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Risk and Protective Factors in African American Anxiety

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A dissertation submitted to Eberly College of Arts and Sciences at West Virginia University in
partial fulfillment of the requirements for the degree of Doctor of Philosophy in Psychology

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ABSTRACT

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Patricia Hopkins, M.S.

African Americans (AAs) have lower prevalence rates of anxiety disorders than European Americans (EAs). Yet, anxiety disorders in AAs tend to be more chronic and functionally impairing than in EAs. Researchers have suggested that sociocultural risk factors, such as greater experiences of discrimination, stigma toward mental illness, and an increased focus on somatic symptoms, may increase the risk of developing severe and chronic anxiety in AAs. Likewise, sociocultural protective factors, such as a strong sense of ethnic identity and high levels of religiosity, may reduce the likelihood of developing anxiety in AAs. Therefore, the purpose of these studies was to determine the association between these sociocultural factors and anxiety by racial group. To do this, two studies were conducted. In Study 1, 155 AAs and 176 EAs were recruited to complete a series of questionnaires related to anxiety and sociocultural factors. Correlational analyses and structural equation modeling were conducted to determine associations between the variables by group. In Study 2, 45 AAs and 44 EAs were recruited for an in-person study. Worry (a component of anxiety) was experimentally induced and three physiological measures and self-reported anxiety were gathered to determine associations between response to the stressor and the sociocultural factors. Across the two studies, AAs endorsed greater experiences of discrimination, positive religious coping, spirituality, and ethnic identity than EAs. Structural equation modeling and the multiple regression analyses did not indicate consistent evidence of differences between the groups. Correlational analyses showed that greater experiences of discrimination and increased somatic symptom focus were associated with higher anxiety, regardless of group. Furthermore, increased self-stigma and public stigma also were associated with anxiety, possibly differentially in the groups, though additional research is needed to clarify these associations. The protective factors were not associated with anxiety in either group. Future studies should continue investigating the relations between anxiety and stigma, somatic symptom focus, and experiences of discrimination. Additionally, research should be conducted to determine if there are additional factors that may protect against anxiety in AAs.

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Risk and Protective Factors in African American Anxiety

Anxiety disorders are the most common mental illnesses in the United States (Kessler et al., 2005). In any given 12 months, 18.1% of the population in the United States is suffering from an anxiety disorder. Lifetime prevalence rates for any anxiety disorder are about 25% (Kessler et al., 1994). In addition to prevalence, anxiety is associated with a number of negative outcomes, such as depression (Sartorius, Üstün, Lecrubier, Wittchen, 1996), reduced productivity in everyday and work activities (Roy-Byrne et al., 1990), reduced well-being and lower function in chronically ill medical patients (Sherbourne, Wells, Meredith, Jackson, & Camp, 1996), worsening physical disability in older women (Brenes et al., 2005), illicit drug use (Woodward & Fergusson, 2001), as well as, increased risk of coronary artery disease and myocardial infarction (see Januzzi, Stern, Paternak, & DeSanctis, 2000, for review). Although much is known about anxiety, much of the extant research on anxiety is based on primarily European American (EA) samples (Suinn & Borrayo, 2008). Some evidence indicates that anxiety prevalence and severity may be different in African American (AA) samples. Thus, the purpose of this research was to identify sociocultural factors that are unique to African Americans and may contribute to differences in anxiety between African Americans and European Americans.

Anxiety in African Americans

Prevalence rates of anxiety disorders in African Americans are generally lower than in European Americans (Asnaani, Richey, Grant et al., 2005; Kessler et al., 2005). Breslau, Aguilar-Gaxiola, Kendler, Su, Williams, and Kessler (2006) showed that AAs had significantly lower lifetime prevalence rates than EAs for any anxiety disorder (23.8% and 29.4%, respectively). Asnaani, Richey, Dimaite, Hinton, and Hoffman (2010) computed odds ratios to compare anxiety disorder diagnoses between AAs and EAs. EAs were at significantly increased

odds of developing social anxiety disorder (SAD; OR = 1.79), generalized anxiety disorder (GAD; OR = 2.23), and panic disorder (PD; OR = 1.70) compared to AAs. However, when AAs do have an anxiety disorder it tends to be more severe than their EA counterparts. Breslau, Kendler, Su, Gaxiola-Anguilar, and Kessler (2005) investigated persistence of anxiety disorders in AA and EA participants using data from a large national study. Overall, AAs had lower anxiety disorder lifetime prevalence rates than EAs (i.e., 24.7% and 29.1%, respectively). However, within participants who indicated lifetime prevalence, AAs had a higher 12-month prevalence rate than EAs. Specifically, 53.2% of AAs compared to 36.4% of EA with a lifetime diagnosis of anxiety met criteria for an anxiety disorder diagnosis within the previous 12 months. These results suggest a greater persistence of anxiety disorders in AAs compared to EAs. Himle et al. (2009) investigated the impairment (e.g., days missed from work, difficulty engaging in self-care, etc.) and severity (e.g., low scores on the Global Assessment Functioning Scale; American Psychiatric Association, 2000; substance dependence, suicidal thoughts) associated with an anxiety disorder diagnosis in AAs and EAs. AAs were less likely than EAs to have a diagnosis of GAD, SAD, and PD. However, AAs who did have these disorders exhibited significantly more impairment and severity than the EA participants (Himle et al., 2009). These two studies indicate that although African Americans may have lower prevalence rates of anxiety disorders, when they do meet criteria for a diagnosis, the course is more severe than it is for EAs.

To determine rates of anxiety disorder recovery in AAs, Sibrava et al. (2013) conducted a prospective study over a two-year span using data from the Harvard/Brown Anxiety Research Project – Phase II (HARP-II). AAs with GAD reported an average duration of 17 years with 89.4% of the participants indicating that their current episode was their first episode. Duration for SAD was 28 years with 98.8% indicating this was their first episode, and individuals with

panic disorder with agoraphobia (PDA) indicated duration of 13 years with 94.8% indicating this was their first episode. After two years, Sibrava and colleagues examined rates of recovery in their AA sample compared to a primarily EA sample (97%) from the Harvard/Brown Anxiety Research Project – Phase I (HARP-I). The HARP-I used similar data collection methods and analyses as the HARP – II (Bruce et al., 2005; Yonkers et al., 1996). After two years, AAs with GAD had a .23 probability of recovery, which was comparable to EA participants (i.e., .25; Yonkers et al., 1996). AAs with SAD had a .07 probability of recovery compared to .20 in EA participants (Bruce et al., 2005). AAs with PDA had a .00 probability of recovery compared to .23 in EAs (Bruce et al., 2005). These results highlight that the persistence of anxiety disorders in African Americans tends to be more chronic than in European Americans.

These differences in anxiety outcomes between AAs and EAs may be due to unique social and cultural factors. That is, there may be sociocultural factors that serve as protectants against anxiety in AAs, thereby reducing risk of developing an anxiety disorder. Similarly, there may be sociocultural factors that are more salient in AA lives which increase severity and impairment in those who develop an anxiety disorder. Various sociocultural factors have been identified as potential explanations for lower prevalence rates of anxiety and greater anxiety symptom severity in AAs compared to EAs. Risk factors include experiences of discrimination, stigma toward mental illness, and a focus on somatic symptoms of anxiety (Hunter & Schmidt, 2010). In addition to these risk factors, two protective factors, religiosity (Breslau et al., 2006; Chapman & Steger, 2010; Himle et al., 2009) and ethnic identity (Carter, Sbrocco, Lewis, & Friedman, 2001), have been identified as potential factors that lower rates of anxiety in AAs compared to EAs.

Stigma toward Mental Illness

Many individuals hold negative attitudes toward those with mental illnesses. Specifically, individuals with mental illness are often viewed as violent, unpredictable, and dangerous (Corrigan, Markowitz, Watson, Rowan, & Kubiak, 2003; Rao, Feinglass, & Corrigan, 2007). Therefore, people may act differently toward those they know or believe to have a mental illness, resulting in the marginalization of those with mental illnesses in society. Stigma can be separated into two categories: public and self-stigma. Public stigma refers to the general attitudes of the public toward individuals with mental illness. Whereas, self-stigma are the negative attitudes individuals with mental illnesses hold toward themselves (Link, 1987; Tucker et al., 2013). Both public and self-stigma can negatively affect the lives of those who have mental illnesses. For example, people may be less likely to seek psychological services for fear of being labeled mentally ill. Furthermore, those who experience high levels of self-stigma tend to have lower self-esteem, increased symptom severity, and reduced treatment adherence and efficacy (Boyd, Otilingam, & DeForge, 2014; Livingston & Boyd, 2010). Some research indicates that stigma toward mental illness may be higher in AA populations than EA populations.

Cooper-Patrick and colleagues (1997) found that AAs reported more stigma toward mental illness and greater worry that they would be labeled “crazy” than EAs. In addition to personal worries of labeling, AAs indicate greater beliefs than EAs that those with mental illnesses are dangerous (Rao, Feinglass, & Corrigan, 2007) and report more anxiety when thinking of interactions with those who have a mental illness (Masuda et al., 2009). Alvidrez (1999) found that AA women reported more anxiety than EA women about seeking psychological services due to the negative stigma associated with mental illness in their

communities. Finally, Conner, Koeske, and Brown (2009) found that AAs reported greater public and self-stigma toward mental illness than EAs. That is, compared to EAs, AAs reported more stigma toward those with mental illnesses, but also indicated more shame and embarrassment when they themselves had a mental illness.

The difference between AAs and EAs with regard to stigma toward mental illness could explain differences in prevalence rates between the racial groups. That is, due to increased stigma felt by AAs toward mental illness, these individuals may be less likely to self-report experiences of anxiety. Therefore, when given the opportunity to seek services for mental illnesses, AAs may downplay their symptoms for fear of being labeled in a way that could lead to being ostracized from the group. AAs, who do report high levels of anxiety, may not seek professional psychological services due to embarrassment or shame. As a result, AAs may be less likely to be diagnosed with an anxiety disorder, and less likely to receive psychological treatment, leading to more chronic and debilitating anxiety.

Somatic Symptom Endorsement

AAs are more likely to develop life-threatening illnesses, such as cardiovascular disease (CVD; Roger et al., 2011), diabetes, and hypertension (see Kurian, & Cardarelli, 2007, for a review), than EAs. Efforts have been made to educate AAs about the increased risk for developing these physical illnesses (Centers for Disease Control and Prevention, 2010; Daniels et al., 2012). Consequently, physical symptoms may be more salient in the minds of AAs due to these campaigns. Some of the symptoms that characterize these physical illnesses are associated with anxiety and AAs may misattribute these symptoms of anxiety as a sign of a physical illness. Some researchers have hypothesized that the increased salience of physical illness in AAs may result in a greater focus on physical symptoms, as a means of identifying potential physical

illnesses (Hunter & Schmidt, 2010). Thus, AAs may place more attention on the physical components of anxiety over the cognitive aspects.

Some research has found evidence that AAs may also focus more on the physical symptoms of anxiety than EAs. Studies on panic disorder found that AAs reported more tingling in their extremities than EAs (Horwath et al., 1993; Smith, Friedman, & Nevid, 1999). Horwath et al. (1993) also found a non-significant trend ($p < .10$) toward other physiological responses to panic in AAs when compared to EAs (i.e., shortness of breath, pain in the chest, feelings of choking). Another study compared self-reported anxiety after a physical induction of anxiety-like symptoms between AAs and EAs (Gordon, Steiner, & Teachman, 2014). Participants were spun in a chair or asked to breathe through a straw to simulate physiological anxiety responses (i.e., dizziness and shortness of breath, respectively). Participants were then asked to indicate their subjective ratings of anxiety. AAs reported significantly more anxious feelings after the induction than EAs. Overall, these results suggest AAs may be more sensitive to the physiological aspects of anxiety than EAs.

The greater focus on somatic symptoms in AAs may explain lower rates of anxiety in this group compared to EAs. That is, AAs may misinterpret physiological anxiety responses as physical illnesses and seek assistance from their general care physician for these symptoms. Hunter and Schmidt (2010) hypothesized that when African Americans meet with their physicians to discuss their symptoms, they may be diagnosed with a physical illness but the underlying anxiety is not noticed. Moreover, medications for common medical issues, such as hypertension, may mask physiological symptoms of anxiety, possibly reducing the severity of their anxiety symptoms.

Discrimination

Several researchers have suggested that experiences of discrimination may be associated with worse health outcomes in AAs. Studies have found experiences of discrimination in AAs to be associated with elevated stress (Sellers, Caldwell, Schmeelk-Cone, & Zimmerman, 2003), depression (Banks, Kohn-Wood, & Spencer, 2006), increased psychological distress (Jackson et al., 1995), reduced life satisfaction (Broman, 1997), decreased resilience (Brown & Tylka, 2010), and reduced general health status in women (Schulz et al., 2000). Given that AAs are more likely to experience discrimination than EAs and that many of the negative health outcomes associated with discrimination are also related to anxiety, discrimination may uniquely predict anxiety in AAs compared to EAs.

Hunter and Schmidt (2010) suggest that due to awareness of racism some AAs experience cultural mistrust toward EA culture, which may result in a reduced likelihood of AAs to seek psychological services. This may explain greater anxiety disorder impairment and persistence, as AAs may be less likely to seek psychological services due to cultural mistrust. Other researchers have suggested that experiences of discrimination result in racial battle fatigue (Soto, Dawson-Andoh, & BeLue, 2011), which mirrors some of the symptoms of anxiety. Racial battle fatigue occurs due to physiological and psychological exhaustion after extended or repeated exposure to racial microaggressions and discrimination (Smith, Allen, & Danley, 2007). Thus, discrimination may be more strongly associated with anxiety in AAs than in EAs.

Discrimination can be divided into two separate categories: major and everyday experiences of discrimination. Major experiences of discrimination are events that do not occur frequently but have a large impact on one's life (i.e., not receiving a promotion due to race). Everyday experiences include relatively minor experiences of discrimination that are likely to

occur more often (i.e., receiving seemingly slower service at a restaurant than others). It is important to note that much of the research on discrimination experiences involves perceived discrimination, or the participant's subjective report of the experience. That is, the researchers cannot corroborate these experiences as truly related to discriminatory behavior. However, studies have shown that perceived and actual experiences of discrimination are equally distressing for an individual (Kessler, Mickelson, & Williams, 1999).

Soto, Dawson-Andoh, and Belue (2011) investigated the association between generalized anxiety disorder (GAD) and experiences of discrimination in AAs and EAs. Overall, AAs reported significantly more experiences of discrimination than EAs. Greater experiences of everyday discrimination significantly predicted GAD. Specifically, increased experiences of race-based discrimination were associated with increased odds of having GAD in AAs but not EAs. Kessler, Mickelson, and Williams (1999) also investigated the association between GAD, discrimination, and anxiety in EAs and AAs. AAs reported significantly more experiences of everyday discrimination than EAs. However, greater experiences of everyday discrimination were associated with increased likelihood of having GAD in the entire sample. The authors of this study controlled for race so it cannot be determined if there were differences by race. Another study investigated the association between discrimination and social anxiety disorder (SAD) in EAs and AAs (Levine et al., 2014). AAs were significantly more likely to report experiences of race-based discrimination, and greater experiences of everyday discrimination were significantly associated with increased rates of SAD in the entire sample. Unfortunately, the authors did not investigate if race-based discrimination predicted SAD in AAs compared to EAs.

The results from these studies show that AAs report greater experiences of discrimination than EAs and that perceived discrimination is associated with anxiety disorder diagnoses. As Soto and colleagues (2011) suggested, racial battle fatigue due to everyday experiences of racial discrimination may result in anxiety. Therefore, those AAs who do develop anxiety disorders may be particularly affected by discrimination, which may result in more severe and chronic anxiety. Similarly, because AAs experience higher levels of discrimination, they may be less likely to seek psychological services due to cultural mistrust (Hunter & Schmidt, 2010). That is, due to racial discrimination, AAs may feel less comfortable seeking services from mental health care professionals. Indeed, a focus group of AAs on attitudes toward psychologists and psychotherapy found that AAs worried psychologists would not be aware or able to understand experiences with discrimination and racism (Thompson, Bazile, & Akbar, 2004). Therefore, it may be that discrimination results in underreporting of anxiety and diminished treatment seeking, as well as more severe and chronic anxiety in AAs.

Religiosity

Religion has long been identified as an important aspect of AA culture (Ellison & Taylor, 1996). AAs tend to report greater church attendance (Blaine & Crocker, 1995) and indicate that religion is an important part of their everyday lives (Haley et al., 2004). Further, Blaine and Crocker (1995) found a positive association between religiosity and well-being in AAs, but not EA participants. Religiosity in AAs has also been associated with reduced depression levels (Brown, Ndubuisi, & Gary, 1990) and increased happiness (St. George & McNamara, 1984). These findings indicate that religiousness is salient in AA culture and is associated with positive outcomes. Thus, religiosity in AAs may be a protective factor against anxiety, thereby resulting in lower prevalence rates of anxiety in AAs compared to EAs.

Several studies have investigated the associations among religiosity, race, and anxiety. Haley et al. (2004) examined differences in religiosity in AA and EA dementia caregivers. AAs reported greater church attendance, employed the use of prayer more often, and reported greater importance of religion in their lives than EAs. Further, AAs in the sample reported less anxiety than EAs. However, as the purpose of the study was not primarily focused on the relation between anxiety and religiosity, no analyses were conducted to determine the associations between religiosity and anxiety by race. This study highlights the salience and importance of religiosity in AAs, but it cannot be determined whether religiosity was associated with the lower anxiety levels in AAs.

Another study somewhat filled this gap by investigating the relations among socioeconomic status (SES), race, anxiety, and religiosity (Schieman, Pudrovska, Pearlin, & Ellison, 2006). Religiosity levels in participants were measured through divine control, or how much an individual perceives a higher power to have control over the positive and negative outcomes in one's life. For low SES individuals, there was a positive relation between religiosity and anxiety in AAs and a negative relation between these variables in EAs. That is, low SES AAs who perceived a higher power to have more control in their life reported less anxiety, whereas low SES EAs reported more anxiety. Overall, high SES individuals, regardless of race, indicated lower rates of religiosity than low SES individuals. Further, there was no significant relation between religiosity and anxiety in high SES individuals. Thus, there may be differences in the protective nature of religiosity for anxiety, dependent on an individual's SES and race.

The use of positive rather than negative religious coping may drive the anxiety-reducing aspect of religiosity. Positive religious coping refers to an individual using their faith for support,

which includes turning to clergy for support, seeking and receiving religious forgiveness, and viewing God as loving and forgiving (Ano & Vasconcelles, 2005). Negative religious coping occurs when a person believes adverse life events are due to God's punishment or that God has abandoned him or her (Chapman & Steger, 2010). A meta-analysis found that positive religious coping is related to positive psychological outcomes whereas negative religious coping is related to poor psychological outcomes (Ano & Vasconcelles, 2005). With regard to race and anxiety, Chapman and Steger (2010) found that AAs employed greater positive religious coping and less negative religious coping compared to EAs. Furthermore, AA participants scored lower on the Beck Anxiety Inventory than the EA participants. Moderation analyses were conducted to assess the interaction between positive and negative religious coping by race. The positive coping by race interaction was non-significant, indicating that AAs and EAs did not differ in the relation between positive religious coping and anxiety. However, there was a significant interaction between negative religious coping and anxiety. For EAs, negative religious coping was associated with greater levels of anxiety; this association was not found in AAs. Although these results are not conclusive evidence that positive religious coping is associated with less anxiety in AAs, they indicate that religious coping may be associated with anxiety and that the relation may vary by race.

Overall, these studies suggest there may be an association between religiosity and lower levels of anxiety in AAs. Moreover, these findings show that religiosity may be a unique protective factor against anxiety in African Americans and may explain generally lower prevalence rates of anxiety in AAs compared to EAs. That is, AAs who indicate high levels of religiosity may have a reduced likelihood of developing an anxiety disorder due to positive religious coping, greater church attendance, or the importance of faith in their lives. Furthermore,

those AAs who do develop anxiety disorders may not engage in such religious practices and therefore, may be more susceptible to developing an anxiety disorder.

Ethnic/Racial Identity

Broadly, ethnic identity refers to the commitment and affiliation a person has to the values and beliefs associated with an ethnic group (Phinney & Ong, 2007). A variety of theories have been created to conceptualize ethnic identity within African Americans. Allport (1954) highlighted that AA identity is associated with the stigma associated with being Black within American culture. AAs within this conceptualization attempt to manage a positive self-identity within a culture that devalues AAs. A drawback to this model is that it focuses on the greater society's impact on the individual's ethnic identity, and does not consider the cultural impact on identity development. Later models moved away from a focus on stigmatization and included unique aspects of AA culture that influence identity. Cross (1971) introduced the Nigrescence model, which included several steps to developing a healthy AA identity. This model considered the unique aspects of AA culture and history within the greater American culture. More recently, Sellers, Smith, Shelton, Rowley, and Chavous (1998) introduced the multidimensional model of racial identity. This model highlights the importance of race to the individual and what it means to be AA.

Ethnic identity in European Americans is conceptualized somewhat differently, as the dominant culture is constructed around the values and norms of EAs (Chávez & Guido-DiBrito, 1999). As such, identification with one's ethnic identity for EAs is often unconscious as it is the "standard American culture" (Helms, 1997, p. 207). However, ethnic identification can become more salient for EAs when the experience of ethnic identity for other groups is identified (McDermott & Samson, 2005). That is, when considering the experience of other ethnic and

racial groups, ethnic identity is brought to the forefront for EAs. Helms (1984) created a model of EA ethnic identity development that involves several steps to developing a strong ethnic identity that results in accepting and understanding the unique racial experience of other racial groups (Helms, 1997).

As might be expected, AAs report higher levels of ethnic identity than EAs, which may have important psychological implications (Brown et al., 2014; Carter et al., 2001; Williams et al., 2012). In general, a strong sense of ethnic identity is associated with greater self-esteem (Smith & Silva, 2011), less depression (Williams et al., 2012), and increased GPA (Yasui, Dorham, & Dishion, 2004) in AAs. Williams et al. (2012) investigated the relation between ethnic identity and anxiety in AAs and EAs. Ethnic identity was negatively associated with anxiety in the AA sample, and positively associated with anxiety in the EA sample. That is, greater ethnic identity resulted in less overall anxiety in AAs and greater anxiety in EAs. Similarly, Carter et al. (2001) found that trait anxiety was negatively correlated with ethnic identity in AAs, but unrelated in the EA participants. Together, these studies indicate that ethnic identity seems to be more important to AAs than EAs and may serve a protective function against anxiety.

Overall, ethnic identity may explain lower prevalence rates of anxiety in AAs compared to EAs. That is, ethnic identity may protect against stressors that may lead to anxiety disorders. AAs with a greater ethnic identity may have a greater sense of self or identification with AA culture. Further, engagement in cultural activities may provide a social support system to help AAs cope with stressors that may result in anxiety.

Summary and Statement of the Problem

Much of the research investigating anxiety outcomes is based on results from samples of primarily EA participants. However, several studies have investigated the prevalence of anxiety disorders in AAs and EAs. Generally, these findings suggest that AAs have lower rates of anxiety disorder diagnoses than EAs (e.g., Breslau et al., 2005), but compared to EAs, anxiety disorders in AAs tend to be more chronic, functionally impairing, and less responsive to treatment (Breslau et al., 2005; Himle et al., 2009; Sibrava et al., 2013).

AAs may have unique protective factors such as a religiosity and a strong sense of ethnic identity that may explain the lower rates of anxiety in AAs compared to EAs. AAs demonstrate greater religiosity compared to EAs, which is related to lower rates of anxiety (Chapman & Steger, 2010). Additionally, AAs tend to endorse greater ethnic identity than EAs (Brown et al., 2014; Carter et al., 2001; Williams et al., 2012), which has been associated with less anxiety in AAs, but not EAs (Williams et al., 2012). Therefore, these sociocultural protective factors may partially explain generally lower prevalence rates of anxiety in AAs compared to EAs.

However, a variety of risk factors may contribute to anxiety outcomes in AAs compared to EAs, such as stigma toward mental illness, somatic symptom focus, and experiences of discrimination. AAs report more stigma toward mental illness and report less willingness to seek psychological services (Alvidrez, 1999; Masuda et al., 2009). Greater experiences of discrimination are associated with generalized anxiety disorder, social anxiety disorder, and psychological distress (Levine et al., 2014; Soto et al., 2011; Williams et al., 1997). AAs report more experiences of discrimination than EAs, and therefore, they may be more likely to experience anxiety related to these events (Williams et al., 1997). Finally, AAs may focus more on physical symptoms of anxiety, which may result in misdiagnoses and reduced likelihood of

receiving psychological treatment (Hunter & Schmidt, 2010). These three sociocultural factors may partially explain lower prevalence rates of anxiety disorders in AAs but higher rates of chronic anxiety.

Overall, these studies highlight several factors that may be associated with lower prevalence rates of anxiety and greater symptom severity and persistence in AAs compared to EAs. What is unknown is which of these sociocultural factors most strongly is associated with anxiety by group. A greater understanding of the role these variables play in AA compared to EA anxiety can help researchers and clinicians create treatment programs that target problem areas and help build upon protective factors. Therefore, the overall goal of this project is to determine how these sociocultural variables relate to anxiety in AAs compared to EAs.

General Project Aims

The overall goal of this project was to identify sociocultural risk and protective factors that may explain differences in anxiety prevalence and severity between African Americans and European Americans. To do this, two studies were proposed. The first study was conducted to determine associations between sociocultural risk and protective factors with anxiety by race. It was expected that risk factors (i.e., experiences of discrimination, somatic symptom focus) would result in greater anxiety endorsement, whereas greater stigma toward mental illness would result in lower self-reported anxiety in AAs, but unrelated or not as strongly associated in EAs. Further, it was expected that sociocultural protective factors (i.e., ethnic identity and religiosity) would be associated with lower anxiety endorsement in AAs, but would be unrelated or not as strongly associated in EAs.

The second study expanded on the first study by experimentally inducing worry, a component of anxiety, and investigating the associations between worry, sociocultural risk, and

protective factors by race. Additionally, two physiological markers of stress (i.e., cortisol and heart rate/heart rate variability) were used as assessments of physiological response to the induction. It was expected that greater sociocultural risk factors would be associated with greater stress response due to the induction in AAs, but unrelated or not as strongly associated in EAs. Similarly, greater sociocultural protective factors in AAs, but to a lesser extent EAs, would result in a lower stress response to the worry induction.

