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Social Buffering by God: Can Prayer Reduce Stress in an Experimental Setting?

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SOCIAL BUFFERING BY GOD:

CAN PRAYER REDUCE STRESS IN AN EXPERIMENTAL SETTING?

by

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(Under the Direction of Janie H. Wilson)

ABSTRACT

Social networks are associated with positive health outcomes such as higher ratings of life-satisfaction, reduced risk of mortality, and decreased cardiovascular responses. Similarly, religiosity has been found to be beneficial to both physical and mental health. Specifically, religious involvement has been associated with decreased blood pressure and heart rate. Further, a social presence during a stressful event has been associated with reduced stress as measured by heart rate, blood pressure, and lower self-reported stress. However, this social buffering may not extend to a perceived presence, such as a higher deity. The current experiment examined whether prayer could reduce stress responses (blood pressure, heart rate, and self-reported anxiety levels) during a stressful situation and found that blood pressure and heart rate were not significantly related to treatment condition. However, a marginal association between condition and self-reported anxiety was found, suggesting that social buffering can be offered through prayer.

INDEX WORDS: Social buffering, Prayer, Cardiovascular stress responses, Social support, Religion, Gender differences

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DEDICATION

I would like to dedicate this work to my parents, Jim and Laurie Schwartz. Their support

has been an essential component to my success in life.

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CHAPTER 1

INTRODUCTION

Previous research suggests that having strong social relationships (social networks) can be beneficial in regard to many aspects of mental and physical health. In particular, social networks have been associated with decreased anxiety, depression, and fatigue (Achat, Kawachi, Levine, Berkey, Coakley, & Colditz, 1998). Individuals with a great deal of ongoing social support also have higher ratings of quality of life (Freidland, Renwick, & McColl, 1996) and emotional well-being (Baker & Taylor, 1997).

Social networks benefit various aspects of physical health as well. Research indicates that social networks are related to a reduced risk for coronary heart disease and hypertension (Berkman & Syme, 1994). Furthermore, social networks may even moderate death rates. House, Landis, and Umberson (1988) found that the highest mortality rates were among individuals with limited or poor social relationships. Cardiovascular functioning is another area of physical health that is affected by social networks. A team of researchers monitored the ongoing blood pressure of 148 workers from seven different occupations and found that mean heart rates were significantly higher among participants who reported low social support at work. Further, this effect was observed not only during working hours, but also during leisure time and rest (Undén, Orth-Gomér, & Elofsson, 1991).

The relationship between social support and health is not always as simple as it may seem, however. In fact, research suggests that the health benefits associated with social support vary by gender. For example, one experiment found that social support was associated with reductions in ambulatory systolic blood pressure for women only.

That is, these researchers found that, for men, social support did not significantly decrease cardiovascular reactivity (Linden, Chambers, Maurice, & Lenz, 1993).

Another experiment that examined gender and social support found similar results. Olstad, Sexton, and Søgaard (2001) investigated the relationship between social support/social networks, mental distress, and stress among individuals aged 20 to 39 and 40 to 62. These researchers found that social support/social networks buffered women more than men in terms of the effect of work stress on mental health.

Overall, research provides evidence that social support and access to social networks have many advantages, although these advantages may vary by gender. Presumably, social networks provide ongoing comfort and support, which in turn benefits overall health. Although ongoing social support may come in many different forms, it is typically described as support from friends, family, and/or co-workers. Religiosity may also be seen as a form of ongoing support, although it is not a form of social support per se. Indeed, research suggests that support from religiosity has health benefits similar to support from social networks.

Throughout the past century, a great deal of literature has accumulated regarding the relationship between religion and health. Studies of this nature suggest that both mental and physical health benefit from various aspects of religious involvement (George, Ellison, & Larson, 2002). This relationship is not as simple as it may seem, however. Evidence from these studies suggests that causality likely runs in both directions. Also, it is important to keep in mind that religion is a multidimensional construct that is not easily defined. Thus, various aspects of religious involvement must be examined in order to understand the correlations it has with health.

Definitions

Two major dimensions of religious activity are organizational religious activity and non-organizational religious activity. The distinction between these two activities is important because each one yields different results in regard to benefits of religion. Koenig, George, and Titus (2004) described organizational religious activity as the social aspect of religion. That is, it can be viewed as the other-directed dimension of religiousness. Organizational religious activities include going to church or synagogue, participating in private prayer or Bible study groups, and attending other church/synagogue activities. Non-organizational religious activity, on the other hand, involves religious behaviors that are more personal and private.

When a person is engaged in a non-organizational religious activity, he or she is typically alone. Thus, these behaviors do not necessarily involve relating to other people. Examples of non-organizational religious activities include reading religious literature, listening to religious radio or watching religious television, and mediation or private prayer (Koenig et al., 2004).

Another important distinction involves the motivation for pursuing religion. Allport and Ross (1967) offered two main motivations for religious involvement: extrinsic motivation and intrinsic motivation. One major distinction between the two motivations is that a person with an extrinsic motivation *uses* his or her religion, whereas someone who is intrinsically motivated *lives* his or her religion. Allport et al. (1967, p.34) concisely stated that "…the extrinsic type turns to God, but without turning away from the self." People with extrinsic orientations use religion for their own personal gain. For example, these people may find religion useful for securing their social status. People

who are intrinsically motivated, on the other hand, view religion itself as an end. These people put their religion first and everything else second. They embrace a religious doctrine and make a conscientious effort to internalize and follow this doctrine.

Mental/Subjective Health and Religion

As noted, a growing body of literature supports the notion that religiosity is inversely associated with mental or subjective health. In particular, one experiment found that several aspects of prayer were related to depression, anxiety, and other mental states (Laird, Snyder, Rapoff, & Green, 2004). The authors examined 162 arthritis patients and found that patients with greater faith reported fewer symptoms of depression and anxiety. Also, frequency of prayer per week predicted emotional health for osteoarthritis patients, such that the more days per week these patients prayed, the better their affective disposition. In particular, prayers of thanksgiving (expressions of gratitude for life circumstances) had an added benefit. Osteoarthritis patients who engaged in more prayers of thanksgiving reported higher levels of overall subjective well-being. Lastly, prayer indices were positively correlated with hope among arthritis patients.

Similarly, Kroll and Sheehan (1989) found religion and mental health to be negatively correlated. These researchers studied psychiatric inpatients in terms of their religious beliefs, practices, and experiences. After the researchers collected information on the mental status of the patients, participants completed two inventories (one assessing depression and the other measuring religious variables). The results showed that patients with major depression and anxiety disorders were the least religious. Interestingly, these two groups of psychiatric patients had the lowest percentage of believers in God.

Mirola (1999) also found support for a negative relationship between religion and depression. This experiment was conducted on a sample of men and women between the ages of 18 and 55. The four measures of religious involvement that were used included frequency of church attendance, holding an office or responsibilities within the church, perceived spirituality or religiosity, and use of prayer to cope with stress. The author found that religious involvement was negatively associated with depression, but only for women. That is, women who scored higher on measures of religious involvement were less likely to be depressed. Further, Mirola found that one specific type of religious involvement, prayer, had the ability to buffer the harmful effects of chronic role strains on women's depression. Regardless of the fact that men considered themselves to be "somewhat" to "very" religious, attended church frequently, and held office within the church, there was no relationship between religious involvement and depression found among men.

Other studies that link depression to religious involvement have found similar results. Pressman, Lyons, Larson, and Strain (1990), for example, found that participants with strong religious beliefs were less likely to be depressed. Additionally, Koenig et al. (2004) found that religiousness and spirituality predicted fewer depressive symptoms. Specifically, Koenig et al. discovered that participants involved in organizational religious activity and those with more daily spiritual experiences were less likely to be depressed. Also, depressive symptoms were less common in participants with greater intrinsic religiosity and for participants more involved in activities such as prayer.

In addition to alleviating depression, religiosity seems to improve general mental health. Parker, Roff, Klemmack, Koenig, Baker, and Allman (2003) examined the

interaction of three measures of religiosity on depression and general mental health. The three measures of religiosity were organizational religiosity (frequency of church attendance or other religious meetings), non-organizational religiosity (frequency and time spent in private religious activity, such as prayer), and intrinsic religiosity. A sample of 1000 adults (age 65 years or older) participated in this study. The researchers found that participants who scored high on all three measures of religiosity had the lowest depression scores and the highest general mental well-being scores. Similarly, Lawler and Younger (2002) found that both the Spiritual Well-being Scale and the Stanford Spiritual Experiences Scale were associated with several psychological mood states that included tension, depression, anger, vigor, inertia, and confusion. In other words, higher levels of spirituality predicted lower levels of negative mood.

Religion has also been associated with reductions in anxiety. Specifically, Wiegand (2004) found that one particular religious behavior, prayer, influenced state anxiety. In this experiment, college student participants read either a prayer or a control passage before they completed an anagram performance task. Using two separate instruments, this experiment assessed state anxiety levels both before and after the manipulation. Contrary to what was expected, this experiment found that state anxiety did not significantly differ between participants who read a prayer before the task and those who read a control passage before the task. However, further examination revealed that when participants in the prayer condition actually prayed, they exhibited significant reductions in state anxiety. That is, participants who actually prayed had less anxiety than those who simply read the prayer. This experiment illustrates the complex nature of religious behavior and the potential benefits that are associated with it.

