FORGIVENESS AND LONELINESS: STRESS AND ANXIETY’S CORRELATES IN A STUDENT AND CLINICAL HIV-POSITIVE POPULATION

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Persistent periods of stress exacerbate the symptoms of chronic illness. Additionally, loneliness is strongly correlated with stress and both state and trait anxiety. Prolonged periods of loneliness are linked with depression in both clinical and student samples. Forgiveness, a cognitive, emotional, and behavioral response to interpersonal or intrapersonal conflict, is important to social harmony. In this study I describe three studies that examine forgiveness, loneliness, stress, and anxiety in two populations, a student population and an HIV+ clinical population. Study 1 examined how the variables of forgiveness and loneliness are associated with perceived stress in a student sample of undergraduate students. Study 2 examined the same variables (forgiveness, loneliness, and perceived stress) in an HIV-positive clinical population. Finally, study 3 extends the model and examines the relationship of forgiveness and loneliness to variables related to stress, state and trait anxiety. For studies 2 and 3, 63 HIV-positive individuals participated in the cross-sectional correlational study. The data was analyzed in each study using hierarchical linear regression analysis. We also tested the models for the three studies to determine if forgiveness moderates the relationship between loneliness and state and trait anxiety. In study 1, using hierarchical linear regression analyses, I found that increased forgiveness and decreased loneliness was associated with less perceived stress in both a non-clinical and clinical sample of HIV-positive adults. In studies 2 and 3, I conducted hierarchical linear regression analyses and found that increased forgiveness contributed a significant portion of the variance in perceived stress and state and trait anxiety in a non-clinical and HIV-positive sample. I did not find moderation in any of the models.
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INTRODUCTION

Significance

According to the Centers for Disease Control (CDC), an estimated 1,106,400 people are infected with HIV in the United States, highlighting the pandemic status of this disease and the need for more research on the care of these individuals (CDC, 2009). At the end of 2007, the number of HIV-positive individuals in Texas was 94,063 (CDC, 2008), which is one of the largest HIV-positive populations in the country. In the Dallas-Fort Worth area alone 22,220 people live with HIV (CDC, 2008). Since the introduction of highly active antiretroviral therapy (HAART), healthcare uses a chronic disease model, which focuses on the management of various psychosocial stressors that affect immune functioning (Leserman, 2003).

Little is known about the psychosocial constructs of forgiveness and loneliness in this community, and how these variables are associated with the stress and anxiety that accompany living with HIV. This study addresses this gap in the literature and examines the psychological well being of HIV-positive individuals. Specifically, I will investigate how stress and anxiety are associated with forgiveness and loneliness. This investigation is conducted in three separate studies to see if relationships exist in a non-clinical sample, then to see if similar relationships exist in an HIV-positive sample. Finally, I explore whether forgiveness and loneliness are related to state and trait anxiety in an HIV-positive sample. Study 1 examines forgiveness and loneliness and its association with perceived stress in a student sample. Study 2 examines forgiveness and loneliness and its association with perceived stress in an HIV-positive sample. Study 3 examines forgiveness and loneliness and its association with state and trait
anxiety in the same HIV-positive sample conducted in Study 2. More broadly, I explore
the associations of these variables using Lazarus and Folkman’s transactional model of
stress and coping across the three studies.

Theory

Lazarus and Folkman’s (1984) transactional model of stress and coping posits
that the perception of stress is derived from appraisal of stressors in the environment.
According to Folkman and Lazarus (1988), coping is not merely a response to tension,
but is also influenced by an individual’s cognitive appraisal of an event. Subsequently,
cognitive appraisal influences emotional arousal.

Lazarus and Folkman (1984) view psychological stress as a relationship between
the person and the environment that is assessed as potentially dangerous. There are
two cognitive-behavioral processes that mediate the person-environment relationship.
The first process is the cognitive appraisal, which is an evaluative process that
determines why and to what extent a particular transaction between the person and the
environment is stressful. The second process is coping, which occurs by managing the
psychological demands of the person-environment relationship and the subsequent
emotions generated from the situation.

The cognitive appraisal is viewed as the process of interpreting an encounter
using the lens of life experiences and its significance to well-being. Three appraisals
comprise this process. The primary appraisal is the first judgment of the stressor as
being threatening or non-threatening. Primary appraisals of stressful situations take one
of three forms: immediate harm, potential or anticipated harm, or a challenge that can
be mastered for potential gain. The secondary appraisal is a judgment involving how to deal with the situation. It serves as an evaluation of the benefits and consequences of the coping strategy. Finally, the reappraisal is an assessment that is based on new information obtained from the preceding appraisals. The reappraisal differs from the primary appraisal only in that it follows an earlier cognitive evaluation. In summary, primary appraisals evaluate perceived control of the situation and resources available to the individual. Secondary appraisals guide the use of specific coping strategies. The effectiveness of these coping strategies determines the reappraisal, as well as the individual’s psychological adjustment. I investigated forgiveness and loneliness, two cognitive-behavioral responses to secondary appraisals in our model, and their associations with three factors: stress, state anxiety, and trait anxiety. I examined how these factors are associated with forgiveness and loneliness in the context of Lazarus and Folkman’s (1984) transactional model of stress and coping.

Health Outcomes and Stress

Chronic stress is associated negatively with health outcomes in chronically ill populations (Lovato, 2003; Kiecolt-Glaser, Marucha, Malarkey, Mercado, & Glaser, 1995). A number of studies highlight the interaction between the psychological and biological processes of stress in clinical populations (Dew et al., 1997, Rabkin, 1997, & Leserman, 2003). Specifically, in the HIV-positive community, stress is associated negatively with physical health (Henry, 1992), and positively associated with depression (Elliot, 1997; Rabkin, 1997) and anxiety (McDaniel & Blalock, 2000; Dew et al., 1997; Sewell et al., 2000). As seen in Figure 1, perceived stress occurs after the appraisal
process, when the individual perceives a threat, but assesses insufficient resources to cope with the stress.

![Diagram of Lazarus and Folkman's transactional model of stress]

*Figure 1.* Perceived stress occurs after the appraisal process, in Lazarus and Folkman’s transactional model of stress.

At this point, perceived stress can develop into either positive stress or negative stress, depending on the individual’s cognitive-behavioral responses to the perceived threat.

Although the aim of this study is not to address the biological contingencies associated with HIV, we are aware that associations exist between physiological and psychological constructs in the HIV-positive population. The connections between biological and psychological phenomena are discussed briefly to provide a holistic approach to the psychological variables of interest in this population. I hope to provide a framework for the exploration of these biological and psychological pathways in the HIV-positive population to enrich the connections made in this study, as well as to provide an area for future research in this population.