Study 1

The purpose of study one was to identify which sociocultural factors were associated with anxiety in AAs versus EAs. To do this, a community sample of AAs and EAs were administered a variety of self-report measures that assessed anxiety, experiences of discrimination, stigma toward mental illness, religiosity, and ethnic identity. Structural equation modeling was used to determine the extent to which each factor contributed to anxiety in AAs and EAs. The following hypotheses were tested.

Hypothesis 1: In general, AAs would endorse greater stigma toward mental illness, discrimination experiences, and physical symptoms of anxiety than EAs. Also, AAs would report greater religiosity and a stronger sense of ethnic identity than EAs.

Hypothesis 2: Greater stigma in AAs would be associated with less self-reported anxiety symptoms, but unrelated or not as strongly associated in EAs. It was expected that greater stigma toward mental illness would lead to AAs reporting fewer symptoms of anxiety.

Hypothesis 3: Greater reports of discrimination and a focus on physical symptoms would be associated with greater anxiety levels in AAs, but unrelated or not as strongly associated in EAs. That is, these sociocultural factors would be risk factors of anxiety in AAs.

Hypothesis 4: Greater positive religious coping and ethnic identity would be associated with less anxiety levels in AAs, but unrelated or not as strongly associated in EAs. That is, those factors would serve as protective factors against anxiety in AAs.

Method

Participants

Five hundred twenty-two people registered for the study online via Amazon's Mechanical Turk (MTurk). Of these participants, 61 completed less than half of the assessments and 36 self-identified as non-United States citizens. Twenty-eight of the participants completed the assessment exceptionally fast (less than 10 minutes). As such, participants who completed less than half the assessments, identified as non-US citizens, and completed the study in less than 10 minutes were removed.

As the purpose of this study was to assess similarities and differences in African American and European American anxiety, only individuals who self-identified in one of these groups were included in the study. Participant self-identified race and participant-identified parental races were considered. However, the decision to include a participant in the study was based on participant identification, regardless of if their parent was of a different race. For example, if a participant self-identified as African American but reported an AA mother and EA father, they were included as African American. Likewise, if participants identified as "biracial" but reported an AA mother and EA father, they were not included in the analyses. Eleven participants self-identified as African American, though one parent was AA and one was EA. Two participants reported one AA parent and one biracial parent (i.e., "Black/Spanish" and "Black/Native American"). Two participants self-identified as AA, though reported parents who were of a different race (i.e., two Asian parents or two European American parents). No

participants who self-identified as EA reported parents of any other race. Five participants who identified as biracial were not included in the analyses, though their reported parent races were the same as participants who were included but self-identified as AA (e.g., one EA and one AA parent).

After excluding individuals who completed the study in less than 10 minutes, identified as non-AA/non-EA, or identified as non-US citizens, 331 participants completed the study. Of these participants, 155 were African American (51% female; $M_{age} = 31.43$ years, $SD = 8.58$) and 176 were European American (58% female; $M_{age} = 36.94$ years, $SD = 12.47$). There were several differences in demographic information between the two samples. Of note, the AA sample was significantly younger ($t(311.11) = 4.72, p < .001$), were more likely to be single ($X^2(3) = 13.52, p = .004$), and had less education ($X^2(8) = 16.29, p = .04$) than the EA sample. EAs were more likely to report they would call themselves an anxious person ($X^2(1) = 9.65, p = .002$) and were more likely to indicate they have sought professional services to help with a psychological issue than AAs ($X^2(1) = 13.05, p = <.001$) (see Table 1 for all demographic information)¹.

Measures

Body Sensations Questionnaire (BSQ; Chambless, Caputo, Bright, & Gallagher, 1984).

This scale is comprised of 17 items to assess physiological responses to anxiety (e.g., “numbness in arms or legs”). Participants rate items on a scale from 1 (*not at all*) to 5 (*extremely*). Higher scores indicating the participant reports more fear and anxiety when experiencing physical symptoms of anxiety. The scale was found to have good reliability (AAs: $\alpha = .96$; EAs: $\alpha = .92$).

Beck Anxiety Inventory (BAI; Beck et al., 1988). This is a 21-item measure that assesses anxiety severity ($\alpha = .93$). The BAI measures both cognitive (e.g., fear of dying, inability to

relax) and physiological symptoms (e.g., feeling dizzy, sweaty palms) of anxiety. Participants rate items on a scale from 0 (*Not at all*) to 3 (*Severely - I could barely stand it*). Summed scores create a range of responses from 0 to 63. Scores between 22 and 35 signify moderate levels of anxiety, scores of 36 and above denote severe anxiety symptoms (Eack, Singer, & Greeno, 2008). The scale was found to have good reliability (AAs: $\alpha = .96$; EAs: $\alpha = .95$).

State Trait Anxiety Inventory (STAI; Spielberger et al., 1970). This 40-item scale assesses anxiety experienced in the moment (i.e., state anxiety) and general anxiety experienced over time (i.e., trait anxiety). Example items include “I feel calm” and “I feel jittery”. Participants rate each item on a scale from 1 to 4 with higher numbers indicating greater intensity. Both the trait (AAs: $\alpha = .94$; EAs: $\alpha = .95$) and state (AAs: $\alpha = .95$; EAs: $\alpha = .95$) subscales had good internal reliability.

Day’s Mental Illness Stigma Scale (Day, Edgren & Eshleman (2007). This 28-item measure assesses individual attitudes and beliefs toward mental illness (e.g., “I tend to feel anxious and nervous when I am around someone with a mental illness” and “There are no effective treatments for mental illnesses”). Participants rate items on a scale from 1 (*completely disagree*) to 7 (*completely agree*). Higher scores indicating the participant has more negative beliefs, or stigma, toward mental illness. The scale was reliable in both the AA ($\alpha = .95$) and EA sample ($\alpha = .95$).

Self-Stigma of Mental Illness (SSMI; Tucker et al., 2013). This 10-item scale assesses stigma toward the self about having a mental illness (e.g., If I went to a therapist, I would be less satisfied with myself). Participants rate their responses on a scale from 1 (*strongly disagree*) to 5 (*strongly agree*). Five items are reverse coded, so that higher scores indicate greater self-stigma toward mental illness. The scale was found to have good reliability (AAs: $\alpha = .88$; EAs: $\alpha = .89$).

Everyday Discrimination Scale (EDS; Williams et al., 1997). This 9-item scale was created to assess everyday experiences of discrimination. Participants are asked to report on a scale of 1 (*never*) to 5 (*very often*), “In your day-to-day life how often have any of the following things happened?” Questions include, “people acting as if you are not smart” and “being treated with less respect than others” (Banks et al., 2006). Higher scores indicating the participant self-reported greater experiences of perceived discrimination. The scale was found to have good reliability (AAs: $\alpha = .94$; EAs: $\alpha = .93$).

Brief RCOPE (Pargament et al., 2000). This 14-item scale is a shorter version of the 29-item RCOPE scale that is commonly used to assess religious coping. The Brief RCOPE has two subscales: positive coping (e.g., sought God’s love and care) and negative coping (e.g., wondered whether God had abandoned me). Participants respond to the items on a scale ranging from 1 (not at all) to 4 (a great deal). A mean score is created for each subscale, so that higher scores indicate greater positive or negative religious coping. The Positive RCOPE (AAs: $\alpha = .95$; EAs: $\alpha = .97$) subscale and Negative RCOPE (AAs: $\alpha = .92$; EAs: $\alpha = .97$) subscale were both found to have good reliability.

Intrinsic Spirituality Scale (ISS; Hodge, 2003). This six-item scale assesses for the salience of spirituality in participant lives. Questions and corresponding responses are presented in sentence completion format. An example item states, “In terms of the questions I have about life, my spirituality answers...” Participants indicate their response on a continuum ranging from 0 = *no questions* to 10 = *absolutely all of my questions*. Each question stem has corresponding response options. Another example item, “When I think of the things that help me to grow and mature as a person, my spirituality...” Participants respond on a continuum specific to that item,

0 = has no effect on my personal growth to 10 = is absolutely the most important factor in my personal growth. The scale was reliable in both the AA ($\alpha = .97$) and EA sample ($\alpha = .97$).

Multiple Group Ethnic Identity Measure – Revised (MEIM-R; Phinney & Org, 2007).

This 6-item scale was created to assess ethnic group identification. The MEIM-R measures both ethnic exploration (e.g., I have often talked to other people in order to learn more about my ethnic group) and commitment (e.g., I feel a strong attachment towards my own ethnic group). Participants rate items on a scale from 1 (strongly disagree) to 5 (strongly agree). Means are calculated with higher scores indicating greater ethnic identity. The scale was found to have good reliability (AAs: $\alpha = .89$; EAs: $\alpha = .91$).

Center for Epidemiologic Studies Depression Scale (CES-D; Radloff, 1977). This 20-item scale assesses depressed mood over the last week. Participants are asked to report how often they have felt each item on a scale from 0 (rarely or none of the time) to 3 (most or all the time). Representative items include “I felt lonely” and “I felt that everything I did was an effort”. This assessment was included as a potential covariate given the comorbidity between depression and anxiety (Hirschfeld, 2001). The scale was found to have good reliability (AAs: $\alpha = .89$; EAs: $\alpha = .86$).

Demographics and other information. Participants were also asked to provide their race, gender, education, marital status, income, age, and religious affiliation. Individual questions were used to determine previous experiences with mental health services.

Procedure

Participants completed an online survey posted on Amazon’s Mechanical Turk (MTurk). Through MTurk’s secure system requiring individual login and password, participants were able to read a description of the study and voluntarily choose to participate. After registering for the

study via MTurk, participants were directed to a secure survey link hosted by SurveyMonkey. Participants first read and acknowledged an online consent form, before completing the questionnaires. Participants completed the primary measures in random order to control for potential order effects, followed by demographic information. Participants received \$1.00 MTurk credit for participation.

Results

Data were examined for missingness and normality. None of the primary outcome measures were missing more than 5%; with missing data, statistical tests were used to exclude cases pairwise. Skew and kurtosis were examined separately by participant group. For AAs, the BAI ($M = 15.07$, $SD = 14.61$ skewness = .90, $SE = .20$) and Negative RCOPE ($M = 1.75$, $SD = .83$ skewness = .87, $SE = .20$) were negatively skewed. The Intrinsic Spirituality Scale ($M = 6.25$, $SD = 2.79$ skewness = -.88, $SE = .20$) was positively skewed. For EAs, the BAI ($M = 15.66$, $SD = 13.48$, skewness = .82, $SE = .18$), Everyday Discrimination scale ($M = 1.39$ $SD = 1.02$ skewness = .83, $SE = .18$), Positive RCOPE ($M = 1.90$, $SD = 1.04$, skewness = .82, $SE = .18$), and Negative RCOPE ($M = 1.43$, $SD = 3.08$, skewness = 1.43, $SE = .18$) were negatively skewed. As such, these scales were log or square root transformed to normalize the distribution. For AAs, the BAI was normalized best with the square root transformation ($M = 3.27$, $SD = .17$, skewness = .06, $SE = .20$), the Negative RCOPE was best normalized with the log transformation ($M = .20$, $SD = .02$, skewness = .48, $SE = .22$), and for the Intrinsic Spirituality scale the non-transformed scale was the best fit. For EAs, the BAI, Everyday Discrimination scale, and Negative RCOPE were all square root transformed to improve the normality (BAI: $M = 3.48$, $SD = .14$, skewness = -.08 $SE = .18$; Everyday Discrimination scale: $M = 1.07$, $SD = .11$, skewness

= $-.34$, $SE = .18$; Negative RCOPE: $M = 1.17$, $SD = .24$, skewness = 1.24 , $SE = .18$). The Positive RCOPE scale's normality was not improved with transformations.

Bivariate correlations and t -tests were conducted to determine if there were differences between the transformed and non-transformed primary outcome variables. There was no change in the significance for any of the t -tests. There were no differences in transformed and non-transformed correlations for the AA sample. For the EA sample, the transformed BAI was no longer correlated with the SSMI. All other measures met assumptions of normality. Therefore, for ease of mean interpretation, the non-transformed results are presented. Mean and standard deviation for each measure are reported in Table 2.

Mean Comparisons

First, independent samples t -tests were conducted to determine the extent to which each risk/protective factor and anxiety differed between AAs and EAs (see Table 2). Related to anxiety, it was expected that AAs would self-report lower levels of anxiety on the State Trait Anxiety Inventory (STAI) and Beck Anxiety Inventory (BAI) than EAs. The t -test results showed no significant differences between the groups on the Beck Anxiety Inventory, STAI-Trait, or STAI-State.

Regarding risk factors, it was expected that AAs would report greater experiences of discrimination, stigma toward mental illness, and somatic symptom focus than EAs. The t -test results showed a significant difference between the groups on the Everyday Discrimination Scale, with AAs reporting greater incidents of discrimination than EAs. There were also significant differences between the groups on the Days Mental Illness Stigma Scale with AAs reporting greater public stigma toward mental illness than EAs, but no significant differences were found between the groups on the Self Stigma of Mental Illness scale, which is an assessment of self-

stigma. Finally, the groups did not differ in their endorsement of somatic symptoms on the Body Sensations Questionnaire.

Regarding protective factors, it was expected that AAs would have higher ethnic identity and greater religiosity scores than EAs. The *t*-test results showed a significant difference between the groups on the Multiple Group Ethnic Identity Measure, such that AAs reported greater ethnic identity than EAs. AAs also reported engaging in more positive religious coping and reported higher levels of spirituality than EAs. Interestingly, it was expected that AAs would engage in less negative religious coping than EAs, but results showed that AAs engaged in negative religious coping more often than their EA counterparts.

Correlations

Bivariate correlation analyses were conducted to determine the associations between the sociocultural risk and protective factors with anxiety in both the AA and EA samples. Two scales were used to assess both public (Day's Mental Illness Stigma Scale) and self-stigma (Self Stigma of Mental Illness scale). For AAs, the Day's Mental Illness Stigma Scale was significantly and positively related to the Beck Anxiety Inventory, STAI-State, and STAI-Trait. All of these anxiety measures were unrelated to the Day's Mental Illness Stigma Scale in EAs. Regarding self-stigma in AAs, the Self-Stigma of Mental Illness scale was unrelated to all of the anxiety measures. The opposite was found in EAs, such that the Self-Stigma of Mental Illness Scale was positively associated with all of the anxiety assessments. These findings indicate the hypotheses were partially confirmed. As expected, it appears that greater public stigma in AAs was associated with increased anxiety but unrelated to anxiety in EAs. However, self-stigma in EAs was associated with increased anxiety and not associated with anxiety in AAs.

Correlational analyses showed that greater experience of discrimination was associated with higher levels of anxiety in both AAs and EAs. Fisher r-to-z transformations were used to determine if there was a significant difference between the strength of these correlations, but no difference was found ($z = -.75, p = .45$). Therefore, the hypothesis that discrimination would be associated with greater anxiety in AAs compared to EAs was not confirmed.

The results showed significant associations between anxiety and somatic symptoms focus in both EAs and AAs. No difference was found between the groups in the strength of the associations ($z = -.83, p = .41$). Thus, the hypothesis that somatic symptom focus would be associated with greater anxiety in AAs compared to EAs was not confirmed.

For both groups, the Intrinsic Spirituality Scale was not associated with any of the anxiety measures. The positive religious coping scale was only correlated with the Beck Anxiety Inventory for AAs, such that greater use of positive religious coping was associated with more anxiety. None of the other anxiety assessments were significantly correlated with the positive religious coping scale for AAs. The positive religious coping scale was unrelated to all of the anxiety assessments for EAs. In both groups, the negative religious coping scale was associated with all of the anxiety measures, such that increased use of negative religious coping was associated with greater anxiety. Fisher r-to-z transformations found no significant difference in the strength of the associations between anxiety and negative religious coping between the groups (Beck Anxiety Inventory: $z = -.22, p = .82$; STAI-State $z = -.29, p = .77$; STAI-Trait: $z = -.16, p = .87$). As such, these findings do not support the hypothesis that spirituality and positive religious coping would serve as a protective factor against anxiety in AAs. Unexpectedly, positive religious coping was associated with more anxiety in AAs. Additionally, negative religious coping was associated with increased anxiety for both groups.

For both groups, correlational analyses revealed that ethnic identity was unrelated to all of the anxiety assessments for AAs and EAs. Thus, the hypothesis that increased ethnic identity in AAs would be associated with less anxiety was not confirmed. As expected, ethnic identity was unrelated to anxiety in EAs.

Partial Correlations

Research shows that depression and anxiety are highly correlated (Dobson, 1985). Thus, the Center for Epidemiological Studies - Depression (CESD) scale was included in this study as a potential covariate. Indeed, the CESD was correlated with all of the anxiety assessments (i.e., Beck Anxiety Inventory, STAI-State, STAI-Trait) for both EAs and AAs ($ps < .05$). As such, partial correlations were conducted controlling for the CESD in AAs and EAs (Tables 3 and 4).

When partial correlations were conducted, there were several changes in the associations between the anxiety assessments and risk factors. For both groups, generally the strength of the associations between anxiety and the sociocultural factors became weaker. Several of the significant associations between anxiety and the sociocultural risk and protective factors became non-significant. Only in 1 case did controlling for depression significantly strengthen the relation.

Notably, for AAs several non-significant associations between the STAI-State and STAI-Trait and the sociocultural risk and protective factors became significant when depression was included as a covariate. Specifically, the Positive Religious Coping Scale was significantly negatively correlated with the STAI-State ($r = -.26, p = .001; z = 1.53, p > .05$) and STAI-Trait ($r = -.24, p = .003; z = 1.78, p > .05$). The Intrinsic Spirituality Scale also became significantly negatively associated with the STAI-State ($r = -.19, p = .02; z = .8, p > .05$). Also, the Multiethnic Identity Measure became significantly negatively associated with the STAI-State (r

= $-.17, p = .23$; $z = .27, p > .05$) and STAI-Trait ($r = -.21, p = .01$; $z = .45, p > .05$). However, Fisher r-to-z transformations showed that the change in strength of these relations were non-significant.

For EAs, several non-significant associations between the STAI-Trait and the sociocultural risk and protective factors became significant when depression was included as a covariate. Specifically, the Day's Mental Illness Stigma Scale, which is an assessment of public stigma, became significantly negatively correlated with the STAI-Trait ($r = -.19, p = .01$; $z = -2.15, p < .05$). The Intrinsic Spirituality Scale became significantly negatively associated with the STAI-Trait ($r = -.20, p < .01, z = 1.59, p > .05$). Additionally, the Multiethnic Identity Measure became significantly negatively correlated with the STAI-Trait ($r = -.21, p < .01, z = -.95, p > .05$). Fisher r-to-z transformations showed that the change in strength of these relations were only significant for the relation between the STAI-Trait and the Day's Mental Illness Stigma Scale.

Structural Equation Modeling

Structural equation modeling was used to assess how the sociocultural risk and protective factors uniquely accounted for anxiety outcomes in the sample. Model fit was evaluated based on the following criteria: non-significant chi-square indicating that the saturated and non-saturated model are similar, $RMSEA \leq .06$, $CMIN/DF \leq 3.00$, and $CFI \geq .95$. First, a measurement model was estimated to determine if the measures loaded onto their respective latent variables: sociocultural risk factors (Everyday Discrimination, Body Sensations Questionnaire, Self Stigma of Mental Illness, Days Stigma Scale), sociocultural protective factors (Multiethnic Identity Measure, Intrinsic Spirituality Scale, and Positive Religious Coping), and anxiety (Beck Anxiety Inventory and State -Trait Anxiety Inventory) (see Figure 1).

IBM SPSS Statistics Version 21 AMOS was used for the analyses. Bootstrapping with 5000 samples and 95% confidence intervals were used to reduce the effects of non-normal data. The initial model had a chi square of $X^2(32) = 203.57, p < .001$. The fit indices, CMIN/DF = 6.36, CFI = .88, and RMSEA = .13, did not indicate a good fit between the model and the observed data. Standardized parameter estimates for the initial measurement model are provided in Figure 1; unstandardized estimates and standardized confidence intervals and standard error are shown in Table 5.

Due to the poor fit, modification indices were reviewed to improve the measurement model. There were several modification indices noted; however, only suggestions that were theoretically sound were utilized. A modification to covary the errors for the two stigma scales (Self Stigma of Mental Illness and the Day's Mental Illness Stigma scale) was made. Given that both of these scales assess stigma, this modification was implemented. Again, bootstrapping with 5000 samples was used to reduce the effects of non-normal data. The results of these modifications did not improve the model fit, $X^2(31) = 197.19, p < .001$, CMIN/DF = 6.36, CFI = .88, and RMSEA = .13 (see Figure 2). Overall, there was no change in the Chi-square significance or any of the fit indices. As such, the model was still a poor fit.

Further investigation of the original model indicated that the Self Stigma of Mental Illness scale standardized estimate was at .22. Latent variables with loadings less than .4 may indicate the measured variable does not adequately describe the latent variable. The Self Stigma of Mental Illness scale was removed from the model. As such, the Self Stigma of Mental Illness scale and Day's Stigma scale were no longer made to covary. Again, bootstrapping with 5000 samples and 95% confidence intervals were used to reduce the effects of non-normal data.

Overall, the model continued to be a poor fit, $\chi^2(24) = 185.11, p < .001$, CMIN/DF = 7.71, CFI = .88, and RMSEA = .14 (see Figure 3).

Even though the measurement model was a poor fit, a structural model was completed, as planned in the dissertation proposal. As in the measurement model, the latent risk variable was created from the Everyday Discrimination Scale, Body Sensations Questionnaire, the Self Stigma of Mental Illness Scale, and the Day's Stigma toward Mental Illness Scale; the latent protective variable was created from the Multi-Ethnic Identity Measure, the Intrinsic Spirituality Scale, and the Positive Religious Coping Scale. As was hypothesized in the proposal, race (dummy coded as AAs = 1 and EAs = 0) was included as a predictor of the risk/protective factors. In turn, the risk/protective variables were expected to relate to the anxiety latent variable. It was expected that race would be associated with the risk and protective variables and that these variables would be associated with anxiety outcomes. Because the depression measure (CESD) was correlated with the anxiety assessments, it was included as a covariate and set to predict the anxiety latent variable. However, given the results of the measurement model, a poor model fit was expected. IBM SPSS Statistics Version 21 AMOS was used for the analyses. Bootstrapping with 5000 samples and 95% confidence intervals were used to reduce the effects of non-normal data. The full model was a poor fit, $\chi^2(51) = 443.91, p < .001$, CMIN/DF = 8.70, CFI = .79, and RMSEA = .15 (see Figure 4). As the modification indices and removal of the Self-Stigma of Mental Illness Scale did not improve the model fit, these changes were not made in the structural model.

Overall, both the measurement and structural models were a poor fit. However, there were some interesting findings (even though the model was not a good fit). As hypothesized, race was significantly associated with the risk and protective factor latent variables. This suggests that

race is related to the various factors that load onto these latent variables. Similarly, as predicted, the protective factors latent variable (ethnic identity, positive religious coping, spirituality) was significantly negatively associated with the anxiety latent variables. However, the risk factors latent variable was not significantly associated with the anxiety latent variable.

Discussion

Previous research has shown that AAs tend to have lower rates of anxiety but greater symptom severity and chronicity when compared to EAs (Breslau, Kendler, Su, Gaxiola-Aguilar, & Kessler, 2005; Himle, Baser, Taylor, Campbell, & Jackson, 2009; Sibrava et al., 2013). The present study investigated whether several hypothesized risk and protective sociocultural factors were uniquely related to anxiety outcomes in African Americans compared to European Americans in a non-clinical community sample. Several hypotheses were identified to test possible associations between the factors and anxiety. As the risk and protective factors were specifically identified to affect AA anxiety outcomes, it was generally expected that AAs would report higher levels in all of these domains. Moreover, it was expected that higher reports on these risk and protective factors would be associated with anxiety in AAs, but unrelated or less strongly related in EAs. Overall, the groups generally did not differ in self-reported levels of anxiety, but AAs reported more discrimination, public stigma, religiosity/spirituality, and ethnic identity than EAs. However, these sociocultural factors were not necessarily uniquely associated with anxiety outcomes in AAs compared to EAs. Rather many of the factors appeared to be similarly related to anxiety for both groups. Thus, while AAs may report higher levels of the risk and protective factors, in this non-clinical community sample, it does not appear that the factors uniquely related to anxiety in African Americans compared to European Americans.

Anxiety and Race

It was hypothesized that AAs would report lower levels of anxiety than EAs; however, mean comparisons showed there were no significant differences between the groups. These results may be due to the generally healthy sample utilized in this study. In research with clinical samples, AAs tend to report lower levels of anxiety disorders than EAs (Asnaani, Richey, Grant et al., 2005; Kessler et al., 2005). However, in research with non-clinical samples differences in self-reported anxiety is less consistent, though EAs often indicate higher levels of anxiety than AAs (Chapman & Woodruff-Borden, 2009; Melka, Lancaster, Adams, Howarth, & Rodriguez, 2010; Williams, Chapman, Wong, & Turkheimer, 2012). Thus, the non-significant differences between the groups may be due to the non-clinical nature of the sample. Indeed, because of the non-clinical sample, the study may more aptly assess for prevalence rather than severity. That is, because the sample was taken from a non-clinical population, the levels of severity are based on the number of participants with significant anxiety symptoms. Thus, prevalence of anxiety in the sample is important to consider when interpreting the severity of anxiety found in study participants.

Stigma

As hypothesized, AAs reported more public stigma than EAs, which is supported by the literature (Anglin, Link, & Phelan, 2006; Masuda et al., 2009; Rao, Feinglass, & Corrigan, 2007). However, there was not a significant difference between the groups with regard to self-stigma toward mental illness. Only two studies were found that specifically investigated self-stigma in an AA and EA sample. One study found AAs reported more self-stigma (Conner et al., 2010) and the other found no difference between the groups with self-stigma (Jimenez, Bartels,

Cardenas, & Alegria, 2013). However, the findings of these studies may not generalize to the current study sample because the participants were older adults and the AA participants in the Jimenez et al. (2013) study were actively receiving mental health treatment. Regardless, this non-significant difference between the groups is interesting and adds additional evidence to this area of research.