In more general terms, religion has been shown to have a positive effect on mental and subjective well-being. Ellison, Boardman, Williams, and Jackson (2001) examined this relationship by analyzing data from the 1995 Detroit Area Study. These researchers focused on three major aspects of religious involvement for their predictor variables: religious service attendance, prayer, and belief in eternal life. The dependent variables in this experiment were psychological distress and psychological well-being. The results showed that frequency of attendance at religious services was positively associated with psychological well-being and negatively associated with psychological distress. These associations remained significant even after the researchers controlled for a wide range of psychosocial and sociodemographic covariates. They also found that belief in eternal life was a significant predictor of psychological well-being, but it was not associated with psychological distress.

Further, spiritual involvement has been associated with improved subjective well-being. Fabricatore, Handal, and Fenzel (2000) conducted an experiment that examined the influence of personal spirituality on subjective well-being. Personal spirituality involves experiencing a connection with God and incorporating religious or spiritual beliefs into everyday life. This experiment also examined whether personal spirituality has the ability to moderate the effects of stressors. One hundred and twenty undergraduate students from a religiously affiliated liberal arts college were recruited for this experiment. These participants filled out a packet of questionnaires assessing spiritual involvement, satisfaction with life, and experience of stressors (both everyday hassles and significant life events). The researchers found that stressors were negatively associated with satisfaction with life for individuals low in personal spirituality. In

contrast, there was no significant relationship between stressors and satisfaction with life for those high in personal spirituality. Therefore, this experiment revealed that personal spirituality had the ability to moderate the relationship between stressors and satisfaction with life. This suggests that high personal spirituality is capable of buffering against some of the negative aspects of stress.

Compton (2001) supported this notion that religion is necessary for well-being. He proposed that, in addition to subjective well-being and personal growth, a type of religiosity is necessary for complete psychological well-being. Compton believed that the recent reviews of psychological well-being were incomplete because they only included two factors (subjective well-being and personal growth). In his study, Compton added a type of religiosity to the existing theory of psychological well-being in order to describe how people search for well-being. This type of religiosity is marked by its emphasis on other-centeredness and self-reunification. The participants in this study were primarily undergraduate students; although, graduate students and volunteers from the community also participated. The participants completed 10 measures of psychological well-being that totaled 21 scales and subscales. The results supported Compton's hypothesis that a type of religiosity that is characterized by other-centeredness is an important factor in psychological well-being. Overall, he found support for a tripartite model of psychological well-being that included subjective well-being (happiness and life satisfaction), personal growth (self-actualization, a sense of meaningfulness), and other-centered religiosity.

In addition to well-being, religious involvement also benefits one's perceived purpose in life. An experiment conducted on 12 to 15 year-olds from the United

Kingdom found frequency of personal prayer to be an important predictor of perceived purpose in life (Francis & Evans, 1996). This experiment included a sample of participants who never attended church services and a sample of participants who attended church services most weeks. All participants were asked to complete a set of questionnaires that included frequency of personal prayer and perceived purpose of life. Interestingly, the researchers found that among both churchgoers and non-churchgoers, frequency of personal prayer was positively associated with higher levels of perceived purpose in life. Apparently, the important factor here was frequency of prayer, not church attendance. However, it is not possible to generalize this information to the entire population because the participants in this study were a select age group (12-15 years old). Nonetheless, the results of this study yield some support for the power of prayer.

Different types of prayer are also important for a number of quality of life indices (Poloma & Pendleton, 1989). Poloma (1993) labeled these types or dimensions of prayer as colloquial, petitionary, ritual, and meditative. Colloquial prayer is a conversational style of prayer in which the person talks to God in his or her own words. Typically this type of prayer involves intercession for guidance, general blessings, or forgiveness from sin. It may also include giving thanks to God for His blessings or expressing love to Him. Petitionary prayer can be similar to colloquial prayer in that they are both conversational forms of prayer. In contrast to colloquial prayer, however, petitionary prayers are typically more concrete and specific. Petitionary prayers are frequency requests to meet the material needs in one's life or in the life of one's friends. Ritual prayer involves using a prayer that has already been prepared. This can be achieved by reading a scripted prayer or by reciting a scripted prayer from memory. Meditative prayer, on the other hand, is

very different from the other three forms of prayer. That is, colloquial, petitionary, and ritual types of prayer are generally viewed as one-way conversations with God, whereas meditative prayer is not really viewed as a conversation at all. Also, meditative prayer is viewed as a more passive form of prayer compared to the other three forms of prayer. Meditative prayer focuses on the intimacy and the personal relationship one has with God. It may involve thinking about and feeling the presence of God or "being still and knowing that God is God" (Poloma, 1993, p. 40).

Poloma and Pendleton (1989) examined how these four forms of prayer influence five types of quality of life. Frequency of prayer and prayer experiences (religious experiences of prayer) were also included to assess the overall influence of prayer on quality of life. The five types of quality of life measured in this experiment were life satisfaction, existential well-being, happiness, negative affect, and religious satisfaction. The results found that prayer experiences were generally better predictors of quality of life than any one of the four types of prayer. However, specific aspects of quality of life were associated with certain types of prayer. For example, meditative prayer was the only form of prayer that was related to existential well-being and religious satisfaction. Ritual prayer, on the other hand, was the only form of prayer that was positively associated with negative affect. This finding suggests that individuals who only partake in ritual prayer are more likely to be lonely, sad, tense, and depressed. Lastly, colloquial prayer was the only form of prayer that predicted happiness. Interestingly, petitionary prayer was not related to any of the quality of life indices.

Moreover, all of these associations remained statistically significant even after the sociodemographic variables were controlled. However, when these sociodemographic

variables were included, additional information was discovered. For example, Poloma and Pendleton (1989) found that people with high general life satisfaction tended to have lower levels of education, higher levels of income, and higher frequencies of prayer experiences. The researchers also found that people who said they were happiest with their lives had higher incomes and were more likely to engage in colloquial prayer. These same people often had prayer experiences, but ironically they reportedly prayed less frequently. Lastly, people who scored higher on religious satisfaction tended to be older, prayed more frequently, had more prayer experiences, and were more likely to engage in meditative forms of prayer.

Poloma (1993) extended this research to examine the relationship between the four types of prayer, frequency of prayer, and the experience of intimacy with the divine. Overall, it was found that the more often people pray, regardless of the type of prayer they engage in, the more likely they are to experience a deeper intimacy with the divine. At closer examination, it was found that meditative prayer had the strongest relationship with feeling close to God. In other words, people who used meditative prayer, with or without other forms of prayer, were more likely to experience intimacy with God. Although colloquial prayer was found to be the most common form of prayer, it was second best to meditative prayer in regard to experiencing intimacy with the divine. Ritual prayer and petitionary prayer were the least associated with the experience of intimacy with the divine (although they were both still significantly associated).

Results from the experiments conducted by Poloma (1993) and Poloma and Pendleton (1989) suggest that, for the most part, prayer is associated with favorable outcomes. However, this is not always the case. For example, Ellison et al. (2001) found

that frequency of prayer and psychological distress were positively correlated, suggesting that the more often people pray, the more likely they are to experience psychological distress. However, it is possible that increased frequency of prayer does not lead to increased psychological distress. Rather, elevated psychological distress may, in fact, lead to increased frequency of prayer. In other words, people may pray more often when they are experiencing a great deal of psychological distress. Thus, directionality should always be interpreted with caution.

Physical Health and Religion

Physical health has also been associated with various aspects of religion. Koenig et al. (2004) found that some aspects of religion were related to improved physical health of participants age 50 or older. The participants that participated in this study were patients who had been consecutively admitted to the general medicine service at Duke University Medical Center. After participants had completed a number of questionnaires and surveys, they were given a physical examination. The results found that the religious characteristics associated with improved physical health conditions were organizational religious activity, observer-rated religiousness, observer-rated spirituality, and intrinsic religiosity. Participants who were more involved in organizational religious activity exhibited improved physical functioning and were less severely ill, particularly those younger than 75 years of age. Also, participants who had higher observer-rated spirituality and observer-rated religiousness obtained higher health ratings and experienced fewer comorbid illnesses. In contrast, participants who reported no religious or spiritual beliefs had lower self-rated and observer-rated health, and they experienced

more comorbid illnesses. Lastly, intrinsic religiosity was positively correlated with physical functioning.

Religiosity has also been linked to physical health in terms of mortality. Oman and Reed (1998) found an association between religious attendance and mortality in a sample of adults age 55 and older. Each participant provided a self-reported estimate of religious attendance in terms of how often they usually attend religious services. Mortality rates were recorded over the next five years. After controlling for potential confounders, the researchers found that frequent religious attendance was associated with lower mortality. For both males and females, the lowest mortality rate was seen in those who attended church on a weekly basis. Participants who never attended religious services had the highest mortality rate.

Pressman et al. (1990) found that elderly women, in particular, benefit from strong religious beliefs. This experiment examined the ambulation status of women (65 or older) who had surgery due to hip fractures. These patients were periodically evaluated during their hospital stay, after their surgery, and before their discharge. Ambulation status was measured by distance walked at discharge and assistance required during walking. Religious beliefs were measured from a three-item scale of personal importance of religion. The three items included: 1) attendance at religious services, 2) perceived religiousness, and 3) degree that religion (and/or God) is a source of strength and comfort. The researchers found that religious beliefs were positively associated with ambulation status at discharge, even after controlling for severity of illness. Thus, participants with stronger religious beliefs walked greater distances at discharge compared to participants with weaker religious beliefs.

Additionally, hospitalization has been associated with religious involvement. One experiment explored this relationship by conducting research on adults age 60 or older (Koenig & Larson, 1999). The researchers gathered information from participants concerning church attendance, religious affiliation, and hospital admissions. The results found a negative relationship between attendance at religious services and hospitalization. Participants who attended church once a week or more were less likely to be hospitalized relative to those who attended religious services less frequently. Also, those who frequently attended religious services spent fewer days in the hospital. Similarly, participants who were unaffiliated with any religious denomination spent more time in the hospital compared to those who were religiously affiliated. On average, participants with a religious affiliation spent 11 days in the hospital compared with 25 days for unaffiliated participants. This association actually increased when physical health and other covariates were controlled.

