An abundance of evidence supports that stress predicts poor health, and religiosity, broadly defined, typically predicts good health. It is possible that one mechanism by which religiosity positively impacts health is through reduction in or prevention of the stress response, and that Surrender (Surrender to God) is a measure that captures aspects of religiosity that would predict lowered stress levels. In the present investigation, two samples were studied in order to investigate the relationship between one characterization of religiosity (Surrender) and stress. Participants in Study 1 were 460 (306 female) Southern Appalachian undergraduate university students who completed the Surrender Scale (Wong-McDonald & Gorsuch, 2000) and the State–Trait Anxiety Inventory (STAI, Spielberger, 1983) online during spring 2009. Study 2 utilized a high-risk (low income and/or high pregnancy risk) sample of 230 pregnant women involved in a longitudinal study who completed the Surrender Scale and the Prenatal Psychosocial Profile (PPP, Curry, Campbell, & Christian, 1994), which contains an 11-item stress measure, during their first research contact early in pregnancy. Hierarchical regression analysis revealed that Surrender was consistently inversely related to stress on both the STAI and the PPP. These findings contribute to the current understanding of the religiosity–health association in two ways. First, they offer support for Surrender and its associated lower stress levels to be explored as a mechanism by which religiosity influences health. Second, findings support the exploration of the potential for stress reduction through increasing Surrender in reportedly religious individuals.

Keywords: religious coping, stress, surrender, pregnancy, religiosity

Numerous studies over several decades have confirmed that stress is related to poor health (Cohen et al., 1998; Kiecolt-Glaser, McGuire, Robles, & Glaser, 2002; Klainin, 2009; Repetti, Taylor, & Seeman, 2002; Troxel, Matthews, Bromberger, & Sutton-Tyrell, 2003) and that religiosity, measured in various ways, is related to good health (Ai, Seymour, Tice, Kronfol, & Bolling, 2009; Koenig, McCullough, & Larson, 2001; Miller & Thoresen, 2003; Powell, Shahabi, & Thoresen, 2003; Seeman, Dubin, & Seeman, 2003); however, the aspects of religiosity that contribute to health and pathways by which those contributions are made are just beginning to be investigated. The most robust finding in the religiosity–health literature is that religious service attendance predicts all-cause mortality (Tartaro, Luecken, & Gunn, 2005), possibly because attendance is one of the most commonly used metrics of religious commitment. Studies have shown explanatory value of religiosity over and above social support in onset of physical and mental illnesses, reduced mortality, and likelihood of recovery from or adjustment to physical and mental illness (Cohen, Yoon, & Johnstone, 2009; George, Larson, Koenig, & McCullough, 2000). Critics of early studies have conjectured that such findings suffer from a multitude of possible confounding variables such as gender, social support, age, social desirability responding, and income. Yet
when these most commonly cited confounds are controlled for, the religion-health connection typically remains (Hummer, Rogers, Nam, & Ellison, 1999; Strawbridge, Shema, Cohen, & Kaplan, 2001).

The relationship between religiosity and health is obviously more complex than a simple linear correlation between two variables, even to the extent that certain aspects of religiosity are actually predictive of increased anxiety rather than decreased anxiety (see Gartner, 1996). Forcing constructs as broad and complex as religiosity, stress, and health and their inter-relationships into an empirical research paradigm is challenging and likely insufficient to capture the truth about those interrelationships and mechanisms; however, building on previous empirical findings gives us a glimpse of patterns upon which we can build to aid our understanding. For an excellent overview of issues involved in the imposition of modernistic psychological scientific methodology on religiosity research, see Slife, Hope, and Nebeker (1999). What empirical findings have shown, which align well with theoretical assumptions about benefits of religiosity, is that there is a consensus that religiosity on a macro level is contributing to health, but because of the assortment of ways that religiosity has been defined and studied, it is unclear what aspects of religiosity are responsible for this effect.

People can adhere to the same religious belief system for very different reasons (Allport, 1950; Ryan, Rigby, & King, 1993), which can lead to different motivational, behavioral, and health outcomes. Much health research has relied on measures of religious attendance, and occasionally importance of religion, to differentiate religious from nonreligious individuals, often with the categorization made on the basis of a single survey question. Illustrating this trend, Koenig et al. (2001) analyzed 101 religious studies and pointed out that 90 of them used denomination, attendance, or membership in the clergy as the sole measure of religiosity. Even with such simplistic criteria, however, religious individuals have been found to be healthier overall (McCullough, Hoyt, Larson, Koenig, & Thoresen, 2000). On the other hand, such vague measures can do little to elucidate which aspects of religiosity are contributing to health.

