ABSTRACT

Title of Document: THE CARDIOVASCULAR AND PSYCHOLOGICAL EFFECTS OF COPING WITH PERCEIVED ETHNIC / RACIAL DISCRIMINATION

Radha V. Gholkar, Doctor of Philosophy, 2009

Directed By: Professor Barry D. Smith, Department of Psychology

Most previous studies have demonstrated the superiority of active coping, but less is known about the role of coping in perceived ethnic and racial discrimination. The purpose of this study was to examine whether active or passive coping is more effective in situations of low vs. high perceived controllability over a discriminatory event. Fifty-two African-American participants were randomized to one of four conditions: High Control / Active Coping; High Control / Passive Coping; Low Control / Active Coping; and Low Control / Passive Coping. Before and after the coping task, participants played a simulated computer game in which they were ostracized due to race. Continuous measures of heart rate and blood pressure were collected, in addition to periodic measurements of mood, anxiety, and self-efficacy. It was first hypothesized that active coping and high controllability would be associated with greater decreases in cardiovascular reactivity / recovery, negative mood, and anxiety. Second, it was hypothesized that there would be an interaction between

coping and control. Finally, it was hypothesized that individuals in the Low Control/Passive Coping condition would exhibit less cardiovascular reactivity / recovery, negative mood and anxiety, and higher self-efficacy when the uncontrollable discriminatory event was reintroduced. Data were analyzed using reactivity and recovery scores in a series of ANCOVAs. Results supported the benefits of active coping and high controllability, specifically in reference to negative mood. However, active coping was also associated with significantly longer diastolic blood pressure and heart rate recovery times. Furthermore, significant interactions were observed between coping and control for negative mood and anxiety. However, results did not support the hypothesis that the Low Control/Passive Coping group was more resilient during the second discriminatory event compared to the other groups, as this group scored significantly lower on subjective self-efficacy than all other conditions. Post hoc analyses largely confirmed these findings, but also demonstrated additional null results. Results suggest high controllability and active coping may be more advantageous for self-reported psychological than for cardiovascular indices, providing support for the concept of John Henryism. Implications for future work, including basic and applied research, are discussed.

THE CARDIOVASCULAR AND PSYCHOLOGICAL EFFECTS OF COPING WITH PERCEIVED ETHNIC / RACIAL DISCRIMINATION.

By

Radha V. Gholkar

Dissertation submitted to the Faculty of the Graduate School of the
University of Maryland, College Park, in partial fulfillment
of the requirements for the degree of
Doctor of Philosophy
2009

Advisory Committee:
Professor Barry D. Smith, Chair
Professor Bradley Hatfield
Professor Carl Lejuez
Professor Karen O'Brien
Professor Charles Stangor

Dedication

For colleagues and clients I have been blessed to work with, who continue to make social justice a part of their professionalism and personalities.

Acknowledgements

My gratitude to Professors Hatfield, Lejuez, O'Brien, Stangor and my committee chair, Dr. Smith, for their constructive criticism regarding this project. Many thanks also to my labmates Thom White, Hoa Vo, Christina Sadak, and Earta Norwood for their invaluable insights and support along the way.

Table of Contents

Dedication ii
Acknowledgements iii
Table of Contents iv
List of Tables v
List of Figures vii
Chapter 1: Introduction 1
Chapter 2: Methods 11
  Design Overview 11
  Apparatus & Measures 12
  Procedure 19
Chapter 3: Results 25
  Sample Demographics 25
  Analysis of Covariance 26
  Data Reduction 26
  Hypothesis Testing 28
  Manipulation Check 33
Chapter 4: Discussion 35
  General Discussion 35
  Limitations 49
Conclusion 57
  Future Directions 59
Appendix A: Literature Review 88
  Perceived Ethnic & Racial Discrimination 88
  The Transactional Theory of Coping 112
  Coping & Perceived Control 119
  Coping & Perceived Discrimination 121
  Self-Efficacy 126
Appendix B:Instruments 127
Appendix C: Sample Protocol Forms & Scripts 139
References 150

List of Tables

Table 1.
Overview of study variables and instruments.

Table 2.
Summary of sequence of tasks for laboratory protocol.

Table 3.
Sample Characteristics.

Table 4.
Goodness of fit Tests Examining Demographic Differences Between Groups.

