to further investigate this relationship as it pertains to existential well-being. Curiously, there was no effect for the RWB subscale and forgiveness. It would seem more consistent that persons high in religiousness would be more likely to forgive, given that most religions have provisions for forgiveness. Lawler & Younger (2002) reported a similar finding with a sample of older adults. They suggest the importance of contextual factors that influence judgment and reasoning behavior beyond religious orientation. These contextual factors may include the severity of the offense, the time since the offense, and the importance of the relationship. Given this surprising relationship between religiousness and forgiveness found in both old and young adults, additional research should consider specific contexts in which lack of forgiveness could be independent of religious beliefs.

Implications and Limitations

These results seem to further support the idea that spirituality has a salutary effect on physical and mental health. In particular, an existential orientation toward life may be even more health protective than overall religiousness. However, we did not measure

worship frequency, or religious affiliation, which could have some bearing on these results (Pargament, 1997). Further studies should take these variables into account. It would also be informative to elaborate on the relationship between existential well-being and sense of coherence. It is probable that these two constructs overlap to a large extent given their similar characteristics.

It should also be noted that the order of the two interviews was not counterbalanced. It is possible that the structured interview itself was more stressful for lower spiritual participants as opposed to higher spiritual participants. However, given the static order of the interviews, we can only assume that the repeated stressors were less stressful for the higher spiritual participants based on the concept of allostatic load as previously mentioned. Finally, the inclusion of only women in this particular study limits the generalization of our findings. Future studies should explore potential gender differences on these variables. There is research to suggest that men may not benefit to the same extent as women from religious and spiritual practices (Mahalik & Lagan, 2001).

It appears that the portion of the SWB scale concerned with existential factors, such as meaning in life and life satisfaction, is more closely related to overall health than the more overtly religious portion of the SWB scale. This would indicate that the coherence hypothesis, as reported by George et al. (2000), is an important factor in this particular study. Those people who perceive a certain sense of coherence, purpose, and satisfaction in life are apt to be healthier than their counterparts and therefore, it is likely that some of the effects found with spirituality are attributable to these factors. This would seem to agree with the work done by Antonovsky (1987) on the sense of

coherence. Antonovsky proposed three themes as important to a sense of coherence: comprehensibility, manageability, and meaningfulness. Thus, those people who perceived an order or predictability in their lives, who believed they had the resources to deal with those events that inevitability occur, and who were able to find meaning in those events could be considered to have a strong sense of coherence. Research using this Sense of Coherence Scale has extended cautious support for Antonovsky's hypothesis that sense of coherence could be a major factor in protecting health. Further research should test the similarity between the existential well-being portion of the SWB scale, and the sense of coherence scale. In addition, the link between anger and hostility and existential well-being should be further explored. Spirituality may be health protective because of the potential for anger and hostility moderation. It would also be interesting to further elaborate the inconsistency suggested by the lack of association between religiousness and forgiveness and to explore the contexts in which this might occur.

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APPENDICES

APPENDIX A

Tables and Figures

Table 1
Correlations among the Spirituality scores and measures of stress, health, and forgiveness

	PSS[a]	CHIPS	SWLS	MEDS	MEDC	AF	AVOID	REV
SWB	**-.47****	-.22	**.65****	**-.30***	-.14	**.27**	**-.32***	**-.40****
EWB	**-.51****	**-.46****	**.71****	-.23	**-.25**	**.28***	**-.34***	**-.32***
RWB	**-.30***	.04	**.37****	-.23	.05	.21	-.21	**-.35***
PSS		**.33***	**-.53****	.23	-.15	-.16	.10	-.03
CHIPS			**-.37****	**.28***	**.46****	-.22	.22	.13
SWLS				**-.26***	**-.29***	.13	-.08	.01
MEDS					**.43****	**-.36****	**.36****	.21
MEDC						-.23	.16	.11
AF							**-.63****	**-.59****
AVOID								**.67****

p<.10
***p<.05**
****p<.01**
[a]Note: Perceived stress (PSS), self-reported physical health (CHIPS), self-reported mental health (SWLS), use of medications (MEDS), number of reported chronic illnesses (MEDC), acts of forgiveness (AF), avoidance subscale of TRIM (AVOID), revenge subscale of TRIM (REV)

Table 2
Summary of Hierarchical Regression Analysis for EWB as a Predictor of Physical Health - CHIPS

Variable	B	SE B	Beta	T	p	R^2
CHIPS						
Step 1						
Stress	.725	.304	.326	2.386	.02	.106
Step 2						
Stress	.276	.336	.124	.821	.42	.105
Existential well-being	-.840	.319	-.397	-2.663	.01	.222*
Step 3						
Stress	-2.181	1.897	-.977	-1.149	.26	.105
Existential well-being	-3.107	1.752	-1.468	-1.773	.08	.222
Interaction	5.063E-02	.038	1.093	1.315	.20	.251