Stress and depression, two mental health constructs that have biological pathways in the body, can also play a role in physical health, which is particularly salient in an HIV-positive population. In Lazarus and Folkman’s (1984) transactional model,
stress is considered a perceived threat, which follows the primary appraisal of a situation. Evans and colleagues (1995) conducted a study that examined the relationship of stress and depression to cell-mediated immunity in an HIV-positive population. The authors measured levels of perceived stress in 99 asymptomatic HIV-positive and 65 HIV-negative gay men using a modified version of the Psychiatric Epidemiology Research Interview (PERI). They also gathered several medical and biological variables to compare levels of stress and other salient variables between the two groups. The authors reported a significant negative correlation between severe stress and natural killer (NK)\(^+\) cells (\(r = -0.44, p < 0.0001\)), as well as multiple groups of cytotoxic/suppressor T lymphocyte subsets. They also concluded that total severe stress was a predictor of immune alteration as well as alterations in NK cell phenotypes. This study provided the first evidence that stress may alter the number of killer lymphocytes in HIV-positive men (Evans et al., 1995). They found no significant correlations with depression nor with any of the salient biological or medical variables.

Other researchers identified significant links between biological markers, stress, and depression in an HIV-positive population. Leserman and colleagues (2002) examined the effects of physiological and psychosocial variables and the progression to AIDS in an exhaustive longitudinal study called the Coping in Health and Illness Project (CHIP). CHIP is a 9-year longitudinal study that followed 99 asymptomatic HIV-positive gay men who were not on HIV medications. The most consistent and compelling data from this study linked stress, immunological functioning, and disease progression (Leserman, 2003). For example, at baseline, CHIP patients with significantly elevated stress levels were found to have lower natural killer (NK) cell counts and significantly
fewer CD8 T-lymphocytes (Evans et al., 1995), which may assist in HIV replication inhibition (Barker, 1999). At nine years follow-up, the researchers discovered that higher amounts of both stress and stressors contributed significantly to a quicker progression to AIDS (Leserman et al., 2002). They also noted that for every one point increase in the cumulative average of stressful life events, the risk of progressing to AIDS increased by 14% and the risk of developing an AIDS clinical condition increased by 35%. Some collinearity was noted between social support and depressive symptoms, indicating a need for more research to delineate psychosocial effects on the progression to AIDS.

Similarly, other researchers reported links between stress and poorer health behaviors and outcomes in an HIV-positive population. Riley and Fava (2003) administered the Global Severity Index subscale on the Symptom Checklist 90 – Revised to 126 HIV-positive women and also measured their stress management. The authors found that those who reached the AIDS diagnosis reported significantly more stress than those in the asymptomatic or symptomatic phases. They also reported an inverse relationship between stress and perceived self-efficacy to carry out daily activities ($r = -0.34$, $p < 0.001$). This suggests that stress in the HIV-positive population can be detrimental to many other areas in life, which are associated with poorer health behaviors and worse health outcomes (Riley & Fava, 2003).

This study attends to the psychosocial factors linked with stress, linked to immunological functioning and health outcomes. I examine these correlates in a student

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1 A natural killer cell is a non-specific cell of the immune system which fights antigens or any foreign objects in the body. NK cells play a vital role in the immune systems of all individuals, but particularly in HIV-positive individuals, whose immune systems are compromised due to the human immunodeficiency virus. Particularly, NK cells play a vital role in protecting the body from opportunistic infections, which are prevalent in those that have an advanced stage of HIV, or AIDS (acquired immunodeficiency syndrome). A CD8 T-lymphocyte cell is a specific cell of the immune system, which fights viruses in the body by recognizing infected cells and killing them. CD8 T-lymphocytes are one mechanism the body uses to fight HIV infection.
and a clinical HIV-positive population to demonstrate more broadly the associations of psychosocial factors with health. The first psychosocial variable I examine is stress.

**Stress**

Effectively managing stress may improve mental health outcomes of chronically ill individuals, particularly those who are HIV-positive. In a meta-analysis of randomized controlled trials of stress management with HIV-positive adults from 1989 to 2006, Scott-Sheldon and colleagues (2008) examined 35 independent studies. They chose the studies based on: 1) the use of psychosocial, behavioral, or educational stress-management interventions, 2) studies with HIV-positive adults, 3) whether a randomized clinical trial was used; and 4) whether the study provided sufficient information to calculate between-groups effect size estimates. The authors found that stress-management for HIV-positive individuals significantly reduced anxiety, depression, fatigue, and improved overall quality of life. The effect sizes were all in the small to medium range. For the anxiety outcomes, an adverse relationship was found between anxiety and medical adherence, where the effects of stress management were decreased if reports of medication adherence were poor. The authors speculated that demanding medication regimens increased anxiety. The results of this study also suggested that interventions did not appear to improve CD4-positive counts, viral load, or any hormonal outcomes compared with controls. Nevertheless, this study demonstrated a strong link between stress, anxiety, and mental health outcomes in HIV-positive individuals by showing the reduction of stress was associated with reduction in depression and improvements in overall quality of life.
Anxiety

Although stress is a major barrier to optimal health, other psychosocial factors are present that impede optimal health. For example, excessive stress can develop into a state of anxiety (Sapolsky, 2004; Blalock & Campos, 2003). Further, those who experience a chronic state of anxiety may internalize these thought patterns and behavior, which could develop into trait anxiety (Spielberger, 1983). Both types of anxiety are prevalent in the general public as well as in the HIV-positive population (O’Cleirigh, Hart, & James, 2008; Zvolensky, 2008). Prevalence of anxiety in the HIV-positive population is reported to be as high as 40% (McDaniel & Blalock, 2000). However, other authors conclude the prevalence of anxiety disorders in HIV-positive populations is not significantly different than HIV-negative populations (Dew et al., 1997).

Sewell and colleagues (2000) measured levels of anxiety and the prevalence of anxiety disorders in 173 gay men with a diagnosis of HIV or AIDS, and 84 gay men who were HIV-negative. In this study, anxiety disorders are defined by the Diagnostic and Statistical Manual of Mental Disorders IV – Text Revision (DSM-IV TR) criteria needed to meet the diagnosis of any of the anxiety disorder diagnoses, and levels of anxiety may simply be one or two symptoms of any particular disorder. They measured anxiety using the State-Trait Anxiety Inventory and the Anxiety subscale on the Brief Symptom Inventory (Derogatis, 1983). They reported a 19% prevalence rate of anxiety disorders in the HIV/AIDS population, which was not significantly different from the HIV-negative sample. They also reported the prevalence of current and lifetime anxiety disorders did not differ between men with or without AIDS, and those in the HIV-positive or AIDS
groups did not differ significantly from the general population. Figure 2 highlights how perceived stress can develop into state or trait anxiety within Lazarus and Folkman’s transactional model.

Anxiety can manifest itself in many ways, including somatization, particularly in the HIV-positive population (Gonzalez, Zvolensky, Miller, & Solomon, 2010; Junqueira, Bellucci, & Reimao, 2008). The wide array of symptoms that anxiety may present as in both the HIV-positive and HIV-negative populations makes it difficult for researchers to understand the relationship between AIDS and anxiety disorders, but continues to warrant investigation (Sciolla, Atkinson, & Grant, 1998).

