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Spirituality and Religious Support as Buffers against the Negative Effects
of Marital Distress on Ambulatory Blood Pressure

by

John D. Livingstone

A dissertation submitted to the faculty of

Brigham Young University

in partial fulfillment of the requirements for the degree of

Doctor of Philosophy

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BRIGHAM YOUNG UNIVERSITY

GRADUATE COMMITTEE APPROVAL

of a dissertation submitted by

John D. Livingstone

This dissertation has been read by each member of the following graduate committee and by majority vote has been found to be satisfactory.

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As chair of the candidate's graduate committee, I have read the dissertation of John D. Livingstone in its final form and have found that (1) its format, citations, and bibliographical style are consistent and acceptable and fulfill university and department style requirements; (2) its illustrative materials including figures, tables, and charts are in place; and (3) the final manuscript is satisfactory to the graduate committee and is ready for submission to the university library.

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ABSTRACT

Spirituality and Religious Support as Buffers against the Negative Effects of Marital Distress on Ambulatory Blood Pressure

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Doctor of Philosophy

The beneficial effects of religion and spiritual factors on cardiovascular functioning have become an area of increasing research. Similarly, considerable research has also investigated the negative effects of marital distress on cardiovascular functioning. Little is known, however, about potential protective factors against the deleterious effects of marital distress on cardiovascular functioning. Social support has been identified as a potential buffer against the negative effects of marital distress on ambulatory blood pressure, and the current study hypothesized that spirituality, religiosity, and religious support would also buffer the negative effects of marital distress on ambulatory blood pressure. Fifty-eight married couples were recruited from both marital therapists and the community surrounding Brigham Young University. Participants wore ambulatory blood pressure monitors for 24 hours and completed questionnaires which measure marital distress, spirituality, religiosity, religious support and social support. It was found that for

normotensive individuals (SBP < 120) spirituality, religious support, and social support have an additive effect of lowering blood pressure on individuals with high marital quality. No effect was found for spirituality, religiosity, or religious support buffering the negative effects of marital distress on ambulatory blood pressure. It was also found that men and women view the relationships between religiosity and social support, and religious support and social support differently. Specifically, social support is more highly related to religiosity and religious support in women compared to men. It appears that for happily-married individuals, spirituality, religious support and social support have an additive effect in lowering blood pressure.

Spirituality and Religious Support as Buffers against the Negative Effects of Marital Distress on Ambulatory Blood Pressure

The beneficial effects of religion and spiritual factors on cardiovascular functioning have become an area of increasing research (Gillum & Ingram, 2006; Miller & Thorerson, 2003; Seeman, Dubin & Seeman, 2003; Tartaro, Luecken, & Gunn, 2005). Similarly, considerable research has investigated the negative effects of marital distress on cardiovascular functioning (Gottman, 2001; Kiecolt-Glaser & Newton, 2001). However, little is known about potential protective factors against the deleterious effects of marital dysfunction on cardiovascular disease. Marital distress, defined as negative interactions, negative responses to conflict, and poor marital satisfaction (Fincham & Beach, 1999; Pasch & Bradbury, 1998) is related to increased cardiovascular disease (CVD), the leading cause of death in the US (Ritz, 2007). Marital distress is further related to increased blood pressure (BP; Barnett, Steptoe, & Gareis, 2005; Tobe, Kiss, Szalai, Perkins, Tsigoulis, & Baker, 2005), which is one of the strongest predictors of CVD (Ritz, 2007). As the negative aspects of marriage relationships are independent of the positive ones (Rook, 1998), factors that ameliorate the negative effects of marital distress may have important implications for the cardiovascular functioning of married individuals.

Spirituality and religious support are related to lower BP and CVD (Gillum & Ingram, 2006; Seeman, Dubin & Seeman, 2003; Tartaro, Luecken, & Gunn, 2005; Walsh, 1998). Spirituality is a multifaceted construct dealing with an individual's relationship or experience with the transcendent, sacred, holy, or divine, distinct from material reality experienced by the senses, but with observable phenomena (Miller &

Thoresen, 2003). Religious support are the aspects of the social relationships between individuals in their shared place of worship, including support received from fellow parishioners, support given to fellow parishioners, support from religious leaders, and anticipated support (Fiala, Bjorck, & Gorsuch, 2003; Krause, 1999). Spirituality and religious support have been shown to contribute to improved health functioning, although this may be due to lifestyle factors and social aspects (Levin & Vanderpool, 1989; Powell, Shahabi, & Thoresen, 2003). Other research has suggested that these salutary effects are beyond what would be expected when lifestyle factors are controlled for (Gillum & Ingram, 2006; Seeman, Dubin & Seeman, 2003; Tartaro, Luecken, & Gunn, 2005; Walsh, 1998). Therefore, it is possible that spirituality and religious support may buffer against the negative health effects of marital distress; in other words, those higher in spirituality and religiosity may have less detrimental health effects from marital distress.

