THE RELATIONSHIP BETWEEN POSITIVE AND NEGATIVE RELIGIOUS COPING, DEPRESSIVE SYMPTOMS, AND ADHERENCE TO HEALTH BEHAVIORS IN CARDIAC REHABILITATION PATIENTS: THE ROLE OF PERCEIVED CONTROL

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THE RELATIONSHIP BETWEEN POSITIVE AND NEGATIVE RELIGIOUS COPING, DEPRESSIVE SYMPTOMS, AND ADHERENCE TO HEALTH BEHAVIORS IN CARDIAC REHABILITATION PATIENTS: THE ROLE OF PERCEIVED CONTROL

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ABSTRACT

Cardiovascular disease is a diagnosis that requires the use of effective coping strategies to manage the disease itself, as well as the challenges associated with it (e.g., lifestyle changes). Religious and spiritual coping incorporates religious and spiritual beliefs in the coping process and is one strategy commonly used by individuals facing stressful health threats, such as cardiovascular disease. While religiosity is generally associated with better physical and mental health outcomes, different patterns of religious coping may predict disparate outcomes. Limited research exists to explain the mechanisms though which patterns of religious/spiritual coping exert their differential effects, but perceived control is one possibility. Using a moderated mediation model, the purpose of this study was to examine the
effect of perceived control on the relationship between positive and negative religious/spiritual (R/S) coping, depressive symptoms, and adherence to health behavior recommendations in individuals with cardiovascular disease. Using a sample of 146 cardiac rehabilitation patients, it was hypothesized that the interaction between low levels of perceived control and positive religious/spiritual coping would be negatively related to depressive symptoms, which would in turn negatively predict adherence to health behavior recommendations. It was further hypothesized that the interaction between low levels of perceived control and negative religious/spiritual coping would be positively related to depressive symptoms, which would in turn negatively predict adherence to health behavior recommendations. Results did not support the proposed hypotheses. Perceived control failed to moderate the relationship between positive R/S coping and depressive symptoms, as well as the relationship between negative R/S coping and depressive symptoms. In addition, depressive symptoms were unrelated to health behavior adherence. Although not specifically predicted, results showed that both forms of R/S coping were positively related to depressive symptoms, and that both forms of perceived control were negatively related to depressive symptoms. Study limitations are discussed, as well as possible implications for practitioners working within a cardiac rehabilitation context.
The faculty listed below, appointed by the Dean of the College of Arts and Sciences have examined a thesis titled “The Relationship between Positive and Negative Religious Coping, Depressive Symptoms, and Adherence to Health Behaviors in Cardiac Rehabilitation Patients: The Role of Perceived Control” presented by Kalon R. Eways, candidate for the Master of Arts degree, and certify that in their opinion it is worthy of acceptance.

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LIST OF ABBREVIATIONS

Cardiovascular Disease = CVD
Religious/Spiritual Coping = R/S coping
Cardiac Rehabilitation = CR
Coronary Heart Disease = CHD
Myocardial Infarction = MI
Beck Depression Inventory-II = BDI-II
Brief Religious Coping Scale = Brief RCOPE
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CHAPTER 1
INTRODUCTION

Cardiovascular disease (CVD) is the leading cause of death in the United States and is quickly becoming the leading cause worldwide (Bonow, Smaha, Smith, Mensah, & Lenfant, 2002). Given the impact of CVD on one’s life and well-being, it is imperative that individuals with the disease employ effective coping strategies to manage the illness and prevent future adverse events. Historically, most research analyzing coping strategies has relied on Lazarus and Folkman’s (1984) Cognitive Theory of Stress and Coping, which emphasizes the role of cognitive appraisals in informing one’s reaction to stressors. A related but distinct field of coping research is religious and spiritual (R/S) coping. Research has shown that individuals frequently rely on religious and spiritual beliefs when faced with stressful life events, such as CVD (Trevino & McConnell, 2015). While religiosity is generally associated with better physical and mental health outcomes, different patterns of R/S coping have been shown to lead to disparate outcomes (e.g., Pargament, Koenig, Tarakeshwar, Hahn, 2004; Lee, Nezu, & Nezu, 2014). For example, positive R/S coping, defined as a secure and collaborative relationship with a divine being, is typically related to well-being (e.g., less depressive symptoms). Conversely, negative R/S coping, represented by underlying spiritual tensions, is typically predictive of distress (e.g., more depressive symptoms). Unfortunately, we also know that high levels of distress are significantly related to maladaptive decisions about health. Depressive symptoms, for instance, have consistently
been shown to predict poorer adherence to health behavior recommendations (Allgöwer, Wardle, & Steptoe, 2001).

Although the relationship between distress and health behavior adherence has been well-established, less is known about the emotional and cognitive precursors to CVD, especially within the context of cardiac rehabilitation (CR). The current study aimed to address this gap in the literature by assessing the relationships between positive and negative patterns of R/S coping, symptoms of depression, and adherence to health behavior recommendations in a sample of CR patients. Perceived control was also examined as a moderator in order to better characterize its effects on the aforementioned relationships. Perceived control has been identified as a moderator in past research, but little is known about its effect on the specific relationships between negative and positive R/S coping and depressive symptoms.

Using a moderated mediation model, the study tested the following hypotheses: (1) The interaction between positive R/S coping and perceived control would be related to depressive symptoms, which would in turn be negatively related to adherence to health behavior recommendations; and (2) The interaction between negative R/S coping and perceived control would be related to depressive symptoms, which would in turn be negatively related to adherence to health behavior recommendations. Analyses were conducted using an existing data set of 146 individuals with CVD recruited from two CR programs in two Midwestern cities. All participants had complete data at the beginning of CR (Time 1) and 12 weeks later at the end of CR (Time 2). Results showed that neither interaction term was significantly related to depressive symptoms. In other words, perceived control failed to moderate the relationship between positive R/S coping and depressive
symptoms and between negative R/S coping and depressive symptoms. In addition, depressive symptoms were non-significantly related to health behavior adherence.
CHAPTER 2

REVIEW OF THE LITERATURE

Cognitive Theory of Stress and Coping

Over the last few decades there has been a notable surge in stress and coping research. Much of this research was initiated by Lazarus and Folkman’s (1984) Transactional Model, also known as the Cognitive Theory of Stress and Coping. This is one of the most widely researched coping theories. As the title suggests, the theory emphasizes the role of cognitive appraisal in determining an individual’s reaction to stress and in shaping his or her coping process (Folkman & Moskowitz, 2004). Furthermore, the coping process is conceptualized as both relational and process-oriented. That is, stress is viewed as a particular relationship between an individual and the environment that is perceived as exceeding his or her available resources, and/or threatening well-being (Lazarus & Folkman, 1984). Differences in stress experiences are a result of individual person factors, the particular context in which the stressor occurs, and the integration of the two. Process-oriented refers to the idea that this person-environment relationship is interactive (i.e., transactional), constantly changing, and bidirectional in nature.

As mentioned above, perceptions of stress are a result of cognitive appraisals, which are defined as the processes through which a person evaluates whether an encounter with a particular environment is relevant to his or her well-being (Folkman, Lazarus, Dunkel-Schetter, DeLongis, & Gruen, 1986). There are two main types of cognitive appraisal:
primary and secondary. During primary appraisal, the person assesses the significance of the encounter and determines whether there is anything at stake. These encounters are appraised as irrelevant, benign-positive, or stressful. Irrelevant transactions are, as the name suggests, irrelevant to the individual. They are not considered potential threats to well-being. Similarly, benign-positive transactions are seen as nonthreatening and are typically indicative of a positive outcome. Lastly, stressful appraisals are perceived as directly relevant to the individual and signal that injury or damage has already occurred (i.e., harm-loss appraisal), the potential for harm exists (i.e., threat appraisal), or the opportunity for growth or mastery is present (i.e., challenge appraisal). Harm-loss and threat appraisals are typically associated with negative emotions, whereas challenge appraisals are associated with more positive emotions (Folkman, 1984).

After the person has appraised a transaction as relevant and stressful, he or she must then evaluate the resources and options available for managing the stressor. Coping resources vary across people and environments and can be physical, social, psychological, or material (Folkman, 1984). This evaluative process is referred to as secondary appraisal and is considered to be the precursor to the coping process. The individual has not yet changed his or her behavior to address the demand, but rather is considering how to do so in order to maximize benefit and minimize harm.

Both primary and secondary appraisals are affected by a myriad of factors, most notably perceived control. In the case of primary appraisal, perceived control can occur at both the person and environmental levels. For example, if a person possesses an internal locus of control (i.e., the belief that one’s own behavior determines an event or outcome), he or she may be more likely to appraise a situation as controllable, and thus not stressful.
Primary appraisal may also be affected by situational factors, such as the ambiguity of the outcome. That is, high levels of ambiguity are typically associated with lower levels of perceived control. In the case of secondary appraisal, perceptions of control are typically based on the belief that a specific situation can be changed or controlled. Again, this determination is made by comparing the demands of the stressor to the resources and options available for coping with or controlling the stressor (Folkman, 1984).

Coping mediates the effect of cognitive appraisals on outcomes in the context of stressful events, and is defined as the cognitive and behavioral efforts used to actively manage the internal or external demands of the person-environment encounter that has been appraised as exceeding an individual’s resources (Lazarus & Folkman, 1984). Coping typically serves two functions: to regulate emotions or feelings of distress (i.e., emotion-focused coping) and to actively employ strategies to directly resolve the stressor (i.e., problem-focused coping) (Folkman et al., 1986). Perceived control also affects this stage of the coping process as emotion- and problem-focused coping typically differ in usefulness depending on the context in which they are applied. Emotion-focused coping is generally more effective in situations that are uncontrollable, as efforts are channeled towards managing one’s emotions in the face of the stressor. On the other hand, problem-focused coping is most effective in situations that are controllable; efforts are directed towards actively changing or controlling the stressor (Riley & Park, 2014). Still, while emotion- and problem-focused coping are differentially effective, problem-focused coping, in general, leads to better outcomes (e.g., Herman & Tetrick, 2009). Regardless of their utility, research has shown that most people use both types of coping during stressful events. For example,
Folkman and Lazarus (1980) analyzed over 1,300 stressful events and found that emotion- and problem-focused coping were both used in 98% of the episodes.