Blood pressure is another aspect of physical health that appears to be associated with religiosity. Lawler and Younger (2002) examined the relationship between spiritual and religious well-being and cardiovascular responses (diastolic blood pressure, systolic blood pressure, and heart rate). Participants were asked to fill out a packet of questionnaires that included inventories on stress and health, relationships and general information, and religion and spirituality. After baseline blood pressure was taken, individuals participated in a betrayal interview. Blood pressure was taken again during this interview and then after the interview. The researchers found that higher levels of religious spiritual well-being were related to lower diastolic blood pressure and mean

arterial pressure. Religious spiritual well-being was measured by religious affiliation, frequency of attendance at worship, and religiousness.

While examining religious orientation, Masters, Hill, Kircher, Lensegrav-Benson, and Fallon (2004) also found a connection between blood pressure and religion. This experiment used two age groups (older and younger) to examine the relationship between cardiovascular responses and religious orientation (extrinsic and intrinsic). First, all participants filled out a questionnaire to determine whether they exhibited a predominately intrinsic religious orientation or a predominately extrinsic orientation. Next, the participants were exposed to either a cognitive stressor task (mental arithmetic) or an interpersonal challenge (role play). All participants were exposed to both tasks and the order of the tasks was counterbalanced. Blood pressure was taken at the beginning of the experiment (baseline) and during the stressor presentation. The results showed that during baseline and stressor presentation older-extrinsic participants had higher systolic and diastolic blood pressure compared to older-intrinsic participants and younger participants. Also, extrinsic participants (both young and old) had higher blood pressure during the interpersonal challenge than did intrinsic participants (both young and old).

Another experiment that examined the relationship between cardiovascular responses and religion found somewhat different results, however. Tartaro, Luecken, and Gunn (2005) investigated how the gender and religiosity/spirituality of young adults affected their blood pressure and cortisol levels during a laboratory stressor. The researchers found that individuals who were more religious/spiritual and those who prayed frequently exhibited the lowest cortisol responses. When blood pressure was examined, however, these researchers found that men were the only ones who benefited

from religious involvement. Interestingly, religious involvement was associated with increased blood pressure for women. In particular, this experiment found that two dimensions of religiosity/spirituality (frequency of prayer and attendance at services) were associated with elevated blood pressure for women. Religiosity/spirituality, frequency of prayer, and attendance at services were all associated with reductions in blood pressure for men, however. Thus, this experiment illustrates how gender can moderate the benefits associated with religious involvement.

Overall the literature regarding gender differences and benefits associated with religion has been mixed at best. Whereas, the experiment by Tartaro et al. (2005) discussed above suggests that men benefit more from religious involvement, other experiments suggest otherwise. As previously discussed, Mirola (1999) found that religious involvement was negatively associated with depression, but only for women. Further, Mirola (1999) found that regardless of the fact that men considered themselves to be "somewhat" to "very" religious, attended church frequently, and held office within the church, there was no relationship between religious involvement and depression among men. Thus, additional research needs to be conducted to determine how gender relates to religious social support.

The literature previously reviewed also provides a great deal of information pertaining to the relationship between religion and health. Overall, religion and health seem to have a positive relationship, suggesting that religious involvement leads to favorable health outcomes. Presumably, religious involvement is beneficial to many aspects of health because it provides ongoing support in the same way that social

networks provide ongoing support. I will now turn to a discussion of the relationship between social support and stress.

Acute Stress

Social support can also be beneficial to health even in acute stressful situations. In other words, the presence of another person can reduce stress in an environment that might be interpreted as threatening. Indeed, previous research on social buffering has found that reductions in blood pressure, heart rate, and self-reports of stress occur when a friend is available during a stressful task (Lepore, Mata Allen, & Evans, 1993).

However, the quality of the friendship between the participant and the friend may be more important than the mere presence of the friend. In particular, Uno, Uchino, and Smith (2002) found that positive friends provide more support during a stressful task than ambivalent friends. The social relationships inventory (SRI) was used in this experiment to classify friends as ambivalent or positive. This inventory asked participants to rate how supportive and upsetting they felt their friend was when they needed social support on a scale ranging from 1 (not at all) to 6 (very much). Individuals who scored greater than "1" on negativity and greater than "1" on positivity were classified as ambivalent friends. Positive friends, on the other hand, were those who scored greater than "1" on positivity and only "1" on negativity. After the friends were classified as either positive or ambivalent, participants performed a set of speech tasks. Ultimately, this experiment found that participants who received social support from a positive friend had lower cardiovascular reactivity (stress responses) than participants who interacted with an ambivalent friend.

Further, stress responses are altered when a friend is able to evaluate participants'
performance (Kors, Linden, & Gerin, 1997). Indeed, one experiment discovered that
when a friend is able to judge participants' task performance, cardiovascular responses
are higher than when the friend is not able to evaluate performance among women
(Fontana, Diegnan, Villenueve, & Lepore, 1999).

CHAPTER 2

RATIONALE FOR THE PRESENT EXPERIMENT

All of this research suggests that friends who are positive and nonjudgmental provide the most effective social support. However, this particular kind of friend is not always accessible in the face of a stressful situation. One alternative to the physical presence of a friend could be feeling the presence of a higher deity, such as God. This higher deity could be seen as a positive and nonjudgmental friend whose main purpose is to provide comfort and support. Accordingly, praying to a higher deity, such as God, during a stressful task could potentially provide a similar stress reduction to that seen with social buffering.

Although a great deal of research has been conducted examining the effects of religion and prayer, there are still many unanswered questions. In particular, the literature regarding gender and religious social support has been mixed. Also, the available literature lacks experimental manipulation of prayer and potential effects on stress responding. As noted above, in the face of a stressful situation, prayer could potentially reduce stress in the same way the presence of a friend reduces stress. Therefore, the present experiment investigated the influence of praying in a stressful environment and gender on stress responses. Specifically, this study examined how gender influenced stress responses of individuals in three different conditions: prayer, self-talk, and control. Outcomes included psychological as well as physiological indices of stress.

Hypotheses

Individuals in the prayer condition will demonstrate the lowest stress response relative to the remaining two conditions. Also, individuals in the self-talk condition will

have lower stress responses than individuals in the control condition. Further, gender and

prayer are expected to interact such that women in the prayer condition will have lower

stress responses than men in the prayer condition.

CHAPTER 3

METHOD

Participants

Participants in this experiment were undergraduate students at a Southeastern

university. Students received credit in their courses for participating and the total sample

included 87 participants. Thirty-four males (39.1%) and 53 females (60.9%) participated.

There were 59 Caucasian participants (68%), 22 African American participants (25%),

one Asian American participant (1%), two Hispanic participants (2%), and three

participants (3%) that selected "other" as their ethnicity. The mean age for participants

was 19.60 ($SD = 1.62$). Individuals younger than 18 years of age were not tested in this

experiment. There were 14 Catholics, 37 Baptists, three Episcopalians, 11 Methodists,

one Presbyterian, one Lutheran, one Muslim, and one Atheist. Also, there were seven

participants that reportedly did not have any religious affiliation and 10 participants who

selected "other" as their religious affiliation.

Measures

Anxiety. Anxiety measures included an anxiety thermometer (Wiegand, 2004) and

the state portion of the State-Trait Anxiety Inventory (Spielberger, Gorsuch, Lushene,

Vagg, & Jacobs, 1983). The anxiety thermometer is a visual analogue scale of anxiety. It

ranges from "not anxious at all" to "extremely anxious." The respondent makes a vertical

line indicating where they believe they fall on this continuum at that particular time (see

Appendix A). The state portion of the State-Trait Anxiety Inventory measures the amount

of stress an individual experiences at any one point in time. This inventory has ten items

worded positively for the presence of anxiety and ten items worded negatively for the

presence of anxiety. Ratings for this measure are scored at four levels of intensity, from 1 (not at all) to 4 (very much). Thus, lower scores on this scale indicate more anxiety and higher scores indicate less anxiety (see Appendix C).

Physiological stress responses. Physiological measures included blood pressure and heart rate, which were taken by a wrist monitor. These measures were taken by a Samsung (model SS-303) automatic wrist monitor with Heart Sense®.

Personality. Introversion and extraversion were examined in this experiment by using a scale created by Eysenck and Eysenck (1975). This introversion/extraversion scale is composed of 24 true or false questions that characterize participants as introverted or extraverted (see Appendix E).

Aspects of religiosity. The Religious Internalization Scale (Ryan, Rigby, & King, 1993) was used in order to assess religious orientation including intrinsic orientation and extrinsic orientation. This scale is adjusted (modified) to be relevant to all religions (see Appendix H).

Another measure of religion included in this experiment was entitled measures of religion. This scale consists of two circles, one representing "self" and the other representing "religion" (Kurek, 2002). These two circles either overlap to some degree or do not overlap at all. The more the circles overlap, the closer self and religion are considered to be connected. Respondents are asked to mark the set of circles that fits them best (see Appendix I).

Importance of religion was also measured using a scale developed by Blaine and Crocker (1995). This scale includes five items and is measured on a scale from 1

(strongly agree) to 5 (strongly disagree). An example item is "My religious beliefs are what lie behind my whole approach to life" (see Appendix I).