Marriage and Health

A number of salutary physical health benefits have been documented for individuals in happy marriages. Some of these physical health benefits include lower fatality rates for married individuals following a heart attack compared to unmarried individuals (Chandra, Szklo, Goldberg, & Tonascia, 1983) and higher survival rates following hospitalization for both married men and women. For individuals with cancer, married individuals often have higher survival rates than non-married individuals (Goodwin, Hunt, Key, & Sarnet, 1987). The survival rates for married individuals appear to exceed unmarried individuals even when issues such as timing of diagnosis, type and response to treatment are considered although that the apparent benefits of marriage on

individuals with cancer may not be as significant as timing of diagnosis, type of treatment, and response to cancer treatment (Goodwin, et al. 1987).

The benefits to physical health for happily married individuals may also impact severity of illnesses, responses to treatment, and follow-up care subsequent to hospitalization. For hospitalized patients, marital status is an independent risk factor for several hospital outcomes. For example, individuals who are married often have less severe illnesses upon admission to the hospital than their non-married counterparts while the likelihood of discharge to a nursing home facility following hospitalization is higher for unmarried versus married individuals (Gordon & Rosenthal, 1995). Also, the risk of death among surgical patients is higher for unmarried individuals, and length of stay and hospital costs are higher for unmarried individuals compared with married individuals (Gordon & Rosenthal, 1995).

Not only are there physical benefits from marriage, but there are also mental health benefits for individuals who are married as well. Individuals who are not married have higher rates of psychiatric disorders including schizophrenia and depression (House, Landis, & Umberson, 1988). Although increases in psychiatric disorders for unmarried individuals may be due to increased social isolation compared to married persons, it is possible that unhealthy individuals tend to not become involved in social relationships. Conversely, it is also possible that social isolation itself is a health risk factor for psychiatric illness (House, et al., 1988).

There are specific hypotheses as to why the health benefits for married individuals are greater than for unmarried individuals. It is possible that healthy individuals may be more likely to marry and stay married (Kiecolt-Glaser & Newton, 2001). Alternatively, it

is also feasible that individuals who are married have more social support, less stress, fewer problematic health-related behaviors, and spouses who attempt to control their health-related behaviors leading to improved health outcomes (Umberson, 1992). Both possibilities offer plausible explanations as to why married individuals have improved health functioning compared to unmarried persons.

Although a number of benefits to health can be identified for married individuals, a number of detrimental effects, both physical and mental, can be identified for those experiencing marital distress and disruption. For many individuals, getting married does not significantly change their health behaviors; however, a change from being married to unmarried (either by divorce or widowhood) may result in individuals engaging in more unhealthy behaviors by both men and women (Umberson, 1992). These changes may be due to an increase in stress due to the marriage dissolution for the individual, or because there is no longer a spouse to monitor the individuals' health behavior. Further, these detrimental health effects for these individuals are often more problematic than would be expected for never-married individuals (Glenn & Weaver, 1981).

Although marriage partners may promote healthy behaviors in their spouse, marriage partners may also be a primary source of stress in an individual's life. For many individuals who are unhappily married, higher levels of distress are experienced than those who are unmarried (Glenn & Weaver, 1981). Similarly, for many couples who are distressed, lower levels of positive behavior and higher rates of negative behavior in their relationship are often reported (Jacobsen, Follette, & McDonald, 1982). While marriage partners may be a primary source of social support, in many marriages, spouses may also limit an individual's ability to seek social support elsewhere (Coyne & DeLongis, 1986).

Detriments to mental-health functioning are associated with marital dysfunction. For many individuals experiencing marital discord, there are higher rates of depression. In fact, for individuals experiencing marital discord, the increased risk of depression is 25 times compared to individuals in non-distressed relationships (Beach, Fincham, & Katz, 1998). Even in couples experiencing mild marital distress, there is an increase in major depressive disorder, compared to individuals in non-distressed relationships (Beach et al., 1998). Other marital factors that may contribute to depression in individuals in troubled marriages include negative partner behavior, partner abuse, and low partner satisfaction.

Marital conflict is also associated with poor physical health among marriage partners. Specifically, marital conflict is linked with specific diseases such as cancer and chronic pain (Fincham & Beach, 1999). Hostile marital interactions are also related to decreases in immune functioning and decreased healing from injury (Kiecolt-Glaser, Loving, Stowell, Malarkey, Lemeshow, Dickson, et al., 2005). Of particular importance to individuals in distressed marriage, decreased cardiovascular functioning and cardiac illness are associated with marital distress (Baker, Szalai, Paquette, & Tobe, 2003; Newton & Sanford, 2003).

Cardiovascular Functioning and Marriage

Cardiovascular disease (CVD) is the leading cause of death in the United States (Ritz, 2007). It is estimated that approximately 900,000 people will die each year from heart disease, accounting for approximately 29% of all deaths in the United States. In the past twenty years, a number of factors such as lifestyle (diet, exercise, alcohol use), stress, and cultural factors have also been associated with increased blood pressure.

Blood pressure has been identified as one of the most important risk factors in cardiovascular functioning (Ritz, 2007).

A number of factors have been identified in association with increased blood pressure among maritally-distressed individuals. In marital interactions characterized by conflict-filled interactions in which change in the relationship is requested by one partner, high levels of negative behavior are associated with greater changes in diastolic blood pressure (Newton & Sanford, 2003). Interestingly, although greater negative behavior is associated with higher blood pressure, this appears to be much more pronounced for the person requesting the change, and is more prominent for women than for men (Newton & Sanford, 2003). As women often make more requests for change in their relationships, this offers some insight into research findings indicating that negative marital interactions may be more detrimental for women than for men (Kiecolt-Glaser, et al., 2001).