Table 5.
Oneway Analysis of Variance Examining Differences in Covariate Measures Between Groups.

Table 6.
Summary of Laboratory Session Periods.

Table 7.
Hypothesis 1: Intercorrelations Among Dependent Variables.

Table 8.
Hypothesis 2: Intercorrelations Among Dependent Variables.

Table 9.
Hypothesis 1: Univariate Analysis of Covariance for Effects of Coping and Control on Systolic BP Reactivity.

Table 10.
Hypothesis 1: Univariate Analysis of Covariance for Effects of Coping and Control on Diastolic BP Reactivity.

Table 11.
Hypothesis 1: Univariate Analysis of Covariance for Effects of Coping and Control on State Anxiety Reactivity.

Table 12.
Hypothesis 1: Univariate Analysis of Covariance for Effects of Coping and Control on Negative Mood Reactivity.

Table 13.
Hypothesis 1: Univariate Analysis of Covariance for Effects of Coping and Control on Systolic BP Recovery.

Table 14.
Hypothesis 1: Univariate Analysis of Covariance for Effects of Coping and Control on Heart Rate Recovery.

Table 15.
Hypothesis 1: Univariate Analysis of Covariance for Effects of Coping and Control on Diastolic BP Recovery.

Table 16.
Hypothesis 2: Univariate Analysis of Covariance for Effects of Coping and Control on Systolic BP Reactivity.

Table 17.
Hypothesis 2: Univariate Analysis of Covariance for Effects of Coping and Control on Diastolic BP Reactivity.

Table 18.
Hypothesis 2: Univariate Analysis of Covariance for Effects of Coping and Control on Negative Mood Reactivity.

Table 19.
Hypothesis 2: Univariate Analysis of Covariance for Effects of Coping and Control on State Anxiety Reactivity.

Table 20.
Hypothesis 2: Univariate Analysis of Covariance for Effects of Coping and Control on Systolic BP Recovery.

Table 21.
Hypothesis 2: Univariate Analysis of Covariance for Effects of Coping and Control on Diastolic BP Recovery.

Table 22.
Hypothesis 2: Univariate Analysis of Covariance for Effects of Coping and Control on Heart Rate Recovery.

List of Figures

Figure 1.
Interaction of Coping and Control on Negative Affect Reactivity.

Figure 2.
Interaction of Coping and Control on State Anxiety Reactivity.

Chapter 1: Introduction

The purpose of this study was to examine whether active or passive coping is more effective in reducing the physiological and psychological effects of perceived ethnic and racial discrimination. Perceived discrimination is a persistent social experience for many minorities living in pluralistic societies. Various studies have reported high rates of perceived discrimination experienced by minorities, ranging from 30% - 98.5% (e.g., Brondolo et al., 2005; Prelow, Mosher, & Bowman, 2006; Romero & Roberts, 2003). Segregation and other forms of subtle discrimination, such as unequal treatment and pressure to conform to stereotypes, have been demonstrated to exist on American campuses even today (Ancis, Sedlacek, & Mohr, 2000). Virtually every study conducted on the effects of discrimination has examined perceived, rather than actual, discrimination, possibly due to practical considerations. Therefore, it is possible that some mental health conditions (e.g., depression) may exacerbate individuals' representations of perceived discrimination, leading them to conclude that it exists when in fact, it does not. However, given the lack of direct tests of this hypothesis in the literature and the multitude of studies suggesting perceived discrimination is an important variable in its own right (e.g., Gibbons, Gerrard, Cleveland, Wills, & Brody, 2004; Guyll, Matthews, & Bromberger, 2001), this study intended to measure discrimination solely in terms of what each individual participant perceives.