Also, prayer experiences were measured on a five-item scale created by Poloma and Pendleton (1989). Prayer experiences are defined by the authors as religious experiences in prayer. This measure asks respondents to rate how often certain experiences in prayer have happened to them on a scale from A (never) to D (regularly). This measure was included because Poloma and Pendleton found prayer experiences to be related to five measures of quality of life (life satisfaction, existential well-being, happiness, negative affect, and religious satisfaction; see Appendix J).

Finally, a measure of God image created by Benson and Spika (1973) was used in this experiment. The two dimensions of God image this measure assesses are controlling and loving. This scale is composed of 10 items and participants are asked to indicate on a scale of 0-6 where they feel their image of God fits (see Appendix K).

Procedure

Before the experiment began, participants were randomly assigned to one of three testing conditions: prayer, self-talk, or control. After participants had completed the informed consent, their blood pressure and heart rate were taken. Then, they provided a baseline self-reported stress rating by marking a vertical line on the anxiety thermometer (see Appendix A). Next, the stress-provoking task was explained to the participants. Blood-pressure and heart-rate were taken again once it was clear that participants understood what was required of them. Then, participants were given one minute to read a statement that was specific to the condition which they had been assigned. Next, they were given five minutes to think about what they would say about themselves in the task.

Forty-five seconds before participants engaged in the stress-provoking task, they were given a broad list of topics to talk about if they did not have anything to say during the task (see Appendix B).

The participants then engaged in the stress-provoking task. The stress-provoking task required participants to "sell themselves" while being videotaped. They were asked to record reasons why they should be hired for a job. Participants were told that they were to treat this situation as though it were a real job interview. Also, participants were told they must talk to the video camera for a minimum of four minutes with a short break after the first two minutes had elapsed. In reality, participants had completed the task after two minutes had elapsed. Participants were led to believe that the task was four minutes in total so that when they were stopped after two minutes for measurement of stress, they would be in the mindset that they were not finished with the task. This allowed stress to continue during measurements. After the task was complete, participants in all conditions rated their stress on the anxiety thermometer. Blood pressure and heart rate were also taken at this time. Next, all participants completed the state portion of the State-Trait Anxiety Inventory (see Appendix C) and a form on demographics (see Appendix D). Participants were also asked to complete the Introversion/Extraversion scale at this time (see Appendix E).

Next, manipulation checks were conducted. Participants in the prayer condition were asked if they actually prayed while reading the prayer (see Appendix F). If they had prayed at this time, they were asked additional questions about how the prayer passage affected them. Also, participants in the self-talk condition and the control condition were asked what they thought about while they read the statement that was assigned to them

(see Appendix G). Finally, participants were asked to fill out a number of surveys including: the Religious Internalization Scale (see Appendix H), the measures of religiosity scale (see Appendix I), the importance of religion scale (see Appendix I), the prayer experience scale (see Appendix J), and God Image scale (see Appendix K). Finally, participants were debriefed and thanked for their participation.

Prayer condition. In the prayer condition, participants read a prayer that was non-specific to any particular religion, other than specifying a single deity (God; see Appendix L). Thus, individuals from various religious denominations were able to use this prayer.

Self-talk condition. Individuals in the self-talk condition were given a statement that did not have any religious or spiritual content (see Appendix L). It was a statement that promoted participants to encourage themselves in a positive manner.

Control condition. Participants in the control condition read a statement that was neutral in content (see Appendix L). Ideally, this passage did not evoke positive or negative feelings; it simply took time to read.

CHAPTER 4

RESULTS

Primary Analysis

The primary independent variable in the present experiment contained three

conditions: prayer, self-talk, and control. Gender was the moderating factor in this

experiment. The primary measures that were analyzed as dependent variables were the

stress responses. These included systolic blood pressure, diastolic blood pressure, heart

rate, self-rated anxiety levels (anxiety thermometer), and the state portion of the State-

Trait Anxiety Inventory. Thus, the primary analysis was a 2 x 3, between-groups

multivariate analysis of variance with five dependent variables. Means and standard

errors are presented in Table 1.

After all of the data were collected, each baseline blood pressure reading was

subtracted from the appropriate blood pressure reading that was taken after participants

had completed the task. The same was done for heart rate and anxiety thermometer

scores. The state anxiety scale was only measured once due to the redundancy and length

of this scale. Thus, subtraction was not necessary to analyze this measure.

The results of this experiment found that the majority of F-tests did not reach

significance. However, the significance of two of the dependent variables (anxiety

thermometer and state anxiety) was marginal (see Table 2).

Gender was marginally related to the scores on the state portion of the State-Trait

Anxiety Inventory $F(1, 79) = 3.07, p = .08$. As indicted in Figure 1, females tended to

report higher state anxiety ($M = 2.18, SEM = .07$) than males ($M = 1.97, SEM = .12$).

Treatment condition was marginally related to the anxiety thermometer $F(2, 79) =$ 1.8, p = .17. As indicated in Figure 2, those in the prayer condition tended to report lower levels of anxiety on the anxiety thermometer (M = 1.15, SEM = .33) than those in the self-talk condition (M = 2.06, SEM = .55) and those in the control condition (M = 2.23, SEM = .36).

Condition and gender marginally interacted to affect anxiety thermometer scores, $F(2, 79)$ = 2.89, p =.06. Significant effects were further analyzed using Tukey's HSD (p < .05). Females in the prayer condition rated their stress lower (M = 1.13, SEM = .71) than females in the self-talk condition (M = 3.21, SEM = .51). Further, males in the self-talk condition rated their stress lower (M = .90, SEM = .89) than females in the self-talk condition (see Figure 3).

Secondary Analysis

Religious orientation, measures of religiosity, importance of religion, prayer experience, measure of God Image, and Introversion/Extraversion were examined. Given that the primary analysis was not found significant, these variables were used as covariates (see Table 1 for means and standard errors). The data were analyzed using multivariate analysis of covariance (see Table 3).

Follow-up Analysis

Correlational follow-up analyses were conducted on all of the dependent variables and the covariates in this experiment using Pearson's correlation coefficient. The results of these analyses found that anxiety thermometer scores and prayer experiences were negatively correlated, $r(85)$ = -.18, p = .04, suggesting that the more prayer experiences that an individual has, the lower his or her self-reported stress was on the anxiety

thermometer. Also, state anxiety was positively correlated with the importance of religion measure, $r(84) = .25$, $p = .01$, which suggests that the more important one's religion is, the lower his or her state anxiety. Further, heart rate was negatively correlated to the importance of religion measure, $r(84) = -.23$, $p = .02$. This finding suggests that the more important religion was to participants, the lower their heart rate.

CHAPTER 5

DISCUSSION

The three levels of manipulation (prayer, self-talk, and control) comprised the primary independent variable in this experiment. Stress responses were used as dependent variables in this experiment. These stress responses included systolic blood pressure, diastolic blood pressure, heart rate, self-rated anxiety levels (anxiety thermometer), and the state portion of the State-Trait Anxiety Inventory. Although systolic blood pressure, diastolic blood pressure, and heart rate were not significantly related to treatment condition, self-rated anxiety levels, measured using the anxiety thermometer, were marginally associated with treatment condition. Even though this measure did not reach significance, it is still a noteworthy finding because of the direction of the means for the treatment conditions. The means of the anxiety thermometer were all in the expected direction for each of the conditions. That is, the prayer condition had the lowest anxiety thermometer mean while the control condition had the largest anxiety thermometer mean. Thus, participants in the prayer condition tended to report lower levels of stress on the anxiety thermometer, whereas participants in the control condition tended to report higher levels of stress on the anxiety thermometer. This finding supports the hypothesis that predicted participants in the prayer condition to demonstrate the lowest stress relative to the remaining two conditions. Also, the direction of the means support the hypothesis that participants in the self-talk condition would have lower stress than individuals in the control condition. Furthermore, previous research in this area also supports this experiment's findings.

Recent research on the relationship between prayer and stress has found that prayer is an effective way to reduce self-reported stress. Wiegand (2004) found that college students reported less state anxiety when they prayed before completing a stressful task than they did when they did not pray before the task. That is, when participants read a prayer and then prayed before completing an anagram performance task, they exhibited significant reductions in state anxiety. Thus, the results Wiegand found correspond with that of the present experiment.

Similarly, another experiment found that several aspects of prayer were related to reductions in anxiety (Laird et al., 2004). The aspects of prayer that Laird et al. assessed included: frequency of prayer per week, frequency of prayer per day, duration of prayer, and the level of belief in the effect of prayer on the self and others. Laird et al. discovered that all of these aspects of prayer were negatively correlated with anxiety, such that the more participants prayed and the more they believed in the effect of their prayers, the less anxiety they reported experiencing in their lives. Although the experiment conducted by Laird et al. refers to the general effects of prayer on overall anxiety levels, it still supports the present experiment's finding that suggests prayer is associated with reductions in stress.

Bormann et al. (2005) also found a connection between prayer and stress reduction. These researchers discovered that an ancient form of prayer called a mantram had the ability to reduce symptoms of stress and anxiety among a sample of veterans. For five weeks, participants in this experiment simply repeated a mantram (a word or phrase with spiritual significance, sometimes called a Holy Name) for 90 minutes a week. After

five weeks had elapsed, participants reported less stress and anxiety according to the State-Trait Anxiety Inventory and the Perceived Stress Scale.

Based on the results of these experiments and that of the present experiment, it is reasonable to assert that prayer can reduce stress and anxiety. Thus, it seems obvious why so many Americans turn to prayer when they are faced with stressful events (Ellison et al., 2001). What is less obvious, however, is the why prayer seems to reduce stress. One hypothesis is that praying allows individuals to gain perspective on the stressful situation they are faced with, which allows them to reevaluate the significance of the situation. This may reduce stress because it allows the individual to view the situation as an opportunity for personal or spiritual growth or as part of a larger divine plan (Ellison et al., 2001).