Other differences in husbands and wives with regard to change in blood pressure and levels of distress also exist. When partners disagree, wives appeared to have greater changes in heart rate and blood pressure than husbands. However, in tasks that challenge partners' achievement (i.e. challenging verbal intelligence), higher rates of blood pressure and heart rate changes are found for husbands (Smith, Gallo, Goble, Ngu, & Stark, 1998). This also indicates that there are important sex differences in the types of stressors that affect the health of marriage partners (Smith, et al. 1998).

Low marital cohesion and quality of marriage are also associated with elevated blood pressure. Individuals with greater marital-role concerns have higher ambulatory diastolic blood pressure during the middle of the day, compared with individuals with low marital-role concerns (Barnett, Steptoe, & Gareis, 2005). Over a three-year time

period, individuals with low marital support had higher rates of diastolic blood pressure than individuals with higher marital support (Baker, et al., 2003). Similarly, unhappily married women often have higher blood pressure in the home compared with happily married women (Carels, Sherwood, Szczpanski, & Blumenthal, 2000). Furthermore, marital stress, but not work stress, predicts poorer prognosis for women with coronary heart disease, suggesting that stressful employment may not be as problematic as stressful marriage (Orth-Gomer, Wamala, Horsten, Schenck-Gustafsson, Schneiderman, & Mittleman, 2000).

Potential Protective Factors for Cardiovascular Functioning

There are a number of factors that are possible buffers or protective factors against cardiovascular functioning in individuals with troubled marriages. As noted previously, happily married individuals often have better health outcomes than do individuals experiencing marital distress (Tobe, et al., 2005). Positive social support may be a protective factor or buffer against the deleterious cardiovascular effects of marital disruption (Stansfeld, et al., 1998). Also, high quality interpersonal relationships, as measured by perceived social support, may act as a buffer against maladaptive cardiovascular responses (Carels, Szczepanski, Blumenthal, & Sherwood, 1998; Steptoe, 2005). This may account for the health benefits to men in happy marriages as they often identify their spouses as their main source of social support (Kiecolt-Glaser & Newton, 2001). However, for many women, their social support networks are much wider usually including spouses, close friends, and other family members as important parts of their social network (Kiecolt-Glaser & Newton, 2001). Regardless, it should be noted that the

presence alone of another individual may not be a protective factor (Kiecolt-Glaser & Newton, 2001).

Religion and spiritual factors have become an area of increasing research and study as most Americans profess a belief in God or a higher power (Miller & Thoresen, 2003). Religious and spiritual factors are related to positive health outcomes, including lower blood pressure (Powell, Shahabi, & Thoresen, 2003). For example, individuals who attend religious services one or more times per week often have lower blood pressure than those who do not attend religious services (Gillum & Ingram, 2006). Also, religious orientation (intrinsic or extrinsic) is related to blood pressure differences in individuals (Masters, Hill, Kircher, Benson, & Fallon, 2004). High religious coping is associated with lower blood pressure among certain groups including African Americans (Steffen, Hinderliter, Blumenthal, & Sherwood, 2001). Other studies have also found that religiosity and spirituality are related to lower blood pressure (Seeman, et al., 2003; Tartaro, et al., 2005).