Perceived stress and anxiety are related to debilitating symptoms in the HIV-positive population. Phillips and colleagues (2004) conducted a study that examined the psychosocial correlates related to fatigue in an HIV-positive population, which is one of the most prevalent symptoms in this population (Barroso & Lynn, 2002). They administered the Perceived Stress Scale and the State-Trait Anxiety Inventory to 79
HIV-positive men and women between the ages of 24 and 63. They found a significant Pearson’s correlation coefficient between stress and fatigue ($r = 0.71, p < 0.0001$). A hierarchical linear regression analysis found that sleep quality, state anxiety, HIV-related symptoms, and depression accounted for 67% of the variance in fatigue, with state anxiety a particularly salient variable in the model ($F(5, 73) = 8.30, \beta = 0.06, p < 0.01$). Perceived stress was not a significant predictor in the final regression analysis.

Gonzalez and colleagues (2010) explored anxiety sensitivity among HIV-positive adults. They administered the Anxiety Sensitivity Index, the Positive Affect Negative Affect Scale, and the Symptom Checklist – 90 to 51 HIV-positive adults. In their hierarchical regression analyses, they found that being male with negative affect accounted for 59% of the variance in somatization. They also found anxiety sensitivity (physical concerns) was significantly associated with somatization symptoms, and anxiety sensitivity (mental concerns) was also positively correlated with generalized anxiety symptoms. This study identified how both physical and mental concerns in the HIV-positive population contribute to the exacerbation of anxiety symptoms, which may be particularly prevalent in males.

As mentioned above, stress and anxiety are two psychosocial factors that are negatively associated with numerous physical and mental constructs in both student and HIV-positive populations. Further, the reduction of stress and anxiety by psychological interventions was also shown to be positively associated with health in HIV-positive populations. Other research has shown that additional psychological processes may be correlated with stress, anxiety, and health, which were also examined.
Loneliness

Loneliness is one variable that may be associated with stress and anxiety. Loneliness also is a prevalent construct in the HIV-positive population (Bekhet, Zauszniewski, & Nakhala, 2008). Loneliness is strongly correlated with stress (Gordijn & Boven, 2009) and both state and trait anxiety (Phillips, Sowell, Tavakoli, Fulk, & Hand, 2004; Nokes & Kendrew, 2001), and is associated with worse mental health outcomes (Bekhet, Zauszniewski, & Nakhala, 2008). Figure 3 illustrates how loneliness is conceptualized in Lazarus and Folkman’s model, where it may be the result of the perception of the inability to cope with the threat. For example, Peplau and Pearlman (1982) identify loneliness as an attribution of social failure, where an individual feels rejected by his/her peers or from society.

Specifically, prolonged periods of loneliness are linked to increased depression in both a student and clinical sample. For example, Rokach (2000) investigated how individuals cope with loneliness in the cancer population, HIV-positive population, and the general population. She administered the Loneliness Questionnaire to 38 cancer
patients, 34 HIV/AIDS patients, and 53 people from the general population. The questionnaire contained six subscales: acceptance and reflection, self-development and understanding, social support network, distancing and denial, religion and faith, and increased activity. After completing the survey, participants were asked to reflect on past loneliness experiences and to endorse those items that described how they successfully coped with the feelings of loneliness. The HIV-positive population coped significantly more with their feelings of loneliness through self-development and understanding, social support, denial, and increased activity than the cancer and general populations. These findings highlight the uniqueness of experiencing loneliness in the HIV-positive population, and suggests that other phenomena (e.g., stigma and discrimination) may play a role in how loneliness is experienced in this population.

Researchers also reported that loneliness is negatively associated with health outcomes in a clinical sample (Kiecolt-Glaser et al., 1984). In an HIV-positive population, social support (a strong correlate of loneliness) can enhance emotional well-being and defend against HIV-related psychological distress and physical symptoms (Lam, Naar-King, & Wright, 2007), which may create a state of mind conducive to forgiveness (Lawler et al., 2005).

Forgiveness

Forgiveness is a second variable that may be associated with stress and anxiety. Forgiveness is a construct that recently became a focus of research in psychology. We are interested in explicating the role forgiveness plays in stress, anxiety, and loneliness in HIV-positive populations. Numerous conceptualizations of forgiveness exist (for more
information regarding other theoretical conceptualizations, see Enright & Coyle, 1998; McCullough, Pargament, & Thoresen, 2000). The definition of forgiveness used in our study is a cognitive, emotional, and behavioral response to interpersonal or intrapersonal conflict, which is considered important in maintaining social harmony (Lawler, Younger, Piferi, Jobe, Edmondson, & Jones, 2005). Essentially, we define forgiveness as a letting go of negative emotions and affect; perceptions of the transgressor/transgression are no longer negative, but changed to a neutral or positive perception. Figure 4 illustrates how forgiveness can lead to positive stress in Lazarus and Folkman’s transactional model.

Figure 4. Forgiveness can lead to positive stress in Lazarus and Folkman’s transactional model.

Recent investigations examined the neurodevelopmental pathways of forgiveness. Farrow and colleagues (2001) used functional magnetic resonance imaging (fMRI) to investigate the anatomical origins of forgiveness and how it differs physiologically from empathy. The authors asked 10 participants to read various social scenarios and use their social reasoning to make judgments. The authors reported both forgiving and empathic judgments activated the left superior frontal gyrus, orbitofrontal
gyrus, and precuneus. Empathic judgments also activated the left anterior middle
temporal and left interior frontal gyri, and forgiving judgments activated the posterior
cingulated gyrus. Frontal temporal regions were both activated with empathy and
forgiveness, but activation of the left middle temporal gyrus was seen only for empathy
and not for forgiveness. These findings demonstrate that empathy and forgiveness, two
common yet distinct social behaviors, activate various parts of the brain, and provides
the physical root from which forgiveness originates.

The physiological basis of forgiveness was investigated further using
neuroimaging studies. Forgiveness, trust, moral behavior, and infant-mother
communication were all found to activate the same brain systems, suggesting a
neurological link between affect and cognition resulting in forgiveness (Harris, 2003).
Unfortunately, there is a dearth of literature on forgiveness and health outcomes. One
study performed by Seybold, Hill, & Neumann (2001) examined the correlates of
forgiveness and anxiety, depression, anger, social desirability, and various coping
styles. They also examined the correlates of forgiveness with an array of immunological,
psychophysiological, and physiological variables. The authors reported higher levels of
forgiveness correlated with lower anxiety, depression, and stress. Higher levels of
forgiveness were also correlated with lower hematocrit levels, lower white blood cell
counts, and lower cytotoxic cell/T-helper cell ratios, all which indicate good health.