Greater self-stigma was not associated with increased anxiety in AAs but was significantly associated in EAs. Greater public stigma was associated with more anxiety in AAs, but not in EAs. Therefore, the hypotheses were partially confirmed. As expected, public stigma was associated with anxiety in AAs but not in EAs. Interestingly, self-stigma was not correlated with anxiety in AAs, but was in EAs. As indicated above previous research has found inconsistent findings related to self-stigma in AAs. Potentially, self-stigma is less impactful for anxiety in a community sample of AAs. Because there are few studies that have investigated differences in self-stigma in AAs and EAs, it is difficult to draw firm conclusions about these findings. Future studies should continue to investigate the associations between self-stigma and public stigma in both groups to determine if these findings are replicated. Studies should also include additional variables that may explain these relations (e.g., self-efficacy, self-confidence, collectivism/individualism).

Discrimination

As hypothesized AAs reported greater experiences of discrimination than EAs. This result is consistent with previous research, which indicates that AAs tend to report more experiences of perceived discrimination than EAs (e.g., Corrigan et al., 2003; Levine et al., 2014; Soto et al., 2011). It was also expected that experiences of discrimination would be associated with anxiety outcomes in AAs but that this relation would be non-significant or less strong in

EAs. However, experiences of discrimination were associated with anxiety in both AAs and EAs. Furthermore, there was no difference in the strength of the association between the groups.

There is evidence that regardless of ethnic or racial group, greater experiences of discrimination are associated with higher levels of anxiety (Levine et al., 2014). However, the effects of discrimination may affect AAs more often. One study found that about 25% of AAs reported “often” experiencing discrimination while less than 5% of EAs reported “often” experiencing discrimination (Kessler, Mickelson, & Williams, 1999). Because AAs tend to report more instances of discrimination than EAs, it is likely that AAs will more often face the effects of discrimination than their EA counterparts. Therefore, the finding that EAs and AAs have similar associations between anxiety and discrimination does not necessarily mean it affects both groups equally. Other studies have found that *racial* discrimination was associated with an anxiety disorder diagnosis in AAs but not EAs (Soto, Dawson-Andoh, & BeLue, 2011). In the current study, non-identified (i.e., for any reason) experiences of discrimination were investigated. Future studies should consider the various reasons for discrimination to determine if there are differences in the relation between types of discrimination and anxiety by group. Another explanation for these findings may be due to the non-clinical sample. The previous work investigated the associations between discrimination and a specific anxiety disorder diagnosis (i.e., social anxiety disorder and generalizing anxiety disorder) (Levine et al., 2014; Soto, Dawson-Andoh, & BeLue, 2011). Therefore, the results found in the current study with a non-clinical sample, may be different than results found if a clinical sample was utilized.

Overall, the hypothesis that AAs report more experiences of discrimination was confirmed. However, the hypothesis that experiences of discrimination would be more strongly related to anxiety in AAs compared to EAs was not confirmed. While there are negative

outcomes for both groups, AAs are more likely to experience discrimination than EAs (e.g., Corrigan et al., 2003; Levine et al., 2014; Soto et al., 2011), which could possibly increase the likelihood of negative outcomes occurring for this group. Future studies should continue to investigate the relation between discrimination and anxiety in AAs and EAs. Specifically, researchers may want to consider if there are differences in a clinical vs. non-clinical anxiety levels and if the type of discrimination affects the groups differently.

Somatic Symptom Focus

It was hypothesized that greater focus on physical symptoms would be associated with increased anxiety in AAs, but this relation would be less strong or non-significant in EAs. Contrary to expectations, there was no difference in scores on this measure found between EAs and AAs. Additionally, the Body Sensations Questionnaire was also positively associated with all of the anxiety assessments for both groups, and correlations were especially strong with the Beck Anxiety Inventory.

There are several possibilities that may explain the non-significant differences between the groups. Hunter and Schmidt (2010) hypothesized that due to increased prevalence of physical illnesses in AAs, AAs may give more attention to physiological responses to anxiety compared to EAs. Two studies showed that AAs reported more physical anxiety symptoms during a panic attack than their EA counterparts (Horwath, Johnson, & Hornig, 1993; Smith, Friedman, & Nevid, 1999). In the current study, a non-clinical sample was utilized, which might explain the non-significant differences between the groups. However, one study found that AAs reported more anxiety after a physical anxiety induction in a non-clinical college sample than EAs (Gordon et al., 2014), though there were no differences in physiological response to the stressor. Thus, with the small body of literature and inconsistent findings, it is difficult to draw

firm conclusions about the results in the current sample. Future studies are necessary to replicate these findings. As the work with clinical samples has only found differences in panic disorder, future research utilizing a clinical sample should determine if AAs report more physical symptoms than EAs with other anxiety disorders.

Another important consideration that may have affected the results is the assessment used to measure physical symptoms focus. The Body Sensations Questionnaire assesses how frightened respondents are to the physical symptoms of anxiety they may experience. The BSQ was highly positively correlated with the anxiety measures for both groups, in particular with the Beck Anxiety Inventory. Inspection of the items on the Body Sensations Questionnaire and Beck Anxiety Inventory show similarity between these two measures. Possibly, individuals who report high fear of physical anxiety symptoms also tend to report more anxiety in general and therefore the scales were highly correlated in both groups. Thus, future studies might consider the use of an assessment that focuses on attention to physical symptoms more broadly, without restricting it to fear of physical symptoms that occur when feeling anxious.

Overall, the hypotheses were not confirmed. There was no difference between the groups in self-reported somatic symptom focus. Additionally, the associations between anxiety and the physical symptom focus were significant for both groups. However, the associations were in the expected directions (i.e., greater physical symptom focus associated with increased anxiety). The use of a non-clinical sample and assessment that measures fear of physical anxiety symptoms may have contributed to the non-significant findings. Future studies should continue to assess the relation between somatic symptom focus and anxiety in a clinical sample to confirm these non-significant relations.

Religious Coping/Spirituality

It was hypothesized that AAs would report greater levels of religiosity and spirituality than EAs. As expected, AAs reported a greater use of positive religious coping as well as spirituality than EAs. Interestingly, AAs reported more use of negative religious coping than EAs, which is contrary to what previous research has found.

Chapman and Steger (2010) showed in a college sample that AAs used significantly more positive religious coping and significantly less negative religious coping than EAs. These differences in results may be explained by differences in the scale reliability of the Chapman and Steger (2010) study and the present study. The reliability of the negative religious coping scale in the Chapman study was in the questionable range for EAs (.68) and the acceptable range for AAs (.73). In the present study, the reliability for each sample was excellent (.97 and .92, respectively). Thus, the use of the negative religious coping scale in the current study may more accurately portray use of negative religious coping, which could explain the discrepant findings. Another consideration is the participants in the present study were drawn from a community sample and were about 15 years older than the college sample in the Chapman and Steger (2010) study. That is, the age and life circumstance differences between the two study samples may explain the differing results. Of note, one study found in a mixed race sample that college students reported significantly lower positive and negative religious coping than elderly hospital patients (Pargament, Koenig & Perez, 2000). Therefore, participant age and current life circumstance may affect the use of religious coping styles.

Furthermore, it was expected that greater religiosity/spirituality would be associated with less anxiety in AAs, but unrelated to or less strongly related in EAs. Contrary to hypotheses the Positive Religious Coping Scale was positively correlated with anxiety in AAs, but only with the Beck Anxiety Inventory. That is, AAs who reported more positive religious coping also reported

more anxiety. One possible explanation for this finding may be due to the greater use of any religious coping style in AAs compared to EAs. Potentially, AAs who reported more negative religious coping also reported more positive religious coping. Thus, the positive association between the positive religious coping scale and the Beck Anxiety Inventory may be attributable to the use of negative religious coping in AAs. Positive religious coping was not associated with any of the other anxiety assessments in AAs or EAs.

Similarly, Intrinsic Spirituality was not correlated with any of the anxiety assessments. Few studies have assessed the relation between spirituality and anxiety in AAs and EAs, and the relation to spirituality and anxiety in these groups is unclear. For example, one study showed that AAs reported greater spirituality and less anxiety than EAs; however, no correlational analyses were conducted to determine associations between anxiety and spirituality (Haley et al., 20004). A second study found greater spirituality in AAs compared to EAs, but no difference in anxiety levels between the groups, and no correlations between spirituality and anxiety were reported (Ghafoori, Barragan, Tohidian, & Palinkas, 2012).

Thus, the current study does not confirm the hypothesis that increased positive religious coping and spirituality are associated with less anxiety in AAs. However, this work adds to the literature by directly showing the non-significant associations between these variables, which suggests these factors may not be protective against anxiety for AAs.

Ethnic Identity

As expected, AAs reported significantly greater ethnic identity than EAs, which aligns with previous research (Carter et al., 2001; Williams et al., 2012). However, contrary to hypotheses, ethnic identity was not correlated with anxiety in AAs. As expected, ethnic identity and anxiety were not associated in EAs. Two studies have shown that ethnic identity is related to

lower anxiety in AAs (Carter et al., 2001; Williams et al., 2012). Furthermore, in both of these studies, ethnic identity was unrelated to anxiety or associated with increased anxiety in EAs. One explanation for the non-significant associations between anxiety and ethnic identity in AAs may be due to differences in the sample age compared to previous studies. In both studies noted above, the mean age of the participants was at least 10 years younger than the current sample mean age. Potentially, as individuals age the effect of ethnic identity as a protective factor against anxiety may weaken. However, much of the research on ethnic identity is in adolescents and college students and no studies were found that showed decreases in the effects of ethnic identity as people age. Thus, future studies are necessary to confirm possible this hypothesis.

Overall, the study results confirm the hypothesis that AAs report higher levels of ethnic identity than EAs. Contrary to expectations, there was no association between anxiety and ethnic identity in AAs. As little research has been conducted in this area, future studies should continue to explore the relation between ethnic identity and anxiety in AAs to determine if these study results replicate. Future studies should also consider using an older and younger sample, to determine if ethnic identity is a protective factor against anxiety as people age.

Depression Covariate

Due to the significant correlations between depression and anxiety, depression was used as a covariate in the partial correlations. The effect of controlling for depression resulted in no change in direction and generally weaker relations between anxiety and the sociocultural factors. Because anxiety and depression are highly correlated (as seen in this study), when depression was controlled for in the partial correlations, the overlapping variance attributable to anxiety was likely removed. As a result, the relations between these variables were weakened.

However, several variables became significantly associated when depression was controlled for in the partial correlations. In both EAs and AAs, these changes in significance occurred with the STAI-Trait or STAI-State scales. Research has suggested that the STAI may not be effective in differentiating between those with anxiety or depressive disorders (Kennedy, Schwab, Morris, & Beldia, 2001). As such, the STAI scales may be assessing a combination of anxiety and depression, rather than only anxiety. Therefore, when depression was controlled for in the analyses with the STAI, the STAI may assess anxiety more accurately than when depression is not controlled for.

For AAs, negative correlations were found between the STAI-State and STAI-Trait with the Positive Religious Coping Scale and Ethnic Identity. Furthermore, the STAI-State became significantly negatively associated with the Intrinsic Spirituality Scale. These findings are in the hypothesized direction indicating that more engagement in these factors is associated with less anxiety. For EAs, ethnic identity and spirituality became significantly negatively associated with the STAI-Trait. The relation between ethnic identity is particularly interesting as previous research has not shown ethnic identity to be a protective factor in EAs. Future studies assessing the relation between anxiety and these sociocultural factors should consider using another assessment of anxiety to ensure consistent findings. This may particularly important when investigating the relation between protective factors and anxiety, as the changes only occurred with the protective factors in the current study.

Structural Equation Modeling

Structural equation modeling was conducted to examine the relations between the risk/protective factors and anxiety and the influence of race on these relations. Latent variables were created with the intention of representing each of the risk and protective factors and anxiety.

Unfortunately, the measurement model was a poor fit though several modifications were made to improve the fit. Some aspects of the model likely contributed to the non-significant findings. First, bivariate correlations showed that none of the sociocultural protective factors were correlated with anxiety or were correlated with anxiety in the unexpected direction (i.e., Beck Anxiety Inventory positively associated with the Positive Religious Coping Scale in AAs). When depression was included as a covariate some of the associations became significant, but these changes were not consistent across the different measures of anxiety. There were significant associations between the risk factors and anxiety; however, these relations were weakened when depression was included as a covariate. As such, the risk and protective factors were not consistently associated with the anxiety outcomes. Second, the protective and risk factors did not all strongly load onto their respective latent variable, which may have reduced the overall validity of the latent variables. Third, the sample size may have been too small for the model. Kline (2011) recommends that studies using structural equation modeling have at least 10 (but preferably 20) participants for each estimated parameter in the model. The number of estimated parameters in the current study was 36. Kline (2011) notes that as the ratio between sample size and estimated parameters decreases, so does the “trustworthiness of the results” (pp. 12). As such, the poor model fit of the sociocultural factors may partially be due to small sample size. Future studies should consider including different or additional assessments of the risk and protective factors to strengthen the fit of the latent variables. Also, to ensure stability of the model, it is recommended that future studies employ at least a 10:1 but preferably 20:1 ratio (cases to estimated parameter) to guide sample size.

Study 2

The purpose of study two was to experimentally induce an anxiety-like state through a worrying task to determine the extent to which risk (i.e., discrimination, somatic symptom focus, stigma toward mental illness) and protective factors (i.e., ethnic identity and religiosity) related to anxiety in AAs and EAs. That is, an anxiety-like state was induced to determine whether these sociocultural factors facilitate or attenuate a stress response. Another goal of study two was to take a multimethod approach to assessing anxiety, rather than just relying on self-report measures. Thus, physiological measures were incorporated into the study.

A general methodological issue that could contribute to some of the race-based differences in anxiety is the use of self-report measures. Self-report measures can be problematic, as individuals may not respond honestly or may interpret questions and response options differently (Heurtin-Roberts, Snowden, & Miller, 1997). Dishonest responding, or self-concealment, can be especially problematic in mental health research, as individuals may choose not to report symptoms due to stigma toward mental illness and potential group ostracism (Conner, Koeske, & Brown, 2009; Masuda, Anderson, & Edmonds, 2012). Conversely, some may over report symptoms in order to gain attention or more treatment (Kessler, Wittchen, Abelson, & Zhao, 2009). Given that AAs tend to report more stigma toward mental illness, it is necessary to consider that AAs may underreport symptoms of anxiety resulting in lower rates, but more chronic anxiety. When participants do not respond to an assessment honestly or interpret the items differently, the results may be invalid. One way to help reduce this problem is to assess the construct using other methods in addition to self-report. Combining physiological assessments with traditional self-report assessments provides researchers with greater information that can be used to better understand the construct (Blascovich, 2000). Thus, in the

current study, heart rate, heart rate variability, and cortisol were used as non-self report measures of stress following a worry induction.

Heart rate variability (HRV) measures the interaction between the parasympathetic and sympathetic nervous system on heart rate (Appelhans & Luecken, 2006). A meta-analysis of resting-state HRV showed that those with anxiety disorder diagnoses have lower HRV than healthy controls (Chalmers, Quintana, Abbott, & Kemp, 2014). Kawachi, Sparrow, Pantel, Vonkas, and Weiss (1995) found that participants with lower HRV had increased levels of phobic anxiety. Another study showed that individuals diagnosed with generalized anxiety disorder, social anxiety disorder, and panic disorder exhibited lower HRV than healthy controls during a hyperventilation task (Pittig, Arch, Lam, & Craske, 2013). Thus, HRV is a useful tool to assess physiological response to anxiety-related experiences.

Cortisol is another physiological assessment that has been found to relate to anxiety. One study found that individuals with generalized anxiety disorder had significantly higher baseline cortisol levels than control participants (Mantella et al., 2008). Takahashi et al. (2005) found that cortisol at baseline and post anxiety induction was associated with trait anxiety in participants. Several other studies have investigated cortisol levels after an anxiety induction. Condren, O'Neill, Ryan, Barrett, and Thakore (2002) found that after a social evaluative stressor and a mental math task, participants with social anxiety disorder exhibited higher levels of cortisol than controls. Alpers, Abelson, Wilhelm, and Roth (2003) showed that individuals with driving phobia experienced significantly greater cortisol responses after driving than controls. These studies indicate that cortisol can be a helpful tool in measuring physiological response to anxiety-provoking situations that are not biased in the same way self-report measures may be.

In this study, worry (a component of anxiety) was experimentally induced to directly measure the associations between worry and sociocultural risk and protective factors. To reduce potential issues with self-reported anxiety due to stigma or differential interpretation, physiological assessments of stress were collected before and after the worry induction. Participants also completed self-report assessments of anxiety, sociocultural risk, and sociocultural protective factors. Several hypotheses were tested.

Hypothesis 1: The sociocultural risk factors for anxiety (i.e., stigma, discrimination, and somatic symptom focus) would be associated with a stronger reaction to the worry induction in AAs. That is, AAs with greater risk factors would exhibit a greater increase in heart rate (HR) from baseline to worry induction and their HR would decrease less over time, indicating lower HRV. Similarly, AAs with greater risk factors would exhibit a greater increase in cortisol levels from pre- to post-worry induction. Also, self-reported anxiety would be positively associated with discrimination and negatively associated with stigma in AAs. These sociocultural risk factors would be unrelated or less strongly related to HR, HRV, cortisol, or self-reported anxiety in EAs.

Hypothesis 2: The sociocultural protective factors (i.e., ethnic identity, religiosity) would be associated with a weaker reaction to the worry induction in AAs. That is, AAs with greater protective factors would exhibit a smaller increase in heart rate (HR) from baseline to worry induction and their HR will decrease more quickly over time, indicating higher HRV. Similarly, AAs higher in religiosity and ethnic identity would have a smaller increase in cortisol from pre- to post-worry induction. Self-reported anxiety would be negatively associated with both religiosity and ethnic identity. These protective risk factors would be unrelated or less strongly related to HR, HRV, cortisol, or self-reported anxiety in EAs.

Method

Participants

Participants were recruited through advertisements posted on community bulletin boards around Morgantown, WV, online advertisements (e.g., Craigslist), and through the WVU SONA system. Based on a power analysis with $\alpha = .05$ and $\beta = .20$, a minimum of 82 participants (41/group) were needed to detect a medium effect size (G*Power: Faul, Erdfelder, Buchner, & Lang, 2009). A matching process was conducted to ensure equal numbers of EAs and AAs were enrolled throughout the study. For example, if five EA participants were enrolled in the study, efforts were made to enroll five AA participants before adding additional EA participants. Thus, over the year of data collection, similar numbers of both EA and AA participants were enrolled. One hundred and two participants completed the study. Two participants were removed due to a computer program error, which led to the data being saved incorrectly. As the purpose of this study was to assess similarities and differences in African American and European American anxiety, only individuals who self-identified in one of these groups were included in the study. Thus, the same exclusionary criteria used in Study 1 were used in Study 2. Three participants were excluded, because they did not identify as AA or EAs. Nine participants were excluded because they identified as more than one race (i.e., participants identified as EA and AA). Participants who did not identify as United States citizens were also excluded; three of the participants already excluded also identified as non-US citizens. Thus, the final sample included 45 African Americans (73% female; $M_{age} = 23.20$ years, $SD = 6.37$) and 44 European Americans (69% female; $M_{age} = 23.51$ years, $SD = 7.07$) (see Table 6 for additional participant demographics).

Participants were asked if they had taken hypertension medication, stimulants, benzodiazepines or if they had smoked within 1 hour of the study, because these factors may have affected the physiological measures. Three participants reported taking a stimulant medication the day of the study (Vyvanse or Ritalin). No participants reported taking benzodiazepines the day of the study. Four participants reported being current smokers, but only one had smoked a cigarette within one hour of study initiation. These participants were assessed to determine if any were outliers in HR, HRV, and cortisol. None of the participants were, thus, these participants were included in the final sample.

Self-Report Measures

Beck Anxiety Inventory (BAI; Beck et al., 1988). This is a 21-item measure that assesses anxiety severity. The BAI measures both cognitive (e.g., fear of dying, inability to relax) and physiological symptoms (e.g., feeling dizzy, sweaty palms) of anxiety. Participants rate items on a scale from 0 (*Not at all*) to 3 (*Severely - I could barely stand it*). Summed scores create a range of responses from 0 to 63. Scores between 22 and 35 signify moderate levels of anxiety. Scores of 36 and above denote severe anxiety symptoms (Eack, Singer, & Greeno, 2008). The scale was found to have good reliability (AAs: $\alpha = .93$; EAs: $\alpha = .92$).

State Trait Anxiety Inventory (STAI; Spielberger et al., 1970). This 40-item scale assesses anxiety experienced in the moment (i.e., state anxiety) and general anxiety experienced over time (i.e., trait anxiety). Example items include “I feel calm” and “I feel jittery”. Participants rate each item on a scale from 1 to 4 with higher numbers indicating greater intensity. Scores are averaged with higher scores indicating greater self-reported anxiety. Both the trait (AAs: $\alpha = .93$; EAs: $\alpha = .93$) and state (AAs: $\alpha = .96$; EAs: $\alpha = .95$) subscales had good internal reliability.

Penn State Worry Questionnaire (PSWQ; Meyer, Miller, Metzger, & Borkovec, 1990). This 16-item scale is a general assessment of participant worry. Example items include “My worries overwhelm me” and “I know I should not worry about things, but I just cannot help it”. Participants rate items on a scale from 1 (*not at all typical of me*) to 5 (*very typical of me*). Scores are averaged with higher scores indicating greater self-reported worry. The scale was reliable in both the AA ($\alpha = .94$) and EA ($\alpha = .97$) sample.

Body Sensations Questionnaire (BSQ; Chambless, Caputo, Bright, & Gallagher, 1984). This scale is comprised of 17 items to assess physiological responses to anxiety (e.g., “numbness in arms or legs”). Participants rate items on a scale from 1 (*not at all*) to 5 (*extremely*). The scale was found to have good reliability (AAs: $\alpha = .88$; EAs: $\alpha = .91$).

Perceived Discrimination and Devaluation Scale (Link, 1987). This 12-item measure assesses participant beliefs that others devalue and discriminate against individuals with mental illnesses (e.g., “Most people believe that a former mental patient is just as trustworthy as the average citizen ” and “Most people in my community would treat a former mental patient just as they would treat anyone”). Participants rate items on a scale from 1 (*strongly agree*) to 6 (*strongly disagree*). Five items are reverse scored. Item responses were then averaged with higher scores indicating more beliefs that others hold negative attitudes toward those with mental illness. The scale had good reliability in both the AA ($\alpha = .86$) and EA ($\alpha = .85$) sample.

Self-Stigma of Mental Illness (SSOMI; Tucker et al., 2013). This 10-item scale assesses stigma toward the self about having a mental illness (e.g., If I went to a therapist, I would be less satisfied with myself). Participants rate their responses on a scale from 1 (*strongly disagree*) to 5 (*strongly agree*). Five items are reverse coded, so that higher averaged scores

indicate greater self-stigma toward mental illness. The scale had good reliability (AAs: $\alpha = .92$; EAs: $\alpha = .88$).

Everyday Discrimination Scale (EDS; Williams et al., 1997). This 9-item scale was created to assess everyday experiences of discrimination. Participants are asked to report on a scale of 1 (*never*) to 5 (*very often*), “In your day-to-day life how often have any of the following things happened?” Questions include, “people acting as if you are not smart” and “being treated with less respect than others” (Banks et al., 2006). Scores are averaged with higher scores indicating greater self-reported experiences of discrimination. The scale had good reliability (AAs: $\alpha = .88$; EAs: $\alpha = .85$).

Brief RCOPE (Pargament et al., 2000). This 14-item scale is a shorter version of the 29-item RCOPE scale that is commonly used to assess religious coping. The Brief RCOPE has two subscales: positive coping (e.g., sought God’s love and care) and negative coping (e.g., wondered whether God had abandoned me). Participants respond to the items on a scale ranging from 1 (not at all) to 4 (a great deal). Scores are averaged by subscale, so that higher scores indicate greater positive or negative religious coping. The Positive RCOPE (AAs: $\alpha = .95$; EAs: $\alpha = .98$) subscale and Negative RCOPE (AAs: $\alpha = .82$; EAs: $\alpha = .88$) subscale were both reliable.

Intrinsic Spirituality Scale (ISS; Hodge, 2003). This six-item scale assesses for the salience of spirituality in participant lives. Questions and corresponding responses are presented in sentence completion format. An example item states, “In terms of the questions I have about life, my spirituality answers...” Participants indicate their response on a continuum ranging from 0 = *no questions* to 10 = *absolutely all of my questions*. Each question stem has corresponding response options. Another example item is, “When I think of the things that help me to grow and mature as a person, my spirituality...” Participants respond on a continuum specific to that item,

1 = has no effect on my personal growth to 11 = is absolutely the most important factor in my personal growth. Scores are averaged with higher scores indicating greater spirituality. The scale was reliable in both the AA ($\alpha = .94$) and EA ($\alpha = .96$) sample.

Multiple Group Ethnic Identity Measure (MEIM; Phinney & Org, 2007). This 12-item scale was created to assess ethnic group identification. The MEIM measures both ethnic exploration (e.g., I have often talked to other people in order to learn more about my ethnic group) and commitment (e.g., I feel a strong attachment towards my own ethnic group). Participants rate items on a scale from 1 (strongly disagree) to 5 (strongly agree). Means are calculated for each subscale, with higher scores indicating greater ethnic identity. The scale was had good reliability for AAs ($\alpha = .88$) but questionable reliability for EAs ($\alpha = .66$).

Center for Epidemiologic Studies Depression Scale (CES-D; Radloff, 1977). This 20-item scale assesses depressed mood over the last week. Participants are asked to report how often they have felt each item on a scale from 0 (rarely or none of the time) to 3 (most or all the time). Representative items include “I felt lonely” and “I felt that everything I did was an effort”. This assessment is included as a potential covariate given the comorbidity between depression and anxiety (Hirschfeld, 2001). Scores are averaged with higher scores indicating higher levels of depression. The scale had good reliability (AAs: $\alpha = .88$; EAs: $\alpha = .87$).

Demographics and other information. Participants were also asked to provide their race, gender, education, marital status, income, age, and religious affiliation. Participants also provided health information (i.e., smoking status, height, weight, hypertension/stimulant/benzodiazepine medication use). Individual questions were used to determine previous experiences with mental health services.