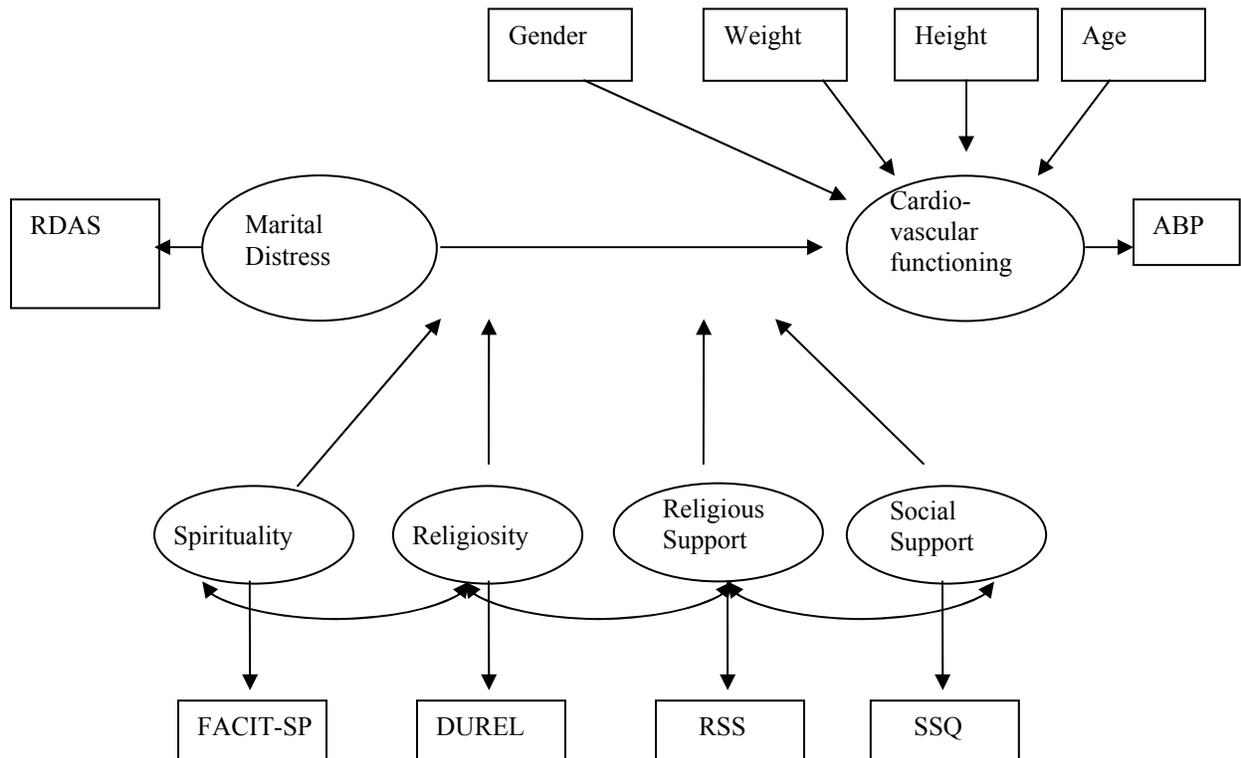
It has been proposed that the benefits of religiosity and spirituality are due to the lifestyle that is associated with religious behavior. Levin and Vanderpool (1989) and others (Powell, et al., 2003) suggested that the salutary effects of religiosity may be attributed to the promotion of health-related behaviors, hereditary predispositions of particular groups, beneficial social factors of religious groups, and psychodynamic factors beneficial to religious systems. They also suggest that future studies take these factors into account when investigating the salutary effects of religion and spirituality on blood pressure. In response, Walsh (1998) found that even when factors such as health-related behaviors and little social support being controlled for, the association of

religiosity and blood pressure remained. Therefore, further research is warranted on the effects of religiosity and spirituality specifically on cardiovascular functioning.

Current Study

Social support has been identified as a buffer against poor cardiovascular functioning for individuals experiencing distress. Religious factors, such as weekly attendance at religious services, spirituality, and religious coping have been identified as salutary factors that may improve an individual's cardiovascular functioning. Marital discord has been identified as a potential risk factor for decreased cardiovascular functioning as a result of increased blood pressure, which may affect future health outcomes for the individual. Therefore it is hypothesized that for individuals experiencing marital distress, high levels of self-reported spirituality will be associated with decreased ambulatory blood pressure. Specifically, it is hypothesized that high levels of self-reported spirituality will moderate the relationship between marital distress and ambulatory blood pressure. Further, it is hypothesized that self-reported religiosity will moderate the relationship between marital distress and ambulatory blood pressure and will be associated with lower blood pressure for individuals experiencing marital distress. It is also hypothesized that religious support will moderate the relationship between marital distress and ambulatory blood pressure and will be associated with lower blood pressure. Finally, it is hypothesized that social support will moderate the relationship between marital distress and ambulatory blood pressure and will be associated with decreased ambulatory blood pressure. Weight, height, age and gender will be also be included as covariates as they have an influence on ambulatory blood pressure (see Figure 1).

Figure 1. Proposed Model



Sample Characteristics

Participants for this study were drawn from a convenience sample recruited from the community in and surrounding Brigham Young University through advertising efforts such as flyers, word of mouth, and referrals from local therapists working with distressed couples. Sample characteristics are presented by gender in Table 1. Initially, 68 couples with participants within the ages of 21 to 65 years old were recruited of which 23 couples were recruited from marital therapists working with the couple in marital therapy. All of the individuals recruited were married; the average marriage duration was 6.16 ± 6.778 years.

The sample was predominantly Caucasian (91.2%), most were members of the Church of Jesus Christ of Latter-Day Saints (94%), and approximately 60% of the sample

earned less than \$30,000. All subjects in this sample had completed high school, many had completed some college (39.5%), and many had graduated from college (36.8%). Because of attrition or malfunctions with equipment used in the study, the final number of participants was 58 married couples (N=116) with 50% being female and 19 couples recruited from therapists working with couples in marital therapy. Exclusionary criteria for participation in the study included pregnancy and use of medication that could affect blood pressure and cardiovascular functioning. Institutional Review Board (IRB) approval was granted prior to conducting the study and informed consent was obtained from each participant prior to their participation in the study.

Procedures

Participants came to the Brigham Young University Comprehensive Clinic in the morning. Upon arrival, participants were weighed and had their height measured. They then had their blood pressure taken three times (with a two minute rest between measures) by a trained laboratory assistant to obtain baseline blood pressure readings.