**Religious and Spiritual Coping**

Religious and spiritual beliefs are a central part of millions of people’s lives, with approximately 85 percent of the global population reporting some religious affiliation (Gallup, 2011). Research has shown that religiosity/spirituality is a pivotal coping resource for individuals confronted with stressful life encounters, such as chronic illness. In fact, a study by Ayele, Mulligan, Gheorghiu, and Reyes-Ortiz (1999) found that 86% of hospitalized and long-term care patients utilized religious methods to cope with their illnesses. Over the last 20 years, religious and spiritual (R/S) coping has become a distinct field of research and is currently defined as an effort to understand and deal with life stressors in ways related to the sacred. It involves employing both internal and external resources of coping which include but are not limited to: prayer, attending church services, seeking social support from church members, trusting God’s love, and meditation (Gall et al., 2005; Park, Sacco, & Edmondson, 2012). Given the scope of R/S coping, it is difficult to characterize its behavioral manifestations as either emotion- or problem-focused. Whereas many people utilize R/S coping in an emotionally passive manner (e.g., religious benevolent reappraisals, prayer), others use it in a more active and problem-focused manner (e.g., increased service attendance) (Park et al., 2012). Therefore, R/S coping will be conceptualized hereafter as a unique coping process, distinct from both emotion- and problem-focused coping.
R/S Coping and Health

R/S coping has been studied in a multitude of stressful contexts, with health threats being one of the most widely researched. In general, R/S coping has been associated with better health outcomes and well-being. For example, Koenig et al. (1992) found that depressive symptoms were inversely related to religious coping amongst elderly, hospitalized male patients. Researchers have also linked R/S coping to other psychological and physical outcomes including: higher levels of subjective well-being; better quality of life; better self-reported current health; lower incidence of cancer; and decreased rates of mortality (Brewer, Robinson, Sumra, Tatsi, & Gire, 2014; Hoff, Johannsen-Henry, Ross, Hvidt, & Johansen, 2008; Jackson & Bergeman, 2011; Koenig et al., 1992).

While a relationship between R/S coping and health has been clearly established, different patterns of R/S coping have been shown to predict different outcomes. Pargament, Smith, Koenig, and Perez (1998) are credited with identifying two distinct patterns of R/S coping—positive and negative—through the validation of a 14-item self-report measure of religious and spiritual coping called the Brief RCOPE. Positive coping represents a secure and collaborative relationship with God, whereas negative coping reflects underlying spiritual tensions and a distrustful or skeptical attitude towards God. Pargament and his colleagues also demonstrated that positive and negative R/S coping were related to different outcomes. Positive R/S coping was associated with better outcomes (e.g., fewer symptoms of psychological distress), and negative coping was associated with signs of distress (e.g., depression and poorer quality of life). The authors concluded that while R/S coping is generally adaptive, it also has the potential to be maladaptive depending on the pattern employed.
The above finding is one that has been echoed by dozens of empirical studies. Lee et al. (2014), for example, studied the relationship between positive and negative R/S coping and psychological outcomes in 198 individuals with HIV/AIDS. Results showed that positive R/S coping was significantly related to positive affect and life satisfaction. Conversely, negative R/S coping was related to higher levels of depression and lower quality of life after controlling for demographic and clinical variables. In a two-year longitudinal study conducted by Pargament et al. (2004), positive R/S coping methods were found to be predictive of improvements in health in medically ill elderly patients, while negative methods were predictive of declines in health. In addition to predicting health outcomes of medically ill patients, R/S coping patterns have also been shown to predict outcomes of patient caregivers (Rabinowitz, Hartlaub, Saenz, Thompson, & Gallagher-Thompson, 2010).

**R/S Coping and Health Behaviors**

There is clearly a strong relationship between religiosity and health, and more specifically between patterns of R/S coping and health. However, the question of how R/S coping affects health is less understood. One explanation, of course, is that individuals who are religious and thus readily use R/S coping strategies are routinely discouraged from participating in unhealthy behaviors such as alcohol and substance use, smoking, and premarital sex (Brewer et al., 2014; Hoff et al., 2008). At the same time, churches and other faith-based institutions provide opportunities for healthy activities and behaviors. They also encourage frequent social interaction and support. However, “religious lifestyles” may not always have a positive impact on health behaviors, thereby necessitating a re-examination of the distinct effects of positive and negative R/S coping. While the research is sparse, there is some empirical evidence to suggest that positive and negative R/S coping differentially affect
health behaviors, thereby leading to disparate health outcomes (Brewer et al., 2014; Rabinowitz et al., 2010).

One such study used a random sample of British-Christian adults to explore the effects of R/S coping and social support on a variety of outcomes including physical activity and alcohol consumption (Brewer et al., 2014). Using hierarchical regression analysis to control for age and non-religious social support, negative R/S coping was identified as a significant independent predictor of alcohol consumption, suggesting that negative R/S coping strategies may lead to consuming higher quantities of alcohol. As such, the authors concluded that the positive impact of religion on health cannot simply be attributed to adherence to those health behaviors (e.g., reduced alcohol consumption) typically required by religious practices. Rather, religious individuals may engage in risky or unhealthy behaviors depending on the type of R/S coping they employ. Interestingly, there was no observed effect of R/S coping on physical activity and the authors provided no explanation for the null finding.

Another study conducted by Rabinowitz and colleagues (2010) assessed the extent to which positive and negative R/S coping patterns were associated with health behaviors in a sample of Latina and European American female caregivers of elderly relatives with dementia. After controlling for age and care recipient health status, negative R/S coping was found to be positively and significantly associated with an increased cumulative health risk score—characterized by higher levels of smoking, alcohol consumption, weight gain, dietary restriction, and physical inactivity—for both Latina and European American women. Additional analyses revealed that negative R/S coping was significantly related to an increased likelihood for weight gain and increased dietary restriction. Conversely, positive
R/S coping was found to be associated with reduced cumulative health risk among Latina caregivers, but not European American caregivers. Given these results, the authors posited that the use of R/S coping alone does not predict health; rather, *how* one uses religion to cope affects health behavior patterns, which ultimately predicts health outcomes.

The effects of religiosity have also been researched extensively in the context of health screening behaviors, such as cancer screening. Surprisingly, however, the effects of R/S coping have been studied to a much lesser extent. I am aware of only one study specifically examining the effects of positive and negative R/S coping on preventative screenings. Allen and colleagues (2014) carried out a study with 78 adult female Latinas who were congregants of a Baptist church. The goal of the study was to explore the relationships between varied dimensions of religiousness (i.e., church participation, perceived social support, spiritual health locus of control, and R/S coping) on breast, cervical, and color cancer screening practices. Similar to other studies assessing R/S coping and health behaviors, results showed that positive R/S coping was strongly associated with adherence to all age-appropriate cancer screenings. Unfortunately, the researchers did not include negative R/S coping in the analysis due to unacceptable internal consistency of the three-item scale they adapted from the larger measure of R/S coping (Abeles et al., 1999).

Research investigating the link between R/S coping and health behaviors highlights the importance of distinguishing between positive and negative coping styles. It is certainly true that religiosity and R/S coping can have a positive impact on health through the promotion of healthy lifestyles and the discouragement of risky behaviors. However, research analyzing the consequences of negative R/S coping implies that religiosity does not
inevitably lead to healthy lifestyles. While health practices may be one explanatory variable for the relationship between R/S coping and health, there are likely others as well.

**The Role of Perceived Control**

Another commonly studied and potential explanatory variable for the relationship between R/S coping and health is perceived control. Early research involving perceived control mainly tested the variable as a mediator between R/S beliefs/coping and outcomes of health-related stressors. For example, Grosse-Holtforth et al. (1996) found that internal health control beliefs mediated the relationships between R/S coping and depression in a sample of institutionalized, medically ill veterans in a long-term care facility. Specifically, R/S coping was positively related to internal health control beliefs, which were negatively related to depression. Another study utilized a sample of patients who received renal transplants to assess whether the relationship between R/S coping and life satisfaction was mediated by health locus of control, cognitive restructuring, and social support (Tix & Frazier, 1998). None of these variables was identified as a significant mediator. The authors noted that their findings were inconsistent with past research, but did not propose an explanation for the contradiction.

Fiori, Brown, Cortina, and Antonucci (2006) assessed whether religiosity and life satisfaction was mediated by internal and external loci of control in a large sample of U.S. citizens. Path analyses revealed that religiosity was positively associated with an external locus of control but not with an internal locus of control, as predicted. However, both external and internal loci of control were positively associated with life satisfaction. The latter finding was contrary to Fiori et al.'s prediction as they hypothesized that an external locus of control would be negatively related to life satisfaction. The authors address this by
suggesting that the unexpected finding may have been the result of a measurement artifact. Respondents may have unintentionally inferred religious meaning from some external control items, such as, “if bad things happen, it is because they were meant to be.” The authors, therefore, concluded that the significant positive pathway may have represented an association among different religious variables, as opposed to a positive relationship between external control and life satisfaction. Fiori et al. also found age and gender moderation effects between religiosity and internal control. For instance, whereas this path was positive and significant for older adults and females, it was negative and non-significant for younger adults and males. The direct pathway from religiosity to life satisfaction was also significant and positive for younger females, but not for younger males.