*p<.05

Table 3
Mean values for baseline, betrayal interview, recovery and structured interview

	Baseline	*Betrayal*	*Recovery*	*Structured*
SBP	108.22	122.90	112.30	117.57
DBP	65.32	77.96	67.63	73.35
MAP	80.41	95.68	84.62	90.74
HR	71.09	81.90	72.88	78.45

Table 4
Correlations among SWB scale, EWB subscale, RWB subscale and Blood Pressure Levels across Time Periods

	SWB	EWB	RWB
Baseline			
SBP	-.05	-.14	.04
DBP	-.09	-.13	-.02
MAP	-.04	-.10	.03
BPM	-.17	-.18	-.04
Betrayal Interview			
SBP	-.06	.03	-.13
DBP	-.13	-.08	-.13
MAP	-.13	-.07	-.15
BPM	-.12	-.11	-.05
Recovery			
SBP	-.16	-.14	-.13
DBP	-.16	-.16	-.11
MAP	-.16	-.16	-.11
BPM	-.23	**-.28**	-.05
Structured Interview			
SBP	-.21	-.15	-.22
DBP	-.19	-.03	**-.26**
MAP	**-.26**	-.19	**-.25**
BPM	**-.36***	**-.42****	-.15

p<.01**
p<.05*
p<.10

Table 5
Correlations among Reactivity Scores for the Structured Interview and the SWB scale, EWB and RWB subscales

	SWB Scale	RWB Subscale	EWB Subscale
Structured Interview			
ΔSBP	-.23	**-.33***	-.06
ΔDBP	-.06	**-.25**	.17
ΔBPM	**-.40****	-.22	**-.50****

p<.01**
p<.05*
p<.10

40

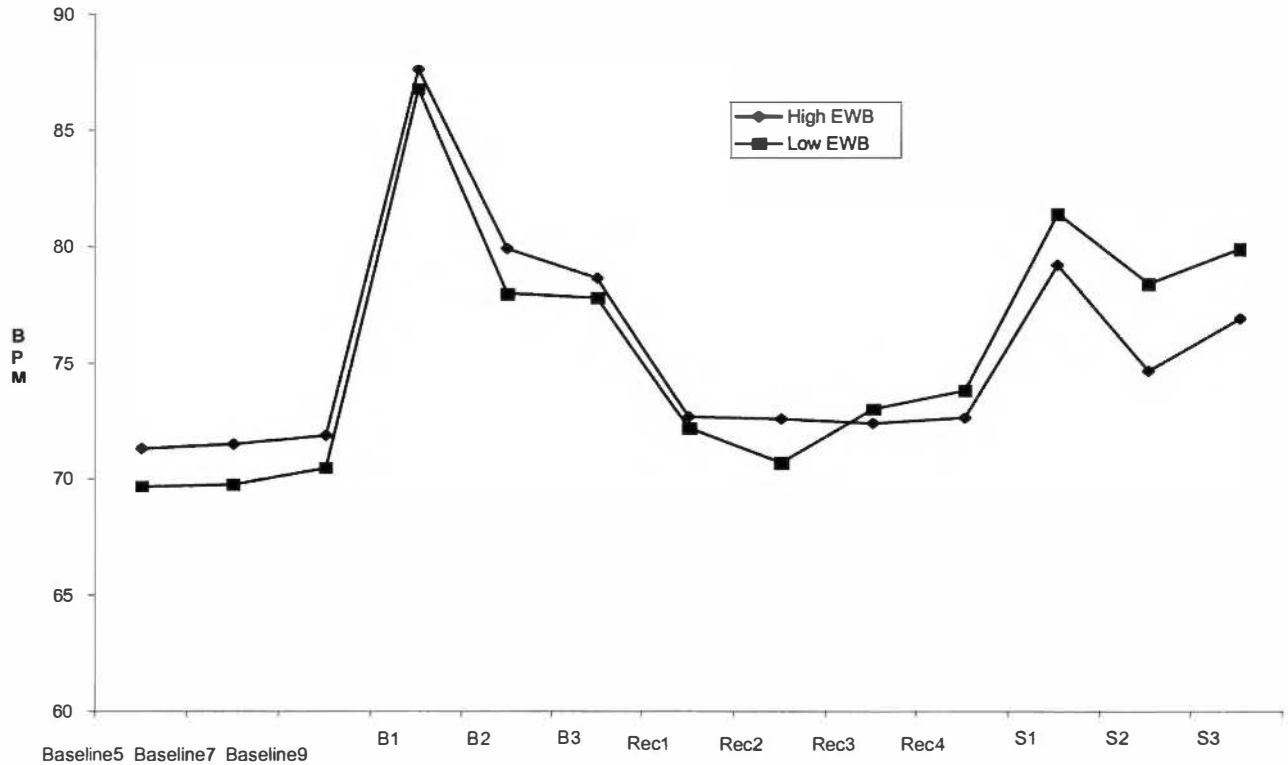

Figure 1
Diastolic blood pressure across all time periods for high and low EWB groups