After obtaining baseline readings, participants were instrumented with an Accutacker II (Suntech, Cary, NC) ambulatory blood pressure monitor. The monitor itself is slightly larger than the average personal digital assistant and was worn on a belt in a protective case. The monitor is equipped with a 3-point electrocardiogram (ECG), with three leads attached to the participant's chest which measure heart rate. The monitor also has a self-inflating cuff and microphone device worn on the non-dominant arm. The microphone, ECG wires, and cuff could be discreetly worn beneath the participant's clothing and allowed for significant flexibility. Some discomfort was reported due to the cuff inflating and deflating and the ECG leads. The monitor was configured to take blood

pressure readings and heart rate at random intervals, approximately three times per hour. Prior to leaving the clinic, blood pressure readings were obtained by both the Accutracker Monitor and the laboratory assistant to ensure accurate functionality of the monitor. Participants then wore the monitor for approximately 24 hours while they participated in their normal daily activities. Participants were also given a number to call if they experienced problems with the monitor throughout the day.

Upon leaving the clinic, participants in this study were encouraged to resume their normal daily activities. Following each reading taken by the monitor, participants were asked to complete a short journal entry immediately following each reading that included information such as level of activity (both physical and mental), current physical position (sitting, standing, etc.), a brief description of what they were doing, who they were interacting with at the time, and their mood at the time. Participants then returned the next morning to have the monitor removed and to turn in questionnaires and journals. All participants were compensated for participation in this study. To protect the subject's information and confidentiality, subject identification numbers were used rather than the individual's name. Also, all study data collected were stored in a secure database with access limited to those involved directly in the study.

Measures

All participants were asked to complete a battery of questionnaires, which took an average of one to two hours to complete. Basic demographic information was collected including age, gender, socioeconomic status, years of marriage, and number of children (if any).

Marital Distress. In order to measure marital distress, participants were given the RDAS (Busby, Crane, Larson, & Christensen, 1995) as part of a battery of questionnaires to complete. The RDAS is a 14-item measure that use a 6-point Likert scale yielding a total score indicating marital quality. The RDAS total score for marital quality can be further broken down into subscales measuring consensus, satisfaction, and cohesion. The RDAS has been shown to be effective at identifying couples and individuals as either distressed or nondistressed (Wood, Crane, Schaalje, & Law, 2005) in their relationship using a cutoff score of 48 (Crane, Middleton, & Bean, 2000). Those couples with scores below 48 would be classified as distressed. The RDAS has a Cronbach's alpha of .90 and a split-half reliability coefficient of .95 (Crane et al. 2000). Questions asked by the RDAS include identifying the extent of disagreement on making major decisions, religious matters, and sex relations. Questions also ask the extent to which the couple quarrels, has considered divorce or separation, and engages in outside interests together.

Spirituality. Spirituality for each participant was measured using the FACIT-Sp, a measure of spirituality that is part of the Functional Assessment of Cancer Therapy-General (FACT-G) measurement system (Peterman, Fitchett, Brady, Hernandez, & Cella, 2002). This 12-item measure asks participants to describe aspects of spirituality including comfort and strength in faith or spiritual beliefs, meaning in their lives, and sense of harmony. The FACIT-Sp was found to have a Cronbach's alpha of .87 (Peterman, et al., 2002).

Religiosity. Participants' religiosity was measured using the DUREL, a religion index for psychiatry research (Koenig, Parkerson, & Meador, 1997). Questions from this questionnaire measure the organizational dimension, private religious activities (i.e.

reading the bible, personal prayer), and intrinsic religiosity (i.e. experiencing the presence of the divine). For this scale, Cronbach's alpha was found to be .75 (Koenig, et al., 1997).

Religious Support. Religious support experienced by participants was measured using the Religious Support Scale (Krause, 1999). The RSS is a 12-item measure utilizing a 4-point Likert scale (very often, fairly often, once in a while, and never). Questions on the RSS include how often people in the congregation make the respondent feel loved and cared for, or whether the respondent feels like members of the congregation are critical and demanding. The RSS was found to have reliability between .75 and .90, with inter-item correlations between .65 and .80 (Fiala, Bjorck, & Gorsuch, 2002).

Social Support. General social support was measured using the Social Support Questionnaire (SSQ; Sarason, Levine, Basham, & Sarason, 1983). The SSQ encourages the respondent to identify those individuals in their life whom they can rely on, who help them feel relaxed, who care about them, and the degree of satisfaction they experience within these relationships. The SSQ was found to have an inter-item correlation of .54 and an alpha coefficient of .94. Test retest reliability was found to be between .83 and .90 (Sarason, et al. 1983).

Other participant characteristics were assessed directly from self-reported information. For example, household income was determined by the participant's response to a range of possible incomes on a demographic questionnaire, while height and weight were assessed by the laboratory assistants when the participants were initially instrumented with the ambulatory blood pressure monitor.

Data Analysis Plan

In order to investigate the effects of spirituality, religiosity, religious support and social-support satisfaction with marital distress and the effect on ambulatory blood pressure, multi-level modeling was employed using SPSS (Linear Models, Mixed). Multi-level modeling was selected as the appropriate analytical tool as it allows for analysis of data in which the observations (i.e. blood pressure of married partners) are not independent. The data that was collected from the married couples will be organized into dyads and then analyzed with dyads as the unit of analysis rather than as separate individuals. This is considered optimal as marital quality is central to the current study and it is assumed that married partners affect each other and, subsequently, their reported marriage quality. Also, married couples may have similar lifestyles and health behaviors which may affect their ambulatory blood pressures. Therefore, the effects of lifestyle and relationship on individuals' blood pressure must be accounted for when analyzing the data. Multilevel modeling produces estimates similar to beta weights obtained through ordinary multiple regression coefficients; however, because multi-level modeling allows for the analysis of dyads rather than separate individuals, these coefficients are more accurate than regular multiple regression techniques allow. Also, as is common with multilevel-modeling, data from independent variables will be centered around their respective grand-means.