Another explanation for the inverse relationship between prayer and anxiety may be that prayer provides the same kind stress reduction that is seen with social buffering. Research on social buffering suggests that reductions in participants' stress levels occur when they have a friend with them during a stressful task because the friend buffers participants from stress. Perhaps, praying during a stressful task results in stress reduction because it allows individuals to receive spiritual support similar to that of the social support offered by a friend in social buffering. Thus, a likely explanation for the inverse relationship between prayer and anxiety may be that prayer provides social buffering.

Therefore, the present experiment found support for the notion that prayer provides social buffering by reducing self-reported stress. In this experiment, however, prayer did not significantly reduce physiological measures of stress (blood pressure and heart rate). A possible explanation for this discrepancy may be that participants expected

to be less anxious because they prayed, but physiologically their bodies did not indicate a reduction in stress. It should be noted, however, that many extraneous variables can affect physiological measures of stress. Additional research is needed to examine whether benefits, such as enhanced immune function, are associated with decreased self-reported stress even when physiological measures do not indicate stress reduction.

Another self-reported stress measure (state anxiety) was marginally related to one of the main independent variables (gender) in the present experiment. Specifically, the present experiment found that, compared to males, females tended to report higher stress on the state portion of the State-Trait Anxiety Inventory. This finding is in line with other research suggesting that women are more likely to report higher stress levels and more anxiety than men (Mirowsky & Ross, 1995). However, I should note that a condition effect was not evident in this gender outcome.

However, evidence for an interaction was found between treatment condition and gender as they related to anxiety thermometer scores. Females who were in the prayer condition rated their stress lower on the anxiety thermometer than females who were in the self-talk condition. This finding is not surprising considering that previous research has found that women frequently use prayer as a way to cope with daily stress (Mirola, 1999). Further, this finding supports the hypothesis that prayer would be a more effective means of reducing stress than self-talk, especially for women.

Further examination of the interaction revealed another significant mean comparison. Males in the self-talk condition rated their stress lower than females in the self-talk condition. This suggests that men who read a self-talk passage before the stressful task were less stressed than women who read a self-talk passage before the task.

Although this outcome was not expected in the present experiment, a possible

explanation could simply be that men and women benefit from different types of support.

Indeed, research suggests that different types of social support affect men and women

differently (Pretorius, 1996). In fact, Pretorius found that although men and women do

not differ a great deal in the social support they typically receive from others, they do

significantly differ in how they are affected by different kinds of social support.

Specifically, Pretorius found in terms of health, women benefit more from specific

dimensions of support (number of supporters, support given by family, and support given

by friends) than men do from these dimensions of support. Also, Pretorius discovered

that tangible support (support of a material nature) was damaging to men's health, but not

women's health. Thus, Pretorius's research supports the notion that men and women are

affected in different ways from varying types of social support.

     The present experiment's findings also suggest that the effects of differing types

of social support are moderated by gender. In particular, the findings of present

experiment suggest that it is more beneficial for men to use uplifting self-talk as a way to

cope with stress than it is for women to do so. Thus, it appears that men benefit more

from support in the form of self-talk, while women benefit more from prayer.

     Correlational analyses on all of the dependent variables and the covariates were

also conducted as follow-up analyses in the present experiment. Based on Pearson's r,

three significant correlations were found. First, anxiety thermometer scores and prayer

experiences were negatively correlated, suggesting that the more prayer experiences that

individuals have, the lower their self-reported stress was on the anxiety thermometer.

Prayer experiences are defined by Poloma and Pendleton (1989) as religious experiences

in prayer. The correlation between anxiety thermometer scores and prayer experiences is noteworthy because the authors found prayer experiences to be related to five measures of quality of life including: life satisfaction, existential well-being, happiness, negative affect, and religious satisfaction.

Second, this experiment found that state anxiety was positively correlated with the importance of religion measure. Due to the fact that lower scores on the state anxiety scale indicate more anxiety, the correlation suggests that the more important one's religion is, the lower their state anxiety.

Third, heart rate was negatively correlated with the importance of religion measure. This finding suggests that the more important religion was to participants, the lower their heart rate. Previous research on cardiovascular responses and religion has reported similar results regarding this relationship. In fact, Larson, Koenig, and Kaplan (1989) found a negative correlation between blood pressure and frequency of church attendance combined with the belief that religion was very important.

Conclusions

Although the present experiment did not find significant differences in the physiological measures of stress (blood pressure and heart rate) across treatment conditions, this experiment still found some indirect support for its main hypothesis. That is, the present experiment found that based on self-reports of stress, social buffering can be offered through prayer. Further, the present experiment found support for the notion that gender can moderate stress responding and that men and women benefit from different types of support. However, due to the fact that physiological measures of stress

were not found significant in the present experiment, additional research should be conducted to discover the details of prayer as a potential way to obtain social buffering.

Limitations and Future Directions

The present experiment was limited in many ways. Most importantly, the sample size of the present investigation was relatively small (87 participants). One reason that the sample size was relatively small in this experiment was due to the fact that each participant was assessed one at a time (for 50 minutes each) by the same experimenter. Although this procedure gave the experiment more control, it also proved to be a time-consuming method.

Further, the participants in the present experiment did not vary a great deal in terms of demographics. All of the participants in the present experiment were undergraduate students at a Southeastern university. Also, most of the participants in this experiment were 18-20 years of age. That is, approximately 80% of participants were either 18, 19, or 20 years of age. Further, most of the participants (approximately 93%) reported being affiliated with some form of religion.

The effectiveness of the stress-provoking task used in the present experiment presented another limitation. Although the video interview task was intended to be a stress-provoking task, there is no guarantee that all participants actually viewed this task as stressful. Furthermore, even if all of the participants in this experiment viewed this task as stressful, the degree of stress that this task evoked may have varied from participant to participant. In other words, it is probable that some participants were more comfortable talking about themselves in front of a video camera than other participants. Thus, future research using a stressful task to measure stress responding should consider

this limitation. At the very least, future researchers should ask participants how they viewed the stress-provoking task.

Future research measuring stress responding should also investigate the effects of self-reported measures of stress and physiological measures of stress. As previously noted, the present experiment found a discrepancy between self-reported stress and physiological stress (blood pressure and heart rate). Future research should examine the underlying mechanisms behind this discrepancy in stress measures and, more importantly, how this inconsistency could be interpreted. Further, additional research should be conducted to examine whether benefits, such as enhanced immune function, are associated with decreased self-reported stress even when physiological measures do not indicate stress reduction.

Additional research is also needed to explore how gender influences stress responding under different types of support. The present experiment's results suggest that women benefit more from support in the form of prayer, while men benefit more from support in the form self-talk. However, previous research in this area has been mixed. Thus, future research should examine how the effects different types of social support are moderated by gender.

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    women. *International Journal of Behavioral Medicine, 9*(3), 243-262.

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APPENDIX A

ANXIETY THERMOMETER

(Wiegand, 2004)

Directions: Place a vertical mark on the thermometer where you are CURRENTLY.

Not at all
anxious

Extremely
anxious
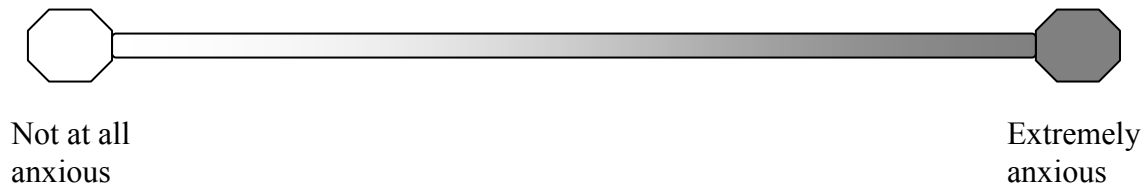
APPENDIX B

THINGS TO TALK ABOUT IN INTERVIEW

- Qualities you possess

- Experiences in your past

- Your family

- Your work history

- Your work ethic

- Your greatest accomplishment

- Your greatest failure and what you learned from it

- Your goals in life

APPENDIX C

STATE PORTION OF STATE-TRAIT ANXIETY INVENTORY

(Spielberger et al., 1983)

Please circle a number according to how you would rate yourself right now.

	Not at all	**Somewhat**	**Moderately So**	**Very Much**
1. I feel calm.	1	2	3	4
2. I feel secure.	1	2	3	4
3. I am tense.	1	2	3	4
4. I feel strained.	1	2	3	4
5. I feel at ease.	1	2	3	4
6. I feel upset.	1	2	3	4
7. I am presently worrying over possible misfortunes.	1	2	3	4
8. I feel satisfied.	1	2	3	4
9. I feel frightened.	1	2	3	4

10. I feel comfortable.	1	2	3	4
11. I feel self-confident.	1	2	3	4
12. I feel nervous.	1	2	3	4
13. I am jittery.	1	2	3	4
14. I feel indecisive.	1	2	3	4
15. I am relaxed.	1	2	3	4
16. I feel content.	1	2	3	4
17. I am worried.	1	2	3	4
18. I feel confused.	1	2	3	4
19. I feel steady.	1	2	3	4
20. I feel pleasant.	1	2	3	4

APPENDIX D

DEMOGRAPHICS

Age:_____

Please circle the appropriate answer.