Researchers have been converging toward a consensus that various dimensions of religiosity relate to specific health outcomes and may operate via different paths, which should be examined in detail. While the majority of religiosity studies have used global religious measures, there have been considerable advances in studying religiosity as a multidimensional variable (Fetzer Institute, 1999), as well as in examining various aspects of religiosity in relation to health (for a review, see Hill & Pargament, 2008). Along with the increased interest in measuring religiosity and spirituality has come an additional confound cited by Koenig (2008). Some measures recently reported in the medical literature utilize instruments that are contaminated with item constructs that tap into mental health such as “I feel deep inner peace or harmony,” thus confounding the measure of religiosity with mental health or wellbeing (p. 353). Issues such as this underscore the necessity of careful instrument development or selection, as would be true with any research endeavor. The main focus of our study is to determine the predictive utility of a religiosity construct, Surrender, which can be defined as denial of self for the sake of a divine purpose (Dyslin, 2008) or as an active, rather than passive, giving up of one’s desires and actions to what one believes to be God’s will (Wong-McDonald & Gorsuch, 2000).

At this point in our research, we are investigating participants’ endorsement of their beliefs about God rather than any activity requiring the study of God. Although Helminiak (2008) is correct when he states that the “inclusion of God or ‘God-substitutes’… in the psychology of spirituality prevents the development of a truly psychological understanding,” we believe that it is unnecessary to limit our search to a “truly psychological understanding” (p. 161), although in this investigation we have primarily done just that. Our use of the Surrender construct does not rely on the verification of the existence of God to whom the person surrenders at this point, only that the person is more or less surrendered to God as defined in our measures. However, whether or not it is the scientifically unverifiable God to whom those individuals surrender, the findings remain important.

Although historically religiosity has been a rather ambiguous term measured in many ways, Masters (2008) cited religious orientation as a fertile area of investigation in the religion—
health relationship. Allport and Ross (1967) initially broke religious orientation into two constructs: intrinsic religious orientation (IR) and extrinsic religious orientation (ER). IR individuals view their religion as an end in itself, adhering to its creeds and internalizing its tenets. ER individuals see their religion as a means to an end or as instrumental in achieving ends such as security, status, social relationships, self-justification, or even a sense of peace (Gorsuch & McPherson, 1989). IR individuals tend to attend church and otherwise pursue their religion for spiritual growth while that is not the goal of these behaviors for ER individuals. The IR/ER dichotomy remains among the best-supported areas of investigation in the religion–health relationship, as many studies have confirmed that IR appears to have beneficial effects on both stress and health that are not seen in ER or nonreligious individuals (e.g., Smith, McCullough, & Poll, 2003).

Lest we be accused of attempting to break down religiosity into component parts of which Surrender is one (Slife et al., 1999), we rather contend that Surrender is a measurable construct that qualitatively differentiates between individuals who are intrinsically religious with God as their focus and those who are not. We propose that at least some of religiosity's contribution to health can be explained by the degree to which individuals surrender to God, which results in physiological conditions and responses that improve or maintain health through buffering or preventing the stress response.

The purpose of our study, as mentioned above, is to determine whether there is support for a physiological pathway (i.e., stress response inhibition) by which Surrender affects health. In light of the Extrinsic–Intrinsic dichotomy (Gorsuch & McPherson, 1989), the population defined in our study as surrendered would be categorized as IR individuals. Indeed, Wong-McDonald and Gorsuch (2004) related IR to Surrender (r = .62), the highest correlation to Intrinsic Religiosity among all examined coping methods (other coping methods reviewed in that study are discussed in Pargament et al., 1988). As can be seen then, Surrender reflects IR, which contributes to the likelihood of its positive relation to health.

We believe that there are two paths by which Surrender results in lowered stress: reduced number of stressors and reduction in the perception of stress. Surrender, based on the previously mentioned definition, reflects a deep commitment to following God’s will and therefore should predict a greater adherence to religious tenets regarding actions, resulting in fewer experienced actual stressors, a point on which we will elaborate later in this article. The perception of stress should be reduced because the act of surrendering allows an individual to be able to feel less stress because someone (i.e., God) is capable of overseeing situations that the individual views as negative or beyond his or her control. Thus, we propose that stress buffering and stress reduction are the mediators in the prediction of health outcomes by Surrender, although the prediction of health outcomes is beyond the scope of the current investigation.

**Religiosity and Health**

A number of explanatory mechanisms for the better health of religious individuals have been hypothesized, including practicing healthy behaviors, having ample social resources, and experiencing positive emotions, such as those experienced when one forgives or is forgiven (Tartaro et al., 2005; Worthington, Witvliet, Pietrinin, & Miller., 2007). In fact, in a recent study, Lawler-Row (2010) found that feeling forgiven by God (self-forgiveness) and forgiving others mediated relationships between various aspects of religiosity and health. Additionally, studies of health-related behaviors have confirmed that many religious groups have restrictive moral codes that discourage the consumption of alcohol, illicit drugs, tobacco use, and having multiple sexual partners (Burdeett, Ellison, Sherkat, & Gore, 2007; Cochran, Beeghley, & Bock, 1988), which would reduce various health risks such as alcoholism, tobacco-related illnesses, and contracting STDs. Religious families are also known to monitor their children more closely than less religious or nonreligious families (Baier & Wright, 2001; Clements, Schetzing, Rhodes, Dunn, & Cohen, 2009; Snider, Clements, & Vazsonyi, 2004), offering children fewer opportunities to use substances, participate in risky sexual behaviors, or perhaps even eat poorly.