Analysis will then focus on the relationships between the constructs of spirituality, religiosity, religious support and social support. In order to do this, Pearson Product-Moment Correlation coefficients will be calculated based on scores from the FACIT-Sp, the DUREL, the RSS, and the SSQ. Important differences often exist between

men and women and therefore the correlation coefficients will be calculated for women and men separately, as well as combined.

Results

Dyadic Data

Initial analysis investigated religious and spiritual factors that were reported by the subjects in this study (see Table 2). Results from the couples in this study suggest similarity between the men and women in measures of marital distress, spirituality, religiosity, religious support and social support. Paired samples t-tests for scores on the RDAS, FACIT-Sp, DUREL, RSS, and SSQ scales did not reveal any significant mean differences for men and women in their scores.

The data collected from each individual were organized into married-couple dyads in order to evaluate whether there is a relationship between the married partners' ambulatory blood pressure and the effect of marital distress on ambulatory blood pressure. As gender is a distinguishing characteristic for members of the dyad, the Pearson product-moment correlation coefficient was used to measure the collinearity of ambulatory blood pressure between married individuals. Initially, no significant correlation was found between either systolic or diastolic blood pressure between husbands and wives. However, when the effects of marital distress were partialled out, a significant partial correlation was found for systolic blood pressure when awake for the couples ($r = .331, p = 0.023$). Similarly, another significant partial correlation was also found ($r = .296, p = 0.043$) for diastolic blood pressure when awake for the couples when the effects of marital distress are partialled out. Because there appears to be a relationship between married partners blood pressure when accounting for marital

distress, the effects of the relationship must be accounted for when analyzing the current data, and therefore analyses are made at the level of the dyad, rather than as separate individuals.

Spirituality, Religious Support, and Social Support affecting Blood Pressure

The dependent variables in the analyses were the means of the ambulatory systolic and diastolic blood pressures for each subject during awake and asleep periods. Each subject's age, height, and weight were included in the analysis as covariates, while gender (repeated measure) and dyad (subjects) were included as factors. The moderator variables (scores on spirituality, religiosity, religious support and social support) were analyzed to measure the impact of spirituality, religiosity, religious support and social support on the relationship between marital distress and ambulatory blood pressure.

In order to address the hypotheses of the current study, investigation was made by using marital distress as a continuous variable while observing interactions between marital distress and spirituality, religiosity, religious support and social support. When using the marital distress as a continuous variable, no significant main effects or interactions were found for spirituality, religiosity, religious support, or social support satisfaction with marital distress for the participants of this study. This was found for systolic and diastolic blood pressures, for both awake and asleep periods. Not surprisingly, weight, age, gender had main effects on blood pressure with increased weight ($\beta = 0.1689$, $p = .000$), older individuals ($\beta = .1830$, $p = .031$), and male gender ($\beta = 5.339$, $p = .039$) being associated with increased blood pressure.

Analyses then focused on those individuals in the study who were identified as normotensive (SBP < 120) versus prehypertensive (SBP > 120) and was included as an

additional interaction term. Marital distress was again included as a continuous variable to investigate whether an additive affect on blood pressure for spirituality, religiosity and religious support could be found for those not experiencing marital distress. Interestingly, an interaction was found between marital quality and spirituality ($\beta = -.0562$, $p = .001$) for normotensive individuals compared to hypertensive persons indicating that as spirituality increases and marital quality increases, additional decreases are found for SBP. Similarly, another interaction was found between marital quality and religious support ($\beta = -.0901$, $p = .027$) for normotensives compared to prehypertensives, suggesting that religious support may have an additional affect on SBP as marital quality increases for normotensive individuals. Finally, a third interaction was found for marital quality and social support satisfaction ($\beta = -.9705$, $p = .001$) for normotensives versus hypertensive individuals for SBP when individuals are awake. Similar effects are also found for SPB when individuals are asleep. The interaction between marital quality and spirituality continues to be found for normotensive versus hypertensive individuals ($\beta = -.0432$, $p = .028$). The interaction between marital quality and social support is also found for SBP when asleep for normotensive individuals versus hypertensive individuals ($\beta = -.7935$, $p = .017$), although less pronounced when compared to the awake period. Weight and gender continue to produce main effects on systolic blood pressure, although gender does not have a main effect on SBP when subjects are asleep.

For diastolic blood pressure when awake, a significant interaction was found for marital quality and spirituality ($\beta = -.0246$, $p = .038$) for normotensive individuals compared with prehypertensive individuals. Similar to SPB when awake, a significant interaction was found between marital quality and social support ($\beta = -.3680$, $P = .034$)

for DBP when awake. For DBP when asleep, only age was found to have a significant main effect ($\beta = .2092$, $P = .040$). Similar to SPB, weight continued to exhibit a main effect on DBP. Age had a main effect on DBP while the effect for gender was not found for DBP.