Gender: male   female

Ethnicity:

Caucasian   African American   Asian American   Native American   Hispanic

Other:_____

Year in school:

First Year   Sophomore   Junior   Senior   Other:_____

Religious Affiliation: Yes or No

Catholic   Baptist   Episcopal   Methodist   Presbyterian

        Mormon   Lutheran   Jewish   Buddhist   Hindu

Muslim   Atheist   Agnostic   New Age   Other:_____

APPENDIX E

INTROVERSION/EXTRAVERSION SCALE

(Eysenck & Eysenck, 1975)

Please answer each question true (T) or false (F)

___   1. I tend to keep in the background at social events.

___   2. I prefer to work with others rather than alone.

___   3. I get embarrassed easily.

___   4. I generally tell others how I feel regardless of how they may take it.

___   5. I really try to avoid situations in which I must speak to a group.

___   6. I am strongly motivated by approval or interest of others.

___   7. I often daydream.

___   8. I find it easy to start conversations with strangers.

___   9. I find it difficult to make friends of the opposite sex.

___   10. I particularly enjoy meeting people who know their way around the social

scene.

___   11. I would rather read a good book or watch television rather than go out to a

movie.

___   12. I would rather work as a salesperson than as a librarian.

___   13. I spend a lot of time philosophizing and thinking about ideas.

___   14. I prefer action to thought and reflection.

___   15. I am often uncomfortable in conversations with strangers.

___   16. I am mainly interested in activities and ideas that are practical.

___   17. I would prefer visiting an art gallery over attending a sporting event.

___ 18. I enjoy open competition in sports, games, and school.

___ 19. I make my decisions by reason more than by impulse or emotion.

___ 20. I have to admit that I enjoy talking about myself to others.

___ 21. I like to lose myself in my work.

___ 22. I sometimes get into arguments with people I do not know well.

___ 23. I am very select about who my friends are.

___ 24. I make decisions quickly and stick to them.

APPENDIX F

MANIPULATION CHECK: PRAYER CONDITION

Did you pray when you read the passage that was given to you before the task?

YES   NO

If you answered yes, then please answer the following questions by circling the answer that best describes you.

1. The passage I read before the task made me LESS worried about the upcoming task.

        1   2   3   4   5   6   7
      not at all true   Somewhat true   very true

2. The passage I read before the task made me MORE worried about the upcoming task.

        1   2   3   4   5   6   7
      not at all true   Somewhat true   very true

3. The passage I read before the task did not effect how I felt about the upcoming task.

        1   2   3   4   5   6   7
      not at all true   Somewhat true   very true

4. In your own words, what were you thinking about when you read the passage?

APPENDIX G

MANIPULATION CHECK: SELF-TALK AND CONTROL CONDITIONS

Please answer the following questions by circling the answer that best describes you.

1. The passage I read before the task made me LESS worried about the upcoming task.

1	2	3	4	5	6	7
not at all true			Somewhat true			very true

2. The passage I read before the task made me MORE worried about the upcoming task.

1	2	3	4	5	6	7
not at all true			Somewhat true			very true

3. The passage I read before the task did not effect how I felt about the upcoming task.

1	2	3	4	5	6	7
not at all true			Somewhat true			very true

4. In your own words, what were you thinking about when you read the passage?

APPENDIX H

RELIGIOUS INTERNALIZATION SCALE

(Ryan et al., 1993)

Instructions: This questionnaire has four statements, each of which is followed by three possible responses. Please read the first statement, and then consider each response. Indicate how true each response is for you, by circling the appropriate number on the scale.

A. One reason I think it's important to actively share my faith with others is:

    1. Because God is important to me and I'd like other people to know about Him too.

1	2	3	4	5	6	7
not at all true		Somewhat true				very true

    2. Because I would feel bad about myself if I didn't.

1	2	3	4	5	6	7
not at all true		Somewhat true				very true

    3. Because I want others in my faith to approve of me.

1	2	3	4	5	6	7
not at all true		Somewhat true				very true

B. When I turn to God, I most often do it because:

4. I enjoy spending time with Him.

1	2	3	4	5	6	7
not at all true		Somewhat true				very true

5. I would feel guilty if I didn't.

1	2	3	4	5	6	7
not at all true		Somewhat true				very true

6. I find it is satisfying to me.

1	2	3	4	5	6	7
not at all true		Somewhat true				very true

C. A reason I think praying by myself is important is:

7. Because if I don't, God will disapprove of me.

1	2	3	4	5	6	7
not at all true		Somewhat true				very true

8. Because I enjoy praying.

1	2	3	4	5	6	7
not at all true		Somewhat true				very true

9. Because I find prayer satisfying.

1	2	3	4	5	6	7
not at all true		Somewhat true				very true

D. An important reason why I attend religious services is:

10. Because one is supposed to go to religious services.

1	2	3	4	5	6	7
not at all true			Somewhat true			very true

11. By going to religious services I learn new things.

1	2	3	4	5	6	7
not at all true			Somewhat true			very true

12. Because others would disapprove of me if I didn't.

1	2	3	4	5	6	7
not at all true			Somewhat true			very true

APPENDIX I

MEASURES OF RELIGIOSITY

(Kurek, 2002)

Instructions: Circle the letter next to the set of circles that most accurately reflects you and your relationship with religion:
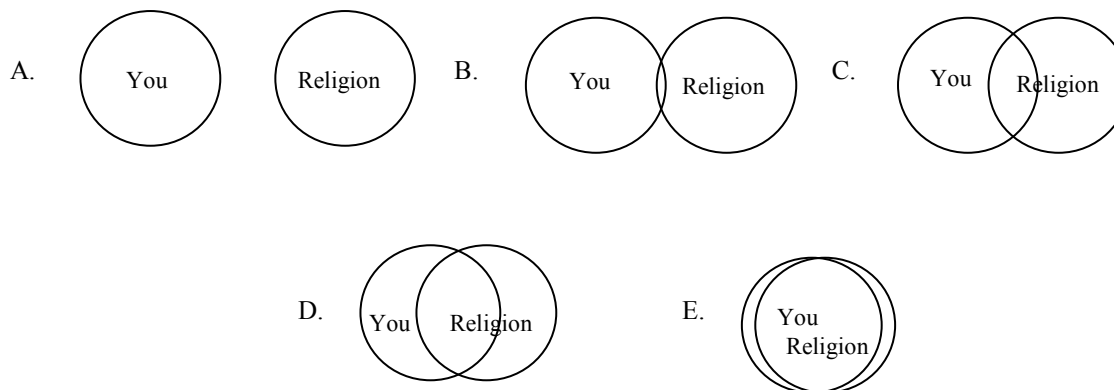
Importance of Religion

(Blaine & Crocker, 1995)

Instructions: Please respond to the following questions regarding your religious/spiritual beliefs using the following scale:

1= strongly disagree
2
3=neither agree nor disagree
4
5=strongly agree

1. My religious beliefs are what lie behind my whole approach to life.

     1   2   3   4   5

2. My religious beliefs provide meaning and purpose to life.

     1   2   3   4   5

3. I am frequently aware of the divine in a personal way.

     1   2   3   4   5

4. I allow my religious beliefs to influence other areas of my life.

     1   2   3   4   5

5. Being a religious person is important to me.

     1   2   3   4   5

APPENDIX J

PRAYER EXPERIENCE

(Poloma & Pendleton, 1989)

 The questions below are about some of the experiences that you might have had during

prayer. How often have you experienced the following?

A = Never

B = Once or twice

C = Occasionally

D = Regularly

1. Experienced a deep sense of peace and well-being.

    A   B   C   D

2. Felt the strong presence of God.

    A   B   C   D

3. Received what you regarded as a definite answer to a specific prayer request.

    A   B   C   D

4. Received what you believed to be a deeper insight into a spiritual truth.

    A   B   C   D

5. Felt divinely inspired or "led by God" to perform some specific action.

    A   B   C   D

APPENDIX K

MEASURE OF GOD IMAGE

(Benson & Spilka, 1973)

Instructions: Describe your idea of the divine with the following pairs of adjectives. Circle the number which best corresponds to your image of the divine.

damning	0	1	2	3	4	5	6	saving
freeing	0	1	2	3	4	5	6	restricting
permissive	0	1	2	3	4	5	6	rigid
demanding	0	1	2	3	4	5	6	not demanding
loving	0	1	2	3	4	5	6	hating
unforgiving	0	1	2	3	4	5	6	forgiving
controlling	0	1	2	3	4	5	6	uncontrolling
approving	0	1	2	3	4	5	6	disapproving
strict	0	1	2	3	4	5	6	lenient
rejecting	0	1	2	3	4	5	6	accepting

APPENDIX L

CONDITION READINGS

(Wiegand, 2004)

<u>Prayer condition</u>

God, please be with me today as I am faced with this difficult task. May your peace,

prosperity, and power be plentiful in my life today. God, I ask You to give me the

strength to overcome obstacles today. May your love and power guide me through this

task. God, please give me confidence so I can accomplish this task today. May your

wisdom and love guide me today. God, bless me with your peace during this task.

Words: 78

Reading Ease: 78.3

Reading Level: 5.0

<u>Self-talk condition</u>

I can do this. Think of all the obstacles that I have overcome in my life.

I am a smart person who can handle this task. I am able to get anything I set my mind to.

All I have to do is believe in myself, and good things will come. I am an important

person who deserves to be rewarded. I have accomplished many hard things in my

lifetime, and I will continue to accomplish hard tasks.

Words: 78

Reading Ease: 77.3

Reading Level: 5.2

Control condition

Razor technology being what it is, you probably think you never have to leave the house for a shave. Well, you're wrong. "Ten years ago, we stopped shaving people altogether," says Adrian Wood, master barber and owner of Paul Mole. "Now we do as many shaves as we want. Young people have decided it's a small luxury. Coming to the barbershop is a fun, manly thing to do. And, it doesn't cost very much."

GQ, May 2003

Words: 82

Reading Ease: 71.4

Reading Level: 5.9

Table 1.