More recent analyses have begun testing perceived control as a moderator, either in addition to mediation analyses, or in and of itself. For instance, Jackson and Bergeman (2011) tested the effects of perceived control as both a moderator and mediator. A mediation analysis was conducted between three dimensions of R/S (i.e., religious practices, daily spiritual experiences, and R/S coping), perceived control, and subjective well-being among a sample of middle aged and older adults in the Midwest. R/S coping was measured by the Religious/Spiritual Coping subscale of the Brief Multidimensional Measure of Religiousness and Spirituality (BMMR/S; Abeles et al., 1999). Results indicated that perceived control mediated the relationship between all three dimensions of R/S and well-being in the full sample; that is, R/S dimensions were positively related to perceived control, which in turn was positively related to well-being. However, these mediating effects did not hold when sub-groups of the sample were analyzed separately: early mid-life (31-49), late mid-life (50-59), and later life (older than 60). For example, perceived control only mediated the effect of
R/S coping on subjective well-being in the older two age groups. Analyses also showed that perceived control moderated the relationship between daily spiritual experiences and well-being in the full sample, between R/S coping and well-being in the full sample, and between religious practices and well-being in the later life sample. Importantly, the authors concluded that *those who have low levels of perceived control experience more pronounced benefits from R/S coping than those with high levels of perceived control.*

A related study also used the BMMR/S (Abeles et al., 1999) to test moderation effects of perceived control (Park et al., 2012). Park et al. analyzed the relationship between R/S coping, health locus of control, and depression in a sample of Congestive Heart Failure patients. R/S coping was conceptualized as the combined use of R/S coping strategies (active coping, acceptance and religious coping) and R/S coping resources (organized religious commitment, private religious practices, religious social support, and daily spiritual experience). Active coping and organized religious commitment were found to be related to lower levels of depressed affect, but only for individuals with high internal health locus of control. Furthermore, greater daily spiritual experiences were related to less depression for only those with lower health control. The authors concluded that daily spiritual experiences, the rate at which an individual experiences episodes of transcendence, may be a more emotion-focused coping resource. Given that emotion-focused coping tends to be more beneficial in low-control situations, this may explain why daily spiritual experiences is a more effective buffer for those who perceive their health as low in controllability. In summary, the results suggested that the impact of religious resources on people with medical illnesses differs based on their perceived level of controllability over disease outcomes.
Perceived Control and Depressive Symptoms

While the literature regarding the effects of perceived control on R/S coping is limited, the relationship between perceived control and depression is well documented. In fact, perceived control is one of the most commonly studied variables within the context of depression. Maier and Seligman (1976) were some of the first researchers to examine the effects of uncontrollable events on animal behavior and are credited with the learned helplessness hypothesis: those subjects who are repeatedly exposed to uncontrollable aversive environments show marked decreases in behaviors aimed at escaping those environments. According to the hypothesis, learning that outcomes are uncontrollable results in motivational, cognitive, and emotional deficits, which collectively contribute to depressed affect. This hypothesis was eventually expanded to humans and is now known as the reformulated model of learned helplessness (Abramson, Seligman, & Teasdale, 1978). Compared to the original hypothesis, the reformulated model places greater emphasis on cognitive processes, particularly perceptions and attributions. In other words, low control over one’s environment itself does not necessarily predict feelings of helplessness, and thus depression. Rather, individuals’ perceptions of control over their environments and the attributions they make for that loss of control (e.g., internal versus external attributions) aid in defining the outcome (Pryce et al., 2011).

Although perceptions and causal attributions differ across individuals and are hypothesized to predict differential outcomes (Abramson, et al., 1978), the temporal order of the relationship between control and depressive symptoms is assumed to be constant. That is, feelings of control are said to precede the development of learned helplessness (and depression), with less controllability predicting poorer outcomes (Abramson, et al., 1978;
Maier & Seligman, 1976). As is the case with most psychological constructs, a bidirectional relationship may exist between perceived control and depression. It could be, for example, that symptoms of depression lead to lower levels of perceived control. However, the prodigious amount of research conducted with the revised learned helplessness model clearly points to control as a predictor, as opposed to a result of depression. As such, perceived control will be conceptualized as a precursor to depressive symptoms for the current study.

**Depressive Symptoms and Health Behaviors**

Over the last several decades, the major challenge in medicine has shifted from infectious disease to chronic illness. While the age of mortality has increased, it is unfortunate that most of the leading causes of death today are preventable chronic illnesses, such as cardiovascular disease (CVD). CVD and related illnesses (e.g., diabetes mellitus, respiratory disease) are considered to be preventable because the majority of their risk factors lie with modifiable health behaviors including: diet, exercise, tobacco use, alcohol use, and stress management. Treatable psychological factors also play a crucial role in the development, maintenance, and trajectory of CVD. Severe and subclinical levels of depression, for example, are known risk factors for the development of CVD in healthy adults (Whooley et al., 2008). Moreover, depression is strongly related to recurrent cardiac events and poorer outcomes in patients with established disease (see Bennett & Boothby, 2007; Whooley & Wong, 2013 for a review).

The main explanatory mechanism for how depression affects CVD is through health behaviors. Whooley et al. (2008) carried out a 4.8-year prospective cohort study consisting of 1,017 outpatients with stable coronary heart disease with the aim of identifying why depressive symptoms are associated with an increased risk of cardiovascular events. Findings
showed that individuals who exhibited depressive symptoms were less physically active, less adherent to medications, and more likely to smoke cigarettes. Moreover, after adjusting for physical activity, the researchers found an approximate 32% reduction in the strength of association between depressive symptoms and cardiovascular events. On the other hand, adjusting for variables such as heart rate variability and levels of serotonin and omega-3 fatty acids failed to change the effect size of depressive symptoms by more than 5%. As such, the authors effectively demonstrated that the relationship between depressive symptoms and future cardiovascular events can be mostly explained by behavioral factors, such as physical activity.

Similarly, Ziegelstein et al. (2000) found that CVD patients with depression are less likely to follow lifestyle and treatment recommendations. The researchers compared rates of lifestyle recommendation adherence in post-myocardial infarction (MI) patients with depression to post-MI patients without depression. Results showed that patients with mild to moderate depression were less likely to adopt low fat and low cholesterol diets, exercise regularly, and have access to increased levels of social support at 4-month follow-up than their non-depressed counterparts. Those with major depression and/or dysthymia were also less adherent to the aforementioned recommendations and were less likely to take medications as prescribed. Additionally, major depression and dysthymia were identified as independent predictors of poor adherence to diabetes-specific health behaviors for those participants with comorbid diabetes diagnoses.

Other researchers have also explored adherence in CVD patients with depression and arrived at comparable findings to Whooley et al. (2008) and Ziegelstein et al. (2000). For example, Gehi Haas, Pipkin, and Whooley (2005) found that in a sample of 940 outpatients
with coronary heart disease (CHD), over 200 of them were depressed. Moreover, the patients with depression were more likely than those without depression to not take medications as prescribed, forget to take medications, and skip medication doses. The aforementioned studies and others provide substantial evidence that CVD patients with depression are more likely to engage in risky health behaviors including but not limited to: poor adherence to lifestyle recommendations, cigarette smoking, alcohol consumption, and low rates of physical activity (e.g., Ruo, Rumsfeld, Pipkin, & Whooley, 2004). Clearly, these behaviors, in turn, will eventually lead to adverse heart-related outcomes.

**Depressive Symptoms and Cardiac Rehabilitation**

Given the aversive impact of depressive symptoms on health behaviors, researchers have turned their attention toward analyzing the effects of depressive symptoms within the context of cardiac rehabilitation (CR), a comprehensive, secondary prevention program aimed at decreasing the rates of future cardiac events by targeting health behavior change (Braverman, 2011). Phase II CR programs are the most commonly studied and include monitored exercise, weight management, stress management, psychoeducation, and education about cardiac medications. They typically require three sessions per week for 12 weeks, for a total of 36 sessions. CR programs are considered to be extremely effective and are a Class I recommendation by cardiac clinical practice guidelines (Braverman, 2011). However, CR’s efficacy is, of course, contingent upon the extent to which patients adhere to the program and engage in the heart-healthy behaviors promoted by it.

Not surprisingly, depressive symptoms have been shown to negatively influence adherence to CR programs. In one multicenter observational study, Kronish and colleagues (2006) assessed the impact of depressive symptoms on secondary prevention behaviors in a
sample of 492 acute coronary syndrome patients. Those patients with persistent depression were significantly less likely to attend CR than patients who were persistently non-depressed. Moreover, even patients with remitted depression (i.e., depressive symptoms remitted after 3 months) had significantly lower rates of adherence than non-depressed patients. These findings were echoed by the research of Lane, Carroll, Ring, Beevers, and Lip (2001) who attempted to identify predictors of CR attendance in 263 post-MI patients. Among other predictors including unemployment and gender, more symptoms of depression and lower rates of pre-MI exercise were found to be significant predictors of nonadherence to CR.

Finally, a study conducted by Glazer, Emery, Frid, and Banyasz (2002) evaluated the effects of three psychological variables; optimism, depression, and neuroticism, on CR adherence and outcomes in a small sample (N = 46) of CHD patients. Of these three variables, depression was identified as the only significant predictor of change in aerobic activity within the CR program. In fact, depressive symptoms accounted for over 9% of the variance when adjusting for age and gender. Furthermore, symptoms of depression accounted for nearly 40% of the variance in CR adherence and remained a significant predictor of adherence even after controlling for neuroticism and optimism. In summary, findings from research examining the relationship between depression and adherence to CR have mirrored those with depression and other health behaviors.

**Gaps in the Literature and Hypotheses**

There is now strong evidence to support a relationship between symptoms of distress and adherence to health behaviors in chronic illness populations. This relationship is especially salient in CVD patient populations as depressive symptoms have consistently been shown to adversely affect outcomes. Few studies, however, have examined the cognitive and
emotional variables related to depression within the context of CVD. Given the deleterious influence of depression on health, it is imperative that these “front-end” correlates are better understood. R/S coping may be one such precursor to depression for patients with CVD, because individuals often turn to religious or spiritual beliefs when presented with a health threat. Also, the health benefits of R/S coping depend upon the specific pattern of coping—negative versus positive—that is employed. While some studies have examined the effects of R/S coping on cardiovascular health, very few have been conducted in a CR setting. The current study assessed the relationship between positive and negative patterns of R/S coping, symptoms of depression, and adherence to health behavior recommendations in a sample of CR patients. Perceived control was also examined, because while it has been shown to moderate the relationship between general R/S coping and health outcomes in past research (Fiori et al., 2006; Jackson & Bergeman, 2011; Park et al., 2012), little is known about the specific relationships between it and negative and positive R/S coping. Using a moderated mediation model, the current study examined whether R/S coping would combine with perceived control to affect symptoms of depression, which would in turn predict adherence to health behavior recommendations.

Guided by past research, I hypothesized the following (see Figure 1): (1) the interaction between positive R/S coping and perceived control would be related to depressive symptoms, which would in turn be negatively related to adherence to health behavior recommendations. Specifically, the combination of high positive R/S coping and low perceived control would be negatively related to depressive symptoms, which in turn would negatively predict adherence; and (2) the interaction between negative R/S coping and perceived control would be related to depressive symptoms, which would in turn be
negatively related to adherence to health behavior recommendations. Specifically, the combination of high negative R/S coping and low perceived control would be positively related to depressive symptoms, which in turn would negatively predict adherence.