Physiological Measures

Heart Rate and Heart Rate Variability. The Polar heart rate monitor is a valid method of assessing HR and HRV (Gamelin, Berthoin, & Bosquet, 2006; Nunan et al., 2008). In the current study, participants were fitted with a Polar heart rate monitor (Polar H7 heart rate sensor and transmitter). The heart rate sensor connected via Bluetooth to a phone application called Elite HRV. This application paired with the heart rate monitor gathered real time data that could be analyzed for heart rate and heart rate variability trends. Data were collected continuously throughout the study and broken into three phases (i.e., baseline, worry, and relaxation). All three phases took place in individual rooms in a larger lab space (i.e., 4x4ft rooms in the Shook research lab space). Participants were seated throughout all phases. During the baseline phase, participants watched a 10-minute nature video. Next, participants completed the worry phase, in which they were asked to worry for 10 minutes about personal issues that are currently causing them anxiety. The final phase was the relaxation phase; during this phase, participants were told to relax as they normally would for 10 minutes.

The KUBIOS software (Niskanen, Tarvainen, Ranta-aho, & Karjalainen, 2002) was used to interpret data provided by the Polar H7 heart rate monitor and transmitter. Heart rate variability was measured by the Root Mean Square of Successive Differences (RMSSD), which is a time-domain measurement used to assess differences between RR intervals (or beat-to-beat intervals in heart beat). This is commonly used in the assessment of HRV in anxiety (Chalmers, Quintana, Abbott, & Kemp, 2014). Mean HR and HRV for the first five minutes of each time phase (i.e., baseline, worry induction, and relaxation) were analyzed. This time segment was chosen based on a small pilot sample, in which participants indicated that they typically sustained “worry” for five minutes before they began problem solving or letting their mind

wander. As such, to avoid any reduction of the worry effects, the data from the first five minutes of each phase was aggregated to create a mean score.

Salivary Cortisol. Cortisol initially increases upon wakening then declines throughout the day (Edwards, Clow, Evans, & Hucklebridge, 2001; Kirschbaum & Hellhammer, 2000). To reduce effects of the natural cycle of cortisol, all data was collected between 4pm - 8pm. Saliva samples were taken from participants before the worry induction and 20 minutes after the worry induction ended. The time for the second saliva sample was based on previous studies that have assessed cortisol after a lab-induced stressor (Kirschbaum, Pirke, & Hellhammer, 1993). To gather saliva samples, participants used a Salivette device (i.e., a capped tube that contains a sponge to absorb saliva). Participants were told to open the Salivette device, place the sponge in their mouth, and gently chew on it for one minute (this was timed by the research assistant). After one minute, the participants were told to place the sponge back into the Salivette container and to close it. Saliva samples were stored in a refrigerator at 5 °C within 24 hours of collection. All saliva samples were centrifuged and placed in a freezer at – 80 °C within 1 month of data collection. Cortisol can be stored up to one week at room temperature (Morris, Cohen, Andrew, & Brown, 2002) and three months at 5 °C (41 °F) (Garde & Hansen, 2005). It is recommended that for long-term storage, the saliva samples should be kept in a freezer of – 40 °C or – 80 °C (Chiappin, Antonelli, Gatti, & De Palo, 2007). Cortisol samples were defrosted and an assay was conducted to determine cortisol levels in the saliva sample. The R&D Systems Cortisol Assay ELIZA kit was used for cortisol analysis.

As per ELIZA kit instructions, a competitive binding method was used to determine cortisol levels in the saliva samples. To prepare the samples for analysis, the samples were diluted 5-fold as was indicated in the instruction manual. Samples were run in duplicate to

ensure accurate measurements of cortisol per participant for the two time points (pre- and post-induction). Mean scores of these duplicate samples were used to determine the cortisol level for the participants at each time point. As indicated in the instruction manual, a standard curve was calculated from cortisol provided in the kit. The standard curve is used to determine cortisol levels in the samples. A portion of the samples fell below the standard curve indicating low cortisol concentration in the samples. R&D Systems was contacted and it was determined that the recommended saliva dilution level provided in the kit (5-fold dilution) was too high, which resulted in over diluted samples. Due to lack of samples and funds, the saliva samples were unable to be re-analyzed with a lower dilution level. Samples that fell below the standard curve were replaced with the lowest concentration levels on the standard curve to allow the low samples to be interpreted.

Worry Induction

Based on the results of Verkuil, Brosschot, Borkovec, and Thayer (2009), a worrying task was chosen to induce an anxiety-like state. Verkuil et al. (2009) found that thinking about worrisome topics were associated with tension and anxiety, whereas cognitive problem solving tasks were not. Therefore, the same worrying task used in the Verkuil et al. paper was used in the current study. Participants were provided with a piece of paper and instructed to write down three things that are currently causing them anxiety. Participants were then asked to spend ten minutes thinking about their worrisome topics. As in the Verkuil study, a relaxation phase of ten minutes followed the worry induction. During this phase, participants were told to sit and relax for ten minutes. As in the other phases of the study, participants were instructed to not use their phones during the relaxation minutes. The study facilitator informed participants when ten minutes were up.

Procedure

Participants met with the primary investigator or trained undergraduate research assistant in a WVU lab space. Participants read and signed a consent form before beginning the study. Participants were asked to first complete the trait anxiety subscale of the STAI. Next, participants were fitted with the heart rate monitor and then provided a saliva sample. Afterward participants were instructed to watch a 10-minute nature video. The video depicted several nature scenes set to classical music. The video baseline was meant to acclimate participants to the study and was an attempt to gain a uniform baseline for all participants.

After the video, participants began the worry phase of the study. Participants were told to write down three topics that were currently causing them the greatest amount of worry. They were informed that they could take the paper with their worries written on it with them when they left. After recording the worries, participants were asked to worry about these concerns for the next 10 minutes. Immediately after the worry induction, participants completed the state anxiety subscale of the STAI. Participants were then told to sit and relax for ten minutes. As in the other phases of the study, participants were not allowed to use their phones. Afterward, participants completed the remaining outcome measures in a random order to reduce potential order effects, followed by demographic information. A second saliva sample was taken 20 minutes after the end of the worry induction. Research has shown that salivary cortisol peaks about 30 minutes following the start of an anxiety induction (Kirschbaum, Pirke, & Hellhammer, 1993). After completing the study, participants were debriefed, thanked for their participation, and given \$20.

Results

Data were examined for missingness and normality. None of the self-report primary outcome measures were missing more than 5%; with missing data, statistical tests were used to exclude cases pairwise. Skew and kurtosis were examined separately by participant group. For AAs, the BAI ($M = 34.67$, $SD = 11.86$ skewness = 1.20, $SE = .35$), CESD ($M = 1.87$, $SD = .46$ skewness = 1.36, $SE = .35$; kurtosis = 1.68, $SE = .70$) and the Negative RCOPE ($M = 1.70$, $SD = .68$ skewness = 1.52, $SE = .35$; kurtosis = 2.65, $SE = .70$) were negatively skewed and kurtotic. For EAs, the Negative RCOPE ($M = 1.48$, $SD = .66$, skewness = 1.55, $SE = .36$) was negatively skewed. As such, these scales were log or square root transformed to normalize the distribution. For AAs, all non-normal scales were improved with the log transformation (BAI: $M = .95$, $SD = .44$, skewness = -.33, $SE = .35$ kurtosis = -.74, $SE = .70$; Negative RCOPE: $M = .20$, $SD = .15$, skewness = .61, $SE = .35$ kurtosis = -.07, $SE = .70$; CESD: $M = .26$, $SD = .10$, skewness = .80, $SE = .35$). For EAs, the Negative RCOPE was improved with the log transformation ($M = .14$, $SD = .16$, skewness = 1.07, $SE = .36$ kurtosis = -.04, $SE = .70$).

Bivariate correlations and *t*-tests were conducted to determine if there were differences between the transformed and non-transformed primary outcome variables. For EAs with transformed scores, the Negative Religious Coping Scale was no longer significantly correlated with the STAI-Trait. Because the transformed NRCOPE resulted in significant changes with a primary outcome variable, and both groups were log transformed to improve the fit (allowing for comparisons between scores), the transformed NRCOPE was utilized in the following analyses. For ease of mean interpretation, the non-transformed variables are presented for all other sociocultural factors.

The HR and HRV scores for each phase of the study (i.e., baseline, worry, relaxation) were also assessed for normality. HR and HRV for all three phases were skewed or kurtotic. Log transformations improved the normality for both variables. As such, log transformed HR and HRV were utilized in the analyses.

Cortisol pre- and post-worry induction were assessed for normality. Initial analyses showed non-normal distributions for both the pre ($M = 2.54$, $SD = 3.51$, skewness = 5.58, $SE = .26$ kurtosis = 39.01, $SE = .52$) and post ($M = 1.64$, $SD = 1.56$, skewness = 3.39, $SE = .26$ kurtosis = 14.53, $SE = .52$) cortisol data. The box plots and normal Q-Q plots were inspected. There were twelve extreme outliers, which were removed. The removal of these outliers improved the distribution for both pre- ($M = 1.74$, $SD = .94$, skewness = 1.39, $SE = .28$ kurtosis = 2.22, $SE = .55$) and post- induction ($M = 1.26$, $SD = .63$, skewness = 1.48, $SE = .28$ kurtosis = 1.47, $SE = .55$) cortisol data. However, the data were still non-normal. Log transformations were conducted and the normality of the data improved for both the pre- ($M = .19$, $SD = .22$, skewness = .34, $SE = .28$ kurtosis = -.78, $SE = .55$) and post-induction ($M = .06$, $SD = .19$, skewness = .79, $SE = .28$ kurtosis = -.26, $SE = .55$) samples. The normality of pre- and post-induction cortisol was also inspected by group; removal of the outliers and log transformations also improved the normality for both groups. Thus, log transformed pre- and post- cortisol were used in the analyses.

Effectiveness of Worry Induction

To determine whether the worry induction was effective, two 3 (Time: baseline, worry, and relaxation) X 2 (Race: AA vs. EA) ANOVAs were conducted with HR and HRV. Time was a within-subjects variable and race was a between subjects variable. Body mass index (BMI), sex, cigarette smoking status, and age were examined as possible covariates. Generally, HR and

HRV did not significantly differ by sex ($ps > .05$). However, there was a significant difference between males and females with HR in the relaxation phase [$t(73) = -2.05, p = .04$], such that females had higher heart rate ($M = 81.40, SD = 10.85$) than males ($M = 76.15, SD = 7.91$). Age was not significantly correlated with HR or HRV ($ps > .05$). Smoking status was not significantly correlated with HR or HRV ($ps > .05$). BMI was positively correlated with HR in all three phases, such that higher BMI was associated with higher HR. As such, BMI and sex were used as covariates in the repeated measures ANOVA with HR.

For HR, the Mauchly's Test of Sphericity indicated that the assumption of sphericity was not met; as such, degrees of freedom were corrected using the Huynh-Feldt estimates of sphericity. The main effect of Time was not significant, $F(1.61, 114.03) = .04, p = .94, \eta^2 = .001$. The main effect of Race was statistically significant, $F(1, 71) = 7.61, p = .007, \eta^2 = .10$; such that EAs had higher heart rate across the phases than AAs (AAs: $M = 77.86, SE = 1.49, 95\% CI [74.89, 80.82]$; EAs: $M = 83.50, SE = 1.55, 95\% CI [80.41, 86.59]$). The interaction between Time and Race was not significant, $F(1.61, 114.03) = .002, p = .99, \eta^2 < .001$.

For HRV, the Mauchly's test of Sphericity indicated that the assumption of sphericity was not met; as such, degrees of freedom were corrected using the Huynh-Feldt estimates of sphericity. The main effect of Time was statistically significant, $F(1.64, 117.83) = 5.96, p < .01, \eta^2 = .08$ (see Figure 5). Posthoc analyses revealed no difference between the baseline ($M = 60.51, SE = 5.58, 95\% CI [49.39, 71.63]$) and worry phases ($M = 69.98, SE = 7.18, 95\% CI [55.67, 84.29]$) (mean difference = $-9.47, p = .12$). There was a significant difference in scores between worry and relaxation phases ($M = 77.68, SE = 7.37, 95\% CI [62.98, 92.39]$) (mean difference = $-7.70, p = .04, 95\% CI [-15.18, -.22]$). Additionally, there was a significant difference between baseline and relaxation (mean difference $-17.17, p = .008, 95\% CI [-29.75, --$

4.59]). The main effect of Race was statistically significant, $F(1, 73) = 4.20, p = .04, \eta^2 = .05$; such that AAs had higher heart rate variability across the phases than EAs (AAs: $M = 80.06, SE = 8.30, 95\% CI [63.51, 96.60]$; EAs: $M = 58.73, SE = 8.64, 95\% CI [41.50, 75.96]$). The interaction between Time and Race was not significant ($F(1.61, 117.83) = .85, p > .05, \eta^2 = .01$).

A 2 (Time: pre-worry induction, post-worry induction) X 2 (Race: AA vs. EA) ANOVA was conducted to determine if cortisol was affected by the worry induction. Time was a within-subjects variable, and Race was a between subjects variable. Body mass index (BMI), sex, age, and cigarette smoking status were examined as possible covariates. There were no significant differences by age ($ps > .05$). Smoking status was not significantly correlated with pre or post-worry induction cortisol ($ps > .05$). BMI was not significantly correlated with pre or post-worry induction cortisol ($ps > .05$). Pre-worry induction cortisol did significantly differ by sex [$t(73) = 2.26, p = .03$], such that females had lower cortisol ($M = .15, SD = .20$) than males ($M = .27, SD = .24$). Post-worry induction cortisol also significantly differed by sex [$t(72) = 2.14, p = .04$], such that females had lower cortisol ($M = .03, SD = .17$) than males ($M = .13, SD = .20$).

Therefore, sex was used as covariate in the repeated measures ANOVA with cortisol.

For cortisol, the main effect of Time was statistically significant, $F(1, 69) = 23.54, p < .001, \eta^2 = .25$ (see Figure 6). Pre-worry induction cortisol ($M = .18, SE = .03, 95\% CI [.13, .24]$) was significantly higher than post-worry induction ($M = .06, SE = .023, 95\% CI [.01, .10]$). The main effect of Race was not statistically significant, $F(1, 69) = 1.60, p > .05, \eta^2 = .02$. There were no significant interactions between Time and Race ($F(1, 69) = .53, p > .05, \eta^2 = .01$).

Group Comparisons

Due to technical difficulties with the physiological assessment instruments, heart rate and heart rate variability was not collected for all participants ($n = 11$). As a result, data from 38 European Americans (74% female; $M_{age} = 23.68$ years, $SD = 7.47$) and 40 African Americans (65% female; $M_{age} = 23.67$ years, $SD = 6.63$) were used in all analyses with HR/HRV. For cortisol, 11 participants were excluded due to extreme outliers. Thus, data from 38 European Americans (71% female; $M_{age} = 23.59$ years, $SD = 7.11$) and 40 African Americans (65% female; $M_{age} = 23.26$ years, $SD = 6.63$) were used in all analyses with cortisol. Mean comparisons showed no differences in demographic data (i.e., age, sex, BMI, race) or self-reported anxiety and sociocultural factors between participants who were removed from these analyses and those whose physiological data was collected and included in the analyses.

Independent samples t -tests were conducted to determine whether any of the variables differed between AAs and EAs (see Tables 7 and 8). With regard to the physiological measures, EAs had significantly higher heart rate than AAs in both the worry and relaxation phases. AAs had significantly higher heart rate variability scores than EAs in the relaxation condition. HR and HRV did not differ between groups during any of the other phases. Pre- and post-induction cortisol did not differ between the two groups.

With regard to the anxiety measures, AAs and EAs did not significantly differ on the Beck Anxiety Inventory, Penn State Worry Questionnaire, STAI-Trait, or STAI-State. Regarding risk factors, AAs reported greater incidents of discrimination than EAs. However, contrary to hypotheses, there were no significant differences between the groups on the Body Sensations Questionnaire, Perceived Devaluation and Discrimination (public stigma scale), or the Self-Stigma of Mental Illness scale. Regarding protective factors, AAs reported greater

ethnic identity, engaging in more positive religious coping, and higher levels of spirituality than EAs.

Correlations

Correlational analyses were conducted to determine associations among the sociocultural factors, physiological data, self-reported anxiety, and sociocultural factors in both the AA and EA samples (see Tables 9 - 14). Heart rate at all three phases (i.e., baseline, worry, relaxation) were correlated with one another for both groups. Heart rate variability at all three phases were also correlated with one another for both groups. Additionally, cortisol at pre-worry induction was correlated with cortisol post-worry induction. Regarding the anxiety assessments, the BAI, STAI-Trait, STAI-State, PSWQ were all significantly correlated with one another for both the EAs and AAs.

Regarding associations between anxiety and HR, HRV, or cortisol, in AAs, the Penn State Worry Questionnaire was positively correlated with HR in the baseline, worry, and relaxation phases. That is, AAs who reported more worry also had higher heart rate throughout each phase of the study. For EAs, the BAI was negatively correlated with HRV during the worry phase. EAs who reported higher general anxiety also had lower HRV during the worry phase. No other significant relations between anxiety and HR, HRV, or cortisol were found for either group.

Regarding risk factors, the Self-Stigma of Mental Illness Scale was negatively correlated with baseline HR, indicating that AAs with greater self-stigma had lower HR at baseline. For EAs, there was a significant positive relation between the Everyday Discrimination Scale and pre-induction cortisol. That is, experiences of discrimination were associated with higher

cortisol pre-induction. No additional associations were found between any of the risk factors and HR, HRV, or cortisol for either group.

Regarding protective factors in AAs, pre-induction cortisol was negatively correlated with positive religious coping, such that increased use of positive religious coping was associated with lower pre-induction cortisol. Negative religious coping was also negatively associated with pre-induction cortisol in AAs, which indicates greater negative religious coping was associated with lower cortisol levels. No other associations between the protective factors and HR, HRV, or cortisol were found for either group.

Bivariate correlations were also conducted to determine if the associations between the risk/protective factors and anxiety were replicated in Study 2. Regarding risk factors, public stigma was not significantly associated with any of the anxiety assessments for either group. Self-stigma was positively correlated with the Beck Anxiety Inventory in AAs but unrelated in EAs. Greater reports of experiences of discrimination were associated with more anxiety in AAs as measured by the BAI, STAI-State, and STAI-Trait. There were no significant associations between discrimination and anxiety in EAs. For both EAs and AAs, the Body Sensations Questionnaire was significantly positively correlated with the Beck Anxiety Inventory ($z = -.41$, $p > .05$), STAI-State ($z = -.11$, $p > .05$), and Penn State Worry Questionnaire ($z = -.46$, $p > .05$). Fisher's r -to- z transformations showed a non-significant difference in the strength of the correlations between the groups. The BSQ was also correlated with the STAI-Trait in AAs but not in EAs.

Regarding protective factors, the Intrinsic Spirituality Scale and the Positive Religious Coping Scale were not associated with any of the anxiety measures for either AAs or EAs. For the Negative Religious Coping Scale, both EAs and AAs high in negative religious coping also

reported higher anxiety measured by the Beck Anxiety Inventory. Z-scores showed a non-significant difference in the strength of the relation between the groups on the BAI ($z = -.10, p > .05$). For AAs only, there was a positive correlation between the Negative Religious Coping Scale and the STAI-State, STAI-Trait and Penn State Worry Questionnaire. That is, AAs who reported engaging in more negative religious coping also tended to have higher anxiety and more worry than AAs who engaged in less negative religious coping.

For AAs, all assessments of anxiety were unrelated to the multiethnic identity measure. Surprisingly, for EAs there was a negative correlation between the Multiethnic Identity Measure and STAI-Trait. This relation suggests that as ethnic identity increases for EAs in this sample, trait anxiety levels decrease. However, it should be noted that the scale reliability for the MEIM in EAs was in the questionable range ($\alpha = .66$). As such, these relations should be interpreted with caution.

Partial correlations. As in Study 1, there were strong positive correlations between the anxiety assessments and the depression measures. Thus, partial correlations were conducted with depression as a covariate to assess for any changes that may occur if the variance from depression were removed from the analyses (see Tables 9 and 10). As with Study 1, the strength of the significant associations between the sociocultural factors and anxiety were reduced or became non-significant. However, for HR, HRV, and cortisol several associations became significantly related though the change in the strength of these relations were not significant.

For AAs, HRV at baseline became significantly positively correlated with the Body Sensations Questionnaire ($z = -.01, p = .92$), such that greater body sensitivity was associated with higher HRV. HRV in AAs also became significantly negatively correlated with STAI-Trait in the baseline ($z = .69, p = .49$) and relaxation phases ($z = .89, p = .37$). Additionally, HR in the

relaxation phase also became significantly positively correlated with the negative religious coping ($z = -.75, p = .45$).

For EAs, HRV in the relaxation phase became negatively correlated with the Beck Anxiety Inventory, indicating that increased anxiety was associated with lower HRV ($z = -0.09, p = .92$). Additionally, ethnic identity became positively associated with the relaxation phase HR ($z = .46, p = .64$), such that greater ethnic identity in EAs was associated with lower HR in the relaxation phase.

Regression analyses

Separate multiple regression models were created to determine if the sociocultural risk factors or protective factors moderated the effect of race on HR in the worry phase, HRV in the worry phase, self-reported anxiety post-induction, or cortisol levels post-induction. All predictor variables were mean centered and the race variable was dummy coded (0 = European American and 1 = African American). An interaction term was created with each centered sociocultural risk or protective factor variable and the dummy coded race variable. Bootstrapping with 5000 samples and 95% confidence intervals were used in all analyses.

A hierarchical multiple regression was conducted, as described above, to determine if the protective factors predicted self-reported anxiety (STAI-State) immediately following the worry induction. In step one, the sociocultural protective variables (i.e., Intrinsic Spirituality Scale, Positive Religious Coping, Multi-Ethnic Identity Measure) and race were entered. In step two, the interaction terms (i.e., sociocultural protective factors by race) were entered. The results indicated there was not a statistically significant interaction between race and any of the protective factors ($ps > .05, \Delta R^2 = .01$ for step 2) (see Table 15). A similar hierarchical multiple regression was created with risk factors entered at step one (i.e., Body Sensations Questionnaire,

Everyday Discrimination Scale, Self-Stigma of Mental Illness, Perceived Discrimination and Devaluation). In step two, interactions with risk factors and race were entered. There was not a statistically significant interaction between race and any of the protective factors ($ps > .05$, $\Delta R^2 = .04$ for step 2) (see Table 16).

Another hierarchical multiple regression was conducted to determine if HR during the worry phase was associated with sociocultural factors by race. As with the previous analyses, two regressions were performed, one with risk factor as predictors and another with protective factors as predictors. In step one, baseline HR was entered. In step two, the race variable and the sociocultural risk or protective factors were entered. In step three, the interaction terms were entered. For protective factors, there were not significant interactions between race and the protective factors ($ps > .05$, $\Delta R^2 = .03$) (see Table 17). Likewise, for risk factors, there were not any statistically significant interactions between race and the risk factors ($ps > .05$, $\Delta R^2 = .01$ for step three) (see Table 18).

To determine the association between HRV (i.e., RMSSD) during the worry phase and the risk and protective factors by race, two hierarchical multiple regressions were conducted. For each regression, in step one baseline HRV was entered. In step two, race and the sociocultural variables (i.e., risk or protective factors) were entered. In step 3, the interaction terms were entered. For the protective factors, the results showed a statistically significant interaction between race and positive religious coping ($b = .18$, $SE = .07$, $p = .01$, 95% CI [.05, .33]) (see Table 19). Simple slopes analysis revealed a statistically significant relationship between HRV and positive religious coping for EAs ($b = -.12$, $SE = .06$, $p = .03$) but not AAs ($b = .06$, $SE = .04$, $p = .14$) (see Figure 7). Such that EAs with lower positive religious coping had higher HRV during the worry induction than those with higher positive religious coping.

However, $\Delta R^2 = .05$ was not significant, $F(3, 69) = 2.58, p = .06$, indicating that the overall model was not significant. The results showed that there were not any significant interactions between risk factors and race ($ps > .05$, R^2 change = .03) (see Table 20).

Finally, a hierarchical regression model was conducted with post-induction cortisol as the dependent variable to see if the interaction of race and the risk and protective factors affected cortisol levels. In step one, pre-induction cortisol was entered. In step two, the risk (or protective) factors and the race dummy variable were entered. In step three, interaction terms were entered. For the protective factors, the results showed a statistically significant interaction between race and spirituality ($b = .06, SE = .03, p = .04, 95\% CI [-.003, .101]$). Though, the simple slopes analysis revealed no statistically significant relationship between cortisol and spirituality for EAs ($b = -.03, SE = .02, p = .18$) or AAs ($b = .02, SE = .02, p = .18$) (Figure 8). Visual inspection of the figure suggests that for AAs greater spirituality was associated with higher cortisol post worry induction, while greater spirituality was associated with lower cortisol for EAs. Moreover, $\Delta R^2 = .06$ was not significant [$F(3, 64) = 1.86, p = .15$], indicating that the overall model was not significant (see Table 21). The results showed no statistically significant interactions between race and any of the risk factors ($ps > .05, \Delta R^2 = .05$) (see Table 22).

Discussion

The purpose of Study 2 was to determine if the risk and protective factors were differentially associated with responses to a worrying task in AAs and EAs. It was expected that AAs who self reported more risk factors (i.e., discrimination, stigma, somatic symptom focus) would demonstrate a stronger physiological response to the worrying task. Likewise, AAs who self reported more protective factors (i.e., positive religious coping, ethnic identity, spirituality) would demonstrate a weaker response to the worrying task. Similarly, higher self-reported

anxiety following the worry phase was expected to be associated with increased sociocultural risk factors and lower sociocultural protective factors in AAs. It was expected that the sociocultural factors would be unrelated or less strongly related to these outcomes in EAs. Broadly, the results suggest that EAs may have had a stronger physiological response to the worry induction than AAs (evidenced by higher HR for EAs and higher HRV for AAs). However, the sociocultural variables were not associated with physiological response during the worry induction and there were no consistent interactions found by race. Thus, the primary hypotheses related to the worry induction were not confirmed.