Means and standard errors for all dependent variables and covariates.

	Mean	Standard Error of the Mean	N
Dependent Variables			
State Anxiety	2.11	.06	86
Anxiety Thermometer (Baseline subtracted)	1.78	.24	87
Systolic Blood Pressure (Baseline subtracted)	3.14	2.43	86
Diastolic Blood Pressure (Baseline subtracted)	2.38	1.62	86
Heart Rate (Baseline subtracted)	-1.78	1.27	86
Covariates			
Introvert/Extravert	13.66	.33	87
Religious Internalization	5.20	.08	85
Measure of Religiosity	3.09	.11	87
Importance of Religion	3.60	.11	87
Prayer Experience	2.62	.07	87
Measure of God Image	4.41	.07	86

Table 2.

Outcome of the multivariate analysis of variance. Dependent variables include state anxiety, anxiety thermometer, systolic blood pressure, diastolic blood pressure, and heart rate.

	Gender	Condition	Gender x Condition
State anxiety	$F(1, 79) = 3.07, p = .08$	$F(2, 79) = .78, p = .46$	$F(2, 79) = .68, p = .50$
Anxiety thermometer	$F(1, 79) = 1.75, p = .18$	$F(2, 79) = 1.80, p = .17$	$F(2, 79) = 2.89, p = .06$
Systolic	$F(1, 79) = .47, p = .49$	$F(2, 79) = 1.13, p = .32$	$F(2, 79) = .08, p = .91$
Diastolic	$F(1, 79) = .19, p = .65$	$F(2, 79) = .32, p = .72$	$F(2, 79) = .58, p = .56$
Heart rate	$F(1, 79) = 1.30, p = .25$	$F(2, 79) = .17, p = .84$	$F(2, 79) = .01, p = .98$

Table 3.

Outcome of the multivariate analysis of covariance. Dependent variables include state anxiety, anxiety thermometer, systolic blood pressure, diastolic blood pressure, and heart rate.

	Gender	Condition	Gender x Condition
State anxiety	$F(1, 70) = 1.58, p = .21$	$F(2, 70) = 1.35, p = .26$	$F(2, 70) = .18, p = .83$
Anxiety thermometer	$F(1, 70) = 2.60, p = .11$	$F(2, 70) = 1.89, p = .15$	$F(2, 70) = 1.74, p = .18$
Systolic	$F(1, 70) = .00, p = .97$	$F(2, 70) = .73, p = .48$	$F(2, 70) = .30, p = .74$
Diastolic	$F(1, 70) = .47, p = .49$	$F(2, 70) = .33, p = .71$	$F(2, 70) = .31, p = .73$
Heart rate	$F(1, 70) = .46, p = .49$	$F(2, 70) = .50, p = .60$	$F(2, 70) = .06, p = .93$
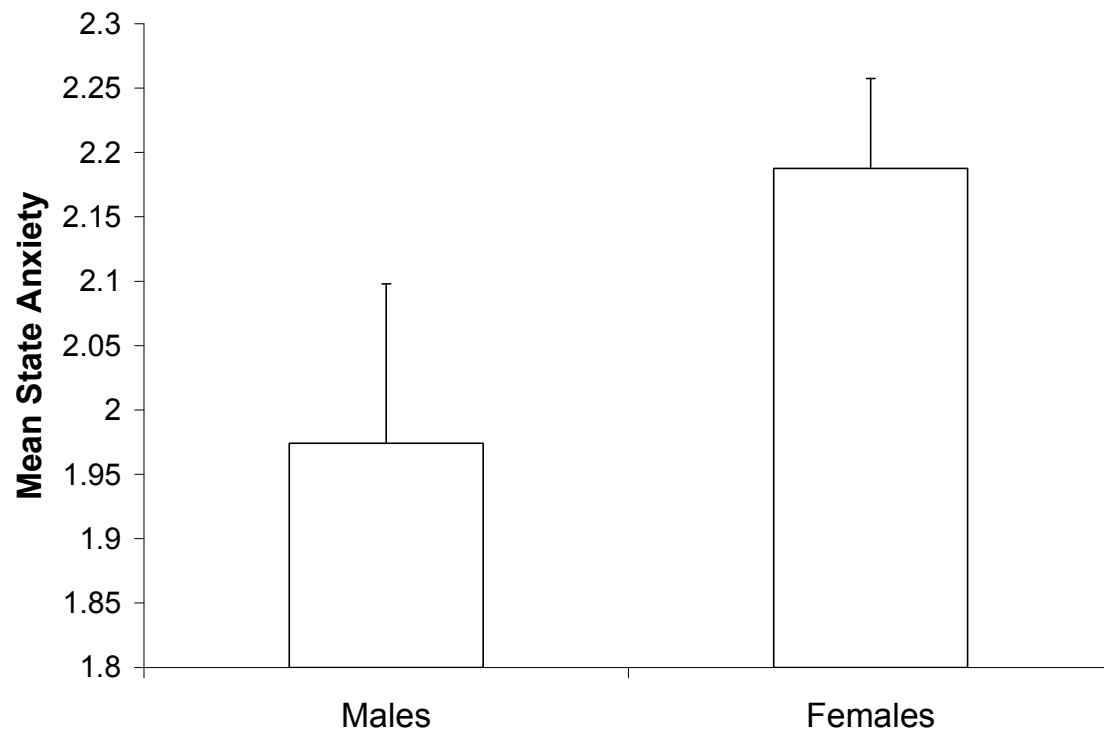
Figure 1. Mean state anxiety across gender.

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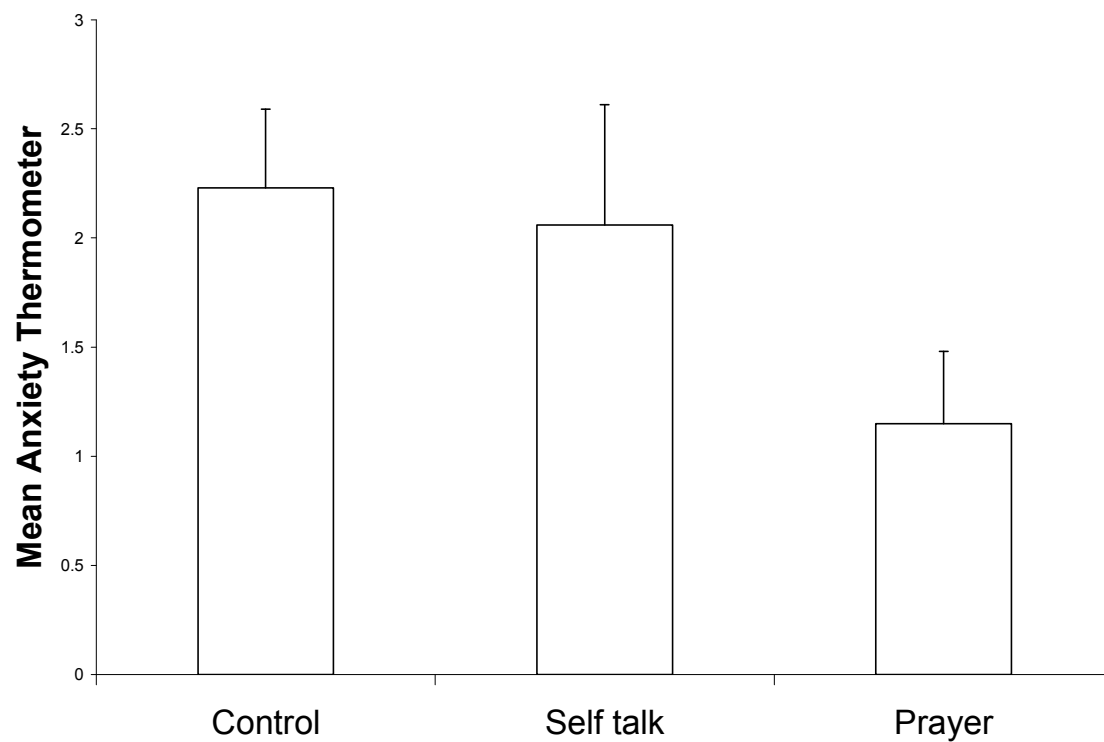
Figure 2. Mean anxiety thermometer across all treatment conditions.
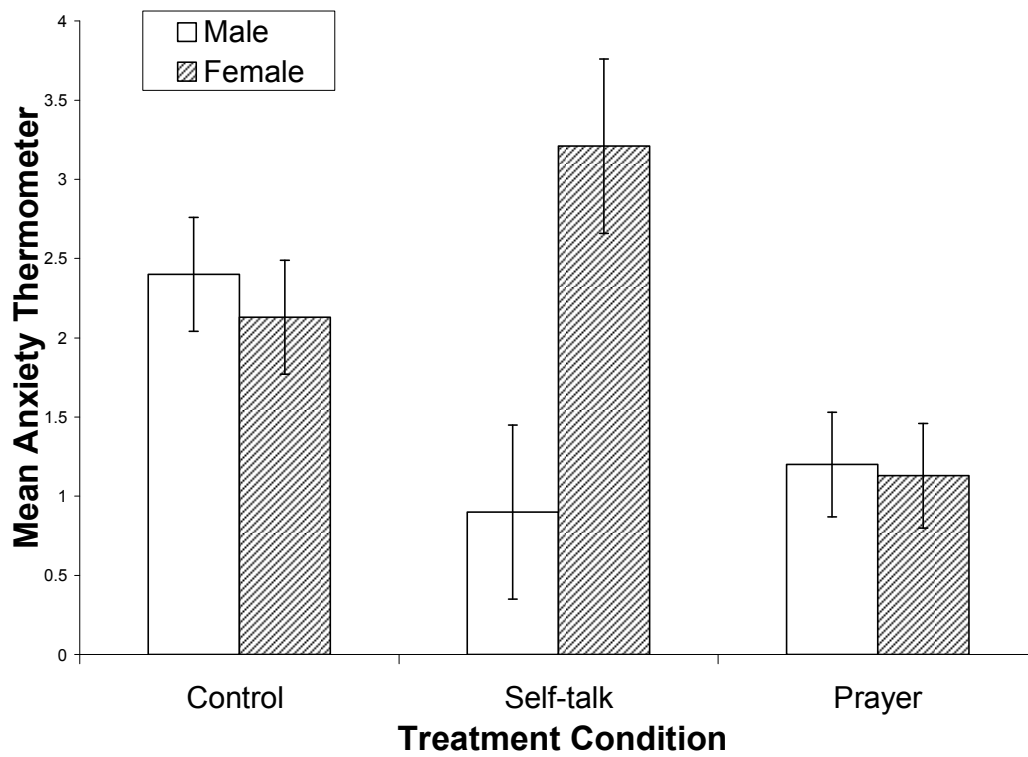
Figure 3. Interaction between gender and treatment condition affecting mean anxiety
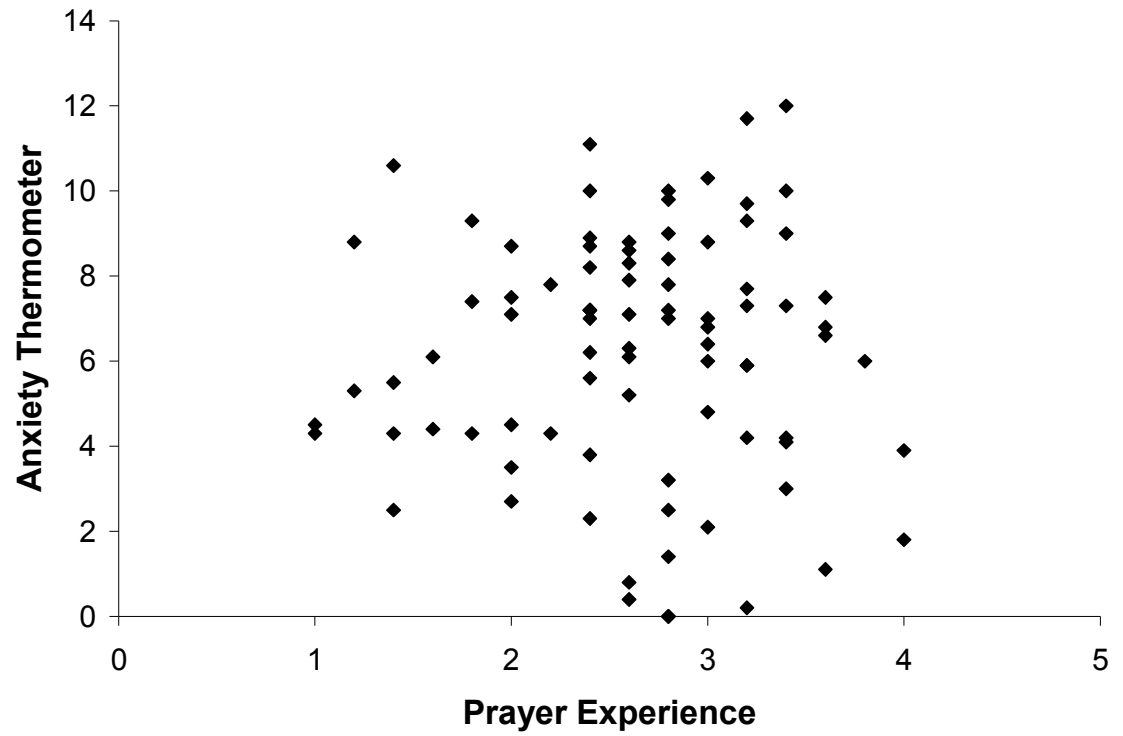
thermometer.