*Figure 1.* Conditional process analysis model depicting the hypothesized relationships between positive R/S coping, negative R/S coping, perceived control, depressive symptoms, and health behavior adherence. All predictor variables and the mediator variable were measured at Time 1. Health behavior adherence was measured at Time 2.
CHAPTER 3

METHODOLOGY

Participants

The current project used an existing data set of patients recruited between 2005 and 2011 from two Phase II CR programs in two Midwestern cities. Inclusion criteria for participation included enrolling in a Phase II CR program, 18 years of age or older, diagnosis of CVD, and no cognitive impairments impeding the ability to consent and complete the study. A total of 552 patients were approached to participate in the study, and 321 agreed to receive more information about the study and possibly participate in it (58%). Of the 321 individuals who expressed interest in the study and were sent study materials, 211 returned the mailed questionnaires and consent forms at Time 1 (66%, or 38% of those initially approached about the study). Of these, 153 participants also answered items related to their health behavior recommendation adherence at Time 2. However, five of these cases were missing more than 40% of the health behavior recommendation scale’s items, so they were deleted. Further, two cases were missing all depressive symptom values at Time 1, so those were also deleted. Thus, the final sample for these analyses consisted of 146 participants (69% of the original sample, or 26% of those initially approached about the study) with data at Times 1 and 2.

Table 1 provides descriptive statistics for the full (n = 211) and current study (n = 146) samples. Ages ranged from 36 to 84 years, with a mean age of 64. The majority of
participants was male (69%) and European American (95%). Other ethnicities included African American, Asian, and Native American. Most individuals were married or living with a partner, but approximately 30% reported being single, separated, divorced, or widowed. Most of the participants attended at least some college/trade school (72%), and earned an annual income of $50,000 or greater (61%). In regards to health variables, the most common diagnoses were stent placement (32%) and myocardial infarction (MI) with stent placement (14%). All participants were stratified by risk for cardiac disease progression according to the American Association of Cardiovascular and Pulmonary Rehabilitation (2004) guidelines. The CR staff assigned risk stratifications (i.e., low, moderate, or high) based on participants’ diagnoses, prior cardiac events, and current risk factors (e.g., comorbid disease, exercise, diet, etc.). The majority of participants was stratified as low or medium risk for disease progression (97%). Of the 36 available sessions, participants completed an average of 16 CR sessions (range: 0 – 38 sessions) over the 12-week Phase II program.

There were no baseline (Time 1) differences between those who completed both data collection time points and those who did not for the following variables: sex, race, marital status, employment status, income, educational attainment, diagnosis, risk stratification, number of CR sessions completed, positive and negative R/S coping, and prevention control. There were, however, significant differences in age, depressive symptoms, and recovery control. Specifically, participants included in this study were older ($M = 63.84; t [207] = -2.67, p = .008$), experienced fewer depressive symptoms ($M = 8.64; t [195] = 2.74, p = .007$), and reported more perceived control over cardiovascular event recovery ($M = 3.12; t [206] = -2.94, p = .004$) than those excluded from the study (means = 59.44, 12.44, and 2.82,
respectively). Thus, caution is warranted when making generalizations beyond this sample to other CR populations.
Table 1

Descriptive Statistics of Participant Characteristics in Study and Full Sample

<table>
<thead>
<tr>
<th>Participant Characteristics</th>
<th>Study Sample</th>
<th>Full Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(n = 146)</td>
<td>(n = 211)</td>
</tr>
<tr>
<td></td>
<td>M (SD)</td>
<td></td>
</tr>
<tr>
<td>Age (years)</td>
<td>63.84 (9.98)</td>
<td>62.52 (11.08)*</td>
</tr>
<tr>
<td>CR Sessions</td>
<td>16.29 (6.87)</td>
<td>16.16 (7.14)</td>
</tr>
<tr>
<td>Male</td>
<td>69.2</td>
<td>65.6</td>
</tr>
<tr>
<td>European American</td>
<td>94.5</td>
<td>91.8</td>
</tr>
<tr>
<td>Partnered</td>
<td>73.3</td>
<td>73.2</td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
</tr>
<tr>
<td>High School/GED</td>
<td>24.8</td>
<td>23.7</td>
</tr>
<tr>
<td>Some college/trade school</td>
<td>20.7</td>
<td>24.2</td>
</tr>
<tr>
<td>2-year college degree</td>
<td>11.0</td>
<td>11.6</td>
</tr>
<tr>
<td>4-year college degree</td>
<td>22.1</td>
<td>22.2</td>
</tr>
<tr>
<td>Graduate degree</td>
<td>18.6</td>
<td>15.9</td>
</tr>
<tr>
<td>Income</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;$10,000</td>
<td>4.40</td>
<td>4.10</td>
</tr>
<tr>
<td>$10,000-19,999</td>
<td>8.00</td>
<td>7.10</td>
</tr>
<tr>
<td>$20,000-29,999</td>
<td>9.50</td>
<td>9.20</td>
</tr>
<tr>
<td>$30,000-39,999</td>
<td>8.00</td>
<td>9.70</td>
</tr>
<tr>
<td>$40,000-49,999</td>
<td>8.80</td>
<td>8.70</td>
</tr>
<tr>
<td>$50,000-59,999</td>
<td>11.7</td>
<td>11.70</td>
</tr>
<tr>
<td>$60,000-69,999</td>
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<td>$70,000-79,999</td>
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<td>8.70</td>
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<td>$80,000-89,999</td>
<td>5.80</td>
<td>8.20</td>
</tr>
<tr>
<td>$90,000-99,999</td>
<td>10.2</td>
<td>9.20</td>
</tr>
<tr>
<td>≥$100,000</td>
<td>18.2</td>
<td>17.3</td>
</tr>
<tr>
<td>Common Diagnoses</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stent</td>
<td>32.2</td>
<td>39.0</td>
</tr>
<tr>
<td>MI &amp; Stent</td>
<td>13.7</td>
<td>13.8</td>
</tr>
<tr>
<td>CABG</td>
<td>21.2</td>
<td>17.6</td>
</tr>
<tr>
<td>Valve replacement/repair</td>
<td>8.9</td>
<td>9.00</td>
</tr>
<tr>
<td>Risk stratification</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>57.4</td>
<td>59.4</td>
</tr>
<tr>
<td>Medium</td>
<td>39.3</td>
<td>36.1</td>
</tr>
<tr>
<td>High</td>
<td>3.3</td>
<td>4.40</td>
</tr>
</tbody>
</table>

Note: *p < .05 in t-tests to compare groups
CR = cardiac rehabilitation; MI = myocardial infarction; CABG = coronary artery bypass graph
Procedures

These data were collected as part of a larger longitudinal study analyzing psychosocial outcomes among patients in two Phase II CR programs in two Midwestern cities. Participants were first approached by the CR staff during their intake sessions of a Phase II program. During the intake interviews, patients were asked if they were interested in learning more about the study. If they expressed an interest in learning more, their contact information was sent to the research team. A member of the research team would then call the patients within one week of their intake sessions. At this time, additional information was provided about the study and patients were given the opportunity to ask questions. If the patients expressed interest in participating, they were mailed a consent form, a Time 1 questionnaire, and a postage-paid return envelope. If, after reading through the materials, the patient agreed to be in the study, he/she was asked to sign the consent form and mail it, along with the completed Time 1 questionnaire, to the research team. Signing the consent form also provided permission for the research team to access patient CR medical records. Time 2 questionnaires were then mailed twelve weeks later at the end of their Phase II CR programs. Participants returned their completed questionnaires in postage-paid envelopes. All study procedures were approved by the appropriate hospital and university institutional review boards.

Measures

Questionnaires consisted of standardized measures, as well as items specifically adapted for this study. In addition to the measures described below, demographic and medical information was collected at Times 1 and 2. The number of completed CR sessions was obtained from the patients’ medical records at the end of CR.
Religious/Spiritual Coping

The 10-item version of the Brief Religious Coping Scale (Brief RCOPE; Pargament, et al., 1998) was used to assess R/S coping at Time 1 and Time 2 (see Appendix A-1). The Brief RCOPE includes positive (items 1, 3, 5, 7, 9) and negative (items 2, 4, 6, 8, 10) religious coping subscales. Using a four-point scale (1 = a great deal, 2 = quite a bit, 3 = somewhat, 4 = not at all), respondents indicated the extent to which they agreed with the positive (e.g., “I work together with God as partners to get through hard times”) and negative coping items (e.g., “I feel that stressful situations are God’s way of punishing me for my sins or lack of spirituality”). To facilitate interpretation, the items were reverse-coded so that higher numbers would indicate more agreement. The items from each subscale were summed to create composite scores of positive and negative R/S coping. Limited information exists about the reliability of the subscales for the 10-item version of the Brief RCOPE. However, international samples indicate good reliability for the positive R/S coping scale (Dutch α = .90, Turkish α = .86, Surinamese/Antillean, α = .89, and Moroccan α = .71), but poor reliability for the negative scale (Dutch α = .29, Turkish α = .56, Surinamese/Antillean, α = .28, and Moroccan α = .28) (Braam et al., 2010). Consistent with those reliabilities, alpha coefficients in this study indicated good (α = .92) and less than optimal (α = .53) reliability for the positive and negative R/S coping subscales, respectively.

Perceived Control

Two questions adapted from the Breast Cancer Perceived Control Scale (Bennett, Compas, Beckjord, & Glinder, 2005) were used to measure participants’ perceptions of control over cardiac event recovery and prevention at Time 1 and Time 2: “In general, how much personal control do you think you have in recovering from your cardiac event?” and
“How much personal control do you think you have in preventing another cardiac event?”

Response options are on a four-point scale (e.g., 1 = very little, 4 = total), with higher scores indicating greater amounts of perceived control.

**Depressive Symptoms**

The Beck Depression Inventory-II (BDI-II; Beck, Steer, & Brown, 1996) was used to measure depressive symptoms at Time 1 and Time 2 (see Appendix A-2). The BDI-II is a 21-item self-report measure that assesses the presence and severity of depressive symptoms as defined by the Diagnostic and Statistical Manual of Mental Disorders-IV (American Psychiatric Association, 1994). Each item provides a four-point response scale ranging from 0 to 3 (e.g., 0 = I do not feel sad, 3 = I am so sad and unhappy that I can’t stand it). The maximum total score is 63, with higher scores indicating more severe levels of depressive symptoms. The scale has shown good reliability in both outpatient (α = .92) and college student (α = .93) samples (Beck et al., 1996). In the current sample, the BDI-II had a reliability coefficient of .92.