Reports published in the past two decades have studied the effects of perceived discrimination on racial and ethnic minorities, particularly in the area of physiological stress responses to perceived discrimination. The majority of studies in this area suggest that perceived discrimination causes greater increases in vascular resistance (i.e., blood pressure) in African-Americans than in Caucasian Americans (Armstead, Lawler, Gorden, Cross, & Gibbons, 1989; Clark, 2000). Even subtle discrimination has been shown to produce pressor effects (Guyll, Matthews, & Bromberger, 2001; Lepore et al., 2006; Merrit, Bennett, Williams, Edwards, & Sollers, 2006). These studies have compared cardiovascular reactivity between subtle-perceived discrimination and either non-perceived discrimination or blatant-perceived discrimination tasks and found that African-American participants exhibited higher diastolic blood pressure reactivity in response to the subtle-perceived discrimination conditions compared to Caucasian participants. Psychological effects of perceived discrimination have been reported as well. In line with stress models, several studies suggest that perceived discrimination is correlationally and longitudinally associated with stress-related psychiatric conditions, such as sleeping disturbance (Thomas, Bardwell, Ancoli-Israel, & Dimsdale, 2006) and alcohol and substance use (Finch, Catalano, Novaco, & Vega, 2003; Gibbons, Gerrard, Cleveland, Wills, & Brody, 2004; Guthrie, Young, Williams, Boyd, & Kintner, 2002). Studies have also consistently reported that perceived discrimination is associated with negative mood (Clark et al., 1999; Mossakowski, 2003; Noh & Kaspar, 2003; Prelow et al., 2006). A longitudinal design by Brody and colleagues (2006) found that

increases in perceived discrimination were prospectively related to depressive symptoms in a sample of more than 700 African American youths; this effect persisted independent of socioeconomic status.

An important question in diverse nations is how minorities cope with perceived discrimination. An accumulating body of research has investigated the mediating effects of coping behavior, especially in the area of physiological hyperarousal. The most influential model has been explicated in Lazarus & Folkman's (1984) transactional coping theory, which has been adapted by Clark and colleagues (1999) to apply to discriminatory events. According to this perspective, a stressor that is perceived to be discriminatory causes a variety of exaggerated physiological and psychological responses. Successful coping responses intervene in this process by reducing the magnitude and duration of stress. In the traditional transactional perspective, two types of coping have been identified (Lazarus & Folkman, 1984). *Active coping* is thought to alleviate stress by allowing the individual to exert control over the stressor, thereby attenuating its effect. Active coping involves planning, problem-solving, and seeking instrumental support. By contrast, in *passive coping*, attention is internally directed toward the individual's emotional, cognitive, and physiological experiences of a particular stressor. It may entail a variety of coping responses, such as the processing and expression of emotion, denial, avoidance, and seeking emotional support. The long-standing consensus among mainstream researchers holds that active coping is more effective at alleviating stress (Amirkhan, 1990; Dixon, Heppner, Burnett, Anderson, & Wood, 1993; Folkman &

Lazarus, 1988; Nezu, 1987), whereas passive coping is associated with maladaptive outcomes, such as depressive symptoms (DeGenova; Patton, Jurich, & MacDermind, 1994; Ravindran, Matheson, Griffiths, Merali, & Anisman, 2002; Wegner & Zanakos, 1994) and substance abuse (Ireland, McMahon, Malow, & Kouzekanani, 1994).

With regard to perceived discrimination, the majority of studies have shown support for the superiority of active coping in dealing with perceived discrimination, particularly in African-Americans. Some theorists have speculated that passive coping strategies are associated with higher blood pressure longitudinally because they prolong sympathetic activation in the short-term (Clark & Anderson, 2001). For example, Krieger (1990) found that African-American women who used passive coping styles (e.g., keeping "quiet" about it) were approximately four times more likely than those who used active coping to indicate that they suffered from hypertension. Most studies examining this hypothesis, however, have not studied reactivity, focusing instead on resting heart rate and blood pressure (e.g., Krieger, 1990; Krieger & Sidney, 1996; Moghaddam, Taylor, Ditto, Jacobs, & Bianchi, 2002). Several other studies have also indicated that passive coping is associated with heightened cardiovascular reactivity (Armstead et al., 1989; Shwerdtfeger, Schmukle, & Egloff, 2005), self reported stress (Barnes & Lightsey, 2005), and anxiety / depression (Caughy, O'Campo, & Muntaner, 2004) in African-Americans.

Despite strong evidence indicating the usefulness of active coping, Lazarus & Folkman (1984; 1987) have theorized that a "one-size-fits-all" approach to coping with stress may be limiting. They have argued that coping is a dynamic, reciprocal

process in which the suitability of a particular coping strategy is determined by the environmental context. For example, one perceived discrimination study demonstrated that not all passive coping strategies produce undesirable outcomes (Scott & House, 2005). This survey study of African-American youth found that some passive coping behaviors, such as internalizing and externalizing, were associated with increased distress, whereas others (e.g., distancing) were not.