The most commonly cited variable accused of confounding the relationship between religiosity and health is social support. The practice
of regularly gathering with the same group for religious services and other religious activities contributes to the number of social relationships experienced by regular church-attenders. Practicing forgiveness is also likely to contribute to the quality and number of social relationships, thereby increasing or maintaining social support (Masters, 2008; Worthington, Witvliet, Pieptrinin, & Miller, 2007). However, religiosity has repeatedly been found to explain variance over and above social support (e.g., Koenig, 2007; Wink, Dillon, & Larson, 2005), verifying that social support is not the sole mechanism by which religiosity influences health.

**Stress as a Mediator Between Religiosity and Health**

As can be derived from the previous discussion, factors such as healthy lifestyle choices, social support, and forgiveness do allude to possible physical causes of illness or poor health that would be avoided by those high in religiosity, but they still do not explain the mechanism by which religiosity translates into better health even for individuals who do not abuse substances or participate in illicit relationships. Another framework by which to explore mediators between religiosity and health is to explore cardiovascular and hormonal variables (Seeman et al., 2003; Tartaro et al., 2005). Cardiovascular and hormonal variables do not only reflect stress, they are the primary physiological indicators of stress, and thus this framework is well-suited to our exploration of stress as a mediator of the relationship between religiosity and health.

Health problems ranging from coronary heart disease (CHD; Repetti et al., 2002; Troxel et al., 2003) to the common cold (Cohen et al., 1998; Kiecolt-Glaser et al., 2002) have been shown to be predicted by stress. Stress has even been implicated in the development of pregnancy and birth complications and behavioral and cognitive problems in children of women who experienced psychological stress during pregnancy (Clements, 1991; Wadhwa, 2005), thereby affecting the health of more than one individual. The American Institute of Stress (AIS, 2009) estimates that “75–90% of all visits to primary care physicians are for stress-related problems” (para 1). Although Markovitz and Matthews (1991) proposed that over time, pronounced, repeated, or prolonged stress responses contribute to the development of disease, health risks due to stress do not seem to be linear (i.e., a certain quantity of stress leads to illness in all individuals). Numerous physical illnesses depend on the interplay among multiple variables including the presence of stressors (Markus & Kitayama, 1991; Turk, 1996).

There is empirical evidence that individual characteristics such as temperament predict the amount of stress someone is likely to experience (Clements & Bailey, 2010) and individual characteristics and behaviors either place people at risk for ill effects of stress or buffer them against those ill effects (Berkman & Syme, 1979; Robles, Brooks, & Pressman, 2009; Klainin, 2009; Schmidt, Sterleman, & Müller, 2008). Although it is difficult to categorize religiosity as either an individual characteristic or a behavior, it is the interplay of stress and religiosity that we have investigated in order to add to the understanding of the mechanism(s) by which religiosity contributes to health.

There is evidence that the physiological stress response may be less pronounced in religious individuals. As mentioned, Pollard and Bates (2004) found that IR was highly negatively related to perceived stress, yet ER was not predictive of stress at all. Physiological measures have confirmed this relationship. Dedert et al. (2004) found cortisol concentrations (a common indicator of stress) to be more rhythmic (i.e., healthier) in women with fibromyalgia who were high in IR, while women low in IR had flattened cortisol rhythms, a characteristic which is predictive of immunosuppression, cardiovascular disease, diabetes, hypertension, and cancer. Tartaro et al. (2005) found that blood pressure and cortisol response to a laboratory stressor were significantly related to IR characteristics such as frequency of prayer, private religiosity, and commitment, with IR predicting healthier blood pressure and cortisol measurements. Participants’ ratings on several IR variables predicted cortisol reactivity when stressed, with the more religious individuals having lower reactivity; however, variables such as religious attendance did not predict cortisol reactivity. Slope analysis also showed that more religious males also had lower systolic and diastolic blood pressure than less religious or nonreligious males.
How Does Religiosity Lead to Reduction of Stress Effects?

There are two likely routes by which religiosity, or certain aspects of religiosity, may affect stress, which were alluded to previously: reduction of stressors and reduction in the perception of stress. Regardless of whether the stressors are actually experienced or only perceived, either contributes to cardiovascular damage and reduced immune function, as well as changes in circulating hormone concentrations and their related sequelae through the physiological stress response (Markovitz & Matthews, 1991; Tartaro et al., 2005).

Reduction of actual stressors. Religiosity may affect health by reducing the actual number of stressors experienced by an individual (Hill, Burdette, Ellison, & Musick, 2006; Strawbridge et al., 2001). Within organized religious settings such as churches, having a social support system may contribute to resources for removing or avoiding stressors (e.g., a special monetary offering to make the house payment for a parishioner who is out of work, advice from a friend who has been in a similar situation and dealt with it successfully). Additionally, individuals who attempt to follow the tenets of their faith may be less likely to be in stressful situations. For example, a Christian (Christianity is the overwhelmingly predominant faith in our study area) who is following biblical principles would not enter into an adulterous relationship or be in debt, thereby reducing marital conflict and financial stresses. These individuals would also be instructed to resolve conflict, resulting in better social relationships. Reduction of actual stressors by these means follows the meditational pathways through healthy behaviors and social support which we discussed above. Masters (2008) points out that forgiveness and showing compassion, additional prescribed biblical practices that would bolster social relationships and reduce interpersonal conflict, have been shown to be predictive of health and specifically have been shown to predict lower blood pressure. Finally, we would be remiss not to include the possibility that God, a god, or higher power may control the number and severity of stressors as well, yet as this is a variable that cannot be measured objectively, it is beyond the scope of this investigation.