**Health Behaviors**

The Health Behaviors Scale (Naslund & Fredrikson, 1993) was used to assess adherence to health behavior recommendations at Times 1 and 2. Eight items were adapted from this scale, which asked participants how frequently they consumed red meat, fruits, vegetables, high-fat foods, and sodium over the last four weeks. The scale also included questions about frequency of light and moderate intensity exercise activities, as well as cigarette smoking. Response options were on a seven-point scale (1 = never, 7 = more than once per day) for the diet and exercise items and a six-point scale (1 = none, 6 = more than 40 per day) for cigarette use. Prior research with a shortened, seven-item version of the
Health Behaviors Scale showed moderately acceptable reliability \( \alpha = .64; \) Bennett & Marte, 2013). In order to improve reliability, a composite score was calculated from the eight items to determine adherence to the recommended health behaviors. Each item was recoded to indicate whether the participant’s frequency of each behavior met (1) or did not meet (0) adherence to the recommended health behavior. The rescaling criteria are outlined in Appendix A-3 and reflect health behavior guidelines and contemporary literature (American Heart Association, 2014a; American Heart Association, 2014b; Appel et al., 2011; Azadbakht & Esmaillzadeh, 2008; Laukkanen, Kauppinen, & Heikkinen, 1998; Smith et al., 2011). After the items were recorded, the values were summed; higher scores indicate greater levels of adherence. In the current study, the reliabilities of this scale at Time 1 \( (KR_{20} = .57) \) and 2 \( (KR_{20} = .64) \) were less than optimal.

**Data Analysis**

The statistical program, SPSS 23.0, (IBM Corp, 2015) was used to calculate descriptive and inferential statistics. Prior to testing the hypotheses, the data were screened for errors and assumptions. First, descriptive statistics were run for all variables. These analyses revealed that of the 146 cases with complete health behavior recommendation data at Time 2, eight had missing Time 1 BDI-II items, four had missing Time 1 Brief RCOPE items, and three had missing Time 1 Health Behaviors Scale items. None of the cases was missing more than 40% of data on any given scale, and all of the data were missing at random. As such, expectation maximization procedure was used to impute all of the aforementioned missing values.

After the values were imputed, assumptions required by ordinary least squares (OLS) regression analyses were tested. Histograms of the standardized residuals were created to
assess for the assumption of normality. Linearity between the predictor variables and outcome variable was tested by examining the symmetry of scatter plots between the predictor and outcome variables. To test for the assumption of homoscedasticity, plots of the standardized predicted values against the standardized residual values were examined. Correlation analyses were then conducted between participant characteristics and the mediator and outcome variables in order to identify potential covariates. Sociodemographic variables found to be significantly correlated with the mediator or outcome variable were included as covariates in the analyses.

**Hypotheses One and Two**

The PROCESS add-on for SPSS (Hayes, 2013) was used to test the proposed hypotheses. Four separate analyses were conducted using Hayes’ conditional process analysis approach, with two analyses for each proposed hypothesis (see Figure 1). All models were run using Model 7 of Hayes’ (2013) macro. Estimates of the indirect effects utilized bias-corrected bootstrap confidence intervals at the 95% level based on 1,000 bootstrap samples. Although Hayes (2013) provides no specific recommendation for sample size, he reasons that larger samples are generally better. More specifically, Warner (2013) suggests a minimum sample size of 150-200 for moderated mediation analysis; thus, this sample size of 146 could be considered adequate.

To test hypothesis one, two separate analyses were conducted, with positive R/S coping as the predictor variable in each. The first analysis included the mean-centered Time 1 composite positive R/S coping score as the predictor, the Time 1 composite BDI-II score as the mediator, the mean-centered Time 1 prevention control variable as the moderator, and the Time 2 composite health behaviors score as the outcome variable. Based on results of
preliminary data analyses (see below), participant age, Time 1 health behaviors, and Time 1 negative R/S coping were included as covariates. The second analysis included the following variables: the mean-centered Time 1 composite positive R/S coping score as the predictor, the Time 1 composite BDI-II score as the mediator, the mean-centered Time 1 recovery control variable as the moderator, and the Time 2 composite health behaviors score as the outcome variable. Again, participant age, Time 1 health behaviors, and Time 1 negative R/S coping were entered as covariates.

Analyses for hypothesis two were similar to those mentioned above, with negative R/S coping substituted as the predictor variable. Analysis 3 included the mean-centered Time 1 composite negative R/S coping score as the predictor, the Time 1 composite BDI-II score as the mediator, the mean-centered Time 1 prevention control variable as the moderator, and the Time 2 composite health behaviors score as the outcome variable. Participant age, Time 1 health behaviors, and Time 1 positive R/S coping were entered as covariates in the model. The final analysis included the mean-centered Time 1 composite negative R/S coping score as the predictor, the Time 1 composite BDI-II score as the mediator, the mean-centered Time 1 recovery control variable as the moderator, and the Time 2 composite health behaviors score as the outcome variable. Participant age, and Time 1 health behaviors, Time 1 positive R/S coping were entered as covariates.
CHAPTER 4

RESULTS

Preliminary Analysis and Descriptive Statistics

Preliminary data screening and descriptive statistics indicated that the data violated the assumption of normality required by OLS regression: BDI-II and negative R/S coping scores were both significantly positively skewed and kurtotic. The bootstrapping procedure employed by conditional process analysis theoretically addresses non-normality, and Hayes (2013) contends that this assumption is one of the least important in OLS regression. However, to assess for any potential improvements in the distribution statistics, log transformations were applied to the BDI-II and negative R/S coping variables. After applying the transformations, skew and kurtosis improved significantly for BDI-II but not for negative R/S coping. Therefore, analyses were re-run using the log transformed BDI-II variable as the mediator. As expected, results remained largely the same as the original analyses. In addition, all other assumptions required by Hayes (2013) approach using OLS regression were met. For ease of interpretation, only results from the original analyses will be presented here.

Correlation analyses revealed that age was significantly correlated with BDI-II scores at Time 1 ($r = -.25, p < .001$) and health behaviors at Time 2 ($r = .18, p < .05$). As such, age was entered as a covariate in addition to Time 1 health behavior adherence for each analysis. The opposing type of R/S coping from the predictor variable was also included. For example,
if positive R/S coping was the predictor, negative R/S coping was included as a covariate in that analysis. Correlations among all model variables, including covariates, and descriptive statistics for each variable are presented in Table 2.

Table 2

Descriptive Statistics and Correlations for all Study Variables

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Positive RCOPE</td>
<td>--</td>
<td>-.52**</td>
<td>-.04</td>
<td>.02</td>
<td>-.01</td>
<td>.05</td>
<td>.09</td>
<td>.29**</td>
</tr>
<tr>
<td>2. Negative RCOPE</td>
<td>--</td>
<td>.32**</td>
<td>-.01</td>
<td>-.08</td>
<td>-.23*</td>
<td>-.17*</td>
<td>-.21*</td>
<td></td>
</tr>
<tr>
<td>3. Depressive Symptoms</td>
<td>--</td>
<td>-.15</td>
<td>-.26**</td>
<td>-.26**</td>
<td>-.17*</td>
<td>-.25**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Prevention Control</td>
<td>--</td>
<td>.61**</td>
<td>-.17*</td>
<td>.07</td>
<td>-.10</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Recovery Control</td>
<td>--</td>
<td>.03</td>
<td>.22**</td>
<td>-.18*</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. T1 Health Behaviors</td>
<td>--</td>
<td>.59**</td>
<td>.24**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. T2 Health Behaviors</td>
<td>--</td>
<td>.18*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Age</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
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</tr>
</tbody>
</table>

M 13.19 6.79 8.48 2.80 3.12 4.26 5.50 63.84
SD 4.44 1.87 7.86 0.75 0.62 1.76 1.56 9.98
Range 5-20 5-17 0-40 1-4 1-4 0-8 1-8 36-84
Skew -.04 1.88 1.66 -0.56 -0.42 0.06 -0.27 -.54
Kurtosis -1.08 5.86 2.61 0.35 0.97 -0.26 -0.37 .02

*Note: *p < .05, **p < .01; T1 = Time 1; T2 = Time 2

Hypothesized Models

**Hypothesis One**

See Table 3 for results from Analysis 1. Bootstrapped confidence intervals for the indirect effect in Analysis 1 contained zero, meaning that Time 1 depressive symptoms did not significantly mediate the relationship between Time 1 positive R/S coping and Time 2
adherence to health behaviors. Furthermore, prevention control failed to moderate the direct effect of positive R/S coping on depressive symptoms. Both positive R/S coping and prevention control had significant direct effects on depressive symptoms, after controlling for the covariates; positive R/S coping was positively related to depressive symptoms, while prevention control was negatively related. All other direct paths were non-significant.

Table 3

Model Coefficients for Analysis 1, Hypothesis 1

<table>
<thead>
<tr>
<th>Antecedent</th>
<th>M (T1 BDI-II Score)</th>
<th>Y (T2 Health Behs)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Coeff</td>
<td>SE</td>
</tr>
<tr>
<td>X (T1 Pos R/S Coping)</td>
<td>$a_1$</td>
<td>0.37</td>
</tr>
<tr>
<td>M (T1 BDI-II Score)</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>W (T1 Prevent Control)</td>
<td>$a_2$</td>
<td>-2.06</td>
</tr>
<tr>
<td>X × W</td>
<td>$a_3$</td>
<td>-0.05</td>
</tr>
<tr>
<td>Age</td>
<td>$i_1$</td>
<td>-0.16</td>
</tr>
<tr>
<td>T1 Health Behs</td>
<td>$i_2$</td>
<td>-0.76</td>
</tr>
<tr>
<td>Neg R/S Coping</td>
<td>$i_3$</td>
<td>1.45</td>
</tr>
</tbody>
</table>

$R^2 = .228$

$F(6, 139) = 6.86, p < .001$

$R^2 = .352$

$F(5, 140) = 15.20, p < .001$

Note: T1 = Time 1, Pos R/S Coping = Positive R/S coping, Prevent Control = Prevention Control, Health Behs = Health Behaviors, Neg R/S Coping = Negative R/S coping

Bootstrapped confidence intervals for the indirect effect also contained zero in the second analysis, indicating that Time 1 depressive symptoms was not a significant mediating variable for the relationship between Time 1 positive R/S coping and Time 2 health behavior adherence. As can be seen in Table 4, recovery control failed to moderate the relationship between positive R/S coping and depressive symptoms. Recovery control was, however, negatively related to depressive symptoms, after controlling for age, Time 1 health behaviors.
and negative R/S coping. Positive R/S coping, on the other hand, was positively related to symptoms of depression, after controlling for the covariates. All other direct paths were non-significant.