Witvliet, Ludwig, and Vander Laan (2001) conducted a study examining
physiological reactivity during imagined or recalled offenses. They conducted a within-
subjects study with 72 participants (35 females) using emotional imagery to rehearse
hurtful memories and unforgiving grudges compared to empathic perspective taking and
imagined granting forgiveness to offenders. Each participant completed a two-part, two-hour testing session. In the first phase, they asked the participants to first identify a particular person responsible for offending or hurting him or her. Next, the participant completed a questionnaire about the nature of the offense and the participants’ responses to it. The second phase involved the participant imagining each type of forgiving and unforgiving responses, based on forgiving and unforgiving scripts developed by the researchers. Physiological data (e.g., blood pressure, skin conductance, facial electromyogram, and heart rate) were continuously collected through the systematic manipulated imagery trials and the subsequent relaxation tasks. The authors reported participants were significantly more negative, aroused, angry, sad, and less in control in the unforgiving condition than in the forgiving condition. Further, the forgiving imagery had significantly smaller facial EMG, skin conductance, and heart rate responses when compared to unforgiving and grudge-holding imagery, suggesting that the physiological effects of the forgiving responses are healthier alternatives than the unforgiving responses.

Various personality constructs on the Big Five Personality Inventory also are linked to forgiveness. Forgiveness is positively correlated with Openness to Experience and negatively correlated with neuroticism (Kashdan & Fincham, 2002); suggesting that forgiveness is associated with more positive personality factors. Forgiveness, a teachable skill, can be a powerful psychosocial tool. For example, Yamhure-Thompson and colleagues (2005) reported that forgiveness alone accounted for 25% - 49% of the variance in measures of psychological well-being, which included depression, anger, anxiety, and satisfaction with life. Other research corroborated these findings. Increased
forgiveness is significantly correlated with decreased stress (Harris et al., 2006; Berry & Worthington, 2001; Macaskill, Maltby, & Day, 2001) and anxiety (Coyle & Enright, 1997; Al-Mabuk et al., 1995; Reed & Enright, 2006), both of which are prevalent in an HIV-positive population.

Reed and Enright (2006) conducted a randomized clinical trial with emotionally abused women utilizing either forgiveness therapy or an alternate treatment involving anger validation, assertiveness, and interpersonal skill building. The 20 participants were matched, yoked, and randomized into the two treatment conditions. The participants were given the State-Trait Anxiety Inventory and The Enright Forgiveness Inventory as pre-test, post-test, and follow-up measures of anxiety and forgiveness. The participants of both conditions engaged in one-hour, weekly therapy sessions for an average of eight months. The authors reported a significant change from pre-test to post-test in forgiveness, self-esteem, trait anxiety, and depression between the forgiveness therapy group and the alternative therapy group. The forgiveness group reported significantly higher self-esteem, forgiveness, and lower trait anxiety and depression compared to the alternative therapy group. In the forgiveness therapy group, the participants reported significantly lower state anxiety, trait anxiety, and depression from pre-test to post-test, which suggests that forgiveness is an effective strategy for reducing both state and trait anxiety in this population.

Coyle and Enright (1997) conducted a study that examined the effects of a forgiveness intervention on feelings of anxiety, anger, and grief with postabortion men. Ten men who identified as hurt by an abortion decision by their partners were randomly assigned to the forgiveness intervention group or a wait-list control group. The
intervention was a 12-week program that contained 12 weekly sessions, each lasting approximately 90 minutes. Forgiveness, anxiety, anger, and grief were measured at four comparison points throughout the individual treatment. Forgiveness, anxiety, anger, and grief were measured with the Enright Forgiveness Inventory, State Anxiety Inventory, State Anger Inventory, and the Grief Scale. The authors found that all participants, after completing the forgiveness intervention, reported significant gains in forgiveness and reductions in state anxiety.

Increased levels of forgiveness are correlated with fewer somatic complaints, better medication adherence, and better reports of sleep quality (Lawler, Younger, Piferi, Jobe, Edmondson, & Jones, 2005). Forgiveness is positively correlated with empathy (Mackaskill, Maltby, & Day, 2002; Yamhure-Thompson et al., 2005). Mackaskill and colleagues (2002) examined the relationship between forgiveness of self, others, and empathy. In this study, 324 British undergraduates completed measures of forgiveness and empathy. Forgiveness of self was significantly positively correlated with emotional empathy for men ($r(99) = .23, p < 0.05$) and women ($r(223) = .33, p <0.01$). Forgiveness also is negatively correlated with rumination (Berry et al., 2001) and anger (Mackaskill, Maltby, & Day, 2001).

Forgiveness is a psychosocial variable that is negatively associated with stress and anxiety, and is positively associated with health. Further, forgiveness may be a particularly salient construct to examine in the HIV-positive population because this population deals with numerous HIV-related stressors that are outside the realm of personal control (e.g., stigma, poor health, racial and ethnic discrimination).
Forgiveness, if utilized by the HIV-positive population to cope with the HIV-related stressors, may be linked to a reduction in stress, loneliness, and anxiety.

Aims

My aim is to identify the connections between forgiveness and loneliness and their associations with stress, state anxiety, and trait anxiety. Specifically, I examine the associations of forgiveness, loneliness, and stress in both a student (HIV-negative) and clinical (HIV-positive) sample. I also examine forgiveness and loneliness and their associations with state anxiety and trait anxiety in an HIV-positive sample. First, I examine forgiveness and loneliness and its correlates with stress in a student population to assess if a relationship exists between these variables more broadly in the general population. Next, I examine forgiveness and loneliness and stress in the HIV-positive sample assess whether these variables have a similar relationship in this clinical sample. Finally, I examine forgiveness and loneliness and its association with state and trait anxiety in an HIV-positive clinical sample to investigate whether forgiveness and loneliness have a comparable relationship to both stress and state and trait anxiety. Stress often develops into clinical levels of anxiety (Sapolsky, 2004), and anxiety disorders are remarkably common in the HIV-positive population (Sciolla, Atkinson, & Grant, 1998). If the relationship between these psychosocial variables is significant across the three studies, it can provide the guidance needed to support the development of clinical interventions to reduce stress, loneliness, and state and trait anxiety in both student and HIV-positive populations. To complete this task, I tested the following hypotheses:
1. Increased levels of forgiveness are significantly associated with decreased levels of stress in a student sample and HIV-positive sample.

2. Increased levels of forgiveness are significantly associated with decreased levels of state and trait anxiety in an HIV-positive sample.

3. Increased levels of loneliness are significantly associated with decreased levels of stress in a student sample and HIV-positive sample.

4. Increased levels of loneliness are significantly associated with decreased levels of state and trait anxiety in an HIV-positive sample.

5. Increased levels of forgiveness and decreased levels of loneliness account for a significant portion of the variance in perceived stress in both HIV-negative and HIV-positive samples.

6. Increased levels of forgiveness and decreased levels of loneliness account for a significant portion of the variance in state and trait anxiety in an HIV-positive sample.

7. Forgiveness will moderate the relationship between loneliness and stress and loneliness and state and trait anxiety in both samples.

I hypothesize that increased forgiveness and lower levels of loneliness are correlated with lower levels of stress, state anxiety, and trait anxiety in both HIV-negative and HIV-positive samples.