Reduction in the perception of stress. Religiosity may also affect health by reducing an individual’s perception of whatever stressors are encountered. It has been shown that the perception of stress is actually the trigger for the body’s physiological response to stress in many situations (Wadhwa, 2005). The reasons for those high in aspects of religiosity to perceive events as less stressful could be many. According to Masters (2008), there is an explanatory structure provided by most religions which can be used to integrate life’s events that provide those events meaning. People who view God as benevolent and in control can find peace even in the face of adversity because they believe that 1) God will provide a way to cope with the events, and 2) they will be rewarded in the afterlife.

We have chosen to measure surrender to God (Surrender), conjecturing that it is the act of surrendering one’s will to that benevolent, controlling God’s will that results in a lessening in the perception of stress. Wong-McDonald and Gorsuch (2004) found that both locus of control (LOC) in God (as opposed to LOC in self or LOC in powerful others) and the belief that God is benevolent (labeled the benevolent God concept) predicted greater Spiritual Well-Being ($\beta = .12, p < .05$ and $\beta = .26, p < .01$, respectively). Spiritual Well-Being (Paloutzian & Ellison, 1982) comprises both connection to God (Religious Well-Being), as well as general purpose and satisfaction with life (Existential Well-Being). Clearly, those individuals who are more satisfied with life have reduced perception of stress, which supports this effect that religiosity has on health. We hypothesized, therefore, that individuals indicating higher levels of Surrender (Wong-McDonald & Gorsuch, 2000) would be lower in measured stress.

Surrender as Preferred Measure of Religiosity

Buffering and avoidance of stress fall into the area of coping. The most influential secular theory of coping is probably the transactional model of stress and coping, delineated by Lazarus (1966, 1982, 1991; Lazarus & Folkman, 1984). However, that honor in religious coping circles most assuredly goes to Pargament (e.g., Pargament, 2007; Pargament, Koenig, & Perez, 2000; Pargament et al., 1988).
Distinct from more general measures of religiosity or general measures of coping, religious coping refers to how a person makes use of his or her religious beliefs to understand and adapt to stress, and religious coping, broadly defined, is generally related to lower levels of stress (Ano & Vasconceles, 2005). Researchers have reiterated in many studies that it is through religious coping strategies that the religiosity–health effect occurs (Hathaway & Pargament, 1990; Pargament et al., 1992; Pargament, Smith, Koenig, & Perez, 1998).

Despite many classifications used to demonstrate coping through religious means, the most tested has been Pargament’s R-COPE (Pargament et al., 1998; 2000) and its precursor, the Religious Problem Solving Scale (RPSS, Pargament, 1997). The RPSS was originally developed as a self-report measure of three aspects of religious problem solving: Deferring, Cooperative, and Self-Directed. The scale of interest in the current investigation, the Surrender Scale, was developed by Wong-McDonald and Gorsuch (2000) as a complementary fourth scale, which measures the extent to which individuals relinquish their wills to God’s and submit to Him, and how often they will surrender to God’s will when their own desires differ with what they believe to be God’s will. May (1982) included the notion of replacing willfulness with willingness to submit to God, which is precisely what the Surrender Scale measures.

Our rationale for adopting Surrender as our measure of religiosity is that we were attempting to employ a measure that would identify individuals who trust God to be benevolent and powerful. We believe that the individuals who report willingness to surrender to God will also be likely to trust His benevolence and control, having their LOC in God rather than themselves (Wong-McDonald & Gorsuch, 2004), thus either reducing the individual’s need to feel stress over adversity or reducing the likelihood of the individual being in stressful situations due to obedience to the Bible, as illustrated by the discussion of religiosity and health-related behaviors above (Burdette et al., 2007; Cochrane et al., 1988). In our investigation, we have sought to confirm the relationship between Surrender and measured stress in order to explain one mechanism by which religiosity may impact health. Although various aspects of religiosity have been found to be negatively related to stress levels (Dedert et al., 2004; Pollard & Bates, 2004) and psychophysiological responses to stress (Masters, 2008), Surrender has not been specifically investigated as a potential contributor to (or predictor of) stress or health previously, but it has been shown to be very strongly correlated with IR (Wong-McDonald & Gorsuch, 2000) and Spiritual Well-Being (Wong-McDonald & Gorsuch, 2004).

**General Method**

**Study Overview**

We believe that prevention or reduction of the stress response is one mechanism by which certain aspects of religiosity contribute to good health. If those aspects of religiosity that help to buffer or prevent stress can be identified, those same aspects of religiosity can be investigated in relation to health. If individuals high in the aspects of religiosity that are related to lower stress levels also have better health, the case can be made that stress response reduction is one mechanism by which religiosity affects health. The current studies aim to verify the relationship between Surrender and reported stress.