Table 4

**Model Coefficients for Analysis 2, Hypothesis 1**

<table>
<thead>
<tr>
<th>Antecedent</th>
<th>M (T1 BDI-II Score) Coeff</th>
<th>SE</th>
<th>p</th>
<th>Y (T2 Health Behs) Coeff</th>
<th>SE</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>X (T1 Pos R/S Coping)</td>
<td>( a_1 ) 0.36</td>
<td>0.16</td>
<td>.024</td>
<td>( c'_1 ) 0.02</td>
<td>0.03</td>
<td>.460</td>
</tr>
<tr>
<td>M (T1 BDI-II Score)</td>
<td></td>
<td></td>
<td></td>
<td>( b ) -0.00</td>
<td>0.01</td>
<td>.828</td>
</tr>
<tr>
<td>W (T1 Rec Control)</td>
<td>( a_2 ) -3.50</td>
<td>0.95</td>
<td>&lt;.001</td>
<td>( c'_2 ) ---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>X ( \times ) W</td>
<td>( a_3 ) -0.064</td>
<td>0.19</td>
<td>.742</td>
<td>( c'_3 ) ---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Age</td>
<td>( i_1 ) -0.20</td>
<td>0.06</td>
<td>.002</td>
<td>( i_1 ) 0.00</td>
<td>0.01</td>
<td>.843</td>
</tr>
<tr>
<td>T1 Health Behs</td>
<td>( i_2 ) -0.56</td>
<td>0.34</td>
<td>.106</td>
<td>( i_2 ) 0.51</td>
<td>0.06</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Negative R/S Coping</td>
<td>( i_3 ) 1.37</td>
<td>0.37</td>
<td>&lt;.001</td>
<td>( i_3 ) 0.00</td>
<td>0.072</td>
<td>.967</td>
</tr>
</tbody>
</table>

\( R^2 = .232 \)

\( F(6, 139) = 8.24, p < .001 \)

\( R^2 = .352 \)

\( F(5, 140) = 15.20, p < .001 \)

**Note:** T1 = Time 1, Pos R/S Coping = Positive R/S coping, Prevent Control = Prevention Control, Health Behs = Health Behaviors, Neg R/S Coping = Negative R/S coping

**Hypothesis Two**

Analyses used to test hypothesis two—with negative R/S coping as the predictor variable—provided similar results to those outlined above for hypothesis one. In the third analysis, bootstrapped confidence intervals for the indirect effect contained zero, suggesting that Time 1 depressive symptoms is not a significant mediator of the relationship between Time 1 negative R/S coping and Time 2 adherence to health behaviors. Prevention control also failed to moderate the direct effect of negative R/S coping on depressive symptoms, but it did have a significant direct effect on depressive symptoms, after controlling for the
covariates (see Table 5). Negative R/S coping was also significantly, but positively, related to depression, after controlling for covariates.

Table 5

Model Coefficients for Analysis 3, Hypothesis 2

<table>
<thead>
<tr>
<th>Antecedent</th>
<th>Coeff</th>
<th>SE</th>
<th>p</th>
<th>Consequent</th>
<th>Coeff</th>
<th>SE</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>X (T1 Neg R/S Coping)</td>
<td>$a_1$</td>
<td>1.43</td>
<td>.38</td>
<td>$c'_1$</td>
<td>0.00</td>
<td>0.07</td>
<td>.967</td>
</tr>
<tr>
<td>M (T1 BDI-II Score)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>W (T1 Prevent Control)</td>
<td>$a_2$</td>
<td>-2.21</td>
<td>0.80</td>
<td>.006</td>
<td>$c'_2$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>X × W</td>
<td>$a_3$</td>
<td>-0.57</td>
<td>0.49</td>
<td>.245</td>
<td>$c'_3$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>$i_1$</td>
<td>-0.16</td>
<td>0.06</td>
<td>.011</td>
<td>$i_1$</td>
<td>0.00</td>
<td>0.01</td>
</tr>
<tr>
<td>T1 Health Behs</td>
<td>$i_2$</td>
<td>-.790</td>
<td>0.35</td>
<td>.028</td>
<td>$i_2$</td>
<td>0.51</td>
<td>0.06</td>
</tr>
<tr>
<td>Pos R/S Coping</td>
<td>$i_3$</td>
<td>0.37</td>
<td>0.16</td>
<td>.023</td>
<td>$i_3$</td>
<td>0.02</td>
<td>0.03</td>
</tr>
</tbody>
</table>

$R^2 = .235$ \( F(6, 139) = 7.13, p < .001 \)

$R^2 = .352$ \( F(5, 140) = 15.20, p < .001 \)

Note: T1 = Time 1, Neg R/S Coping = Negative R/S coping, Prevent Control = Prevention Control, Health Behs = Health Behaviors, Pos R/S Coping = Positive R/S coping

Bootstrapped confidence intervals for the indirect effects in the final analysis also contained zero; again, depressive symptoms at Time 1 failed to mediate the relationship between Time 1 negative R/S coping and T2 health behavior adherence at the end of CR. Recovery control also failed to moderate the relationship between negative R/S coping and symptoms of depression. All direct paths were non-significant, with the exception of the paths between recovery control and depressive symptoms and negative R/S coping and depressive symptoms (see Table 6). After controlling for the covariates, recovery control was negatively related to depressive symptoms and negative R/S coping was positively related to this mediator.
Table 6

Model Coefficients for Analysis 4, Hypothesis 2

<table>
<thead>
<tr>
<th>Antecedent</th>
<th>Consequent</th>
<th>Consequent M (T1 BDI-II Score)</th>
<th>Consequent Y (T2 Health Behs)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Coeff</td>
<td>SE</td>
<td>p</td>
</tr>
<tr>
<td>X (T1 Neg R/S Coping)</td>
<td>$a_1$</td>
<td>1.25</td>
<td>0.39</td>
</tr>
<tr>
<td>M (T1 BDI-II Score)</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>W (T1 Rec Control)</td>
<td>$a_2$</td>
<td>-3.51</td>
<td>0.94</td>
</tr>
<tr>
<td>X × W</td>
<td>$a_3$</td>
<td>-0.37</td>
<td>0.45</td>
</tr>
<tr>
<td>Age</td>
<td>$i_1$</td>
<td>-0.20</td>
<td>0.06</td>
</tr>
<tr>
<td>T1 Health Behs</td>
<td>$i_2$</td>
<td>-0.55</td>
<td>0.34</td>
</tr>
<tr>
<td>Pos R/S Coping</td>
<td>$i_3$</td>
<td>0.35</td>
<td>0.16</td>
</tr>
</tbody>
</table>

$R^2 = .265$, $F(6, 139) = 8.36, p < .001$

$R^2 = .352$, $F(5, 140) = 15.20, p < .001$

Note: T1 = Time 1, Neg R/S Coping = Negative R/S coping, Prevent Control = Prevention Control, Health Behs = Health Behaviors, Pos R/S Coping = Positive R/S coping
CHAPTER 5
DISCUSSION

This study aimed to examine whether perceived control moderates the relationships between positive and negative R/S coping, depressive symptoms, and adherence to health behavior recommendations in a sample of 146 CR patients. Using Hayes’ (2013) conditional process analysis procedure, indirect and direct paths were estimated in order to test the following hypotheses: (1) the interaction between high positive R/S coping and low perceived control would be negatively related to depressive symptoms, which would in turn be negatively related to adherence to health behavior recommendations; and (2) the interaction between high negative R/S coping and low perceived control would be positively related to depressive symptoms, which would in turn be negatively related to adherence to health behavior recommendations. Results did not support either hypothesis. That is, neither prevention nor recovery control moderated the cross-sectional relationships between positive and negative R/S coping and depressive symptoms. Further, depressive symptoms at the beginning of CR were non-significantly related to health behavior adherence 12 weeks later in all four analyses. Taken together, these results suggest that the relationship between both positive and negative R/S coping and depressive symptoms do not vary as a function of perceived control within the context of CR. They also suggest that depressive symptoms at the beginning of a CR program are a non-significant predictor of health behavior adherence.
by the time of program completion (after controlling for baseline levels, thereby implying stability in health behaviors).

The findings regarding the effects of perceived control are contrary to prior literature. While the research is sparse, past investigations have identified perceived control as a significant moderator of the relationship between R/S coping and health outcomes (e.g., Park et al., 2012). Notably, Jackson and Bergeman (2011) concluded that individuals who perceive low levels of control over life experiences report more pronounced health benefits from R/S coping than those who perceive high levels of control. There are likely a few explanations for why the results of this study are incongruent with past research, with the most salient being the measure used to assess R/S coping. Previous investigators (Jackson & Bergeman, 2011; Park et al., 2012) measured R/S coping using global indices, without differentiating between positive and negative patterns. That is, the responses to R/S coping scale items were simply summed to create an overall dimension, or quantity, of R/S coping. In contrast, the current scale measured distinct patterns of R/S coping. Thus, it is possible and Pargament et al. (1998) would likely argue, that the Brief RCOPE captures a more nuanced picture of R/S coping and is thereby measuring a theoretically different construct than those of past inquiries. Perhaps it is the case that perceived control moderates only the relationship between overall R/S coping and distress and not the relationship between disparate patterns of R/S coping and distress. To my knowledge, this is the first study to explore the interactions between perceived control and specific R/S coping patterns, so future research is needed to tease out these effects.