Gender Differences in Construct Relationships

Further evaluation investigated the relationships between the constructs of spirituality, religiosity, religious support and social support as measured by the FACIT-Sp, the DUREL, the RSS, and SSQ respectively. Using the Pearson product-moment correlation, there appears to be moderate to strong relationships between these factors (see table 3). Interestingly, only a moderate relationship is found between religious support and social support satisfaction ($r = .394$, $p = .000$), suggesting that religious support and social support are related, but not identical constructs. A strong relationship is found between the spirituality and religiosity ($r = .616$, $p = .000$) suggesting that these two constructs are highly related. Similarly, there is a strong relationship between the spirituality and religious support ($r = .623$, $p = .000$) again suggesting that these are highly related constructs. However, when the correlations between these constructs are calculated separately for men and women important discrepancies arise.

Important differences were found in the correlations of spirituality, religiosity, religious support, and social support when calculated for men and women separately (see Tables 4 and 5). In order to compare the different correlations produced by men and women, the correlation coefficients were transformed into Fisher's Z scores and compared for statistically significant differences (Kenny et al., 2006; see Tables 6 and 7). It was found that women and men in this study produced similar correlation coefficients

for spirituality and religiosity, spirituality and religious support, and spirituality and social support satisfaction when these were calculated according to gender. Similarly, no significant differences were noted in the correlations between religiosity and religious support in this sample. However, it was found that both religiosity and religious support had significantly weaker relationships with social support satisfaction for men in this sample than for their spouses. Interestingly, the weakest relationship was found between religious support and social support satisfaction ($r = .279, p = .037$) for men in this sample. These findings suggest that men and women differ in their views of religiosity and social support, and in their views of religious support and social support. They further underscore the importance of investing religious support as a separate construct from general social support.

Discussion

The current study used married individuals organized into dyads to investigate the effects of spirituality, religiosity, religious support and social support on ambulatory blood pressure. Many of the couples in the study were proactively identified as experiencing marital distress and were recruited from marital therapists in the community. It was found that for those experiencing marital distress, spirituality, religiosity, and religious support do not buffer the effects of marital distress on ambulatory blood pressure. However, for normotensive individuals who are happily married, it appears that spirituality, religious support, and social support have an additive effect in lowering blood pressure. It is possible that the effects of spirituality, religious support, and social support satisfaction are positive aspects of relationships which do not affect the negative aspects, and it has been noted that positive aspects of relationships are

separate from the negative aspects (Rook, 1998). Alternatively, it may be that spirituality and religious support have an effect on ambulatory blood pressure, but the benefits are outweighed by the detriments of marital distress. In other words, marital distress may be more detrimental to ambulatory blood pressure than spiritual factors are beneficial. Regardless, these findings appear to be consistent with the literature suggesting that the benefits of spirituality tend to favor healthy individuals (Miller & Thoresen, 2003, Powell, et al. 2003). However, no effects for religiosity were found suggesting that the cardiovascular benefits to happily married couples are not only based on religious behaviors (i.e. lifestyle, healthy behaviors) as has been suggested (Levin & Vanderpool, 1989; Powell, et al., 2003).

The current study also found that men and women differ in their views of the relationship between social support and religious support, and the relationship between social support and religiosity. Specifically, social support appears to be more central to religiosity and religious support for women than for men. There are a number of reasons why this may be the case. Firstly, women often have more extended social networks than men (Kiecolt-Glaser & Newton, 2001) and it may be that their networks are more likely to extend to members of their religious congregation than men. Second, this was a highly religious sample (91% acknowledge weekly religious attendance or more) and almost half of the women in this sample identified themselves as homemakers or unemployed. Therefore, it is possible that many of the individuals in these women's social support group are also members of the congregation they attend, thereby causing significant overlap in religiosity and social support for the women in this sample. It should be noted also that for members of the Church of Jesus Christ of Latter-Day Saints, congregations

are based on geographical areas and therefore it is likely that the people who live in close proximity to the participants also attend services with them. Conversely, over half of the husbands in this study identified themselves as employed full-time or a full-time student (none identified themselves as homemakers) and therefore may have access to other sources of social support outside of their religious congregation through work or classes. It also may indicate that for women, the social aspects of religious behavior (i.e. attending church) are more related to religiosity than for men.

Finally, it was found that there is a significant relationship between the ambulatory blood pressures of marriage partners when accounting for marital quality and the effect each partner has on the other in the relationship. Therefore, the importance of using dyadic information to investigate the effects of marital quality on blood pressure rather than evaluating individuals separately as the unit of analysis is manifest. Further, the current study also focused on spirituality and religiosity as separate constructs whereas other studies have focused on them together, usually as measured by attendance at weekly religious services. Although these two constructs appear to be highly related, value and additional information is gained by evaluating them as separate constructs.

Some important limitations can be noted for the current study. First, the sample was drawn from primarily Caucasian members of the Church of Jesus Christ of Latter-Day Saint. Most of these individuals acknowledged frequent attendance at church services and many members of the church adhere to strict doctrines of the church regarding health behaviors (i.e. no alcohol and no tobacco) that are known to affect cardiovascular health. Therefore, the generalizability of these findings to other religious groups or the general public are unknown. A more diverse sample may also lead to further knowledge of

cultural influences on religion and how that affects blood pressure. Studies using individuals who do not attend services regularly but still identify themselves as highly religious or spiritual would be beneficial.