Clinical Implications

Forgiveness is a teachable psychosocial tool (Luskin, 2002). Therefore, if forgiveness is associated with loneliness, stress, and anxiety, interventions that teach forgiveness skills can be developed to improve overall health in both populations. The HIV-positive population experiences numerous injustices, such as stigma, which places them at greater risk for stress, anxiety, and subsequently poor mental and physical health.
METHODS

In this section I describe three studies that examine forgiveness, loneliness, stress, and anxiety in two populations, with an HIV-negative sample and an HIV-positive sample. Both samples were recruited from the Dallas/Fort Worth metroplex. Study 1 examined how forgiveness and loneliness explain the variance in perceived stress in a sample of undergraduate students (HIV-negative sample). Study 2 extended Study 1 and examine the same variables (forgiveness, loneliness, and perceived stress) in a sample of HIV-positive participants. Finally, Study 3 further extended the model and examined the relationship of forgiveness and loneliness to new outcome variables related to stress, state and trait anxiety in an HIV-positive sample.

Participants and Procedures

In the first study, 490 undergraduate students from a large state university in Texas participated in this cross-sectional correlational study. All participants were recruited from psychology classes and received academic credit upon completion of the study. Inclusion criteria were that 1) the participant was enrolled as a student; 2) at least 18 years of age; 3) able to read and comprehend English; and 4) the willingness to provide informed consent. Once screened, each participant completed an IRB-approved consent form. Participants completed computerized versions of the study protocol. Study 1 participants’ ages range from 18 – 56 (M = 21.09, SD = 4.96). Other descriptive statistics for this sample are shown in Table 1.

For Studies 2 and 3, the sample consisted of 63 HIV-positive individuals. Both studies were cross-sectional and correlational in design and ages ranged from 24-66 (M
All participants in these studies were recruited from an AIDS service organization (ASO) in the Dallas/Fort Worth metroplex and first screened to determine if they meet the study criteria. Study inclusion criteria were: (1) a documented HIV-positive status; (2) being 18 years of age or older; (3) the ability to read and comprehend English; (4) the ability and willingness to provide informed consent; (5) the ability to attend once-weekly support groups; and (6) willingness to be randomized into a treatment or control condition.

Once screened, each participant completed an IRB-approved consent form. Participants were then enrolled in Project Forgive, a randomized clinical trial of a group-delivered forgiveness intervention; however the data presented here are limited to the baseline data collected. Upon completion of the baseline survey protocol each participant received a $10 incentive. Each participant was assigned a laptop to complete computerized versions of the study protocol. Descriptive statistics for this sample are shown in Table 1.

Measures

At the beginning of each study, demographic data was collected. I assessed forgiveness, loneliness, and perceived stress in Studies 1 and 2 and forgiveness, loneliness, and anxiety in Study 3. All psychosocial variables were measured with published self-report measures that have good levels of reliability and validity.

The Heartland Forgiveness Scale (HFS; Yamhure-Thompson et al., 2005) was used in all three studies to assess self-reports of forgiving behaviors. This scale was developed out of the Heartland Forgiveness Project, which was a research program
designed to study the model of forgiveness. The scale was developed by administering a pilot version of the HFS to 499 students at a large Midwestern university. The pilot measure included 90 items that were generated to measure forgiveness of self, others, and situations. Exploratory factor analysis with varimax rotation was used to reduce the number of items. The final version of the scale is composed of 18 items on a 7-point Likert-type scale that ranges from 1 (almost always false of me) to 7 (almost always true of me). The subscales assess forgiveness along four dimensions: overall forgiveness, forgiveness of self, forgiveness of others, and forgiveness of the situation. However, for my studies I used only the Overall Forgiveness subscale. An example of an item includes, “I continue to punish a person who has done something that I think is wrong.” A high score denotes more forgiveness engaged in by the participant. Strong internal consistency was reported for the HFS, with a Cronbach α of .92. To establish concurrent validity, the HFS was compared to the Multidimensional Forgiveness Inventory and the Willingness to Forgive Scale. No significant differences were found between these measures (Yamhure-Thompson et al., 2005).

The UCLA Loneliness Scale (Russell, 1996) was used in all three studies and measures the level of loneliness experienced. It contains 10 items on a 4-point Likert-type scale that ranges from 4 (often) to 1 (never). In my analyses, I reverse-scored the measure so that the directionality of all variables remained the same. An example from this measure includes, “How often do you feel that you have nobody to talk to?” A high score indicates more loneliness experienced by the participant, with a score above 30 indicating severe loneliness. This scale has excellent internal consistency, the reported Cronbach α’s ranging from .89 - .94 (based on several populations on which the scale
The UCLA Loneliness scale was compared to the NYU Loneliness Scale and the Differential Loneliness Scale. The measures were strongly correlated, with correlation values ranging from .65 to .72, indicating good concurrent validity (Russell, 1996).

The Perceived Stress Scale (PSS; Cohen, Kamarck, & Mermelstein, 1983) was used in Studies 1 and 2. This scale measures the amount of perceived stress and contains 14 items on a 5-point Likert-type scale that ranges from 0 (never) to 4 (very often.) An example item from this measure is, “In the last month, how often have you felt nervous and 'stressed’?” High scores indicate more perceived stress experienced. Reported Cronbach α’s for the PSS range from .84 - .86, suggesting a strong internal consistency (Cohen, Kamarck, & Mermelstein, 1983). Concurrent validity was also established in the previous literature (Cohen et al., 1983).

The fourth instrument, the State-Trait Anxiety Inventory (STAI; Spielberger, 1983) was used only in Study 3. This inventory assesses the amount of situational and long-term anxiety in each participant. The two subscales of this measure, State Anxiety and Trait Anxiety, contain 20 Likert-type items each. Responses range from 1 (almost never) to 4 (almost always). Examples from this scale include, “I feel at ease,” or “I feel upset.” This measure also has excellent reported internal consistency, with Cronbach α’s ranging from .89 - .94 from both student and clinical populations on which the STAI was normed (Spielberger, 1983). A high the score on the STAI denote a higher level of anxiety experienced by the participant. Each state anxiety item on the STAI was selected on the basis of construct validity, which reflected higher scores in stressful situations and lower scores after relaxation training. Furthermore, the trait anxiety items
Data Analysis

I conducted a priori power analyses via the statistical package G*Power (Faul & Erdfelder, 1992) to assess the sample sizes needed to find significant results for the three studies. Power analyses indicated a sample size of 30 is sufficient to receive 80% power at the 0.05 level of significance to detect small effect sizes across the studies. A small effect size was utilized in these studies since no comparative data in the literature could be found, so using a small effect size is an acceptable measure of the strength of association between the variables of interest (Cohen, 1988). This indicates sample sizes in all three studies are sufficient to achieve the power needed to obtain significant results (Tabachnick & Fidell, 2007).