**Study Population**

Two studies are being reported, the first conducted with 460 undergraduate university students from Southern Appalachia and the second with 230 pregnant women, also from Southern Appalachia. The population in this study area is very high in religious attendance and reported importance of religion compared to most other areas of the U.S. (Clements et al., 2009), and virtually all who profess to be religious claim Christianity as their religion. Sixty-four percent of respondents in the study area recently reported at least weekly church attendance and 52% reported their religious beliefs to be extremely important to them (Clements et al.). These results are considerably higher than available national data (Newport, 2006, 2009). One limitation of attempting to study religiosity in a highly religious area is that the prevalence of church attendance and reported religious importance may result in inflated scores on most religiosity measures because of social desirability response bias. Gillings and Joseph (1996) found that religiosity and impression manage-
ment are positively related. Sedikides and Gebauer (2010) further explored the relationship between religiosity and socially desirable responding. In an exhaustive meta-analysis, they found that individuals high on IR were more likely to respond in socially desirable ways, but individuals high on ER or religion-as-quest (Batson & Ventis, 1982) were not. This could be for many reasons, but one is that these individuals are giving socially desirable responses because the responses are actually true of them rather than an attempt at impression management. We would expect this to be true of the highly surrendered individuals as well.

Even though Southern Appalachia is high in religious attendance and in reported importance of religion, the region is considerably less healthy (Bailey & Jones Cole, 2009) than other regions of the U.S. This implies that religious attendance and importance are not capturing the aspects of religiosity that contribute to good health or perhaps other factors contributing to poor health outweigh the benefits of religiosity. We submit that attendance and reported importance are not cleanly capturing the health-benefiting aspects of religiosity that would be captured by a more specific measure of religiosity such as Surrender.

Study 1

Our first study was conducted with a southern Appalachian university student population in which Stress, Surrender, and Temperament were assessed in order to determine predictors of stress. Temperament was found to be a robust predictor of trait stress as reported in Clements and Bailey (2010). In the current study we attempted to determine whether religious coping (Surrender specifically) was predictive of either state anxiety, which is anxiety felt at a particular moment in time, or trait anxiety, which is the amount of anxiety that is typically felt by an individual. The hypothesis for Study 1 was that Surrender would be significantly related to state anxiety and trait anxiety when controlling for age, gender, marital status, and number of children.

Method

Participants. After receiving study approval from the university’s institutional review board, 460 (306 female; 40 married) southern Appalachian undergraduate university students ranging in age from 18 to 53 years ($M = 21.40$, $SD = 4.76$) completed surveys online during spring 2009.

Measures. Survey instruments completed by participants in this study were the State–Trait Anxiety Inventory (STAI, Spielberger, 1983) and the Surrender Scale (Wong-McDonald & Gorsuch, 2000).

State–Trait Anxiety Inventory (STAI). The STAI is the most used measure of stress, having appeared in over 3,000 studies and having been translated into over 30 languages (Barnes, Harp, & Jung, 2002). It is a self-report measure that consists of 20 items to assess State Anxiety (SA), defined as an unpleasant emotional arousal in the face of threatening demands or dangers characterized by temporary feelings of anxiety that tend to be situational, and another 20 items to assess Trait Anxiety (TA), which reflects the existence of stable individual differences in the tendency to respond with state anxiety in the anticipation of threatening situations. Each question is evaluated on a 4-point Likert scale. This yields a possible TA score from 20 to 80, a possible SA score from 20 to 80, and a possible total anxiety score from 40 to 160, which is calculated by adding the two scales’ scores together. The STAI demonstrates excellent internal consistency (average $\alpha = .89$) and test–retest reliability (average $r = .88$, Barnes et al., 2002). We predicted that Surrender would statistically significantly explain variance in both SA and TA.

Surrender Scale (SS). We measured surrender coping using the 12-item SS (Wong-McDonald & Gorsuch, 2000) that was developed based on the format of the Religious Problem Solving Scale (RPSS, Pargament, 1997). Items inquire about behaviors and thoughts related to the degree to which people are willing to surrender to God, such as “When my solutions to problems are in conflict with God’s alternatives, I will submit to God’s way.” Response choices for all items range from 1 (never true of me) to 5 (always true of me).

The SS has been found to be highly correlated with intrinsic religiosity, having one’s Locus of Control in God, and with several measures of spiritual well-being (Wong-McDonald & Gorsuch, 2004). It is a much
stronger predictor of all of these variables than the frequently used religious coping scales developed by Pargament (1997).

Procedure. The SS and the STAI were administered online through The Sona Systems web-based participant pool management system. Students were given one point of extra credit that could be applied toward the grade in a psychology course of the student’s choice. Responses of participants who spent less than 10 min completing the survey set were eliminated from analyses, as this was not adequate time to answer questions meaningfully. The participants eliminated did not differ from the retained participants demographically.

Results

Zero order correlations were computed among Surrender, SA, and TA. Surrender was significantly negatively related to SA and TA ($r = -.12$, $p = .01$ and $r = -.16$, $p = .001$, respectively).