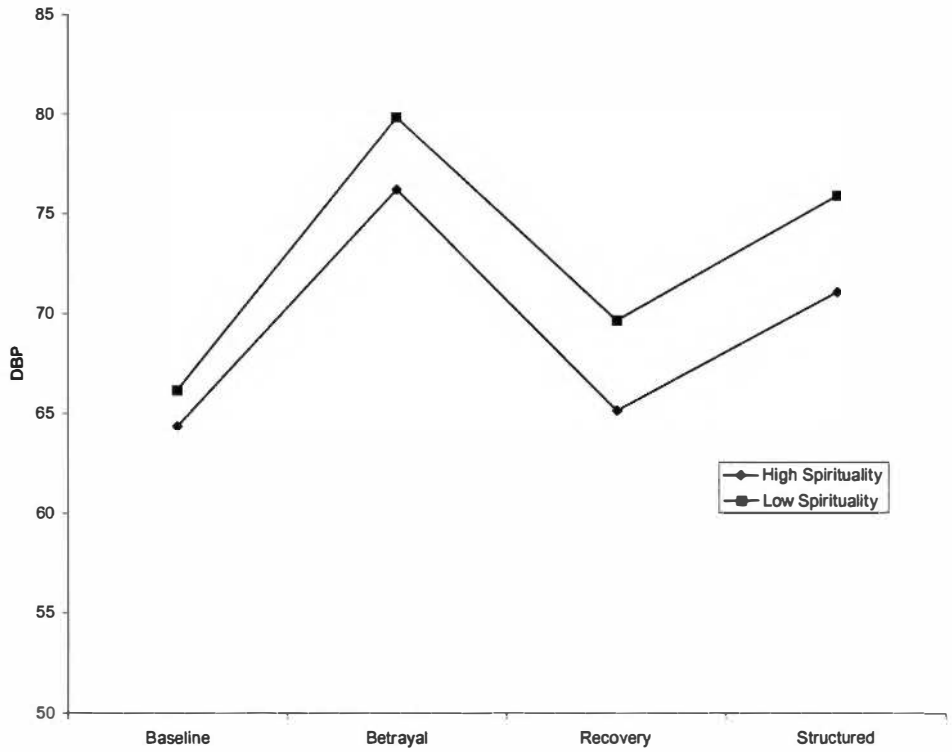

Figure 2
Mean diastolic blood pressure levels across the baseline, betrayal interview, recovery and the structured interview for high and low spirituality group

APPENDIX B

Interview Questions

BETRAYAL INTERVIEW QUESTIONS

1) Now, I would like for you to describe a time when you were betrayed or otherwise hurt by one of your parents. Please describe this event in as much detail as you can.

2) What feelings do you remember having during this event?

3) How did you respond to the offender – did you express your feelings to the offender?

4) Why do you suppose they did this to you?

5) What about this event hurt you the most?

6) What was your relationship like with this person before the event?

7) What is it like now?

8) To the extent that it is the same or better, what has happened to cause the change?

9) What would it take for this situation to be completely reconciled or resolved?

STRUCTURED INTERVIEW

10) How long have you been at UT?

11) Would you describe yourself as a *hard-driving*, *ambitious* type of *man/woman* in accomplishing the things you want, getting things done as *quickly* as possible, *or* would you describe yourself as a relatively *relaxed* and *easy-going* person? How would a close friend or roommate describe you?

5) When you get *angry* or *upset*, do people around you know about it? How do you show it?

6) When you are in your automobile, and there is a car in your lane going *far too slowly* for you and *you cannot get around them*, what do you do? Would you *mutter* and *complain* to yourself? Would anyone riding with you know that you were *annoyed*?

7) What *irritates* you most about the university or the people here?

8) How do you feel about waiting in lines: *Bank* lines, *Supermarket* lines, *Post Office* lines?

Thank you.

VITA

Kimberly Anne Edmondson was born on July 5, 1970 in Mechanicsburg, Pennsylvania. She was raised in Dillsburg, Pennsylvania and graduated from Northern York County School in June, 1988. She entered the Air Force in June, 1988 and served as an Arabic Linguist. In August 1995, she entered The Pennsylvania State University in York where she received her Associate of Arts degree. She then continued to receive her Bachelor of Science degree with Highest Honors, majoring in Psychology from The Pennsylvania State University in Harrisburg. The following Fall, she entered The University of Tennessee, Knoxville and completed the requirements for the Master of Arts Degree in July, 2002.

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