Worry Induction Effects

The worry induction used in the current study was adapted from a study that found a worry induction resulted in higher self-reported anxiety, increased HR, and lower HRV when compared to the relaxation phase (there was no baseline phase) (Verkuil et al., 2009). In the present study, mean comparisons across phases were conducted to determine if there was a physiological response to the induction across the entire sample. The results showed that HR and HRV did not differ between baseline and the worry phase. However, HRV was higher in the relaxation phase compared to the baseline and worry phases. That is, HRV significantly increased from the baseline and worry phase. The difference between worry and relaxation replicates the results found in the Verkuil et al., (2009) study.

Several reasons may explain the non-significant change in HR and HRV from baseline to the worry phase. Of note, the Verkuil et al., (2009) study did not gather baseline data to show that the worry induction resulted in change in HR and HRV between the baseline and worry phases. Therefore, it is unknown whether this null effect is different from previous research. Also, the baseline data collected in the current study may not have been a true representation of

participants' baseline but rather may have been indicative of a stress response. In the current study procedure, immediately before collecting baseline data, participants were fitted with a chest strap heart rate monitor and asked to provide saliva samples. For individuals who rarely participate in research, engaging in these components of the study may have been stressful and could have resulted in increased heart rate and lower heart rate variability. Thus, the data collected during the baseline phase may not be an accurate baseline (i.e., physiological stress effects may be interfering with the results). In anticipation of this possible effect, participants were instructed to watch a 10-minute nature video during the baseline data collection. The intention of this video was to orient participants to the video and reduce stress related to placing the chest strap and providing saliva samples. Data for the baseline were collected during the first five minutes of this video. However, the effects from the initial parts of the study may have continued to influence the participant's physiological response during those first five minutes. Indeed, participant cortisol levels collected at baseline were higher than cortisol collected post-worry induction. This is additional evidence that participant baseline data may not be representative of a "stress free" baseline. Therefore, this possible interference may explain the non-significant differences in HR and HRV between the baseline and worry phases.

Unexpectedly, cortisol levels decreased following the worry induction. One possible explanation for this finding was that post cortisol levels were collected at the incorrect time. The current study was the first to assess cortisol levels following this worry induction; thus, no prior research was available to determine the best time to collect salivary cortisol. Therefore, other studies that measured cortisol and had an anxiety induction were used to guide salivary cortisol data collection methods in the current study. One study used the Trier Stress Test to induce anxiety and then assessed when best to collect salivary cortisol following the stressor

(Kirschbaum, Pirke, & Helhammer, 1993). The study found that cortisol peaked 30 minutes from the beginning of the Trier Stress Test. As such, in the current study, cortisol was taken 30 minutes following the beginning of the worry induction. Theoretically, cortisol should have spiked around the same time in both studies, though the two inductions were different. The Trier Stress Test is a 20-minute anxiety induction (i.e., 10 minutes of preparation for public speaking, 5 minutes of public speaking, 5 minutes of public serial subtraction). In the current study, the worry task was only 10 minutes. As such, when the cortisol was collected, the expected cortisol spike may have already passed. Another possibility is that the worry induction was not strong enough to produce an increased cortisol response. The Trier Stress Test is arguably more demanding of study participants compared to self-induced worrying. Notably, in the worry induction participants could stop worrying if they became too distressed; however, the Trier Stress Test does not allow for mental escape from the task. Thus, the unexpected findings in the current study may be due to incorrect timing in measuring cortisol or that the stress induction was not strong enough to produce an effect.

Another important consideration for the cortisol sample interpretation is the over-dilution of saliva samples during the assay process. Per the R&D Systems Salivary Cortisol ELISA kit, saliva samples were to be prepared with a 5-fold dilution. However, this dilution level was misprinted in the materials. Thus, the over-dilution of the samples may have affected the sensitivity of the assay to detect the cortisol levels in the samples. Indeed, several of the samples had cortisol levels that fell below the normal curve. Samples that fell below the curve were replaced with the lowest value on the curve to maintain interpretability. Unfortunately, this reduced variability in the scores and may have affect the results. Because of these complications, the cortisol findings should be interpreted with caution.

To determine if there were differences between the groups, comparisons between AAs and EAs in the baseline, worry, and relaxation phases showed few differences in physiological response. EAs had significantly higher HR in the worry and relaxation phases than AAs. Additionally, there was a trend toward a significance with EAs were reporting higher HR at baseline than AAs ($p = .06$). AAs had higher HRV in the relaxation phase compared to EAs. There was also a trend toward significance in the baseline phase with AAs having higher HRV than EAs in this phase ($p = .08$). Overall, these results do not clearly indicate that EAs or AAs were more affected by the induction.

Predictors of Physiological Response

Hierarchical multiple regression analyses were conducted to determine if the sociocultural risk and protective factors predicted physiological response and self-reported anxiety by race in response to the worry condition. It was expected there would be an interaction between race and the sociocultural factors, such that the sociocultural factors would differentially predict outcomes in AAs and EAs. However, these hypotheses were generally not confirmed. However, the results showed two significant interactions between race and the sociocultural protective factors in predicting response to the worry induction. Specifically, spirituality and race interacted to predict cortisol post-worry phase. Such that, high spirituality was associated with lower cortisol levels post-worry induction for EAs, but high spirituality was associated with elevated post-worry cortisol in AAs. Also, positive religious coping and race interacted to predict HRV during the worry phase. Such that, lower engagement in positive religious coping resulted in higher HRV for EAs but was unrelated in AAs. Both of these interactions were in the unexpected direction and suggest that these factors are protective for EAs. It should be noted that these findings were not replicated with the other indicators (e.g., HR, self-reported anxiety).

Thus, future studies should continue to investigate these relations to ensure these findings are not due to type 1 error.

The result that the sociocultural risk and protective factors generally did not predict physiological response to the worry induction is not entirely surprising given the non-significant correlations found between these variables. The small sample size may be an explanation for these non-significant findings. Due to technical difficulties with the physiological measurement tools, 11 participants were excluded from the HR/HRV analyses and 11 from the cortisol analyses due to extreme outliers. Thus, the sociocultural risk and protective factors may be differentially related to physiological response in AAs and EAs, but the effect is too small to detect with the current sample size.

The worry induction may also not have been an adequate method to assess for anxiety in the current generally healthy sample. As such, the worry induction may not have activated a detectable physiological response from participants in this study. Thus, there were non-significant relations between the physiological indicators of stress and the sociocultural factors. Future studies with a larger sample size and perhaps a different anxiety induction would help determine if these non-significant findings are due to low power, low stress response, or if these associations are truly not there.

Anxiety and Race

It was hypothesized that AAs would generally report lower levels of anxiety than EAs. Mean comparisons showed there were no significant differences between the groups. As discussed in Study 2, these non-significant differences between the groups are likely because the sample was generally healthy and differences between AAs and EAs are more consistently found with clinical samples (Asnaani, Richey, Grant et al., 2005; Kessler et al., 2005).

Sociocultural Risk Factors

A secondary component of the study was to determine if the relations between the sociocultural risk, protective factors, and anxiety found in Study 1 were replicated in Study 2. Regarding risk factors, as hypothesized and found in Study 1, AAs reported greater experiences of discrimination than EAs. However, contrary to expectations AAs in Study 2 did not report greater somatic symptom focus, public stigma, or self-stigma than EAs. Similar non-significant results were shown in Study 1, except that AAs in Study 1 reported more public stigma than EAs (as was hypothesized).

Different assessments were used to measure public stigma in Study 1 and Study 2, which may explain the discrepancy in results related to public stigma. The Day's Mental Illness Stigma Scale, used in Study 1, focuses on participant beliefs and attitudes about others who have a mental illness (e.g., treatability, anxiety toward those with mental illness, hygiene). The Perceived Devaluation and Discrimination Scale, used in Study 2, focuses on the participant's beliefs about community attitudes toward those with mental illness. Furthermore, the PDD asks specific questions about community attitudes toward a "mental patient" or someone who has been in a "mental hospital". The PDD was created in 1983, which was 20 years after the Community Mental Health Centers Act of 1963, which led to the deinstitutionalization of many inpatient psychiatric care patients over the next 20 years. Due to the historical context and attitudes reflected toward those with mental illness at the time (Wright, Gronfrien, & Owens, 2000), the PDD may reflect out-of-date attitudes and beliefs about individuals with mental health concerns. Therefore, the young sample of participants in Study 2 may have responded to this questionnaire in a similar way, regardless of racial group because the PDD does not reflect current stigmatic attitudes toward mental illness.

The correlational analyses were also reviewed to determine if there was replication of findings across the two studies. Regarding risk factors for AAs, both studies found that AAs who reported increased somatic symptom focus and experiences of discrimination reported more anxiety. These repeated findings confirm the studies hypotheses that these sociocultural risk factors may play a role in anxiety for AAs. Stigmatic attitudes across the two studies were different. In Study 1, AAs who reported more public stigma also had greater anxiety, but in Study 2 public stigma was unrelated to anxiety. As indicated above, the different measure used in Study 2 to assess public stigma may have effected relations between stigma and anxiety. Future studies should continue to explore the relation between public stigma and anxiety in AAs to replicate the findings of Study 1. Studies should consider the choice of assessment to measure public stigma as out of date measures may affect results. For self-stigma, Study 1 found it was unrelated to anxiety but in Study 2 greater self-stigma was associated with greater anxiety. However, self-stigma in AAs was only associated with anxiety measured by the Beck Anxiety Inventory. Thus, self-stigma does not appear to be as strongly or clearly associated with anxiety as demonstrated with public stigma.

Regarding risk factors in EAs, Study 1, EAs who reported greater discrimination, self-stigma, and body sensitivity also tended to report more anxiety. In Study 2, similar associations were found between body sensitivity and anxiety measures; however, there were no associations between anxiety and discrimination or stigma. Notably, the demographics of the two study samples are different, which could affect outcomes. The Study 2 EA sample was about 15 years younger, of higher socioeconomic status (e.g. income), and a larger percentage of females than the EA sample in Study 1. Due to these demographic differences, the experiences of discrimination and stigmatic attitudes may be different across the studies. Overall, the

hypotheses for EAs in Study 2 were confirmed, such that relations between risk factors (i.e., discrimination and stigma) were not associated with anxiety. However, these findings were not consistent across the studies. This indicates that these risk factors may not uniquely affect anxiety in AAs compared to EAs. Future research should consider how age and other demographic variables affect these relations in EAs.

Sociocultural Protective Factors

Regarding protective factors, as hypothesized and shown in Study 1, AAs participants in Study 2 engaged in more positive religious coping, increased spirituality, and reported higher levels of ethnic identity than EAs. These results confirm the two studies hypotheses that AAs would endorse greater sociocultural protective factors than EAs.

Study 1 generally showed no significant correlations between ethnic identity, spirituality, and positive religious coping in AAs. Surprisingly, in Study 1, only positive religious coping was associated with anxiety in AAs and the relation was in the unexpected direction (i.e., greater positive religious coping associated with more anxiety). In Study 2, also contrary to hypotheses, ethnic identity, spirituality, and positive religious coping were not associated with anxiety in AAs. These repeated non-significant relations in Study 1 and Study 2, suggest that ethnic identity and positive religious coping may not be protective factors against anxiety to AAs. That is, these studies do not provide evidence to support the hypotheses that these factors may be protective against anxiety for AAs.

For EAs in Study 1, none of the protective factors were associated with anxiety, as expected. In Study 2, only ethnic identity was positively associated with anxiety, such that EAs with greater ethnic identity reported less trait anxiety. This result is surprising given that previous research has generally found non-significant or positive associations between ethnic

identity and anxiety in EA samples (Carter et al., 2001; Williams et al., 2012). However, in the current study it appears that ethnic identity may be a unique protective factor for EA college students.

Partial Correlations

As in Study 1, partial correlations were conducted in Study 2 because of to the significant correlations between the anxiety and depression scales. Overall, when depression was included as a covariate in Study 1, the relations between the anxiety scales and the sociocultural factors became non-significant. Similar changes were also found in Study 2 with the sociocultural factors. Interestingly, when depression was included as a covariate, the relations between HRV and HR became significantly correlated with the anxiety and the body sensations questionnaire. However, z-score comparisons showed the increased strength of the relations were not significantly increased. Even so, these significant correlations suggest that depression may muddy the associations between anxiety and these physiological assessments. Thus, future studies utilizing HR and HRV may need to consider including depression as a covariate.

General Discussion

Research has shown that AAs have lower prevalence rates of anxiety disorders than EAs (e.g., Breslau et al., 2005). However, studies have also shown that when AAs do have an anxiety disorder they tend to have more functionally impairing and chronic symptoms that are less responsive to treatment than EAs (Breslau et al., 2005; Himle et al., 2009; Sibrava et al., 2013). Thus, the purpose of these studies was to determine if there were sociocultural factors that may account for these anxiety outcomes. Specifically, the intention of these studies was to identify specific sociocultural protective and risk factors unique to AAs that might explain some of the differences in anxiety between the groups.

Five sociocultural factors were identified that were hypothesized to have a stronger effect on anxiety in AAs than EAs. Experiences of discrimination, somatic symptom focus, and stigma toward mental illness were expected to be associated with more anxiety symptoms in AAs. Researchers have hypothesized that AAs with higher endorsement of these experiences are likely to have worse psychological outcomes (Hunter & Schmidt, 2010; Levine et al., 2014; Masuda et al., 2009; Soto et al., 2011; Williams et al., 1997). Likewise, ethnic identity and religiosity/spirituality were expected to be associated with less anxiety in AAs, given that previous research has shown these sociocultural factors tend to be associated with positive psychological outcomes in AAs (Chapman & Steger, 2010; Williams et al., 2012). Overall, AAs were hypothesized to endorse greater levels of these sociocultural risk and protective factors compared to EAs. Furthermore, the sociocultural factors were expected to be associated with anxiety in AAs. EAs were hypothesized to endorse lower levels of the sociocultural factors than AAs, and these sociocultural factors were expected to be less strongly related to anxiety in EAs.

The results of the studies confirmed several of the hypotheses and provided additional information about the role these sociocultural risk and protective factors play in anxiety. Notably in both studies, no differences in anxiety were found between the groups. Previous research on prevalence of anxiety disorders, show that AAs are less likely to have an anxiety disorder than EAs (Breslau et al., 2005). However, research with non-clinical samples has found mixed results with some studies showing no difference between the groups and others showing EAs reporting higher anxiety (Chapman & Woodruff-Borden, 2009; Melka, Lancaster, Adams, Howarth, & Rodriguez, 2010; Williams, Chapman, Wong, & Turkheimer, 2012). Thus, the non-significant differences between the groups may be because the samples were non-clinical. Because there were no differences between the groups, and the samples were not clinical, it is

important to consider that the strength of the associations between the sociocultural factors and anxiety may be reduced. Much of the research on the sociocultural risk show relations between the risk factors and anxiety in those with an anxiety disorder diagnosis (e.g., Horwath et al., 1993; Soto, Dawson-Andoh, & Belue, 2011), though studies with protective factors often utilize non-clinical samples (e.g., Haley et al., 2004; Smith & Silva, 2011). Regardless, the results of the current studies may be affected by the possible lack of clinical severity in anxiety psychopathology.

The general study findings related to the associations between the sociocultural risk factors and anxiety by group were mixed. As expected, in both studies AAs reported greater experiences of discrimination compared to EAs. This finding has been shown in the literature, with AAs often reporting greater experiences of discrimination than EAs (Kessler, Mickelson, & Williams, 1999). Both studies also showed that discrimination was associated with anxiety in AAs. Interestingly, discrimination was associated with anxiety in EAs in Study 1 but not Study 2. Though contrary to expectations, the association between discrimination and anxiety in EAs is not unexpected, given that research has shown experiences of discrimination are associated with anxiety in both EAs and AAs (Kessler, Mickelson, & Williams; 1999). Thus, the results suggest that discrimination is associated with anxiety for AAs but also in EAs. Future research should investigate if the type of discrimination affects outcomes. For example, one study found that racial discrimination was associated with increased odds of having an anxiety disorder diagnosis for AAs but not EAs (Soto, Dawson-Andoh, & Belue; 2011). Thus, a better understanding of the type of discrimination that contributes to anxiety can be helpful in addressing way to reduce the possible effects of discrimination on anxiety.

Contrary to hypotheses, AAs and EAs reported no differences in somatic symptom focus. Also unexpectedly, somatic symptom focus was associated with anxiety for both groups across the two studies. Few studies have investigated somatic symptom focus in EAs and AAs. Some research indicates that AAs report more panic symptoms during a panic attack than EAs (Horwath et al., 1993; Smith, Friedman, & Nevid, 1999). Another study found that a non-clinical sample of AAs reported more anxiety following a physiological stressor (straw breathing and chair spinning) than EAs, suggesting AAs may focus more on somatic symptoms of anxiety than AAs (Gordon, Steiner, & Teachman, 2014). However, the results of the two current studies do not indicate that somatic symptom focus was more strongly associated with anxiety in AAs than EAs. Rather, the results suggest that somatic symptom focus for both groups is equally associated with anxiety. Limitations of the measure assessing somatic symptom focus (i.e., Body Sensations Questionnaire is an assessment of anxiety and somatic symptom focus together) may partially explain the non-significant differences between the groups. Regardless, the information is helpful to guide future studies. Namely, in these two non-clinically anxious samples, somatic symptom focus (as measured by the BSQ) does appear to be associated with anxiety for both groups. This warrants additional research to determine if other assessments of somatic symptom focus replicate these findings. It is also important to determine if these results are associated with anxiety in a clinical sample. Furthermore, as much of the research in clinical samples has been conducted with panic disorder, it is important to determine if somatic symptom focus is also relevant to other anxiety disorders.

Across the two studies, reported level of self-stigma in AAs and EAs was not different. In Study 1, AAs reported more public stigma than EAs and in Study 2 there was no difference between the groups. The correlational relations between self-stigma and public stigma were

inconsistent across studies. Broadly, associations between public stigma and anxiety were found in AAs and associations between self-stigma and anxiety were found in EAs (though this was not replicated across studies). The literature shows AAs tend to report more stigma toward mental illness than EAs (e.g., Masuda et al., 2009; Rao, Feinglass, & Corrigan, 2007). Thus, it was expected that AAs would report more self-stigma and public stigma than EAs. One factor that may have interfered with the findings of these studies was the use of the Perceived Discrimination and Devaluation scale in Study 2. Potentially, if the same measure of public stigma was used in both studies, there may have been replication in findings. Future studies should continue to assess public stigma to determine if there are associations between it and anxiety for AAs in a clinical and non-clinical sample. Regarding self-stigma, two studies were found that assessed self-stigma related to anxiety in AAs and EAs. One study found that AAs generally reported higher levels of self-stigma than EAs (Conner et al., 2009). Another study found similar levels of self-stigma between the groups (Jimenez, Bartels, Cardenas, & Alegria, 2013). In the current research, Study 1 found anxiety and self-stigma were associated with anxiety in EAs but not AAs. However, in Study 2, the Beck Anxiety Inventory was correlated with self-stigma in AAs but not with any anxiety assessments for EAs. Additional research is needed on the association between self-stigma and anxiety before drawing firm conclusions about the current study findings. Though self-stigma did not appear to be related to anxiety in the current studies, it may be related to anxiety in clinically anxious samples. Thus, future studies should investigate if self-stigma is associated with anxiety in clinical samples.

Regarding the protective factors, both studies showed that AAs reported more engagement in positive religious coping, spirituality, and ethnic identity than EAs. These findings, confirmed the hypothesis that AAs would report higher engagement in these specific

sociocultural protective factors. Indeed, research has shown that AAs tend to report higher engagement in these factors than EAs (e.g., Blaine & Crocker, 1995; Brown et al., 2014; Carter et al., 2001). However, contrary to expectations, none of these protective factors were associated with anxiety in AAs. As noted, the non-clinical nature of the samples may have contributed to these non-significant findings. That is, the relations between the sociocultural protective factors and anxiety may only become apparent in a clinically anxious sample. Also, it may be that these sociocultural protective factors are not related to anxiety in AA. Very little research is available on the association between anxiety and ethnic identity (e.g., Carter et al., 2001; Williams et al., 2012) or religiosity/spirituality (e.g., Chapman & Steger, 2010; Schieman, Pudrovskaya, Pearlin, & Ellison, 2006). Additionally, studies use various methods to measure the protective factors and often do not directly assess the relation between anxiety and the protective factors. As such, the small body of literature available makes it difficult to place the findings of the current study into a larger context. Though the hypotheses were not confirmed, this information is valuable because it can be used to guide future studies. Specifically, further investigation into these sociocultural protective factors in clinical samples should be conducted. It should also be considered that these protective factors may not be related to anxiety and other possible protective factors should be explored. Overall, these results suggest that, while AAs may have reported higher levels of the sociocultural protective factors than EAs, these factors were not related to anxiety in these non-clinical community samples.

The results of these studies contribute to the literature in several ways. Hunter and Schmidt (2010) hypothesized the role of sociocultural risk factors in their theoretical paper on anxiety disorders in African Americans. Specifically, the article suggested that experiences of discrimination, somatic symptom focus, and stigmatic attitudes toward mental illness may be

related to anxiety outcomes in AAs (Hunter & Schmidt, 2010). The current studies contributed to the field by assessing the relations between these theorized sociocultural factors in a sample of AAs and EAs. This adds to the literature by helping to determine if these sociocultural factors are unique to AAs. Moreover, these studies expanded on Hunter and Schmidt's (2010) hypotheses by considering possible sociocultural protective factors that may explain lower prevalence rates of anxiety disorders in AAs. No studies found assessed both protective and risk factors simultaneously in an AA and EA sample. By assessing these variables together, we could theoretically determine which factors contributed the most variance to anxiety outcomes by group. While the general findings of the study showed non-significant differences between EAs and AAs, the results will be helpful to guide future research.

Another strength of these studies was the experimental design and incorporation of physiological assessment in Study 2. Much of the literature that investigates the role between anxiety and these sociocultural factors use a cross-sectional design. While cross-sectional studies provide valuable information, the direction of effects are more difficult to ascertain. For example, it is unclear if a sociocultural factor results in worse anxiety or vice versa. Additionally, most studies in this area of research rely on self-report measures, which could be affected by response bias. The use of these various methods of assessment provides additional tools to measure the associations between anxiety and the sociocultural factors. This method is particularly unique in this area of research, as only one study was found that directly assessed physiological response and anxiety in EAs and AAs (Gordon, Steiner, & Teachman, 2014). In Study 2, regressions were conducted to determine if the sociocultural risk and protective factors resulted in self-reported anxiety following the worry induction. While the results showed generally non-significant findings, they provide important information about the risk and

protective factors in a non-clinical sample. Specifically, the generally non-significant interactions between race and the sociocultural factors in predicting self-reported and physiological anxiety suggest these sociocultural factors generally do not differentially predict anxiety by group. This adds to the literature by indicating that these risk and protective factors do not appear to have a differing effect on anxiety by group in a non-clinical sample. Future research should expand these findings by experimentally inducing anxiety in a clinical sample and determine if anxiety is predicted by the sociocultural factors.

The results of these studies also have important implications for health disparities research and clinical work. Notably there were not significant differences between the groups with regard to anxiety, and few of the sociocultural risk and protective factors were differentially associated with anxiety by group. The non-significant results from these studies suggest that non-clinical samples may not be adequate to find differences between the groups with these sociocultural factors. Thus, researchers investigating the relation between anxiety and sociocultural factors should prioritize conducting research with clinical samples. Also, experiences of discrimination were found to be associated with anxiety in both EAs and AAs. This is important for clinicians to remember when treating both EA and AA patients. Though AAs may more often report experiences of discrimination, it is important for clinicians to recognize and assess for experiences of discrimination with everyone, as these experiences may also affect their EA clients. Additionally, even though ethnic identity and spirituality were not directly related to anxiety outcomes in AAs, research has shown benefits related to these sociocultural factors (e.g., Brown, Ndubuisi, & Gary, 1990; Williams et al., 2012). As such, clinicians should continue to assess and support clients who endorse a strong sense of ethnic identity and spirituality.

Limitations and Future Directions

Several limitations to the study should be noted. First, both studies used a non-clinical sample. Much of the literature on differences in anxiety between AAs and EAs is with clinical samples. Therefore, the findings from these two studies may not be applicable to a clinical sample. In the present studies, the Beck Anxiety Inventory was used to assess self-reported anxiety. This scale is often used as a screener for anxiety. Although it is not able to diagnose an anxiety disorder, it can be helpful in estimating the severity of anxiety symptoms. In both samples, average levels of self-reported anxiety were in the low to moderate range. Research has shown that individuals with BAI scores in this range may have an anxiety disorder diagnosis (Muntingh et al., 2011). As no clinical interviews or assessment was done to determine anxiety diagnoses in the current study, it cannot be confirmed if the sample is representative of those with anxiety disorders. Even so, the findings are still interesting given that no study has assessed all of these factors in a non-clinical but somewhat anxious group of EAs and AAs. Future studies with a clinical sample are necessary to ensure that the information learned in this study will translate to a non-clinical sample. Regardless, the current studies may serve as a foundation from which additional studies can be conducted to further explore the associations between the sociocultural risk and protective factors in anxiety. Furthermore, the information learned in this study can be helpful in understanding risk and protective factors of anxiety in non-clinical samples.

Another limitation to the studies was the generally small sample sizes for the analyses conducted. In Study 1, structural equation modeling was utilized to assess the relations between the risk and protective factors with anxiety by race. In structural equation modeling, it is recommended that studies have at least 10 (but preferably 20) participants for each estimated

parameter in the SEM model as this can affect the “trustworthiness of the results” (Kline, 2011 pp. 12). This minimum requirement was not met, thus, the poor model fit of the sociocultural factors may partially be due to small sample size. Likewise, in Study 2 the sample size may have been too small to find significant results in the regression analyses. A power analysis suggested 81 participants to detect a medium effect size (G*Power: Faul, Erdfelder, Buchner, & Lang, 2009). However, due to extreme outliers in the salivary cortisol analysis and heart rate monitor equipment malfunction, 11 participants were removed from analyses using these physiological indicators. Therefore, the sample size may have been too small to detect an effect. Effect size is another component to consider with regard to the sample size. The effect of the sociocultural factors on anxiety may have been small rather than medium (as evidenced by the R^2 change in the regression models). As such, a larger sample size may have been needed to detect effects. Overall, it appears that the regression analyses in Study 2 were likely underpowered, which may have contributed to the non-significant relations found in the analyses. Future studies investigating the sociocultural factors related to anxiety should ensure adequate sample size to adequately assess small effect sizes.