First, the data in each study was checked to ensure normalcy. Missing data was interpolated using mean-substitution as long as 80% of all data are present. If outliers affected the normal distribution curve, they were deleted or converted into a logarithmic curve to prevent violation of assumptions of parametric testing. Univariate analyses was performed to calculate the mean, standard deviation, range, and frequency of the demographic variables, such as age, ethnicity, living arrangement, and household income and the variables of interest (e.g. forgiveness, loneliness, stress or anxiety). Additionally, Cronbach α’s were calculated to determine the reliability of each instrument using our data. To further describe the sample, t-tests and chi-square tests were
conducted to detect any significant demographic differences in the variables for interest (e.g., gender, age, ethnicity, symptom load, and income). For the bivariate analyses, Pearson product-moment correlation coefficients were computed between all of the demographic variables serving as possible covariates, dependent and independent variables. The demographic variables used across the three studies included age, gender, ethnicity, and level of income to better describe our sample.

Finally, the data from each study were analyzed to test the hypotheses using hierarchical linear regression. Demographic variables were simultaneously entered into Block 1, and forgiveness, loneliness, and their interaction were simultaneously entered into Blocks 2 and 3 with perceived stress as the dependent variable in Studies 1 and 2 and state anxiety and trait anxiety as the dependent variables in Study 3. For Study 1 (the undergraduate sample), forgiveness and loneliness were simultaneously entered into the regression model, with perceived stress as the dependent variable. The same procedure was performed for Study 2, except data from an HIV-positive sample were used. Study 3 also used this procedure within an HIV-positive sample, but the dependent variables used were state and trait anxiety.

Two models used to compare total forgiveness and total loneliness, the independent variables, to state anxiety and trait anxiety, the dependent variables. In the first model, demographic variables (not all were entered due to the consideration of power), total forgiveness and total loneliness were entered in the first block with state anxiety as the dependent variable. The second model consists of the same independent variables with trait anxiety as the dependent variable. The models from the three studies also were examined for potential multicollinearity by calculating the
tolerance levels and variable inflation factors. This ensures that each variable is a separate construct that can be calculated accurately in the regression analyses.

Hierarchical regression analyses were performed to test the models for the three studies to determine: 1) if loneliness and forgiveness predict our outcome variables and 2) if forgiveness moderates the relationship between loneliness and state and trait anxiety using the model outlined in Frazier, Tix, and Barron (2004). A moderation analysis addresses the direction or strength of the relation between a predictor and an outcome (Baron & Kenny, 1986; Holmbeck, 1997; James & Brett, 1984). Thus, a moderator effect is nothing more than an interaction whereby the effect of one variable depends on the level of another. To conduct moderation analysis, all variables of interest were standardized prior to the analysis using the outlines given in Frazier, Tix, and Barron (2004). After the variables were standardized, loneliness (predictor variable) was entered into the first block, followed by the moderator variable (forgiveness) in the second block, followed by the product of the predictor and moderator in Block 3. This method allows for the interaction effect to measure the amount of variance accounted for in the outcome variable, which is necessary to find significant moderation (Baron & Kenny, 1986).

Finally, I compared the beta weights between the variables across the three studies using the z-test formula outlined in Paternoster, Brame, Mazerolle, and Piquero (1998). Using the formula (Paternoster et al., 1998), I tested the strength of the relationship between the regression coefficients to determine if a certain predictor (forgiveness and/or loneliness) is a better outcome measure of perceived stress, state anxiety, or trait anxiety, in either a student or HIV-positive sample. After performing the
calculation, I compared the number to a Z score table to see if the calculated number is larger than 1.64, which is the cutoff value for a one-tailed t-test. The numbers that are larger than 1.64 indicate a significant difference between the strength of the relationship between the predictor variable across the studies being measured (Paternoster et al., 1998).

\[
Z = \frac{b_1 - b_2}{\sqrt{SEb_1^2 + SEb_2^2}}
\]
RESULTS

Univariate Statistics

The demographic characteristics of the studies are summarized in Table 1.

Bivariate Statistics

Study 1 (Student Sample)

Forgiveness was negatively associated with perceived stress ($r = -0.42, p < 0.001$) and loneliness was positively associated with perceived stress ($r = 0.49, p < 0.001$). In this model, forgiveness was also negatively associated with loneliness ($r = -0.45, p < 0.001$). In this model, there was a significant correlation between gender and perceived stress. A Spearman’s rho correlation showed that women tend to perceive more stress than men, ($t = -0.19, p < 0.001$). No other demographic variables had significant correlations to the variables of interest.

Studies 2 and 3 (HIV-positive Sample)

Forgiveness was significantly correlated with perceived stress ($r = -0.50, p < 0.001$) and loneliness ($r = -0.28, p < 0.05$). We found that forgiveness is negatively associated with state anxiety ($r = -0.56, p < 0.001$) and trait anxiety ($r = -0.64, p < 0.001$). Loneliness was positively associated with state anxiety ($r = 0.38, p = 0.01$), trait anxiety ($r = 0.56, p = 0.001$), and negatively correlated with forgiveness ($r = -0.28, p < 0.05$). See Table II for more information.
Multivariate Statistics

Study 1 (Student Sample)

The model was able to explain 28% of the variance in perceived stress in the non-clinical sample ($F(5, 484) = 45.72, p < 0.001$). Findings suggest that those who reported more forgiveness ($\beta = -0.25, t = -5.92, p < 0.001$) and less loneliness ($\beta = 0.37, t = 8.79, p < 0.001$) also reported lower perceived stress, which supports previous literature (Lawler et al., 2005). The tolerance and variable inflation factors were within normal limits, indicating no multicollinearity between the predictor variables.

Study 2 (HIV-positive Sample)

The results of hierarchical regression analyses are reported in Table 3. The model was able to explain 36% of the variance in perceived stress in an HIV-positive sample ($F(5, 57) = 8.06, p < 0.001$). Findings suggest that those who reported more forgiveness ($\beta = -0.38, t = -3.49, p < 0.001$) and less loneliness ($\beta = 0.30, t = 2.76, p < 0.01$) also reported less perceived stress, which is also found in previous literature (Lawler et al., 2005). I tested for moderation, and none was found.

Study 3 (HIV-positive Sample)

In Part 1 (state anxiety is the outcome variable), forgiveness was able to account for 34% of the variance in state anxiety ($F(5, 57) = 13.92$). These results suggest that those who were more forgiving ($\beta = -0.50, t = -4.38, p < 0.001$) also reported less state anxiety. Loneliness was not significant in this model, nor was moderation present. In Part 2 of Study 3 (trait anxiety is the outcome variable), 56% of the variance was
explained in trait anxiety ($F(5, 57) = 16.61, p < 0.001$). Findings suggest that those who reported more forgiveness ($\beta = -0.54, t = -5.91, p < 0.001$) and less loneliness ($\beta = 0.39, t = 4.27, p = 0.001$) also reported lower trait anxiety. The tolerance and variable inflation factors in Study 3 were within normal limits, indicating no multicollinearity between the predictor variables. I also tested the model for moderation and none was found.