Hierarchical multiple regression was performed to assess the ability of Surrender to predict anxiety (SA and TA) after controlling for gender, age, marital status, and number of children. Although gender was the only control variable that was significantly related to the dependent variable ($p < .01$), all were retained in order to assess the contribution of each.

Surrender and State Anxiety. Gender, age, marital status, and number of children were entered at Step 1, explaining 3.1% of the variance in SA. After entry of Surrender, the total variance explained by the model as a whole was 4.4%, $F(5, 454) = 4.57, p < .001$. Surrender explained an additional 2.8% of the variance after controlling for gender, age, marital status, and number of children, $R$ squared change $= .028, F$ change $(1, 454) = 13.49, p < .001$. In the final model only gender ($\beta = -.10, p = .03$) and Surrender ($\beta = -.17, p < .001$) were statistically significant predictors of TA (See Table 2), again with being male and being more surrendered predicting lower anxiety levels.

Analyses revealed no violation of assumptions of normality, linearity, multicollinearity, or homoscedasticity on either of the regression models run in Study 1 (Minimum Tolerance $= .76$; Maximum VIF $= 1.0$; Maximum Cook’s Distance ranged from 0.42 to 0.73). P-P Plots revealed no outliers, and Standardized Residuals were acceptable indicating no undue influence of outliers (Tabachnick and Fidell, 2007).

Discussion

Our purpose in Study 1 was to confirm the ability of Surrender to predict anxiety in order to identify an aspect of religiosity that may be contributing to the religiosity–health relationship. Surrender was found to be significantly negatively related to SA and TA as hypothesized. The variance explained is admittedly quite small, but this is not unexpected. Although we believe that surrender to God is predictive of stress, there are likely a multitude of other factors that also contribute to reported stress, so small explained variance can be tol-

---

Table 1

<table>
<thead>
<tr>
<th>Study 1: Hierarchical Multiple Regression Predicting STAI State Anxiety Score (SA) From Surrender</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variable</td>
</tr>
<tr>
<td>----------------</td>
</tr>
<tr>
<td>Step 1 Gender</td>
</tr>
<tr>
<td>Age</td>
</tr>
<tr>
<td>Marital Status</td>
</tr>
<tr>
<td>Number of Children</td>
</tr>
<tr>
<td>Step 2 Surrender</td>
</tr>
</tbody>
</table>

Note. Total $R^2 = .048, F(5, 454) = 4.57, p < .001. * $p < .01$. 

---

---
erated. Our hope within this set of studies was to establish a pattern of stress variables that were significantly predicted by Surrender. Study 1 was a first step toward establishing that pattern as both SA and TA were significantly negatively related to Surrender even when controlling for demographic variables.

The findings from Study 1 support that individuals high on Surrender to God tend to have lower reported stress and therefore should be at lowered risk for stress-related health problems. Because stress is known to contribute to illness through cardiovascular and neurohormonal changes and immunosuppression, these findings support that Surrender may be one mechanism by which religiosity prevents disease and therefore contributes to healthiness.

A limitation of Study 1 was that it was conducted with a fairly homogeneous sample, undergraduate university students in the U.S. Although studies have shown college samples to be generalizable to broader populations, their restricted age and range of experience make them less than ideal for religiosity research. To advance the idea of establishing a pattern of relationships between Surrender and measures of stress in varied populations, we conducted a second study.

Study 2

In Study 2 we attempted to replicate the findings of Study 1, assessing the ability of Surrender to predict stress; however, this study utilized a pregnant population and a stress measure designed specifically for use during pregnancy. It was hypothesized in Study 2 that Surrender would be negatively related to stress when controlling for age, marital status, education, and number of children.

Participants

Study 2 was conducted at a comprehensive obstetric practice associated with a southern Appalachian teaching hospital and medical school. The population served by this practice includes women from surrounding rural counties, women on public assistance, most women in the region who have high-risk pregnancies regardless of SES, and a somewhat smaller proportion of middle- and upper-class women with low-risk pregnancies. The sample and the region are quite racially homogeneous. Race was reported on the background questionnaire; however, 124 of 230 did not respond to this question. Of those reporting race, 93% reported Caucasian. The region is approximately 97% Caucasian. The sample included African American (2.2%), Hispanic (2.2%) and Asian (1.1%) women.

Participants in Study 2 included 230 pregnant women who were enrolled in a state-funded project for pregnant smokers (Tennessee Intervention for Pregnant Smokers [TIPS]). Both smokers (*n* = 163) and nonsmokers (*n* = 67) were included. Participants ranged in age from 15 to 45 (*M* = 24.67 years), with 57 (21.7%) being under the age of 20, and 17 (7.0%) being under the age of 18.

Procedure. TIPS participants were eligible to complete four separate research interviews involving collection of demographic, health, and psychosocial information: one during the first trimester, one during the third trimester, one 6–8 weeks post-partum, and one 6–8 months post-partum. Data were also collected through prenatal and delivery medical chart reviews. For purposes of the current report, only select data from the first trimester interviews and from the prenatal and delivery chart review were used.

Instrumentation. The Surrender Scale (Wong-McDonald & Gorsuch, 2000), as described above in Study 1, was used to measure Surrender in this study. The Prenatal Psychosocial Profile (Curry, Burton, & Fields, 1998) was used as a measure of stress.