In Study 2, participants engaged in a worry induction that was intended to induce an anxiety-like state in participants. The worry induction was based off the study by Verkuil and colleagues (2009), which showed that the worrying task resulted in increased self-reported anxiety. However, worry is just one component of the larger construct of anxiety. Therefore, the worry induction may not have adequately elicited anxiety in the current study participants. Unfortunately, in the present studies, participants were only asked to self-report their current level of anxiety following the worry induction. Therefore, it cannot be determined if self-reported anxiety increased from baseline to the worry condition. Physiological assessments

indicated increased heart rate between the worrying and relaxation phases for EAs but not AAs. AAs also reported decreased heart rate variability between the worrying and relaxation phases, but this was not found in EAs. These physiological changes between conditions may suggest the worry induction resulted in a physiological effect. However, the inconsistency of findings between the groups and in physiological response indicators makes it difficult to draw firm conclusions. Thus, the non-significant relations between physiological response and the sociocultural risk and protective factors may be because the worry induction did not successfully induce anxiety. More specifically, it is unclear if anxiety was elicited and if it was similarly elicited in both groups. Therefore, the non-significant relations between the sociocultural factors and the physiological outcome variables may be explained by failing to elicit an anxious response in participants.

Participants in Study 2 completed an in-laboratory worry induction. Participants completed the study under the direction of four different study experimenters. Three of the experimenters identified as female, one identified as male, three identified as EA, and one identified as biracial (EA/AA). About half of the participants completed the study with the primary investigator (biracial and female). Possibly the stimulus value of these lab personnel may have influenced participant responses to self-report measures and the worry induction. Unfortunately, comparisons between participant responses by lab personnel cannot be conducted, as matching between participant and experimenter was not recorded. Future studies should consider the experimenter's stimulus value and assess for differences in participant responses by experimenter.

Another consideration for future studies is the choice of assessment to determine somatic symptom focus. In the current studies, the Body Sensations Questionnaire was used to assess

somatic symptom focus. Across the two studies, the BSQ was highly positively correlated with the anxiety measures for in groups, in particular with the Beck Anxiety Inventory. The Body Sensations Questionnaire assesses anxiety participants experience when noticing somatic symptoms. However, many of the somatic symptoms that the assessment measures are common physical symptoms of anxiety (e.g., dizziness, heart palpitations, numbness). Inspection of the items on the Body Sensations Questionnaire and Beck Anxiety Inventory show the similarity between these two measures. Thus, future studies might consider the use of an assessment that focuses on attention to physical symptoms more broadly, regardless of feelings of anxiety.

Conclusions

Overall, the two studies provided additional information on sociocultural factors and their relation to anxiety in AAs and EAs. Notably, AAs report higher levels of religiosity, ethnic identity, and experiences of discrimination than EAs. Religiosity/spirituality and ethnic identity were generally not associated with anxiety for either group. Interestingly, experiences of discrimination, somatic symptom focus, and stigma were associated with anxiety for both groups. No evidence showed that the sociocultural factors differentially predicted anxiety outcomes across the two studies. Future studies should continue investigating the relations between anxiety and stigma, somatic symptom focus, and experiences of discrimination. Additional research should also be conducted to explore other variables that may serve as protective factors against anxiety for AAs.

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Footnote 1. Partial correlations were conducted controlling for the demographic variables on which the AA and EA samples differed. When partial correlations were conducted, few changes were noted. Therefore, the primary analyses were conducted without controlling for these demographic variables. When religious affiliation was controlled for in AAs, the Intrinsic Spirituality Scale became negatively correlated with STAI-State ($r = -.17, p = .04$) and the Multiethnic Identity Measure became negatively correlated with the STAI-Trait ($r = -.16, p = .05$). When education was controlled for in EAs, the Beck Anxiety Inventory was no longer correlated with Self-Stigma of Mental Illness Scale ($r = .12, p = .10$). When self-identification of being anxious was controlled in EAs the Self-Stigma of Mental Illness Scale no longer correlated with Beck Anxiety Inventory ($r = .10, p = .17$) or STAI-Trait ($r = .23, p = .002$); the Day's Mental Illness Stigma Scale became significantly correlated with the Beck Anxiety Inventory ($r = .18, p = .02$) and STAI-Trait ($r = .16, p = .04$). For AAs, the Multiethnic Identity Measure was negatively correlated with STAI-State ($r = -.20, p = .01$) and STAI-Trait ($r = -.23, p = .005$). Finally, when previous help seeking behavior was controlled for in EAs the Beck Anxiety Inventory correlated with Day's Mental Illness Stigma Scale ($r = .18, p = .02$). No other significant changes were found when controlling for demographic factors.

Table 1. Demographic Information by Participant Race

	African American		European American		X^2 or t -test
	N (M)	% (SD)	N (M)	% (SD)	
Age	(31.43)	(8.58)	(36.94)	(12.47)	$t(311.11) = 4.72, p < .001$
Gender					$X^2(1, 327) = 1.61, p = .22$
Male	74	48%	72	41%	
Female	79	51%	102	58%	
Transgender	0	0%	2	1%	
Missing	2	1%	0	0.00%	
Income					$X^2(7) = 10.90, p = .14$
0 - 19,999	19	12%	30	17%	
20,000 - 39,999	33	21%	42	24%	
40,000 - 59,999	35	23%	39	22%	
60,000 - 79,999	36	23%	27	15%	
80,000 - 99,999	12	8%	13	7%	
100,000 - 119,999	5	3%	16	9%	
120,000 - 139,999	7	5%	3	2%	
140,000 +	6	4%	6	3%	
Missing	2	1%	0	0%	
Relationship					$X^2(3) = 13.52, p = .004$
Married	49	32%	69	39%	
Single	67	43%	45	26%	
Divorced	5	3%	15	9%	
Partnered but unmarried	34	22%	47	27%	
Education					$X^2(8) = 16.29, p = .04$
Less than High School Diploma	1	< 1%	0	0%	
High School diploma or GED	19	12%	22	13%	
Vocational Training	0	0%	2	1%	
Some college but no degree	47	30%	44	25%	
Associates degree	22	14%	9	5%	
Bachelor's degree	42	27%	71	40%	
Some graduate work but no degree	8	5%	7	4%	
Master's Degree	15	10%	18	10%	
PhD or Professional Degree	1	< 1%	3	2%	

Sexual Orientation					$\chi^2(4) = 10.60, p = .03$
Heterosexual	135	87%	150	86%	
Lesbian	11	7%	3	2%	
Gay	1	< 1%	5	3%	
Bi-sexual	8	5%	14	8%	
Religious Affiliation					$\chi^2(8) = 33.62, p < .001$
Protestant	77	50%	57	32%	
Catholic	31	20%	28	16%	
Hindu	2	1%	0	0%	
Buddhist	2	1%	3	2%	
Not Religious	10	7%	17	10%	
Muslim	6	4%	0	0%	
Jewish	0	0%	3	2%	
Atheist	8	5%	28	16%	
Agnostic	15	10%	34	19%	
Missing	4	3%	6	3%	
Consider yourself an anxious person					$\chi^2(1) = 9.65, p = .002$
Yes	71	46%	110	63%	
No	84	54%	65	37%	
Missing	0	0%	1	1%	
Sought professional services to help with a psychological issue					$\chi^2(1) = 13.05, p < .001$
Yes	48	31%	89	51%	
No	107	69%	87	49%	

Table 2. Study 1 Primary Outcome Variable Means, Standard Deviations, and Group Comparisons

Variable	African American		European American		<i>t</i> -test
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
BAI	15.07	14.61	15.66	13.48	$t(302.4) = -0.27, p = .79$
STAI - State	1.90	0.68	2.01	0.64	$t(329) = 1.64, p = .10$
STAI - Trait	2.06	0.65	2.20	0.64	$t(328) = 2.05, p = .04$
BSQ	2.27	0.98	2.24	0.83	$t(302.27) = -.34, p = .74$
ED	1.89	1.17	1.39	1.02	$t(307.61) = -4.15, p < .001$
SSMI	3.26	0.84	3.36	0.76	$t(329) = 1.09, p = .28$
Days	3.37	1.11	2.01	1.05	$t(329) = -3.89, p < .001$
PRCOPE	2.51	0.95	1.90	1.04	$t(329) = -5.51, p < .001$
NRCOPE	1.75	0.83	1.43	0.62	$t(282.96) = -3.89, p < .001$
ISS	6.25	2.79	4.33	3.08	$t(328.69) = -5.97, p < .001$
MEIM	3.10	0.52	2.57	0.60	$t(329) = -8.54, p < .001$
CESD	1.97	0.55	1.94	0.48	$t(3027.64) = -0.38, p = .71$

Note. BAI = Beck Anxiety Inventory, STAI = State Trait Anxiety Inventory, BSQ = Body Sensations Questionnaire, ED = Everyday Discrimination Scale, SSMI = Self-Stigma of Mental Illness Scale, Days = Day's Mental Illness Stigma Scale, PRCOPE = Positive Religious Coping Scale, NRCOPE = Negative Religious Coping Scale, ISS = Intrinsic Spirituality Scale, MEIM = Multiracial Identity Measure, CESD = Center for Epidemiologic Studies - Depression.

Table 3. Study 1 Bivariate Correlations in African Americans with Partial Correlations Controlling for CESD in Parentheses

	BAI	STAI - State	STAI - Trait	BSQ	ED	SSMI	Days	PRCOPE	NRCOPE	ISS	MEIM
STAI - State	.62** (.23**)	.84** (.65**)	.48** (.01)	.47** (.20*)	0.12	.19*	(.21*)	0.08	.34** (.32**)	.22** (.23**)	.29** (.29**)
STAI - Trait	.67** (.26**)	.38** (-.10)	.43** (.01)	.47** (.20*)	0.12	.19*	(.21*)	0.08	.34** (.32**)	.22** (.23**)	.29** (.29**)
BSQ	.70** (.46**)	.33** (-.10)	.43** (.01)	.47** (.20*)	0.12	.19*	(.21*)	0.08	.34** (.32**)	.22** (.23**)	.29** (.29**)
ED	.48** (.16)	.33** (-.09)	.43** (.01)	.47** (.20*)	0.12	.19*	(.21*)	0.08	.34** (.32**)	.22** (.23**)	.29** (.29**)
SSMI	-0.01 (-.02)	0.06 (.08)	0.09 (.13)	0.07 (.08)	0.12 (.14)	.19*	(.21*)	0.08	.34** (.32**)	.22** (.23**)	.29** (.29**)
Days	.29** (-.04)	.37** (.11)	0.29** (-.09)	.27** (-.01)	.37** (.17*)	.19*	(.21*)	0.08	.34** (.32**)	.22** (.23**)	.29** (.29**)
PRCOPE	.19* (.13)	-0.09 (-.26**)	-0.04 (-.24**)	0.14 (.06)	0.14 (.08)	.17*	(.17*)	0.08	.34** (.32**)	.22** (.23**)	.29** (.29**)
NRCOPE	.44** (.06)	.39** (-.02)	0.39** (-.10)	.37** (.02)	.52** (.30**)	-0.02 (-.03)	(.25**)	.34** (.32**)	.22** (.23**)	.29** (.29**)	.29** (.29**)
ISS	0.08 (.06)	-0.1 (-.19*)	-0.05 (-.14)	0.2 (-.02)	0.09 (.08)	0.14 (.14)	0.1 (.10)	.75** (.75**)	.22** (.23**)	.29** (.29**)	.29** (.29**)
MEIM	0.07 (.06)	-0.14 (-.17*)	-0.16 (-.21**)	0.06 (.10)	0.1 (.14)	0.07 (.07)	-0.19* (-.19*)	.26** (.27**)	-0.07 (-.06)	.29** (.29**)	.29** (.29**)
CESD	.72** (.70**)	.77** (.77**)	.77** (.77**)	.62** (.62**)	.54** (.54**)	0.01 (.01)	.44** (.44**)	0.14 (.14)	.57** (.57**)	0.05 (0.05)	-0.03 (-0.03)

Note. * $p < .05$, ** $p < .01$. BAI = Beck Anxiety Inventory, STAI = State Trait Anxiety Inventory, BSQ = Body Sensations Questionnaire, ED = Everyday Discrimination Scale, SSMI = Self-Stigma of Mental Illness Scale, Days = Day's Mental Illness Stigma Scale, PRCOPE = Positive Religious Coping Scale, NRCOPE = Negative Religious Coping Scale, ISS = Intrinsic Spirituality Scale, MEIM = Multiracial Identity Measure, CESD = Center for Epidemiologic Studies - Depression

Table 4. Study 1 Bivariate Correlations in European Americans with Partial Correlations Controlling for CESD in Parentheses

	BAI	STAI-State	STAI-Trait	BSQ	ED	SSMI	Days	PRCOPE	NRCOPE	ISS	MEIM
STAI - State	.60** (.23**)										
STAI - Trait	.66** (.33**)	.83** (.59**)									
BSQ	.65** (.57**)	.42** (.21**)	.39** (.16*)								
ED	.41** (.15)	.42** (.06)	.39** (-.01)	.32** (.16*)							
SSMI	.15* (.11)	.19** (.17*)	.26** (.29**)	0.11 (.08)	0.13 (.10)						
Days	0.1 (-.03)	0.06 (-.14)	0.04 (-.19*)	0.06 (-.02)	.32** (.26**)	.26** (.25**)					
PRCOPE	0.1 (.02)	0.03 (-.11)	0.02 (-.14)	0.01 (-.05)	.19** (.15)	0.03 (.20)	0.08 (.05)				
NRCOPE	.43** (.25**)	.38** (.13)	.29** (-.03)	.30** (.17*)	.46** (.32**)	0.05 (.02)	.21** (.15)	.46** (.44**)			
ISS	0.07 (-.02)	-0.01 (-.15)	-0.03 (-.20**)	0.02 (-.04)	0.13 (.08)	0.04 (.02)	0.12 (.09)	.82** (.82**)	.33** (.31**)		
MEIM	0.02 (.01)	-0.05 (-.10)	-0.11 (-.21**)	-0.07 (-.09)	-0.08 (-.11)	-0.03 (-.03)	0.19* (.18*)	.28** (.28**)	.20** (.20**)	.32** (.32**)	
CESD	.64** (.23**)	.76** (.59**)	.78** (.39**)	.39** (.16*)	.50** (.13)	0.1 (.03)	0.20** (.18*)	0.14 (.14)	.40** (.40**)	0.13 (.13)	0.02 (.02)

Note. * $p < .05$, ** $p < .01$. BAI = Beck Anxiety Inventory, STAI = State Trait Anxiety Inventory, BSQ = Body Sensations Questionnaire, ED = Everyday Discrimination Scale, SSMI = Self-Stigma of Mental Illness Scale, Days = Day's Mental Illness Stigma Scale, PRCOPE = Positive Religious Coping Scale, NRCOPE = Negative Religious Coping Scale, ISS = Intrinsic Spirituality Scale, MEIM = Multiracial Identity Measure, CESD = Center for Epidemiologic Studies - Depression

Table 5. Study 1 Standardized and Unstandardized Coefficients for Measurement Model

Observed Variable	Latent Construct	β	B	SE	CI Low	CI High	p
Beck Anxiety Inventory	Anxiety	0.72	1.00	0.03	0.65	0.77	0.001
STAI - State	Anxiety	0.89	1.22	0.02	0.85	0.92	0.001
STAI - Trait	Anxiety	0.93	1.26	0.02	0.9	0.97	0.001
Everyday Discrimination Scale	Risk Factors	0.67	1.00	0.07	0.53	0.81	0.001
Body Sensations Questionnaire	Risk Factors	0.61	0.73	0.07	0.46	0.73	0.001
Self Stigma of Mental Illness	Risk Factors	0.22	0.23	0.07	0.07	0.36	0.002
Day's Mental Illness Scale	Risk Factors	0.41	0.6	0.08	0.23	0.55	0.001
Multi Ethnic Identity Measure	Protective Factors	0.43	1.00	0.06	0.31	0.53	0.001
Intrinsic Spirituality Scale	Protective Factors	0.92	10.65	0.04	0.85	0.99	0.001
Positive Religious Coping Scale	Protective Factors	0.88	3.43	0.03	0.82	0.94	0.001

Table 6. Study 2 Demographic Information by Participant Race

	African American		European American		X^2 or t -test
	N (M)	% (SD)	N (M)	% (SD)	
Age	23.2	6.33	23.51	7.07	$t(85) = .21, p = .83$
Missing	1				
Gender					$X^2(1) = .16, p = .69$
Male	14	31%	12	27%	
Female	31	69%	32	73%	
Income					$X^2(7) = 5.96, p = .55$
0 - 19,999	4	9%	3	7%	
20,000 - 39,999	8	17%	3	7%	
40,000 - 59,999	6	13%	8	18%	
60,000 - 79,999	7	16%	6	14%	
80,000 - 99,999	3	7%	5	11%	
100,000 - 119,999	5	11%	6	14%	
120,000 - 139,999	4	9%	1	2%	
140,000 +	8	18%	12	27%	
Education					$X^2(8) = 7.61, p = .47$
Less than HS	1	2%	0	0%	
HS diploma or GED	12	27%	6	14%	
Vocational Training	1	2%	0	0%	
Some college, no degree	17	38%	21	48%	
Associates degree	3	7%	2	5%	
Bachelor's degree	5	11%	5	11%	
Some graduate work, not completed	1	2%	3	7%	
Master's Degree	5	11%	5	11%	
PhD or Professional Degree	0	0%	2	5%	
Sexual Orientation					$X^2(3) = .61, p = .90$
Heterosexual	40	89%	37	84%	
Lesbian	1	2%	1	2%	
Gay	1	2%	1	2%	
Bi-sexual	3	7%	5	11%	
Religious Affiliation					$X^2(8) = 11.92, p = .16$
Protestant	18	40%	12	27%	
Catholic	3	7%	8	18%	
Buddhist	1	2%	0	2%	
Not Religious	7	15%	8	18%	
Muslim	1	2%	0	0%	

Jewish	0	0%	2	5%	
Atheist	1	2%	3	7%	
Agnostic	4	9%	7	16%	
Other faith	10	22%	4	9%	
Anxious Person					$\chi^2 (1) = 2.26, p = .11$
Yes	19	40%	27	61%	
No	26	60%	17	39%	
Professional Help-Seeking					$\chi^2 (1) = 4.06, p = .04$
Yes	18	40%	27	61%	
No	27	60%	17	40%	
Personal Illnesses History (Cardiovascular Disease, Stroke, Diabetes)					$\chi^2 (1) = 2.97, p = .09$
Yes	7	15%	2	5%	
No	38	84%	42	96%	
College Student					$t(87) = .08, p = .93$
Yes	18	40%	18	59%	
No	27	60%	26	41%	
Smoker					$\chi^2 (2) = 4.24, p = .12$
Never	34	91%	42	91%	
Former	2	4%	2	4%	
Current	2	4%	2	4%	
Body Mass Index	27.90	7.95	26.34	6.51	$t(87) = -1.01, p = .32$

Table 7. Study 2 Primary Outcome Variable Means, Standard Deviations, and Group Comparisons

	African Americans		European Americans		<i>t</i> -test
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
BAI	34.67	11.86	39.22	11.38	$t(87) = 1.85, p = .07$
STAI-State	2.29	0.75	2.54	0.64	$t(87) = 1.70, p = .09$
STAI-Trait	2.08	0.57	2.17	0.55	$t(87) = .82, p = .09$
PSWQ	3.38	1.04	3.54	1.07	$t(87) = .74, p = .46$
BSQ	2.57	0.79	2.57	0.74	$t(87) = -.05, p = .96$
ED	2.97	0.97	2.52	0.77	$t(87) = -2.44, p = .02$
SSMI	3.33	0.95	3.01	0.74	$t(87) = -1.77, p = .08$
PDD	4.36	0.96	4.07	0.87	$t(87) = -1.50, p = .14$
PRCOPE	2.71	1.04	2.00	1.10	$t(87) = -3.10, p = .003$
NRCOPE	.20	.15	.13	.16	$t(87) = -1.98, p = .05$
ISS	7.04	2.84	4.67	2.92	$t(87) = -3.894, p < .001$
MEIM	3.28	0.6	2.48	0.41	$t(77.7) = -7.37, p < .001$
CESD	1.87	0.46	1.99	0.46	$t(87) = 1.14, p = .26$

Note. BAI = Beck Anxiety Inventory, STAI = State Trait Anxiety Inventory, BSQ = Body Sensations Questionnaire, ED = Everyday Discrimination Scale, SSMI = Self-Stigma of Mental Illness Scale, Days = Day's Mental Illness Stigma Scale, PRCOPE = Positive Religious Coping Scale, NRCOPE = Negative Religious Coping Scale, ISS = Intrinsic Spirituality Scale, MEIM = Multiethnic Identity Measure, CESD = Center for Epidemiologic Studies - Depression.

Table 8. Study 2 Primary Physiological Outcome Variable Means, Standard Deviations, and Group Comparisons

	AA		EA		<i>t</i> -test
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
HR Baseline	79.02	13.96	83.94	11.98	$t(76) = 1.89, p = .06$
HR Worry	78.19	9.07	83.09	9.24	$t(76) = 2.36, p = .02$
HR Relaxation	77.18	9.97	82.47	9.96	$t(73) = 2.35, p = .02$
HRV Baseline	69.31	55.89	50.91	38.28	$t(76) = 1.77, p = .08$
HRV Worry	75.16	62.85	62.8	58.33	$t(76) = 1.59, p = .12$
HRV Relaxation	91.52	69.38	63.9	57.42	$t(73) = 2.33, p = .02$
Cortisol Baseline	1.67	0.99	1.81	0.91	$t(73) = .86, p = .39$
Cortisol Post Worry	1.13	0.52	1.39	0.72	$t(72) = 1.80, p = .08$

Note. HR = Heart Rate, HRV = Heart Rate Variability. Means and standard deviations are presented as non-transformed scores for ease of interpretability. Results of the *t*-tests are with transformed scores. HR/HRV and Cortisol $n = 40$ for AAs and $n = 38$ for EAs.

Table 9. Study 2 Bivariate Correlations in African Americans with Partial Correlations Controlling for CESD in Parentheses

	BAI	STAI- State	STAI- Trait	PSWQ	BSQ	ED	SSMI	PDD	PRCOPE	NRCOPE	ISS	MEIM
BAI												
STAI - State	.54** (.32*)											
STAI - Trait	.58** (.24)	.54** (.22)										
PSWQ	.61** (.39**)	.49** (.25)	.77** (.61**)									
BSQ	.55** (.32*)	.44** (.19)	.51** (.14)	.52** (.27)								
ED	.30* (.09)	.29* (.11)	.32* (.06)	.19 (-.05)	.37* (.21)							
SSMI	.33* (.08)	.29 (.07)	.29 (.07)	.28 (.04)	.30* (.07)	.14 (-.03)						
PDD	-.08 (-.24)	.06 (-.19)	.06 (.11)	.18 (.09)	.30* (.24)	.10 (.03)	.24 (.18)					
PRCOPE	.12 (.12)	-.05 (-.08)	.09 (.09)	.19 (.22)	-.07 (-.11)	.07 (.06)	.13 (.13)	.01 (-.01)				
NRCOPE	.36* (-.03)	.48*** (.20)	.64** (.32*)	.62** (.40**)	.31* (-.08)	.32* (.12)	.41** (.19)	.23 (.15)	.43** (.52**)			
ISS	.08 (.17)	.01 (.07)	-.08 (-.01)	.05 (.13)	-.11 (-.06)	-.09 (-.06)	.04 (.09)	-.10 (-.08)	.70** (.71**)	.11 (.24)		
MEIM	-.03 (-.09)	-.19 (-.27)	.01 (-.07)	-.06 (-.11)	.02 (-.02)	.10 (.09)	-.09 (-.13)	.08 (-.07)	.04 (.04)	-.13 (-.23)	.02 (.02)	
CESD	.60** .55		0.75 (-.07)	.59** (-.11)	.57** (-.02)	.38* (.09)	.44** (-.13)	0.18 (-.07)	0.04 (.04)	.67** (-.23)	-.01 (.02)	.06

Note. * $p < .05$, ** $p < .01$. BAI = Beck Anxiety Inventory, STAI = State Trait Anxiety Inventory, PSWQ = Penn State Worry Questionnaire, BSQ = Body Sensations Questionnaire, ED = Everyday Discrimination Scale, SSMI = Self-Stigma of Mental Illness Scale, PDD = Perceived Discrimination and Devaluation Scale, PRCOPE = Positive Religious Coping Scale, NRCOPE = Negative Religious Coping Scale, ISS = Intrinsic Spirituality Scale, MEIM = Multiracial Identity Measure, CESD = Center for Epidemiologic Studies - Depression.

Table 10. Study 2 Bivariate Correlations in European Americans with Partial Correlations Controlling for CESD in Parentheses

	BAI	STAI - State	STAI- Trait	PSWQ	BSQ	ED	SSMI	PDD	PRCOPE	NRCOPE	ISS	MEIM
BAI												
STAI - State	.47** (.14)											
STAI - Trait	.50** (.09)	.61** (.36*)										
PSWQ	.54** (.21)	.61** (.43**)	.64** (.36*)									
BSQ	.61*** (.44**)	.46** (.27)	-.24 (-.24)	.59** (.43**)								
ED	.13 (-.02)	.07 (-.05)	.10 (-.08)	-.09 (-.26)	-.02 (-.14)							
SSMI	.05 (-.04)	.03 (-.03)	.15 (.10)	-.02 (-.11)	-.05 (-.12)	.35* (.33*)						
PDD	-.27 (-.36*)	.12 (.15)	.06 (.12)	.01 (.03)	-.08 (-.08)	.13 (.14)	.19 (.19)					
PRCOPE	.09 (.08)	.06 (.05)	.13 (.16)	.07 (.06)	-.10 (-.14)	.03 (.02)	.35* (.35*)	.24 (.24)				
NRCOPE	.34* (.33*)	.17 (.11)	.29 (.26)	.22 (.16)	-.02 (-.11)	.31* (.28)	.12 (.10)	.08 (.09)	.36* (.36*)			
ISS	.03 (-.10)	.13 (.10)	.15 (.08)	.09 (.05)	-.03 (-.09)	.18 (.23)	.41** (.45**)	.31* (.27)	.84** (.83**)	.24 (.21)		
MEIM	-.14 (.19)	.28 (-.11)	-.49** (-.34*)	-.25 (-.03)	-.13 (.06)	.02 (.10)	-.08 (-.04)	-.01 (.01)	.30* (.34*)	-.06 (.01)	.20 (.29)	
CESD	.71***	.54**	.76**	.60**	0.2	0.2	0.12	-0.02	0.04	0.16	0.08	-.37*

Note. * $p < .05$, ** $p < .01$. BAI = Beck Anxiety Inventory, STAI = State Trait Anxiety Inventory, PSWQ = Penn State Worry Questionnaire, BSQ = Body Sensations Questionnaire, ED = Everyday Discrimination Scale, SSMI = Self-Stigma of Mental Illness Scale, PDD = Perceived Discrimination and Devaluation Scale, PRCOPE = Positive Religious Coping Scale, NRCOPE = Negative Religious Coping Scale, ISS = Intrinsic Spirituality Scale, MEIM = Multiracial Identity Measure, CESD = Center for Epidemiologic Studies - Depression.