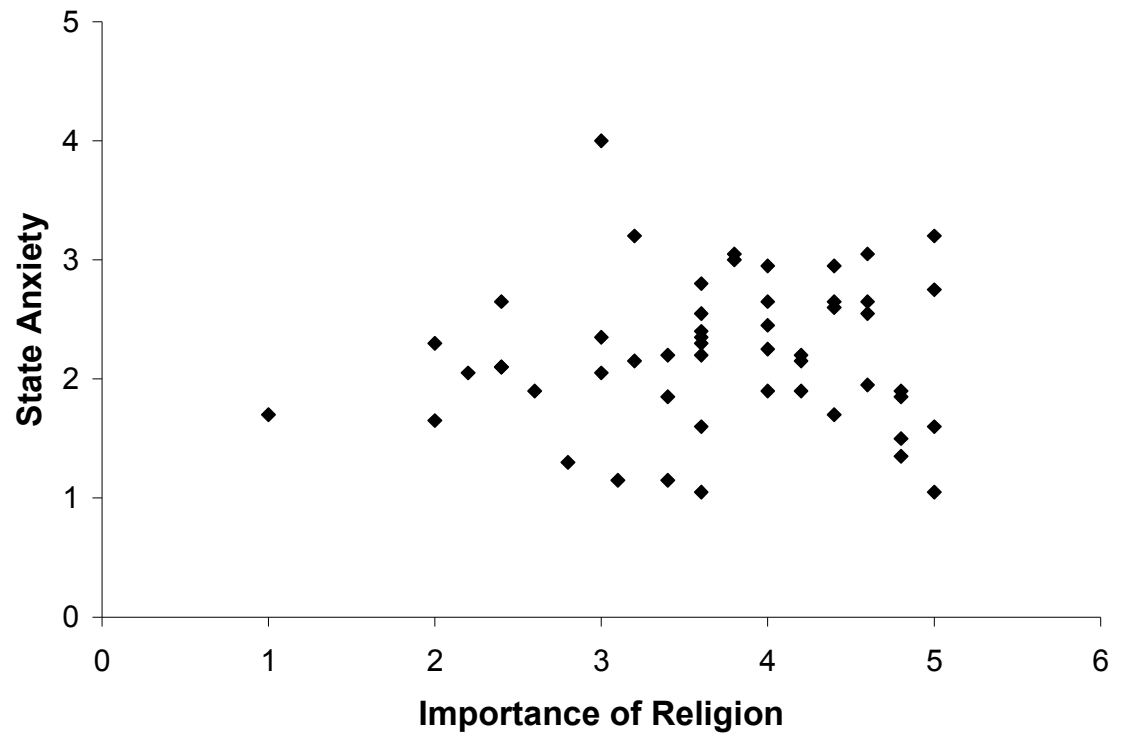*Figure 4.* Correlation between prayer experience and anxiety thermometer.

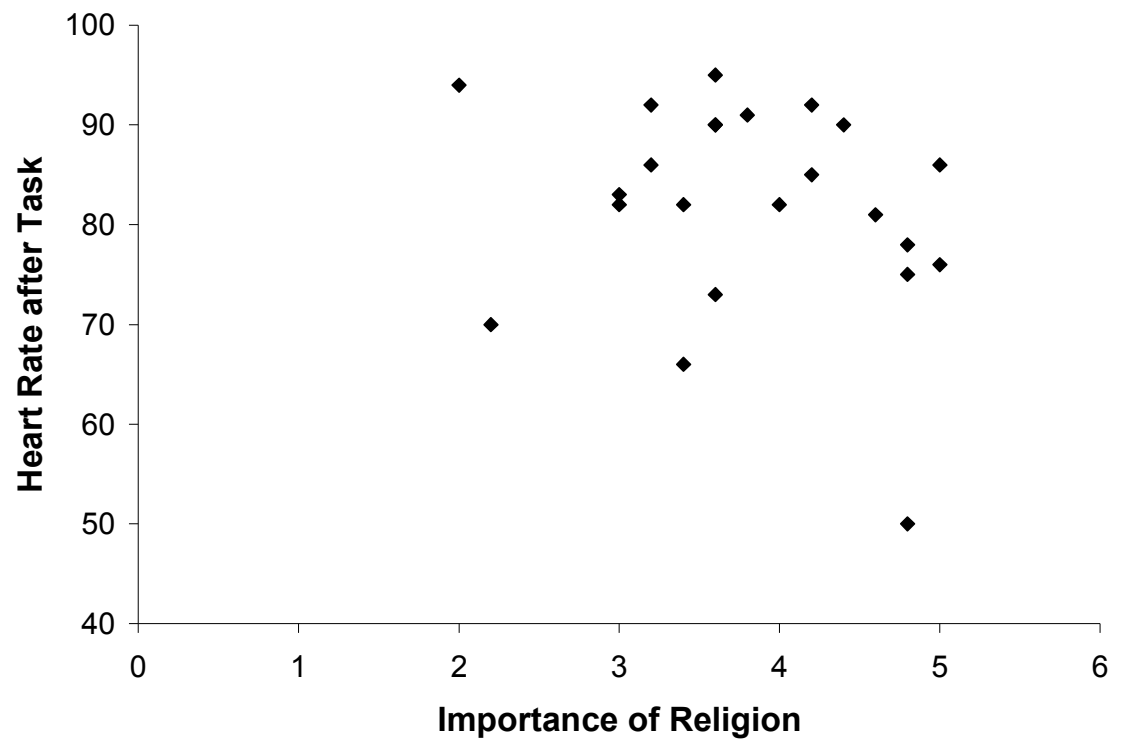*Figure 5.* Correlation between importance of religion and state anxiety.

Figure 6. Correlation between importance of religion and heart rate.