I also compared the beta weights across the three studies using the statistical procedures outlined in Paternoster, Mazerolle, and Piquero (1998) for calculating a $z$ test. In my analyses, I used the same models in the hierarchical regression analyses, and I kept the predictors consistent across the three studies. The results indicated there were no significant differences between the predictor variables between all three studies, except for the relationship between forgiveness in Studies 1 and 3. This indicates the relationship between the predictors and the outcome variables for each study is the same, except for forgiveness (Paternoster, Mazerolle, & Piquero, 1998). Forgiveness appears to be a stronger predictor with trait anxiety as the outcome variable when compared to perceived stress as the outcome variable. See Table 5 for the results.

Post hoc statistical analyses were also conducted. Independent sample $t$-tests were conducted to compare the scores of forgiveness, loneliness, state anxiety, trait anxiety, and loneliness, to race, sexual orientation, and household income. Chi-square tests of independence were also conducted. No additional analyses were significant in Study 1. However, in Studies 2 and 3, the HIV-positive sample, men were more likely to perceive stress ($M = 29.88, SD = 5.44, p < 0.01$), be lonelier ($M = 26.32, SD = 8.12, p < 0.01$), and
0.05), have more state anxiety ($M = 42.75$, $SD = 12.41$, $p < 0.05$), and have more trait anxiety ($M = 45.00$, $SD = 10.50$, $p < 0.05$) than women. I also found that those who were gay also reported more perceived stress, ($M = 30.75$, $SD = 5.73$, $p < 0.01$), more loneliness ($M = 27.58$, $SD = 7.85$, $p < 0.05$), more state anxiety ($M = 43.95$, $SD = 13.21$, $p < 0.05$), and more trait anxiety ($M = 45.60$, $SD = 11.92$, $p < 0.05$). A chi-square test of independence revealed that all men were gay or bisexual, $\chi^2 = (1, n = 63)$, $= 0.74$, $p < 0.001$. 
DISCUSSION

Studies 1 and 2

Based on the findings of Studies 1 and 2, increased forgiveness and decreased loneliness were associated with less perceived stress in both a non-clinical sample and a clinical sample of HIV-positive adults. Loneliness also accounted for a significant portion of the variance in a student sample and an HIV-positive sample. This suggests that forgiveness, which is a teachable skill, may be a strong and reliable protective factor against many negative symptoms across various populations. It could also be used to mitigate loneliness through reconnection of interpersonal ties. Forgiveness may also play a role in mitigating negative personality characteristics, such as chronic anxiety. Further, loneliness appears to be a salient factor contributing to both stress and anxiety in both a student and HIV-positive sample. Clinical implications should focus on teaching forgiveness to PLH and the general population to reduce stress, anxiety, and more chronic problem behaviors. Also, mental health professionals may focus on social support as a way to mitigate the effects of loneliness in PLH.

Study 3

In Study 3, I discovered that more forgiveness is associated with less state anxiety, and more forgiveness and less loneliness were also associated with less trait anxiety in an HIV-positive sample. Increased forgiveness contributed a significant portion of the variance in perceived stress and state and trait anxiety in a non-clinical and HIV-positive sample. In Model 1 of Study 3, loneliness did not account for a significant portion of the variance in state anxiety. Yet, in Model 2, loneliness attributed
to a significant portion of the variance in trait anxiety. It is possible that PLH who have state anxiety experience these feelings independent from loneliness because being around others may raise anxiety. Stigma is a major barrier to PLH to receiving healthcare and practicing proper medical adherence (Reidpath & Chan, 2005). Stigma has also been linked with maladaptive coping in the HIV-positive population (Brown, MacIntyre, & Trujillo, 2003). Perhaps PLH may prefer to be left alone and experience loneliness rather than dealing with the stigma involved with the disease. Further, PLH who are chronically anxious may need to rely more on others for support (Perdices, Dunbar, Grunseit, Hall, & Cooper, 1992). Therefore, they may experience loneliness more strongly when they perceive that support as unavailable.

When comparing the beta weights across the three samples, the only variable that had a significantly different relationship between the three samples was forgiveness. This indicates forgiveness had a significantly stronger predictive relationship with trait anxiety in an HIV-positive sample when compared to forgiveness predicting perceived stress in a student population. Forgiveness may be a stronger predictor in trait anxiety for HIV-positive individuals due to their experience of HIV-related stigma. PLH exhibit more trait anxiety in general compared to the general population, which is related to HIV-related stigma (Reidpath & Chan, 2005). Perhaps forgiveness acts as a buffer to decrease trait anxiety, which may be related to perceived stigma.

I also found no significant difference in the beta weights for African Americans across the three samples, despite the higher prevalence of African Americans in
Studies 2 and 3. This finding indicates that the relationship between forgiveness, loneliness, stress, state anxiety, and trait anxiety might be independent of race.

The clinical and non-clinical samples used in this study were obtained in different ways, which may have led to the demographic differences between the two groups. The sample used in Study 1 was a convenience sample taken from a large university in Texas, while the clinical population was a convenience sample obtained from an AIDS service organization in the DFW area. Although the samples have differences among gender, ethnicity, age, and sexual orientation, the mean, standard deviation, and range of stress between the groups is quite similar. This suggests that forgiveness and loneliness may be significant predictors of stress across varying populations (Yamhure-Thompson et al., 2005). I also speculate that forgiveness and loneliness are significant predictors of trait anxiety across varying populations.

Forgiveness and loneliness were both significant predictors of stress and trait anxiety in a non-clinical sample and an HIV-positive sample, suggesting these may be prominent predictors of stress and anxiety across various settings. This may be particularly important in an HIV-positive population because PLH are stigmatized due to their disease, and may retreat in isolation. This isolation may develop into loneliness, which contributes to perceived stress. However, if PLH practice more forgiveness, then perhaps the role of loneliness and perceived stress may be diminished.

Post hoc analyses indicated that in a student sample, women were reportedly more stressed. However, in an HIV-positive sample, men were reportedly more stressed. Gay individuals were also significantly more stressed, lonely, and had more state and trait anxiety. Interestingly, none of the men endorsed a heterosexual
orientation, which suggests that non-straight men who are HIV-positive are experiencing double stigma regarding their HIV-status and their sexual orientation (Kowalewski, 1988). Consequently, gay and bisexual men who are HIV-positive will experience more prejudice and discrimination, further isolating themselves from other individuals (Grossman, 1991). More research is needed to delineate the differences in these psychosocial variables among race, gender, and sexual orientation to understand the frequency and variation of stress, anxiety, and loneliness among these groups.

Limitations of this study include gathering data from convenience samples. Although I attempted to control for race in our statistical analyses, the HIV-positive sample contained a larger number of African Americans compared to the student sample, which may hinder generalizability. Further, the student sample contained younger participants, which may also affect generalizability to the HIV-positive sample and the population in general. Also, the data were analyzed using cross-sectional, correlational design, so causality cannot be inferred. Variables were measured using self-report techniques, so response bias may also play a factor. The measures, although found to be empirically reliable and valid, were not previously validated in an HIV-positive sample. Therefore, these measures may not accurately reflect the particular construct. Further, these results may not be generalized to other populations.