<table>
<thead>
<tr>
<th>Table 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Study 1: Hierarchical Multiple Regression Predicting STAI Trait Anxiety Score (TA) From Surrender</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Step 1</td>
</tr>
<tr>
<td>Gender</td>
</tr>
<tr>
<td>Age</td>
</tr>
<tr>
<td>Marital Status</td>
</tr>
<tr>
<td>Number of Children</td>
</tr>
<tr>
<td>Step 2</td>
</tr>
<tr>
<td>Surrender</td>
</tr>
</tbody>
</table>

*Note. Total R² = .044, F(5, 454) = 4.18, p = .001. *p < .01. **p < .001.
measure Surrender in Study 2. Women completed it in person rather than online.

Prenatal Psychosocial Profile (PPP). The PPP, developed by Curry et al. (1994), contains three scales including a measure of Social Support (the Support Behaviors Inventory, Brown, 1986), a measure of Self-Esteem (the Rosenberg Self-Esteem Scale, Rosenberg, 1965), and a measure of stress. The dependent variable of interest in the current study was the PPP stress measure (PPP), which contains 11 items originally selected from the Daily Hassles Scale (Kanner, Coyne, Schaefer, & Lazarus, 1981). Items inquire about stress related to financial worries; family; friends; recent moves; recent losses; problems with work; drug/alcohol use; current sexual, emotional, and/or physical abuse; and one item asking women to rate the degree to which they feel generally “overloaded” (Curry et al., 1998). Therefore, this instrument measures both perceived stress and actual stressors, both of which were hypothesized to be lower in individuals high in Surrender to God. Women were asked to rate, on a 4-point scale ranging from 1 (no stress) to 4 (severe stress), the extent to which each of the items is a current stressor for them. Validity and reliability for all three components of the PPP (stress, social support, and self-esteem) have been demonstrated in culturally diverse samples including African American, Caucasian, Hispanic, and Native American women. Internal consistency reliabilities for the stress measure, which is of interest in this study, ranged from .67 to .78 and test–retest reliabilities ranged from .52 to .57, with average timing of the first administration at 13 weeks gestation and second administration always between 24 and 28 weeks gestation (Curry et al., 1998). Convergent validity was demonstrated by a correlation of .71 with the Difficult Life Circumstances Scale (Curry et al., 1994).

Results

Zero order correlations among Surrender and PPP were computed. Surrender was found to be significantly negatively related to stress (PPP; $r = -0.20$, $p = .002$). Hierarchical multiple regression analysis was performed to assess the ability of Surrender to predict Prenatal stress (PPP) after controlling for age, marital status, education, and number of children.

Surrender and Prenatal Stress. Hierarchical multiple regression was used to assess the ability of Surrender to predict PPP after controlling for age, marital status, education, and number of children. Analyses revealed no violation of assumptions of normality, linearity, multicollinearity, or homoscedasticity (Minimum Tolerance = .52; maximum VIF = 1.0; Maximum Cook’s Distance = .16) Inspection of P-P Plot and Standardized Residuals indicated no undue influence of outliers (Tabachnick and Fidell, 2007).

Age, marital status, education, and number of children were entered at Step 1, explaining 9.2% of the variance in PPP. After entry of Surrender in Step 2, the total variance explained by the model as a whole was 11.5%, $F(5, 215) = 5.57, p < .001$. Surrender explained an additional 2.3% of the variance after controlling for age, marital status, education, and number of children, $R^2$ change = .023, $F$ change (1, 215) = 5.50, $p = .02$. In the final model only marital status ($\beta = -.21$, $p = .003$) and Surrender ($\beta = -.15$, $p = .02$) were statistically significant predictors of PPP (See Table 3), with those reporting being married and being more surrendered having the lower stress levels.

Discussion

Findings from this southern Appalachian sample of pregnant women confirm that Surrender is predictive stress as measured by the PPP. Women who reported they were more surrendered to God had lower measured stress even when controlling for age, marital status, education, and number of children. This maintains the pattern from Study 1 that Surrender is signifi-

<table>
<thead>
<tr>
<th>Step 2</th>
<th>$\Delta R^2$</th>
<th>$p$</th>
<th>$\beta$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Children</td>
<td>.112</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Surrender</td>
<td>-.154*</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note. Total $R^2 = .115$, $F(5, 215) = 5.57, p < .001$. *$p < .01$. 

Table 3
Study 2: Hierarchical Multiple Regression Predicting PPP Prenatal Stress From Surrender
cantly negatively related to measured stress. The fact that it was found in a noncollege sample strengthens the argument that individuals reporting that they are surrendered to God are less stressed than individuals who report lower levels of Surrender.

That these women are experiencing less stress, both actual and perceived, than their less surrendered counterparts supports the idea that women who are surrendered to God are either less likely to experience stress or perhaps less likely to evaluate the situations they are in as stressful. Pregnant women in general are advised to take fewer risks (e.g., because they are “eating for two,” “driving for two”) than nonpregnant women; however, Page, Ellison, and Lee (2009) found that religious pregnant and postpartum women take even fewer health risks than nonreligious pregnant and postpartum women, which aligns well with our findings.