Second, although the study utilized a relatively large number of dyads compared with other studies, an even larger sample size of couples (i.e. 150-200 dyads) may allow for other statistical analyses, such as Structural Equation Modeling, that could investigate each factor and covariate in the model and their influences collectively. It should be noted that the subjects in this study were relatively young (mean age < 30 for men and women), and the duration of marriage was also relatively short (mean < 7 years). As hypertension often affects older individuals more than younger individuals, it is possible the same study with older individuals would yield valuable information. Similarly, studying marriage partners who have been married longer, and who have experienced marital distress for longer periods may lead to further information about spiritual factors and marital quality on ambulatory blood pressure.

Finally, two of the questionnaires in the current study were brief measures (the DUREL and the SSQ). The questionnaire measuring religiosity was a brief, five-item questionnaire; a longer questionnaire investigating more aspects of religious behavior may yield more information, particularly about the influence of religiosity in participants' daily lives. Similarly, the questionnaire measuring social support satisfaction was also a brief, six-item questionnaire where a longer questionnaire measuring other aspects of social support (i.e. community support and resources, availability of support) may be beneficial.

Among normotensive, happily-married couples, there were significant interactions between marital quality and spirituality, marital quality and religious support, and marital quality and social support on lowering ambulatory blood pressure. These affects remained even when gender, height, and weight were accounted for. The current study extends the literature suggesting that spirituality and religious variables may interact with marital quality, which in turn affects blood pressure. Future studies might build on this study by investigating larger samples of married couples, other religious groups, and more diverse samples to include ethnicity, SES, and other health-related behaviors.

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Table 1

Demographic Characteristics

Variable	Female (n=58)	Male (n=58)
Demographics		
Age	28.48 ± 7.651	29.95 ± 7.664
Number of children	1.54 ± 1.428	1.54 ± 1.428
Education	36% College degree or higher	36% college degree or higher
Income (% > 30,000)	60.4%	60.4%
Ethnicity (% White)	91.2%	91.2%
Anthropometric		
Height (cm)	165.75 ± 6.177	179.420 ± 6.906
Weight (kg)	65.66 ± 15.75	84.141 ± 16.813
BMI (kg/m ²)	23.854 ± 5.372	26.119 ± 4.860
Blood Pressure (mm hg)		
Wake SPB	110.78 ± 9.995	122.52 ± 10.53
Wake DPB	66.97 ± 6.36	72.24 ± 6.85
Sleep SPB	99.19 ± 10.825	106.14 ± 9.786
Sleep DPB	56.09 ± 7.976	60.55 ± 6.033

Table 2

Mean Score Responses to the RDAS, FACIT-Sp, DUREL, RS and SSQ scales for Men and Women

Variable	Female (n=58)	Male (n=58)
RDAS Total	50.37 ± 7.69	51.02 ± 7.84
FACIT-Sp Total	96.82 ± 12.87	93.45 ± 13.16
DUREL Total	7.46 ± 2.59	7.95 ± 3.37
RS Total	23.12 ± 6.57	24.48 ± 6.00
SSQ		
Number	3.95 ± 1.70	3.84 ± 2.16
Satisfaction	5.27 ± 0.99	5.24 ± 0.81

Table 3

Construct Correlations for All Respondents

	FACIT-Sp	DUREL	RS	SSQ Sat.
FACIT-Sp	-	.616*	.623*	.506*
DUREL		-	.598*	.471*
RS			-	.394*

*significant at the 0.01 level

Table 4

Construct Correlations for Women

	FACIT-Sp	DUREL	RSS	SSQ Sat.
FACIT-Sp	-	.591*	.599*	.593*
DUREL		-	.514*	.675*
RS			-	.492*

* Significant at the 0.01 level

Table 5

Construct Correlations for Men

	FACIT-Sp	DUREL	RSS	SSQ Sat.
FACIT-Sp	-	.634*	.641*	.419*
DUREL		-	.681*	.318**
RS			-	.279**

* Significant at the 0.00 level

** Significant at the 0.05 level

Table 6

Fisher's Z Score for Women

	FACIT-Sp	DUREL	RS	SSQ Sat.
FACIT-Sp		.6792 ± .2745	.6916 ± .2718	.6823 ± .2800
DUREL			.5682 ± .2718	.8199 ± .2858
RS				.5387 ± .2829

Calculated Fisher's Z comparing Women and Men's Correlations (95% CI in parentheses)

$$\text{Fisher Z equation: } z_r = (1/2)[\log_e(1+r) - \log_e(1-r)]$$

$$\text{Confidence Interval: } 95\% \text{ CI} = Z \pm 1.96/\text{sqrt}(n-3)$$

Table 7

Fisher's Z Scores for Men

	FACIT-Sp	DUREL	RS	SSQ Sat.
FACIT-Sp		.7481 ± .2718	.7599 ± .2745	.4465 ± .2692
DUREL			.8310 ± .2718	.3294 ± .2692
RS				.2866 ± .2718