Future research should investigate forgiveness and its relationship with stigma, which is particularly relevant in the HIV-positive community. Forgiveness, a teachable skill, may also be used in an experimental design to determine a causal relationship with stress and anxiety. Additionally, future research should delineate the relationship between loneliness and state and trait anxiety in the HIV-positive community,
particularly since trait anxiety appears to have a stronger association with loneliness than state anxiety in this study. These variables of interest should also be investigated more among various racial minorities, which tend to be more prevalent in the HIV-positive population, to understand how these variables may play a different role with stress and anxiety in different cultures.
Table 1

Demographic Means, Standard Deviations, Ranges and Percentages

<table>
<thead>
<tr>
<th>Demographic Variables</th>
<th>Study 1 (N = 490)</th>
<th>Studies 2 and 3 (N = 63)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
</tr>
<tr>
<td>Age</td>
<td>21.0</td>
<td>4.8</td>
</tr>
<tr>
<td>Females</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>African Americans</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Latino/a</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Other Ethnicity</td>
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<td>-</td>
</tr>
<tr>
<td>European Americans</td>
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<td>-</td>
</tr>
<tr>
<td>Forgiveness</td>
<td>84.78</td>
<td>13.26</td>
</tr>
<tr>
<td>Loneliness</td>
<td>22.16</td>
<td>6.58</td>
</tr>
<tr>
<td>Perceived Stress</td>
<td>26.69</td>
<td>7.14</td>
</tr>
<tr>
<td>State Anxiety</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trait Anxiety</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 2

Intercorrelations among Demographic and Psychological Variables for Studies 1, 2, and 3

<table>
<thead>
<tr>
<th></th>
<th>Age</th>
<th>African American</th>
<th>Gay</th>
<th>Gender</th>
<th>Forgiveness</th>
<th>Loneliness</th>
<th>Perceived Stress</th>
<th>State Anxiety</th>
<th>Trait Anxiety</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>-</td>
<td>-0.03</td>
<td>0.04</td>
<td>-0.06</td>
<td>0.14</td>
<td>0.21</td>
<td>-0.08</td>
<td>-0.21</td>
<td>-0.22*</td>
</tr>
<tr>
<td>African American</td>
<td>-0.04</td>
<td>-</td>
<td>0.56**</td>
<td>-0.44**</td>
<td>0.17</td>
<td>-0.11</td>
<td>-0.06</td>
<td>-0.18</td>
<td>-0.13</td>
</tr>
<tr>
<td>Gay</td>
<td>0.04</td>
<td>0.01</td>
<td>-</td>
<td>0.83**</td>
<td>0.20</td>
<td>-0.24*</td>
<td>-0.31*</td>
<td>-0.28*</td>
<td>-0.26*</td>
</tr>
<tr>
<td>Gender</td>
<td>-0.04</td>
<td>-0.04</td>
<td>0.03</td>
<td>-</td>
<td>0.25</td>
<td>0.20</td>
<td>-0.36*</td>
<td>-0.29*</td>
<td>0.27*</td>
</tr>
<tr>
<td>Forgiveness</td>
<td>0.00</td>
<td>0.02</td>
<td>0.02</td>
<td>0.02</td>
<td>-</td>
<td>0.28*</td>
<td>-0.50**</td>
<td>-0.56**</td>
<td>-0.64**</td>
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<tr>
<td>Loneliness</td>
<td>0.05</td>
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<td>0.02</td>
<td>-0.05</td>
<td>-0.45**</td>
<td>-</td>
<td>-0.47**</td>
<td>0.38*</td>
<td>0.56**</td>
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<tr>
<td>Perceived Stress</td>
<td>-0.04</td>
<td>0.03</td>
<td>0.01</td>
<td>0.18*</td>
<td>-0.42**</td>
<td>0.49**</td>
<td>-</td>
<td>0.53**</td>
<td>0.65**</td>
</tr>
</tbody>
</table>

Note: *p < 0.01; **p < 0.001. Study 1 correlations are presented on the left, while Studies 2 and 3 correlations are presented on the right.
Table 3

Regression Analyses across Studies 1, 2, and 3

<table>
<thead>
<tr>
<th></th>
<th>Regression Analysis for Study 1</th>
<th>Regression Analysis for Study 2</th>
<th>Regression Analysis for Study 3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Perceived Stress</td>
<td>Perceived Stress</td>
<td>State Anxiety</td>
</tr>
<tr>
<td></td>
<td>$t$</td>
<td>$\beta$</td>
<td>$t$</td>
</tr>
<tr>
<td>Gender</td>
<td>4.09**</td>
<td>0.18</td>
<td>-3.13*</td>
</tr>
<tr>
<td>Age</td>
<td>-0.64</td>
<td>-0.03</td>
<td>-0.95</td>
</tr>
<tr>
<td>African American</td>
<td>1.01</td>
<td>0.09</td>
<td>1.03</td>
</tr>
<tr>
<td>Latino/a</td>
<td>-0.37</td>
<td>-0.01</td>
<td>-0.68</td>
</tr>
<tr>
<td>Forgiveness</td>
<td>-5.92**</td>
<td>-0.25</td>
<td>-3.49**</td>
</tr>
<tr>
<td>Loneliness</td>
<td>8.79**</td>
<td>0.37</td>
<td>2.76**</td>
</tr>
<tr>
<td>$F$</td>
<td>$F(5, 484) = 45.72**$</td>
<td>$F(5, 57) = 8.06**$</td>
<td>$F(5, 57) = 13.92**$</td>
</tr>
<tr>
<td>Adj $R^2$</td>
<td>0.28</td>
<td>0.36</td>
<td>0.34</td>
</tr>
</tbody>
</table>

Note: *$p < 0.01$; **$p < 0.001$
Table 4  
*Regression Coefficients between Studies 1, 2, and 3*

<table>
<thead>
<tr>
<th></th>
<th>Studies</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 &amp; 2</td>
<td>1 &amp; 3a*</td>
<td>1 &amp; 3b**</td>
<td></td>
</tr>
<tr>
<td>Forgiveness</td>
<td>Difference in Betas</td>
<td>0.13</td>
<td>0.25</td>
<td>0.29*</td>
</tr>
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<td>1.13</td>
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<td>Loneliness</td>
<td>Difference in Betas</td>
<td>0.07</td>
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<tr>
<td>African American</td>
<td>Difference in Betas</td>
<td>0.05</td>
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<td>Corrected z Value</td>
<td>0.43</td>
<td>0.85</td>
<td>0.31</td>
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</tbody>
</table>

*Note. p < 0.05 (one-tailed). *Study 3a = state anxiety as the outcome variable; **Study 3b = trait anxiety as the outcome variable.*
REFERENCES