It is noteworthy that one of our control variables, Marital Status, was actually more highly predictive of stress than Surrender was. It is possible that Marital Status is not independent of Surrender. Pregnant women who were married reported low levels of stress, but religious women by any metric who are pregnant are likely to be married and religious women who are unmarried are unlikely to be pregnant.

A final limitation of Study 2 relates to sampling. Although this sample was not a college sample, it was from the same geographic area as the sample in Study 1, so any bias due to sampling from this single geographic area remains.

**General Discussion**

Our findings contribute to the understanding of the religion–health relationship in two ways. First, they offer support for Surrender to God and its associated lower stress response to be explored as a mechanism by which religiosity influences health. Second, findings support the exploration of the potential stress-reducing ability of increasing Surrender in reportedly religious individuals. Our first contribution, support for the exploration of the mechanism by which religiosity contributes to health, will require two lines of research. First, further studies establishing a relationship between Surrender and health will be needed to verify that Surrender is at least one aspect of religiosity that affects health outcomes via stress/stress perception reduction. If the relationship between Surrender and Health is confirmed, a second step toward verification of causation would involve designing interventions which increase surrender to God in order to test whether the relationship between Surrender and health outcomes is causal (e.g., systematically increasing Surrender results in decreased stress or improved health). Although it is not likely that nonreligious patients could be convinced to surrender to God, those who do claim to be religious could be guided to further examine the degree to which they trust God as benevolent and powerful, and be challenged to relinquish some of their cares to that God. If those who do increase in Surrender have reduced stress or reduced perception of stress, and develop fewer stress-related health problems over time than those who do not increase in Surrender, the causal argument for Surrender to God to improve health will be bolstered.

The second type of study described above, implementing a surrender-increasing intervention, offers a second contribution; namely, applying research findings to benefit individuals. Individuals who are low in Surrender could be screened for levels of reported religiosity, stress, and stress-related illness. The benefit of using religiosity and, more specifically, Surrender in assessment is that Surrender is a potentially modifiable risk factor. Individuals who report that they are religious yet are low on measured Surrender may benefit from interventions targeted at increasing their surrender to God. No such study has been found to date, but this is an excellent area for future study.

As previously mentioned, this study is not without its limitations. The samples were drawn from southern Appalachia and may not be representative of individuals in other areas of the world, this country, or even from more urban areas within southern Appalachia. Most religiosity research has been conducted with samples from the United States, and quite often with undergraduate populations. By confirming our findings with a second, noncollege sample, we have addressed one aspect of this limitation. Although the study area is known to be highly religious, we do not know whether being religious equates to being high on Surrender. Further studies are needed to determine to what degree common measures of religiosity are related to Surrender, because at this point we do...
not know whether Surrender is a better predictor of stress or health than some of the more common religiosity measures such as attendance at religious services and importance of religion.

A second limitation related to sampling in this study was that our pregnant sample from Study 2 was a very low-income, high-risk sample, and therefore may not be representative of other women in this region or elsewhere; however, this did provide for greater racial and economic diversity within the sample than would have been possible with a lower-risk sample from this area. Further study with samples from other geographic areas and samples with different levels of pregnancy risk should be conducted to determine the degree to which our findings generalize.

Because only a limited number of variables were assessed, there could be a third variable problem in which some factor accounts for both level of Surrender and level of stress. One possibility among many is that the family of origin could have had characteristics that aided in the participant’s development of the capacity to deal with stress and have also prepared the participant to be more likely to report being surrendered to God.

Although the questions raised in this study involved the degree to which individuals reported being surrendered to God, we did not investigate the source of the Surrender (God) but only the act of Surrender. It could also be that individuals surrendering their wills regardless of the target of that surrender would be less likely to feel stressed because they no longer feel responsibility for their life circumstances. Further study manipulating Surrender specifically to God would assist in determining whether differences in stress level are actually attributable to surrender to God.

A final limitation within these studies is that the religiosity variable assessed, Surrender, has been used in very few previous studies, which reduces the ability to compare our findings to previous research. While this is a limitation, it also addresses a limitation of many other studies, which is that it is unclear which aspects of religiosity are impacting outcome variables such as stress. Hopefully, this restriction of religiosity measurement to one aspect of religiosity that we believe to be most likely to affect stress levels will eventually help to explain the mechanism by which religiosity impacts health; however, intervention studies will be needed to verify these mechanisms.

Conclusion

The unique contributions of this study are that we have verified in both college and community samples that Surrender was negatively related to three different measures of stress. In the college sample, State and Trait Anxiety were negatively related to Surrender, and in the pregnant sample a stress measure containing both actual stress and perceived stress was negatively related to Surrender. This could indicate that those individuals who are high in Surrender are at less risk for stress-related illnesses than individuals who report being less surrendered to God, and if so, set the stage for the development of interventions that may ultimately reduce the incidence of stress-related health problems.

References


SURRENDER TO GOD AND STRESS


Received September 15, 2010
Revision received March 8, 2011
Accepted June 20, 2011