It was also surprising that the relationship between depressive symptoms at the beginning of CR and health behavior adherence 12 weeks later at the end of CR was non-
significant. Extensive research has been conducted on the relationship between psychological distress and health behaviors, with findings consistently linking higher levels of distress to poorer adherence (Allgöwer et al., 2001; DiMatteo, Lepper & Croghan, 2000). This relationship is even more salient in the context of CVD: Depression rates are approximately three times higher in cardiac patients than the general population and depression is associated with multiple risky health behaviors including medication non-adherence, decreases in physical activity, poor diet, smoking, and others (Gehi et al., 2005, Lichtman et al., 2008; Ziegelstein et al, 2000). The most likely reason for the null relationship between depressive symptoms and health behavior recommendations in this study is that the Health Behaviors Scale scores remained relatively stable from Time 1 to Time 2. This left very little variance to be explained by the predictor variables, including depressive symptom scores. Another plausible explanation is that the average Time 1 BDI-II score for this sample was 8.48 ($SD = 7.86$), which indicates very low levels of depressive symptoms with minimal variability. These scores are especially low for individuals with CVD (Lichtman et al., 2008). Different results may have been obtained with greater variability in depressive symptom and health behavior scores.

Although no specific predictions were made for the direct effects of the predictor variables on the mediator (i.e., BDI-II scores), it is worth discussing their results. First, results of Hypothesis One revealed a positive relationship between positive R/S coping and depressive symptoms. This was unexpected. Multiple investigations have demonstrated that positive R/S coping is generally related to better functioning and is unrelated to poor health (e.g., Lee et al., 2014; Pargament et al., 1998; Pargament et al., 2004). Pargament, Feuille, and Burdzy (2011) offer one possible explanation for this discrepant finding, which lies with
R/S coping theory. According to these researchers, the efficacy of a particular coping strategy is dependent upon personal, social, and situational factors, in addition to the ways in which health and well-being are measured. Given the complex interplay of all of these factors, it is possible that utilizing a positive R/S coping approach may be beneficial in one situation and maladaptive in another. This possibility can easily be illustrated in the case of CVD. For example, a propensity towards positive R/S coping may have served a cardiac patient well when faced with life stressors in the past (e.g., divorce, death of a loved one) by providing a sense of comfort, connection, etc. However, cardiac events necessitate an immediate mobilization of salubrious behaviors to facilitate recovery and mitigate any aversive physical and mental health effects. If, after a cardiac event, the patient leans only on positive R/S coping (e.g., confessing one’s sins) to bring about recovery, he/she may feel defeated and thus depressed when symptoms persist.

Another possible explanation for this contradictory direct effect is that positive R/S coping and depressive symptoms were measured concurrently at the beginning of CR. Perhaps patients were utilizing positive R/S coping while simultaneously experiencing psychological distress from a recent diagnosis of CVD. It cannot be assumed that the two are causally linked when measured at the same time. It is also possible that positive R/S coping predicts mental health benefits further along in recovery; longitudinal benefits were not effectively captured by this study, because data were not analyzed beyond the 12 weeks of CR.

While the effects of positive R/S coping were surprising, the positive relationship between negative R/S coping and depressive symptoms were more in line with contemporary literature. In fact, these results can be seen as adding to the current literature that has
consistently linked negative R/S coping to poorer health outcomes (e.g., Brewer et al., 2014; Harrison, Koenig, Hays, Eme-Akwari, & Pargament et al., 2001; Lee et al., 2014; Pargament et al., 1998; Ng, Mohamed, Sulaiman, & Zainal, 2016). These findings also suggest the potential need for evaluating coping styles at the entrance to CR, with interventions implemented for patients reporting negative religious styles.

In regards to the direct effects of perceived control on depressive symptoms, results were also reflective of past research. Both recovery and prevention control were negatively related to depressive symptoms in all four analyses. In other words, those individuals who reported more control over recovering from and preventing another cardiac event at the beginning of CR simultaneously reported fewer depressive symptoms. These findings are consistent with the reformulated learned helplessness model (Abramson et al., 1978), which posits that lower levels of perceived control over one’s environment are generally predictive of higher and more severe levels of depression. As such, the current study adds support to a well-established model and extrapolates its effects to a cardiac population.

**Implications**

While this study did not support the proposed hypotheses, it was unique in that it aimed to test the effects of perceived control on the relationship between specific patterns of R/S coping and psychological distress. It also identified significant relationships between some predictor variables and depressive symptoms, and these relationships may have significant implications for CVD practitioners (e.g., CR nursing staff). For example, negative R/S coping was positively related to depressive symptom, suggesting that practitioners should screen for negative R/S coping upon entrance to CR programs; if an individual exhibits a predilection towards maladaptive coping styles, further assessment and
intervention may be warranted. Significant associations were also identified between prevention control and depressive symptoms, as well as between recovery control and depressive symptoms. This finding implies that practitioners should consider promoting patients’ perceived control in an attempt to prevent or alleviate psychological distress. Although this study did not link depressive symptoms to cardiac health behavior adherence, past investigations have repeatedly demonstrated that depressed individuals are significantly less likely to adhere to health recommendations (Ruo et al., 2004; Gehi et al., 2005; Ziegelstein et al., 2000; Whooley et al., 2008). Therefore, monitoring the precursors and contributors to depression would likely benefit one’s progress in CR, as well as his/her ultimate recovery.

Limitations and Future Directions

Despite important implications, there are some limitations to this project that are worth noting. First, all data were collected using self-report measures, allowing for the possibility of response bias. The BDI-II and Health Behaviors Scale specifically inquire about feelings or behaviors over the last two weeks and one month, respectively. This may have introduced the potential for recall bias. Further, collecting data with only self-report measures is a form of mono-method bias, which could lead to inflated estimates. Next, the reliabilities of the negative R/S coping subscale at Time 1, and the adherence to health behavior recommendation scale at Times 1 and 2, were less than desirable, which may have impacted the interpretability of the results. Additionally, perceived control was measured with single items (i.e., prevention and recovery control). As such, I cannot speak to the reliability of these measures or whether they fully capture the construct of perceived control.
The time point at which health behaviors were assessed could also be considered a limitation and may provide one explanation for why Health Behavior Scale scores barely increased from Time 1 to Time 2. Recall that this information was collected at the beginning of CR (Time 1) and 12 weeks at the end of CR (Time 2). It is often the case, however, that patients do not begin CR programs for approximately 2 to 4 weeks following a cardiac event or procedure. Thus, it is possible that participants received information about health behavior recommendations while in the hospital and began implementing these changes well before entering CR and enrolling in the current study. By Time 1 data collection, they may have already undertaken several salubrious behaviors, leaving little room for improvement over the 12-week CR program. Following this logic, it is not completely surprising that the Health Behavior Scale scores remained relatively stable across time points. Future research should take this into consideration and aim to collect health behavior data shortly after patients receive a CVD diagnosis (e.g., during hospitalization for a cardiac event).

In addition to the timing of the measurement of health behaviors, the heterogeneity of the Health Behavior Scale outcome variable could be considered a limitation. The Health Behavior Scale is a unidimensional measure that assesses a variety of health behaviors related to exercise, diet, and smoking. As such, it assumes that these behaviors are related to each other; if someone expresses adherence to one health behavior recommendation (e.g., eating vegetables), he/she is also expected to adhere to another disparate health behavior (e.g., engaging in aerobic activity). However, it is unlikely that individuals adhere equally as well to all health recommendations, so the use of these specific scale items can be considered a notable limitation to the current study. Instead of attempting to capture overall adherence, it may have been more meaningful to assess separate categories of health behaviors (e.g., diet)
as the outcome variable. Ultimately, this may have improved reliability, as well as the ability to detect a significant relationship between depressive symptoms and health behaviors. Future research endeavors should consider using more targeted measures of health behaviors as opposed to a global score.

In regards to the study sample, participants were predominantly European American, male, well-educated, and affluent. They also had extremely low levels of depressive symptoms, which is relatively unusual for individuals diagnosed with CVD (Lichtman et al., 2008). More importantly, the 146 individuals in this sample had significantly lower levels of depressive symptoms than those who participated at Time 1 but were excluded from these longitudinal analyses. They were also older and reported more perceived control over cardiac event recovery than those who were excluded. Although it is difficult to know for certain, it is possible that these differences in patient characteristics biased the sample, because those included in the present project appear to be more mentally healthy than those who were not. Lastly, it is possible the very nature of CR programs limits the generalizability of the results to CVD populations as they do not representatively include individuals classified as ethnic minorities or low socioeconomic status.

Given the detrimental health effects of depressive symptoms, future research efforts should continue to investigate the precursors to these symptoms, especially in the context of CVD. Researchers should also further explore the effects of perceived control on the relationship between patterns of R/S coping and psychological distress to better clarify its effects. These investigations should ideally be conducted with culturally and socioeconomically diverse samples.
Conclusion

The relationship between distress (i.e., depression) and health behaviors (i.e., adherence to health recommendations) is well established, especially in CVD populations. It is now important to better understand the precursors of depressive symptoms for this chronic illness. In the current study, positive and negative patterns of R/S coping were examined as correlates of depression because R/S coping is a commonly-used resource for individuals presented with significant life stressors, such as a health scare. Perceived control was also included as a moderating variable to fill an important gap in the literature, and to further investigate how disparate patterns of R/S coping impact health. Results suggest that perceived control does not moderate the relationship between either pattern of R/S coping and distress within the context of CR. Further, this study did not provide support for the relationship between depressive symptoms and adherence to health behavior recommendations. Significant relationships were found between negative R/S coping and depressive symptoms, as well as between perceived control and depressive symptoms. While positive R/S coping was positively linked to depressive symptoms, the direction of the effect was opposite of my expectations.