Table 11. Study 2 Bivariate Correlations for Heart Rate and Heart Rate Variability in African Americans with Partial Correlations Controlling for CESD in Parentheses

	Baseline HR	Worry HR	Relaxation HR	Baseline HRV	Worry HRV	Relax HRV
Baseline HR						
Worry HR	.84** (.84**)					
Relax HR	.83** (.83**)	.85** (.85**)				
Baseline HRV	-.12 (-.10)	-.26 (-.26)	-.30 (-.30)			
Worry HRV	-.06 (-.04)	-.11 (-.10)	-.20 (-.20)	.75** (.75**)		
Relaxation HRV	.04 (.06)	-.07 (-.06)	-.16 (-.16)	.75** (.75**)	.83** (.83**)	
BAI	.06 (.22)	.20 (.31)	.03 (.14)	.17 (.16)	.23 (.25)	.27 (.29)
STAI-State	.11 (.25)	.10 (.18)	.06 (.14)	-.06 (-.12)	-.09 (-.15)	-.09 (-.13)
STAI-Trait	.10 (.34)	.16 (.31)	.13 (.33)	-.18 (-.33*)	-.12 (-.22)	-.27 (-.45**)
PSWQ	.37* (.62**)	.43** (.61**)	.39* (.58**)	-.16 (-.25)	.04 (.01)	-.05 (-.11)
BSQ	.08 (.28)	.07 (.18)	.08 (.20)	.31 (.33*)	.11 (.09)	.13 (.11)
ED	-.19 (-.15)	-.15 (-.15)	-.26 (-.24)	.19 (.18)	.20 (.21)	.18 (.17)
SSMI	-.32* (-.27)	-.30 (-.29)	-.27 (-.24)	.03 (.30)	.27 (.28)	.17 (.16)
PDD	-.16 (-.11)	-.15 (-.14)	-.06 (-.03)	.21 (.20)	.27 (.27)	.16 (.15)
PRCOPE	.13 (.13)	.16 (.14)	.12 (.14)	.09 (-.23)	.21 (.23)	.16 (.16)
NRCOPE	.10 (.22)	.23 (.33)	.21 (.37*)	-.14 (-.23)	-.01 (-.04)	-.14 (-.22)
ISS	.14 (.11)	.21 (.19)	.13 (.12)	.01 (.02)	.07 (.09)	.09 (.09)
MEIM	-.19 (-.19)	-.22 (-.26)	-.26 (-.25)	-.01 (-.01)	.02 (.02)	.10 (.09)
CESD	-.19	-.08	-.14	.07	.05	.06

Note. * $p < .05$, ** $p < .01$. $n = 40$. BAI = Beck Anxiety Inventory, STAI = State Trait Anxiety Inventory, PSWQ = Penn State Worry Questionnaire, BSQ = Body Sensations Questionnaire, ED = Everyday Discrimination Scale, SSMI = Self-Stigma of Mental Illness Scale, PDD = Perceived Discrimination and Devaluation Scale, PRCOPE = Positive Religious Coping Scale,

NRCOPE = Negative Religious Coping Scale, ISS = Intrinsic Spirituality Scale, MEIM = Multiethnic Identity Measure, CESD = Center for Epidemiologic Studies - Depression.

Table 12. Study 2 Bivariate Correlations for Heart Rate and Heart Rate Variability in European Americans with Partial Correlations Controlling for CESD in Parentheses

	Baseline HR	Worry HR	Relax HR	Baseline HRV	Worry HRV	Relax HRV
Baseline HR						
Worry HR	.74** (.71**)					
Relax HR	.63** (.60**)	.93** (.92**)				
Baseline HRV	-.24 (-.09)	-.34* (-.22)	-0.33 (-.25)			
Worry HRV	-.41* (-.30)	-.10 (.04)	0.01 (.13)	0.63** (.56**)		
Relax HRV	-.51* (-.42*)	-.21 (-.09)	-0.07 (-.03)	.64** (.57**)	.94** (.93**)	
BAI	.18 (.09)	.19 (.22)	0.12 (.25)	-0.3 (-.28)	-0.36* (-.34*)	-.32 (-.30*)
STAI-State	.01 (-.15)	.03 (-.06)	-0.01 (-.03)	-0.29 (-.20)	-.16 (-.01)	-.19 (-.10)
STAI-Trait	.25 (.06)	.12 (-.01)	0.05 (-.01)	-0.32 (-.13)	-.24 (.07)	-.22 (.01)
PSWQ	.03 (-.10)	-.07 (-.14)	-0.11 (-.13)	-0.18 (-.09)	-.17 (-.04)	-.17 (-.09)
BSQ	.20 (.12)	.16 (.12)	0.11 (.12)	-0.06 (.07)	-.16 (-.04)	-.17 (-.09)
ED	.04 (.11)	.09 (.12)	0.12 (.22)	0.05 (-.02)	.04 (.01)	.13 (.10)
SSMI	.17 (.25)	-.02 (.07)	-0.01 (.05)	0.29 (.29)	-.02 (-.04)	.04 (.01)
PDD	.03 (-.01)	-0.17 (-.30)	-0.06 (-.19)	0.03 (.16)	.01 (.13)	.08 (.22)
PRCOPE	.15 (.04)	.08 (.01)	0.27 (.17)	-0.08 (.04)	-.12 (.01)	-.07 (.08)
NRCOPE	0.12 (.05)	0.15 (.11)	0.22 (.17)	-0.2 (-.15)	-.19 (-.13)	-.12 (-.07)
ISS	0.09 (.01)	0.03 (-.01)	0.18 (.19)	0.02 (.11)	.03 (.15)	.06 (-.05)
MEIM	-0.2 (-.10)	0.01 (.14)	0.25 (.35*)	0.04 (-.16)	.25 (.12)	.28 (.17)
CESD	0.2	0.11	-0.01	-0.22	-.26	-.19

Note. * $p < .05$, ** $p < .01$. $n = 38$. BAI = Beck Anxiety Inventory, STAI = State Trait Anxiety Inventory, PSWQ = Penn State Worry Questionnaire, BSQ = Body Sensations Questionnaire, ED = Everyday Discrimination Scale, SSMI = Self-Stigma of Mental Illness Scale, PDD = Perceived Discrimination and Devaluation Scale, PRCOPE = Positive Religious Coping Scale,

NRCOPE = Negative Religious Coping Scale, ISS = Intrinsic Spirituality Scale, MEIM = Multiethnic Identity Measure, CESD = Center for Epidemiologic Studies - Depression.

Table 13. Study 2 Bivariate Correlations for Cortisol in African Americans with Partial Correlations Controlling for CESD in Parentheses

	Pre-induction Cortisol	Post-induction Cortisol
Pre-induction Cortisol		
Post-induction Cortisol	.51*** (.50**)	
BAI	-.12 (.01)	-.08 (-.06)
STAI-State	-.06 (.09)	.05 (.11)
STAI-Trait	-.01 (.17)	-.12 (-.11)
PSWQ	-.08 (-.01)	-.08 (-.06)
BSQ	.10 (.24)	.11 (.17)
ED	-.18 (-.09)	-.07 (-.06)
SSMI	.04 (.12)	.24 (.29)
PDD	.09 (.08)	.22 (.23)
PRCOPE	-.38* (-.37*)	-.20 (-.20)
NRCOPE	-.33* (-.26)	-.12 (-.10)
Spirituality	-.31 (-.27)	.02 (.03)
MEIM	.10 (.19)	.09 (.08)
CESD	-0.16	-0.05

Note. * $p < .05$, ** $p < .01$. $n = 40$. BAI = Beck Anxiety Inventory, STAI = State Trait Anxiety Inventory, PSWQ = Penn State Worry Questionnaire, BSQ = Body Sensations Questionnaire, ED = Everyday Discrimination Scale, SSMI = Self-Stigma of Mental Illness Scale, PDD = Perceived Discrimination and Devaluation Scale, PRCOPE = Positive Religious Coping Scale, NRCOPE = Negative Religious Coping Scale, ISS = Intrinsic Spirituality Scale, MEIM = Multiethnic Identity Measure, CESD = Center for Epidemiologic Studies - Depression.

Table 14. Study 2 Bivariate Correlations for Cortisol in European Americans with Partial Correlations Controlling for CESD in Parentheses

	Pre-induction Cortisol	Post-induction Cortisol
Pre-induction Cortisol		
Post-induction Cortisol	.35* (.34)	
BAI	.31 (.16)	-.01 (-.10)
STAI-State	.15 (.02)	-.10 (-.15)
STAI-Trait	.21 (.03)	-.02 (-.06)
PSWQ	.11 (-.09)	.06 (.04)
BSQ	-.03 (-.19)	-.22 (-.27)
ED	.39* (.28)	.05 (-.01)
SSMI	.14 (.03)	.20 (.17)
PDD	.04 (.10)	-.11 (-.07)
PRCOPE	.01 (.08)	.13 (.18)
NRCOPE	.06 (.01)	.21 (.23)
ISS	-.10 (-.10)	-.06 (-.04)
MEIM	.11 (.19)	.06 (.07)
CESD	.28	.06

Note. * $p < .05$, ** $p < .01$. $n = 38$. BAI = Beck Anxiety Inventory, STAI = State Trait Anxiety Inventory, PSWQ = Penn State Worry Questionnaire, BSQ = Body Sensations Questionnaire, ED = Everyday Discrimination Scale, SSMI = Self-Stigma of Mental Illness Scale, PDD = Perceived Discrimination and Devaluation Scale, PRCOPE = Positive Religious Coping Scale, NRCOPE = Negative Religious Coping Scale, ISS = Intrinsic Spirituality Scale, MEIM = Multiethnic Identity Measure, CESD = Center for Epidemiologic Studies - Depression.

Table 15. Linear model of sociocultural protective predictors of STAI-State, standard errors are based on 5000 bootstrap samples.

	<i>B</i>	<i>SE B</i>	β	<i>p</i>
Step 1				
Constant	2.44	0.06		0.001
Dummy Race	-0.06	0.16	-0.04	0.80
ISS	0.03	0.06	0.15	0.41
PRCOPE	-0.05	0.07	-0.08	0.66
MEIM	-0.3	0.12	-0.28	0.07
Step 2				
Constant	2.39	1.3		0.001
Dummy Race	-0.01	1.06	-0.01	0.98
ISS	0.05	0.09	0.21	0.41
PRCOPE	-0.01	0.1	-0.02	0.94
MEIM	-0.5	0.24	-0.46	0.03
PRCOPE*Race	-0.06	0.12	-0.06	0.79
ISS*Race	-0.03	0.15	-0.08	0.74
MEIM*Race	0.27	0.29	0.18	0.40

Note. $R^2 = .09$ for step 1; $\Delta R^2 = .01$ for step 2. PRCOPE = Positive Religious Coping Scale, NRCOPE = Negative Religious Coping Scale, ISS = Intrinsic Spirituality Scale, MEIM = Multiethnic Identity Measure, CESD = Center for Epidemiologic Studies - Depression

Table 16. Linear model of sociocultural risk predictors of STAI-State, standard errors are based on 5000 bootstrap samples

		<i>B</i>	<i>SE B</i>	β	<i>p</i>
Step 1					
	Constant	2.57	0.09		0.001
	Dummy Race	-0.3	0.14	-0.22	0.03
	BSQ	0.38	0.09	0.42	0.001
	ED	0.08	0.09	0.1	0.32
	SSMI	0.1	0.1	0.12	0.25
	PDD	-0.05	0.08	-0.07	0.47
Step 2					
	Constant	2.57	0.09		0.001
	Dummy Race	-0.31	0.14	-0.22	0.03
	BSQ	0.41	0.13	0.44	0.002
	ED	0.05	0.13	0.06	0.72
	SSMI	0.01	0.13	0.01	0.95
	PD	0.1	0.11	0.14	0.35
	Race*BSQ	-0.03	0.19	-0.02	0.88
	Race*ED	0.06	0.18	0.06	0.72
	Race*SSMI	0.16	0.19	0.15	0.38
	Race*PDD	-0.29	0.17	-0.28	0.06

Note. $R^2 = .09$ for step 1; $\Delta R^2 = .04$ for step 2. BAI = Beck Anxiety Inventory, STAI = State Trait Anxiety Inventory, BSQ = Body Sensations Questionnaire, ED = Everyday Discrimination Scale, SSMI = Self-Stigma of Mental Illness Scale, Days = Day's Mental Illness Stigma Scale.

Table 17. Linear model of sociocultural protective predictors of HR, standard errors are based on 5000 bootstrap samples.

		<i>B</i>	<i>SE B</i>	β	<i>p</i>
Step 1					
	Constant	0.73	0.15		0.001
	Baseline HR	0.61	0.08	0.81	0.001
Step 2					
	Constant	0.76	0.16		0.001
	Baseline HR	0.6	0.08	0.79	0.001
	Dummy Race	-0.01	0.01	-0.12	0.26
	PRCOPE	-.01	0.01	0.04	0.69
	ISS	.01	0.01	0.06	0.49
	MEIM	.01	0.01	0.03	0.76
Step 3					
	Constant	.76	0.16		0.001
	Baseline HR	.61	0.08	0.79	0.001
	Dummy Race	-.02	0.01	-0.16	0.14
	PRCOPE	-.01	0.01	-0.06	0.74
	ISS	-.01	0.01	-0.03	0.85
	MEIM	.02	0.02	0.28	0.17
	PRCOPE*Race	.01	0.01	0.01	0.94
	ISS*Race	.01	0.01	0.11	0.45
	MEIM*Race	-.03	0.02	-0.25	0.11

Note. $R^2 = .65$ for step 1; $\Delta R^2 = .01$ for step 2, and $\Delta R^2 = .03$ for step 3. PRCOPE = Positive Religious Coping Scale, NRCOPE = Negative Religious Coping Scale, ISS = Intrinsic Spirituality Scale, MEIM = Multiethnic Identity Measure, CESD = Center for Epidemiologic Studies - Depression

Table 18. Linear model of sociocultural risk predictors of HR, standard errors are based on 5000 bootstrap samples.

	<i>B</i>	<i>SE B</i>	β	<i>p</i>
Step 1				
Constant	0.73	0.14		0.001
Baseline HR	0.61	0.08	0.81	0.001
Step 2				
Constant	0.79	0.15		0.001
Baseline HR	0.59	0.08	0.77	0.001
Dummy Race	-0.01	0.01	-0.09	0.25
BSQ	0.01	0.05	0.02	0.73
ED	0.01	0.01	0.05	0.42
SSMI	-0.01	0.01	-0.07	0.36
PDD	-0.01	0.01	-0.09	0.17
Step 3				
Constant	0.76	0.16		0.001
Baseline HR	0.6	0.08	0.79	0.001
Dummy Race	-0.01	0.01	-0.08	0.29
BSQ	0.01	0.01	-0.01	0.98
ED	0.01	0.01	0.15	0.27
SSMI	-0.01	0.01	-0.17	0.24
PDD	-0.01	0.01	-0.18	0.17
BSQ*Race	0.01	0.01	0.01	0.94
ED*Race	-0.01	0.01	-0.1	0.40
SSMI*Race	-0.01	0.01	0.11	0.41
PDD*Race	-0.01	0.01	0.13	0.27

Note. $R^2 = .65$ for step 1, $\Delta R^2 = .02$ for step 2, and $\Delta R^2 = .01$ for step 3. BAI = Beck Anxiety Inventory, STAI = State Trait Anxiety Inventory, BSQ = Body Sensations Questionnaire, ED = Everyday Discrimination Scale, SSMI = Self-Stigma of Mental Illness Scale, Days = Day's Mental Illness Stigma Scale.

Table 19. Linear model of sociocultural protective predictors of HRV, standard errors are based on 5000 bootstrap samples.

		<i>B</i>	<i>SE B</i>	β	<i>p</i>
Step 1					
	Constant	0.54	0.16		0.003
	Baseline HRV	0.71	0.09	0.7	0.001
Step 2					
	Constant	0.57	0.17		0.004
	Baseline HRV	0.69	0.1	0.69	0.001
	Dummy Race	-0.03	0.08	-0.05	0.72
	PRCOPE	-0.01	0.03	-0.03	0.8
	ISS	0.01	0.01	0.05	0.63
	MEIM	0.06	0.06	0.13	0.28
Step 3					
	Constant	0.68	0.19		0.001
	Baseline HRV	0.66	0.1	0.66	0.001
	Dummy Race	-0.08	0.09	-0.12	0.38
	PRCOPE	-0.12	0.06	-0.43	0.03
	ISS	0.03	0.02	0.32	0.14
	MEIM	0.22	0.13	0.47	0.09
	PRCOPE*Race	0.18	0.07	0.43	0.01
	ISS*Race	-0.04	0.03	-0.28	0.12
	MEIM*Race	-0.22	0.14	-0.33	0.12

Note. $R^2 = .49$ for step 1, $\Delta R^2 = .01$ for step 2, and $\Delta R^2 = .05$ for step 3. PRCOPE = Positive Religious Coping Scale, NRCOPE = Negative Religious Coping Scale, ISS = Intrinsic Spirituality Scale, MEIM = Multiethnic Identity Measure, CESD = Center for Epidemiologic Studies - Depression

Table 20. Linear model of sociocultural risk predictors of HRV, standard errors are based on 5000 bootstrap samples.

		<i>B</i>	<i>SE B</i>	β	<i>p</i>
Step 1					
	Constant	0.54	0.16		0.001
	Baseline HRV	0.71	0.09	0.7	0.001
Step 2					
	Constant	0.5	0.16		0.003
	Baseline HRV	0.72	0.1	0.71	0.001
	Dummy Race	0.01	0.06	0.02	0.86
	BSQ	-0.06	0.04	-0.13	0.15
	ED	0.02	0.03	0.06	0.43
	SSMI	-0.03	0.03	-0.08	0.33
	PDD	-0.03	0.03	0.08	0.36
Step 3					
	Constant	0.49	0.17		0.005
	Baseline HRV	0.73	0.1	0.72	0.001
	Dummy Race	0.01	0.06	0.02	0.86
	BSQ	-0.06	0.08	-0.15	0.43
	ED	0.04	0.06	0.11	0.52
	SSMI	-0.11	0.07	-0.3	0.13
	PDD	0.01	0.05	0.01	0.96
	BSQ*Race	-0.02	0.09	-0.04	0.77
	ED*Race	-0.01	0.07	-0.01	0.94
	SSMI*Race	0.12	0.08	0.27	0.13
	PDD*Race	0.04	0.06	0.09	0.49

Note. $R^2 = .49$ for step 1, $\Delta R^2 = .03$ for step 2, and $\Delta R^2 = .03$ for step 3. BAI = Beck Anxiety Inventory, STAI = State Trait Anxiety Inventory, BSQ = Body Sensations Questionnaire, ED = Everyday Discrimination Scale, SSMI = Self-Stigma of Mental Illness Scale, Days = Day's Mental Illness Stigma Scale.

Table 21. Linear model of sociocultural protective predictors of post-induction cortisol, standard errors are based on 5000 bootstrap samples.

		<i>B</i>	<i>SE B</i>	β	<i>p</i>
Step 1					
	Constant	-0.01	0.02		0.69
	Pre-induction Cortisol	0.37	0.1	0.43	0.001
Step 2					
	Constant	0.03	0.04		0.55
	Baseline Cortisol	0.37	0.11	0.43	0.003
	Dummy Race	-0.07	0.05	-0.18	0.17
	PRCOPE	0.01	0.04	0.04	0.88
	ISS	0.01	0.02	0.03	0.91
	MEIM	0.01	0.04	0.01	0.99
Step 3					
	Constant	0.01	0.06		0.84
	Pre-induction Cortisol	0.33	0.11	0.38	0.003
	Dummy Race	-0.06	0.06	-0.17	0.25
	PRCOPE	0.09	0.06	0.55	0.11
	ISS	-0.03	0.02	-0.5	0.14
	MEIM	-0.03	0.1	-0.11	0.73
	PRCOPE*Race	-0.14	0.08	-0.56	0.06
	ISS*Race	-0.06	0.03	0.58	0.05
	MEIM*Race	0.04	0.1	0.1	0.68

Note. $R^2 = .19$ for step 1, $\Delta R^2 = .03$ for step 2, and $\Delta R^2 = .06$ for step 3.
 PRCOPE = Positive Religious Coping Scale, NRCOPE = Negative Religious Coping Scale, ISS = Intrinsic Spirituality Scale, MEIM = Multiethnic Identity Measure, CESD = Center for Epidemiologic Studies - Depression

Table 22. Linear model of sociocultural risk predictors of post-induction cortisol, standard errors are based on 5000 bootstrap samples.

		<i>B</i>	<i>SE B</i>	β	<i>p</i>
Step 1					
	Constant	-0.01	0.02		0.69
	Pre-induction Cortisol	0.37	0.1	0.43	0.001
Step 2					
	Constant	0.03	0.04		0.44
	Pre-induction Cortisol	0.36	0.1	0.41	0.002
	BSQ	-0.03	0.02	-0.11	0.23
	ED	-0.02	0.02	-0.09	0.39
	SSMI	0.05	0.02	0.22	0.01
	PDD	0.01	0.02	0.03	0.79
	Dummy Race	-0.07	0.04	-0.18	0.12
Step 3					
	Constant	0.01	0.04		0.72
	Pre-induction Cortisol	0.37	0.1	0.43	0.001
	BSQ	-0.06	0.04	-0.27	0.11
	ED	-0.05	0.05	-0.24	0.24
	SSMI	0.08	0.05	0.36	0.11
	PDD	-0.03	0.04	-0.17	0.31
	Dummy Race	-0.06	0.04	-0.16	0.18
	BSQ*Race	0.05	0.05	0.17	0.26
	ED*Race	0.05	0.06	0.16	0.41
	SSMI*Race	-0.04	0.06	-0.15	0.44
	PDD*Race	0.07	0.05	0.25	0.13

Note. $R^2 = .19$ for step 1, $\Delta R^2 = .08$ for step 2, and $\Delta R^2 = .05$ for step 3. PRCOPE = Positive Religious Coping Scale, NRCOPE = Negative Religious Coping Scale, ISS = Intrinsic Spirituality Scale, MEIM = Multiethnic Identity Measure, CESD = Center for Epidemiologic Studies - Depression

Figure 1. Study 1 initial standardized measurement model of risk factors, protective factors, and anxiety.

Figure 2. Study 1 standardized measurement model of risk factors, protective factors, and anxiety with modification indices.

Figure 3. Study 1 standardized measurement model of risk factors, protective factors, and anxiety with Self-Stigma Scale removed due to low loading on the latent variable Risk Factors.

Figure 4. Study 1 standardized structural model of risk factors, protective factors, and anxiety.

Race was dummy coded with AAs = 1 and EAs = 0.

Figure 5. Change in HRV across phases of Study 2. Transformed scores were used as non-transformed scores changed the results. To assist in interpretability, the non-transformed and transformed means and standard errors are listed below. Non-transformed baseline ($M = 58.65$, $SE = 4.79$) non-transformed worry ($M = 70.80$, $SE = 7.37$), non-transformed relaxation ($M = 78.49$, $SE = 7.59$). Transformed baseline ($M = 1.67$, $SE = .04$), transformed worry ($M = 1.71$, $SE = .04$), and transformed relaxation ($M = 1.76$, $SE = .04$).

Figure 6. Change in cortisol pre and post worry induction. To improve interpretability, non-transformed cortisol values were used. There was a main effect of Time, $F(1, 70) = 4.70, p = .03, \eta^2 = .06$. Pre-worry induction cortisol ($M = 1.73, SE = .11, 95\% \text{ CI } [1.51, 1.95]$) was significantly higher than post-worry induction ($M = 1.27, SE = .07, 95\% \text{ CI } [1.12, 1.41]$).

Figure 7. Multiple regression interaction deconstruction of interaction between positive religious coping and race with worry HRV as the dependent variable. In-text the transformed results are presented. To improve interpretability of the figure, non-transformed HRV values were used. As with the transformed results the $\Delta R^2 = .06$ was not significant, $F(3, 69) = 2.23, p = .09$, indicating that the overall model was not significant. Simple slopes analysis revealed a statistically significant linear relationship between HRV and religious coping for EAs ($b = -.19.13, SE = 11.27, p = .03$) but not for AAs ($b = 11.70, SE = 7.71, p = .10$).

Figure 8. Multiple regression interaction deconstruction between positive religious coping and race with post-worry cortisol as the dependent variable. In-text the transformed results are presented. To improve interpretability of the figure, non-transformed HRV values were used. As with the transformed results the $\Delta R^2 = .08$ was not significant, $F(3, 64) = 2.34, p = .08$, indicating that the overall model was not significant. Simple slopes analysis revealed a non-statistically significant relationship between cortisol and spirituality for neither EAs ($b = -.11, SE = .07, p = .12$) nor AAs ($b = .09, SE = .06, p = .11$).

Appendix A: Questionnaires

Body Sensations Questionnaire (BSQ; Chambless, Caputo, Bright, & Gallagher, 1984)

Perceived Devaluation and Discrimination Scale (PDD; Link, 1987)

Day's Mental Illness Stigma Scale (Day, E.N., Edgren, K., & Eshleman, A., 2007)

Penn State Worry Questionnaire (PSWQ; Meyer, Miller, Metzger, & Borkovec, 1990)

Self-Stigma of Mental Illness (SSOMI; Tucker et al., 2013)

Everyday Discrimination Scale (EDS; Williams et al., 1997)

Brief RCOPE (Pargament et al., 2000)

Intrinsic Spirituality Scale (Hodges, 2003)

Multiple Group Ethnic Identity Measure – Revised (MEIM-R; Phinney & Ong, 2007)

Center for Epidemiologic Studies Depression Scale (CES-D; Radloff, 1977)

Demographics and other information

Body Sensations Questionnaire:

Below is a list of specific body sensations that may occur when you are nervous or in a feared situation. Please indicate how frightened you are by each sensation. Use the following five-point scale:

- 1 – Not at all
- 2 – Somewhat
- 3 – Moderately
- 4 – Very
- 5 – Extremely

- 1. Heart palpitations
- 2. Pressure or a heavy feeling in chest
- 3. Numbness in arms and legs
- 4. Tingling in the fingertips
- 5. Numbness in another part of your body
- 6. Feeling short of breath
- 7. Dizziness
- 8. Blurred or distorted vision
- 9. Nausea
- 10. Having “butterflies” in your stomach
- 11. Feeling a knot in your stomach
- 12. Having a lump in your throat
- 13. Wobbly or rubber legs
- 14. Sweating
- 15. A dry throat
- 16. Feeling disoriented or confused
- 17. Feeling disconnected from your body or feeling only partly present

Devaluation-Discrimination Measure:

Please answer the following questions using a six-point scale from 1 (strongly agree) to 6 (strongly disagree).

1. Most people would willingly accept a former mental patient as a close friend.
2. Most people believe that a person who has been in a mental hospital is just as intelligent as the average person.
3. Most people believe that a former mental patient is just as trustworthy as the average citizen.
4. Most people would accept a fully recovered former mental patient as a teacher of young children in a public school.
5. Most people feel that entering a mental hospital is a sign of personal failure (R)
6. Most people would not hire a former mental patient to take care of their children, even if he or she had been well for some time. (R)
7. Most people think less of a person who has been in a mental hospital. (R)
8. Most employers will hire a former mental patient if he or she is qualified for the job.
9. Most employers will pass over the application of a former mental patient in favor of another applicant. (R)
10. Most people in my community would treat a former mental patient just as they would treat anyone.
11. Most young women would be reluctant to date a man who has been hospitalized for a serious mental disorder. (R)
12. Once they know a person was in a mental hospital, most people will take his opinions less seriously (R)

Note: In items followed by an (R), the scoring is reversed

Day's Mental Illness Stigma Scale

Day, E. N., Edgren, K., & Eshleman, A. (2007). Measuring Stigma Toward Mental Illness: Development and Application of the Mental Illness Stigma Scale¹. *Journal of Applied Social Psychology*, 37(10), 2191-2219.

Please read the following paragraph about mental illnesses.

Mental illnesses have been found to exist throughout history and across cultures. For example, accounts of people with mental illnesses can be found in the Old Testament of the Bible. Ancient Greek and Roman philosophers and physicians, including Hippocrates, Plato, and Aristotle, sought to explain mental illnesses, their causes, and to develop appropriate treatments for these illnesses. Today, many theories of and treatments for these illnesses exist, each generating their own lines of research. There is also evidence that mental illnesses are recognized across different cultures and that very similar cross-cultural descriptions of the symptoms exist. In one cross-cultural study that examined descriptions of mental illnesses, very similar descriptions were found across the countries of China (Taiwan), Colombia, Czechoslovakia, Denmark, India, Nigeria, United Kingdom, the United States, and the (former) USSR. We are interested in your opinions about mental illness and people with mental illnesses in general.

Factors are noted at the end of each item. Brackets indicate where illness names can be interchanged to present various mental illness conditions. Please indicate the extent to which you agree or disagree with the statements listed below using the following scale:

1 2 3 4 5 6 7

completely disagree completely agree

____ 1. There are effective medications for mental illnesses that allow people to return to normal and productive lives.

(Treatability)

____ 2. I don't think that it is possible to have a normal relationship with someone with [a mental illness]. (Relationship

Disruption)

____ 3. I would find it difficult to trust someone with a mental illness. (Relationship Disruption)

____ 4. People with mental illnesses tend to neglect their appearance.

(Hygiene)

____ 5. It would be difficult to have a close meaningful relationship with someone with a mental illness. (Relationship Disruption)

____ 6. I feel anxious and uncomfortable when I'm around someone with a mental illness.

(Anxiety)

____ 7. It is easy for me to recognize the symptoms of mental illnesses. (Visibility)

____ 8. There are no effective treatments for mental illnesses. (Treatability; reverse-scored)

____ 9. I probably wouldn't know that someone has a mental illness unless I was told.

(Visibility; reverse-scored)

____ 10. A close relationship with someone with [a mental illness] would be like living on an emotional roller coaster. (Relationship Disruption)

- ____ 11. There is little that can be done to control the symptoms of mental illness. (Treatability; reverse-scored)
- ____ 12. I think that a personal relationship with someone with a mental illness would be too demanding. (Relationship Disruption)
- ____ 13. Once someone develops a mental illness, he or she will never be able to fully recover from it. (Recovery; reverse-scored)
- ____ 14. People with [mental illnesses] ignore their hygiene, such as bathing and using deodorant. (Hygiene)
- ____ 15. Mental illnesses prevent people from having normal relationships with others. (Relationship Disruption)
- ____ 16. I tend to feel anxious and nervous when I am around someone with a mental illness. (Anxiety)
- ____ 17. When talking with someone with a mental illness, I worry that I might say something that will upset him or her. (Anxiety)
- ____ 18. I can tell that someone has a mental illness by the way he or she acts. (Visibility)
- ____ 19. People with mental illnesses do not groom themselves properly. (Hygiene)
- ____ 20. People with mental illnesses will remain ill for the rest of their lives. (Recovery; reverse-scored)
- ____ 21. I don't think that I can really relax and be myself when I'm around someone with a mental illness. (Anxiety)
- ____ 22. When I am around someone with a mental illness I worry that he or she might harm me physically. (Anxiety)
- ____ 23. Psychiatrists and psychologists have the knowledge and skills needed to effectively treat mental illnesses. (Professional Efficacy)
- ____ 24. I would feel unsure about what to say or do if I were around someone with a mental illness. (Anxiety)
- ____ 25. I feel nervous and uneasy when I'm near someone with a mental illness. (Anxiety)
- ____ 26. I can tell that someone has a mental illness by the way he or she talks. (Visibility)
- ____ 27. People with mental illnesses need to take better care of their grooming (bathe, clean teeth, use deodorant). (Hygiene)
- ____ 28. Mental health professionals, such as psychiatrists and psychologists, can provide effective treatments for mental illnesses. (Professional Efficacy)

Penn State Worry Questionnaire

Instructions: Rate each of the following statements on a scale of 1 (“not at all typical of me”) to 5 (“very typical of me”). Please do not leave any items blank.

1. If I do not have enough time to do everything, I do not worry about it.
2. My worries overwhelm me.
3. I do not tend to worry about things.
4. Many situations make me worry.
5. I know I should not worry about things, but I just cannot help it.
6. When I am under pressure, I worry a lot.
7. I am always worrying about something.
8. I find it easy to dismiss worrisome thoughts.
9. As soon as I finish one task, I start to worry about everything else I have to do.
10. I never worry about anything.
11. When there is nothing more I can do about a concern, I do not worry about it anymore.
12. I have been a worrier all my life.
13. I notice that I have been worrying about things.
14. Once I start worrying, I cannot stop.
15. I worry all the time.
16. I worry about projects until they are all done.

Each item is scored 1-5, as indicated below. Items 1, 3, 8, 10, and 11 are reversed scored. Total is sum of all 16 items.

Self-Stigma of Mental Illness

People at times find that they face mental health problems. This can bring up reactions about what mental illness would mean. Please use the 5-point scale to rate the degree to which each item describes how you might react if you were to have a mental illness.

- 1 – Strongly Disagree
- 2 – Disagree
- 3 – Agree/Disagree Equally
- 4 – Agree
- 5 – Strongly Agree

- 1. I would feel inadequate if I had a mental illness.
- 2. My self-confidence would not be threatened if I had a mental illness.
- 3. Having a mental illness would make me feel less intelligent.
- 4. My self-esteem would increase if I had a mental illness.
- 5. My view of myself would not change just because I had a mental illness.
- 6. It would make me feel inferior to have a mental illness.
- 7. I would feel okay about myself if I had a mental illness.
- 8. If I had a mental illness, I would be less satisfied with myself.
- 9. My self-confidence would remain the same if I had a mental illness.
- 10. I would feel worse about myself if I had a mental illness.

Items 2, 4, 5, 7, & 9 are reverse scored

Everyday Discrimination Scale

In your day-to-day life, how often do any of the following things happen to you?

- 0 - Never
 - 1 - Less than once a year
 - 2 - A few times a year
 - 3 - A few times a month
 - 4 - At least once a week
 - 5 - Almost everyday
-
- 1. You are treated with less courtesy than other people are.
 - 2. You are treated with less respect than other people are.
 - 3. You receive poorer service than other people at restaurants or stores.
 - 4. People act as if they think you are not smart.
 - 5. People act as if they are afraid of you.
 - 6. People act as if they think you are dishonest.
 - 7. People act as if they're better than you are.
 - 8. You are called names or insulted.
 - 9. You are threatened or harassed.

Brief RCOPE:

The following items deal with ways you coped with a significant trauma or negative event in your life. There are many ways to try to deal with problems. These items ask what part religion played in what you did to cope with this negative event. Obviously different people deal with things in different ways, but we are interested in how you tried to deal with it. Each item says something about a particular way of coping. We want to know to what extent you did what the item says. How much or how frequently. Don't answer on the basis of what worked or not – just whether or not you did it. Use these response choices.

Try to rate each item separately in your mind from the others. Make your answers as true FOR YOU as you can.

- 1- Not at all
- 2 - Somewhat
- 3 - Quite a bit
- 4 - A great deal

- 1. Looked for a stronger connection with God.
- 2. Sought God's love and care.
- 3. Sought help from God in letting go of my anger.
- 4. Tried to put my plans into action together with God.
- 5. Tried to see how God might be trying to strengthen me in this situation.
- 6. Asked forgiveness for my sins.
- 7. Focused on religion to stop worrying about my problems.
- 8. Wondered whether God had abandoned me.
- 9. Felt punished by God for my lack of devotion.
- 10. Wondered what I did for God to punish me.
- 11. Questioned God's love for me.
- 12. Wondered whether my church had abandoned me.
- 13. Decided the devil made this happen.
- 14. Questioned the power of God.

Intrinsic Spirituality Scale

For the following six questions, spirituality is defined as one's relationship to God, or whatever you perceive to be Ultimate Transcendence.

The questions use a sentence completion format to measure various attributes associated with spirituality. An incomplete sentence fragment is provided, followed directly below by two phrases that are linked to a scale ranging from 0 to 10. The phrases, which complete the sentence fragment, anchor each end of the scale. The 0 to 10 range provides you with a continuum on which to reply, with 0 corresponding to absence or zero amount of the attribute, while 10 corresponds to the maximum amount of the attribute. In other words, the end points represent extreme values, while five corresponds to a medium, or moderate, amount of the attribute. Please indicate the number along the continuum that best reflects your initial feeling.

1. In terms of the questions I have about life, my spirituality answers
 - 0 - no questions
 - 10 - absolutely all my questions
2. Growing spiritually is
 - 10 - more important than anything else in my life
 - 0 - of no importance to me
3. When I am faced with an important decision, my spirituality
 - 0 - plays absolutely no role
 - 10 - is always the overriding consideration
4. Spirituality is
 - 10 - the master motive of my life, directing every other aspect of my life
 - 0 - not part of my life
5. When I think of the things that help me to grow and mature as a person, my spirituality
 - 0 - has no effect on my personal growth
 - 10 - is absolutely the most important factor in my personal growth
6. My spiritual beliefs affect
 - 10 - absolutely every aspect of my life of my life
 - 0 - no aspect

Multiple Group Ethnic Identity Measure

In this country, people come from a lot of different cultures and there are many different words to describe the different backgrounds or ethnic groups that people come from. Some examples of the names of ethnic groups are Hispanic, Black, Asian-American, Native American, Irish-American, and White. These questions are about your ethnicity or your ethnic group and how you feel about it or react to it.

Please fill in: In terms of ethnic group, I consider myself to be _____ (Check all that apply)

- a. White/Caucasian
- b. Hispanic/Latino(a)
- c. African-American/Black
- d. Asian
- e. Middle Eastern
- f. Native American
- g. Biracial (please indicate)

Use the numbers below to indicate how much you agree or disagree with each statement.

(4) Strongly agree; (3) Agree; (2) Disagree; (1) Strongly disagree

1. I have spent time trying to find out more about my ethnic group, such as its history, traditions, and customs.
2. I am active in organizations or social groups that include mostly members of my own ethnic group.
3. I have a clear sense of my ethnic background and what it means for me.
4. I think a lot about how my life will be affected by my ethnic group membership.
5. I am happy that I am a member of the group I belong to.
6. I have a strong sense of belonging to my own ethnic group.
7. I understand pretty well what my ethnic group membership means to me.
8. To learn more about my ethnic background, I have often talked to other people about my ethnic group.
9. I have a lot of pride in my ethnic group and its accomplishments.
10. I participate in cultural practices of my own group, such as special food, music, or customs.
11. I feel a strong attachment towards my own ethnic group.
12. I feel good about my cultural or ethnic background.

What ethnicity does your mother identify with? (Check all that apply)

- a. White/Caucasian
- b. Hispanic/Latino(a)
- c. African-American/Black
- d. Asian
- e. Middle Eastern
- f. Native American

g. Biracial (Please indicate)

What ethnicity does your father identify with? (Check all that apply)

- a. White/Caucasian
- b. Hispanic/Latino(a)
- c. African-American/Black
- d. Asian
- e. Middle Eastern
- f. Native American
- g. Biracial (Please indicate)

CES-D Scale:

Below is a list of some of the ways you may have felt or behaved. Please indicate how often you've felt this way during the past week.

During the past week...

- 1 - Rarely or none of the time (less than 1 day);
- 2 - Some or a little of the time (1-2 days)
- 3 - Occasionally or a moderate amount of time (3-4 days)
- 4 - All of the time (5-7 days)

- 1. I was bothered by things that usually don't bother me.
- 2. I did not feel like eating; my appetite was poor.
- 3. I felt that I could not shake off the blues even with help from my family.
- 4. I felt that I was just as good as other people.
- 5. I had trouble keeping my mind on what I was doing.
- 6. I felt depressed.
- 7. I felt that everything I did was an effort.
- 8. I felt hopeful about the future.
- 9. I thought my life had been a failure.
- 10. I felt fearful.
- 11. My sleep was restless.
- 12. I was happy.
- 13. I talked less than usual.
- 14. I felt lonely.
- 15. People were unfriendly.
- 16. I enjoyed life.
- 17. I had crying spells.
- 18. I felt sad.
- 19. I felt that people disliked me.
- 20. I could not "get going."

Demographics Questions

1. What is your gender?

A – Male

B – Female

For female participants only:

Please enter the first day of your last menstrual period.

Do you take oral contraceptives? If so, there are several types of birth control pills. Monophasic pills have the same level of hormone throughout the entire “active” phase of the pill pack. In multiphasic pills, the hormone levels in each pill changes throughout the “active” phase of the pill pack. Is your oral contraceptive multiphasic?

A. I do not use oral contraceptives

B. Yes

C. No

D. Unsure

What is your age? _____

Cigarette smoking

A. Never

B. Former smoker

C. Current smoker

Did you smoke within one hour of the start of today’s session? Y/N

What is your weight? (in pounds) _____

What is your height? (in inches) _____

Alcohol use

A. Never

B. Monthly

C. 2 – 4 times per month

D. 2 – 3 times per week

E. Everyday

Do you have a history of any of the following illnesses? (Check all that apply)

A. Diabetes

B. Stroke

C. Hypertension

D. Cardiovascular disease

E. Pheochromocytoma

F. None

Does anyone in your immediate family have a history of any of the following illnesses? (Check all that apply)

- A. Diabetes
- B. Stroke
- C. Hypertension
- D. Cardiovascular disease
- E. None

Do you take medication to manage high blood pressure/ hypertension? Y/N

How long ago did you take your medication?

What is/are the name(s) of the medication?

Do you take stimulant medication (e.g., Adderall, Ritalin)? Y/N

How long ago did you take your medication?

What is/are the name(s) of the medication?

Do you take Benzodiazepines (e.g., Xanax, Valium, Ativan, Klonopin)?

How long ago did you take your medication?

What is/are the name(s) of the medication?

Do you use an inhaler for asthma? Y/N

Did you use your inhaler within the last four hours? Y/N

How physically active are you?

- A. Sedentary – I rarely exercise.
- B. Lightly active – I exercise 1 – 2 time per week.
- C. Moderately active – I exercise 2 – 4 times per week
- D. Very active – I exercise 5 – 7 times per week.

On average, how many hours of sleep do you get per night?

- A. 5 or less
- B. 6
- C. 7
- D. 8
- E. 9 or more

Do you consider yourself an anxious person? (Y/N)

Have you ever sought professional services to help with a psychological issue? (Y/N)

If so, from whom did you seek assistance?

- A. Medical doctor
- B. Religious leader
- C. Psychologist
- D. Social Worker
- E. School Counselor
- F. Other

What types of treatment have you received for psychological issues?

- A. Medication – prescribed by a psychiatrist
- B. Medication – prescribed by a primary care physician
- C. Therapy – Individual with a psychologist/counselor
- D. Therapy – Individual with a social worker
- E. Therapy – Group with a psychologist/counselor
- F. Therapy – Group with a social worker
- G. Therapy – provided by other
 - a. Indicate who provided treatment: _____
- H. Other: Please indicate _____

Religious Affiliation?

A - Christian – Protestant	F - Muslim
B - Christian – Catholic	G - Jewish
C - Hindu	H - Atheist
D - Buddhist	I - Agnostic
E - Not religious	J - Other – Please list: _____

Citizenship Status

- A – United States Citizen
- B – U.S. Permanent Resident (non-citizen)
- C – Non-US Citizen (foreign student)

Please indicate your sexuality (Check one):

- 1) Straight/Heterosexual
- 2) Lesbian/Homosexual Female
- 3) Gay/Homosexual Male
- 4) Bi-sexual
- 5) Transgendered

What is your political affiliation?

- A. Liberal
- B. Conservative
- C. Independent
- D. Not Interested
- E. Other _____

Currently, what is your main occupation or job? Please be specific. If you are a secretary, also indicate the type of business; if you are in retail, indicate what you sell; if you work in child care, indicate the age group of the children you are responsible for, etc. If you are currently a college student under the age of 23, please enter your mother and/or father's occupation(s).

What is the highest level of education obtained by your mother?

- A- did not receive high school diploma or GED
- B- high school diploma or GED
- C- vocational training (e.g., electrician, plumber, mechanic, beautician, L.P.N., etc.)
- D- some college (but no degree)
- E- associate's degree or equivalent (2-year degree)
- F- bachelor of arts (B.A.) or bachelor of science (B.S.) degree
- G- some graduate work (but degree not completed)
- H- master's degree (e.g., M.A., M.S., M.S.W., M.B.A., M.L.S., etc.)
- I- completion of a Ph.D. or professional degree requiring at least 3 years of full-time graduate work (e.g., M.D., O.D., D.D.S., J.D., L.L.D.)
- J- other _____

18. What is the highest level of education obtained by your father?

- A- did not receive high school diploma or GED
- B- high school diploma or GED
- C- vocational training (e.g., electrician, plumber, mechanic, beautician, L.P.N., etc.)
- D- some college (but no degree)
- E- associate's degree or equivalent (2-year degree)
- F- bachelor of arts (B.A.) or bachelor of science (B.S.) degree
- G- some graduate work (but degree not completed)
- H- master's degree (e.g., M.A., M.S., M.S.W., M.B.A., M.L.S., etc.)
- I- completion of a Ph.D. or professional degree requiring at least 3 years of full-time graduate work (e.g., M.D., O.D., D.D.S., J.D., L.L.D.)
- J- other _____

19. What is the highest level of education obtained by you?

- A- did not receive high school diploma or GED
- B- high school diploma or GED
- C- vocational training (e.g., electrician, plumber, mechanic, beautician, L.P.N., etc.)
- D- some college (but no degree)
- E- associate's degree or equivalent (2-year degree)
- F- bachelor of arts (B.A.) or bachelor of science (B.S.) degree
- G- some graduate work (but degree not completed)
- H- master's degree (e.g., M.A., M.S., M.S.W., M.B.A., M.L.S., etc.)
- I- completion of a Ph.D. or professional degree requiring at least 3 years of full-time graduate work (e.g., M.D., O.D., D.D.S., J.D., L.L.D.)
- J- other _____

20. How would you characterize your current hometown?

- A- rural (unincorporated)
- B- small town (village or town)
- C- suburban (metropolitan area of a large city)
- D- small city (population < 30,000)
- E- medium-sized city (population 30,000 – 100,000)
- F- large city (population > 100,000)

21. What would you estimate your combined family income to be?

- A- 0 – \$19,999
- B- \$20,000 - \$39,999
- C- \$40,000 - \$59,999
- D- \$60,000 - \$79,999
- E- \$80,000 - \$99,999
- F- \$100,000 - \$119,999
- G- \$120,000 - \$139,999
- H- \$140,000 or more

Did you eat within one hour of the start of today's session?

Did you drink anything other than water within one hour of the start of today's session?

Did you drink any caffeinated drinks today? If so, how long ago did you have the beverage before the start of today's session?

- a. I did not drink caffeinated beverages today
- b. 1 hour
- c. 2 hours
- d. 3 hours
- e. 4 or more hours

Appendix B
Dissertation Data Collection Procedure and Script

Study Procedure

Consent form

Trait anxiety

Put on HRM

Take baseline cortisol (record time)

Start video (10 minutes)

End Video

Worry task (10 minutes)

State anxiety measure (2-5 minutes)

Relaxation (about 10 minutes)

Cortisol sample 2 (taken 10 minutes after end of worry task)

Questionnaires (about 10 minutes)

Cortisol (20 minutes after worry task ended)

Questionnaires (about 30 minutes after last cort sample)

SONA Credit or Cash

Forms: Consent form (2 copies), blank sheet of paper, pen, participant tracking form, mental health services list

****label salivette containers****

Introduce yourself. Thank participant for his/her time. Ask that all cell phones, ipods, etc. be turned off and put away.

- 1) ***“The purpose of this study is to assess how various factors are associated with anxiety. During today’s session, you will be asked to wear a heart rate monitor, provide saliva samples, and engage in a worry task. Afterward, you will be asked to complete several questionnaires about mental illness, life experiences and general attitudes. Today’s session should take no more than two hours. All information that you provide during the study is completely confidential and anonymous. That is, no one other than study personnel will have access to your data, and your data will not be connected to any personal identifiers (e.g., name, social security number). You have a participant ID, which is how we are able to distinguish between participants’ data. Your participation in this study is voluntary. At any point, you can end the study without penalty. Also, if there are any questions that you do not want to answer, you may skip them. Do you have any questions?”*** [answer questions]

Have the participant read, sign, and date the consent form, as well as initial and date the bottom of each page.

- 2) ***“First, I will have you complete a questionnaire, please inform me when you are done.”***
(Set up mediaLab Trait anxiety)

- 3) ***“Now I would like you to listen carefully as I explain how to put on this heart rate monitor. After I explain, I will demonstrate how to put it on. The monitor collects your heart rate information and transmits it a phone app. To ensure the heart rate monitor detects your heart rate, it must be applied directly to the skin.***
- a. ***For men, the heart rate monitor should be placed an inch or so below the pectoral muscles.***
 - b. ***For women, the heart rate monitor should be placed directly below the breasts. You can use the straps to adjust the size. Once you have put on the monitor, test the tightness by attempting to slip your finger between the strap and your body. It should not allow your finger to pass through. The strap should be loose enough to allow you to breathe properly but tight enough to stay in place when you move around. Let me demonstrate for you.”***

Demonstrate how to put the HRM on

- 4) ***“Now, I will explain how to provide a saliva sample. Remove the cotton swab from the container and place in in your mouth. Roll the swab over your tongue and gently chew on it. Gently chewing on the swab will produce saliva. After one minute I will inform you to place the swab back into the tube and firmly seal it. Do you have any questions?”***
(Answer questions)
- a. Offer the participant gloves. Researcher should wear gloves when handling saliva samples.
- 5) ***“Next, you will watch a 10 minute video.”*** Turn on the nature video for the participant, hit lap on the watch.

After ten minutes, turn off the video, record time, hit lap. Check to make sure the HRM is still collecting HR data.

- 6) ***“Now I will ask you to write down three topics that are currently causing you the greatest amount of worry. No one will see your worry topics and you can take the paper with you when you leave. Please record these worries now”.***
- 6a) Once participants have written the worries, continue. ***“Please spend the next ten minutes worrying about these issues as intensely as possible. Focus on your worries; please don’t doodle, write, or use your phone. I will tell you when ten minutes are up.”***
(Record time, hit lap)

After ten minutes, return to the participant.

- 7) ***“You can stop worrying now. Could you flip your worries over? Please complete this measure and inform me when you have completed by knocking on the door.”***

When they knock on the door, return to the participant.

- 8) ***“Now, I would like you to sit here and relax for ten minutes. I will tell you when ten minutes are up.”***

After ten minutes, return to the participant.

- 9) ***“Now I need to collect a saliva sample from you. As before, please take the salivette and place it in your mouth. Roll it around your mouth and gently chew it. Do this for one minute.”***

- 10) ***“Now you will complete several questionnaires that have to do with general attitudes and life experiences. I will interrupt you in ten minutes to gather one more saliva sample. Do you have any questions before you begin?”*** Answer questions, if any.

After ten minutes, collect another saliva sample.

- 11) ***“I need to collect a final saliva sample from you. As before, you will roll the cotton swab in your mouth and gently chew to stimulate salivation for one minute.”*** Inform them when to place to swab back into the tube. ***“You may now continue completing the questionnaires.”***

After the participant has completed, thank them for their participation. Have them complete the tax form and pay them \$20. ***Make sure they remove the HRM and return it to you.***