To my knowledge, this project was a completely novel approach to assessing the relationship between R/S coping and health outcomes in CR patients. As such, further research is needed to better elucidate the true relations between variables. However, the findings do imply the need for discussions about, or assessments of, coping patterns, with interventions potentially implemented for those endorsing maladaptive styles. They also suggest that CR patients may benefit from attempts to increase perceptions of control over cardiac event recovery and prevention.
APPENDIX A

MEASURES

A-1 Brief Religious Coping Scale

<table>
<thead>
<tr>
<th>10-Item Brief RCOPE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instructions: Think about how you try to understand and deal with major problems in your life (like experiencing a cardiac event). To what extent is each of the following activities involved in the way you cope? Please mark the response that best reflects what you think.</td>
</tr>
</tbody>
</table>

| 1. I think about how my life is part of a larger spiritual force. | 1 = A great deal 2 = Quite a bit 3 = Somewhat 4 = Not at all |
| 2. I feel that stressful situations are God’s way of punishing me for my sins or lack of spirituality. | 1 = A great deal 2 = Quite a bit 3 = Somewhat 4 = Not at all |
| 3. I work together with God as partners to get through hard times. | 1 = A great deal 2 = Quite a bit 3 = Somewhat 4 = Not at all |
| 4. I wonder whether God has abandoned me. | 1 = A great deal 2 = Quite a bit 3 = Somewhat 4 = Not at all |
| 5. I look to God for strength, support, and guidance in crises. | 1 = A great deal 2 = Quite a bit 3 = Somewhat 4 = Not at all |
| 6. I try to make sense of the situation and decide what to do without relying on God. | 1 = A great deal 2 = Quite a bit 3 = Somewhat 4 = Not at all |
| 7. I try to find the lessons from God in crises. | 1 = A great deal 2 = Quite a bit 3 = Somewhat 4 = Not at all |
| 8. I question whether God really exists. | 1 = A great deal 2 = Quite a bit 3 = Somewhat 4 = Not at all |
9. I confess my sins and ask for God’s forgiveness. | 1 = A great deal  
2 = Quite a bit  
3 = Somewhat  
4 = Not at all

10. I express anger at God for letting terrible things happen. | 1 = A great deal  
2 = Quite a bit  
3 = Somewhat  
4 = Not at all
# A-2 Beck Depression Inventory-II

**BDI-II**

Instructions: This questionnaire consists of 21 groups of statements. Please read each group of statements carefully, and then pick out the one statement in each group that best describes the way you have been feeling during the past two weeks, including today. Circle the number beside the statement you have picked. If several statements in the group seem to apply equally well, circle the highest number for that group. Be sure that you do not choose more than one statement for any group, including Item 16 (Changes in Sleeping Pattern) or Item 18 (Changes in Appetite).

<table>
<thead>
<tr>
<th></th>
<th>Statements</th>
<th>Scores</th>
</tr>
</thead>
</table>
| 1 | Sadness.                                                                  | 0 = I do not feel sad.  
1 = I feel sad much of the time.  
2 = I am sad all the time.  
3 = I am sad or unhappy that I can’t stand it. |
| 2 | Pessimism.                                                                | 0 = I am not discouraged about my future.  
1 = I feel more discouraged about my future than I used to be  
2 = I do not expect things to work out for me  
3 = I feel my future is hopeless and will only get worse. |
| 3 | Past failure.                                                             | 0 = I do not feel like a failure  
1 = I have failed more than I should have.  
2 = As I look back, I see a lot of failures.  
3 = I feel I am a total failure as a person. |
| 4 | Loss of pleasure.                                                         | 0 = I get as much pleasure as I ever did from things I enjoy.  
1 = I don’t enjoy things as much as I used to.  
2 = I get very little pleasure from the things I used to enjoy.  
3 = I can’t get any pleasure from the things I used to enjoy. |
| 5 | Guilty feelings.                                                          | 0 = I don’t feel particularly guilty.  
1 = I feel guilty over many things I have done or should have done.  
2 = I feel quite guilty most of the time.  
3 = I feel guilty all of the time. |
| 6 | Punishment feelings.                                                      | 0 = I don’t feel I am being punished.  
1 = I feel I may be punished.  
2 = I expect to be punished.  
3 = I feel I am being punished. |
| 7 | Self-dislike.                                                             | 0 = I feel the same about myself as ever.  
1 = I have lost confidence in myself.  
2 = I am disappointed in myself.  
3 = I dislike myself. |
<table>
<thead>
<tr>
<th></th>
<th>Description</th>
<th>Scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>8.</td>
<td>Self-criticalness. 0 = I don’t criticize or blame myself more than usual. 1 = I am more critical of myself than I used to be. 2 = I criticize myself for all my faults. 3 = I blame myself for everything bad that happens</td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td>Suicidal thoughts or wishes. 0 = I don’t have any thoughts of killing myself. 1 = I have thoughts of killing myself, but I would not carry them out. 2 = I would like to kill myself. 3 = I would kill myself if I had the chance</td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td>Crying. 0 = I do not cry any more than I used to. 1 = I cry more than I used to. 2 = I cry over every little thing. 3 = I feel like crying, but I can’t.</td>
<td></td>
</tr>
<tr>
<td>11.</td>
<td>Agitation. 0 = I am no more restless or wound up than usual. 1 = I feel more restless or wound up than usual. 2 = I am so restless or agitated that it’s hard to stay still. 3 = I am so restless or agitated that I have to keep moving or doing something.</td>
<td></td>
</tr>
<tr>
<td>12.</td>
<td>Loss of interest. 0 = I have not lost interest in other people or activities. 1 = I am less interested in other people or things than before. 2 = I have lost most of my interest in other people or things. 3 = It’s hard to get interested in anything.</td>
<td></td>
</tr>
<tr>
<td>13.</td>
<td>Indecisiveness. 0 = I make decisions about as well as ever. 1 = I find it more difficult to make decisions than usual. 2 = I have much greater difficulty in making decisions than I used to. 3 = I have trouble making any decisions.</td>
<td></td>
</tr>
<tr>
<td>14.</td>
<td>Worthlessness. 0 = I do not feel I am worthless. 1 = I don’t consider myself as worthwhile and useful as I used to. 2 = I feel more worthless as compared to other people. 3 = I feel utterly worthless.</td>
<td></td>
</tr>
<tr>
<td>15.</td>
<td>Loss of energy. 0 = I have as much energy as ever. 1 = I have less energy than used to have. 2 = I don’t have enough energy to do very much. 3 = I don’t have enough energy to do anything.</td>
<td></td>
</tr>
<tr>
<td>16.</td>
<td>Changes in sleeping pattern. 0 = I have not experienced any change in my sleeping pattern. 1a = I sleep somewhat more than usual.</td>
<td></td>
</tr>
<tr>
<td>Question</td>
<td>Description</td>
<td></td>
</tr>
<tr>
<td>-----------------------------------------------</td>
<td>-----------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>17. Irritability.</td>
<td>0 = I am no more irritable than usual.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 = I am more irritable than usual</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 = I am much more irritable than usual.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3 = I am irritable all the time.</td>
<td></td>
</tr>
<tr>
<td>18. Changes in appetite.</td>
<td>0 = I have not experienced any changes in my appetite.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1a = My appetite is somewhat less than usual.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1b = My appetite is somewhat greater than usual.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2a = My appetite is much less than before.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2b = My appetite is much greater than before.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3a = I have no appetite at all.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3b = I crave food all the time.</td>
<td></td>
</tr>
<tr>
<td>19. Concentration.</td>
<td>0 = I can concentrate as well as ever.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 = I can’t concentrate as well as usual.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 = It’s hard to keep my mind on anything for very long.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3 = I find I can’t concentrate on anything.</td>
<td></td>
</tr>
<tr>
<td>20. Tiredness or fatigue.</td>
<td>0 = I am no more tired or fatigued than usual.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 = I get more tired or fatigued more easily than usual.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 = I am too tired or fatigued to do a lot of the things I am used to do.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3 = I am too tired or fatigued to do most of the things I used to do.</td>
<td></td>
</tr>
<tr>
<td>21. Loss of interest in sex.</td>
<td>0 = I have not noticed any recent change in my interest in sex.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 = I am less interested in sex than I used to be.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 = I am much less interested in sex now.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3 = I have lost interest in sex completely.</td>
<td></td>
</tr>
</tbody>
</table>
**A-3 Health Behaviors Scale**

Please read each of the following questions concerning your current health practices. Beside each question below, please circle the number that represents how often you have engaged in that health practice. Circling “1” indicates “never” and circling “7” indicates “more than once per day.”

<table>
<thead>
<tr>
<th>Health Practices</th>
<th>Adherence rescaling</th>
</tr>
</thead>
<tbody>
<tr>
<td>Never 1</td>
<td>Less than once per week 2</td>
</tr>
</tbody>
</table>

1. During the last month (4 weeks), how often did you eat red meat (for example, steak or hamburgers)?

1-4 = met recommendations
5-7 = did not meet recommendations
(Azadbakht & Esmaillzadeh, 2008)

2. During the last month, how often did you eat fruits (for example, bananas, apples, or grapes)?

6-7 = met recommendations
1-5 = did not meet recommendations
(American Heart Association, 2014a)

3. During the last month, how often did you eat vegetables (for example, carrots, spinach, or green beans)?

6-7 = met recommendations
1-5 = did not meet recommendations
(American Heart Association, 2014a)

4. During the last month, how often did you eat high-fat foods (for example, french fries, potato chips, cheesecake, or ice cream)?

0-4 = met recommendations
5-7 = did not meet recommendations
(American Heart Association, 2014a)

5. During the last month, how often did you add salt to your meals?

1-5 = met recommendations
6-7 = did not meet recommendations
(Appel et al., 2011)

6. During the last month, how often did you engage in light intensity exercise such as walking, gardening, or housework?

5-7 = met recommendations
1-4 = did not meet recommendations
(Laukkanan, Kauppinen, & Heikkinen, 1998)
7. During the last month, how often did you engage in moderate aerobic activities such as jogging, using a stair master, dancing, hiking, or biking?

4-7 = met recommendations  
1-3 = did not meet recommendations  
(American Heart Association, 2014b)

<table>
<thead>
<tr>
<th>Cigarette Use</th>
<th>Finally, please mark the response that best reflects how often you smoked cigarettes in the last month.</th>
</tr>
</thead>
<tbody>
<tr>
<td>None don’t smoke 1</td>
<td>Less than one per day 2</td>
</tr>
</tbody>
</table>

8. During the month before your cardiac event, on average, how many cigarettes did you smoke each day?

1-2 = met recommendations  
3-6 = did not meet recommendations  
(Smith et al., 2011)
REFERENCES


Circulation, 124, 2458-2473.


VITA

Kalon Eways was born in Denver, Colorado and currently resides in Kansas City, Missouri. She graduated from the College of Charleston in Charleston, South Carolina with a Bachelor of Science in Psychology. Kalon is currently in her third year of the Clinical Health Psychology PhD program at the University of Missouri-Kansas City.