Specifically, active coping may not be the most effective strategy in uncontrollable stressful situations (Lazarus, 1993; Lazarus & Folkman, 1984; 1987). For instance, in stressful encounters where the individual has little ability to control an outcome by exploiting the environment, active coping may be counterproductive, prolonging and worsening psychological distress and physiological reactivity without resolving the problem. In these cases, active coping may in fact fracture the individual's sense of self-efficacy by promoting the notion that one's coping efforts, rather than the controllability of the environment, are largely responsible for the resolution of the problem (James et al., 1983). As one instance of this, the discrimination literature suggests that active coping may be detrimental in situations where high perceived control is illusory. Based on the American folk hero who died of exhaustion after winning an efficiency challenge against a steam-powered hammer, "John Henryism" is the tendency to persist in prolonged, effortful active coping even when it does not necessarily resolve the stressful situation. John Henryism has been shown to be associated with higher blood pressure reactivity in African-Americans (Arriola, 2002; James et al., 1983; 1984). These studies suggest that active coping

may be less effective in situations where the perceived discrimination is mistakenly perceived to be controllable because emotional distress may be heightened without the promise of a resolution to the situation (Compas, 1995). Furthermore, it is possible that active coping in situations where controllability over discriminatory treatment is low may damage one's sense of efficacy in producing the desired outcome (e.g., fair treatment). Thus, this literature suggests that passive coping may be a more appropriate response to uncontrollable discrimination because individuals using this coping strategy reduce personal responsibility over the situation. Rather, a sense of acceptance of the external environment is promoted.

Unfortunately, data regarding the effects of perceived control on cardiovascular reactivity are limited and conflicting. For example, one study showed that beliefs about the controllability of a laboratory stressor did not affect cardiovascular reactivity (Baker & Stephenson, 2000), while other studies have shown that increased reactivity can be associated with either decreased control (Bongard & Hodapp, 1997) or increased control (Bongard, 1995). On the other hand, perceived control has been associated with positive psychological outcomes such as positive affect (Langston, 1994; Schulz & Decker, 1985). These positive psychological outcomes are further enhanced when high perceived control is combined with active coping (David & Suls, 1999; Thompson, Sobelew-Shubin, Galbraith, Schwankovsky, & Cruzen, 1993). Therefore, perceived control appears to be an important factor in determining how various coping strategies affect minority individuals.

While research in these areas has elucidated the effects of perceived discrimination on minority individuals, the extant literature also has some important limitations. First, previous research has not explicitly studied the effects of perceived discrimination on mood using experimental designs. Therefore, while questionnaire-based studies have been informative, the majority of laboratory research in this area has focused on the physiological effects of perceived discrimination. This represents an important shortcoming, as it means that data from prior studies fail to describe the effects of perceived discrimination and coping on emotion and cognition. Furthermore, the role of coping and a comparison of active and passive coping strategies in response to perceived discrimination have not been studied in a systematic, experimental fashion.

In brief, there were two main objectives in conducting the current research. The first was to identify the contextual factors that maximize the effectiveness of active and passive coping. The second, related objective was to understand how initial coping responses affect later mood, anxiety, self-efficacy, and physiological arousal. The primary aims and hypotheses of this study were as follows:

• Aim 1. To examine the effectiveness of two types of coping strategies, Active / Problem-Focused and Passive / Emotion-Focused, in dealing with a perceived discrimination stressor under two conditions, High Controllability and Low Controllability. It was expected that the perceived discrimination stressor presented in this study would cause increases in negative mood, anxiety, and cardiovascular

arousal and that coping would generally lead to a decrease in these parameters. Based on these assumptions, the following were hypothesized:

Hypothesis 1a. A main effect of Coping would be observed, such that:

- Active Coping would be associated with lower state anxiety, negative affect, blood pressure reactivity, and cardiovascular recovery times compared to Passive Coping.

Hypothesis 1b. A main effect of Control would be observed, such that:

- High Controllability would be associated with lower state anxiety, negative affect, blood pressure reactivity, and cardiovascular recovery times compared to Low Controllability.

Hypothesis 1c. An interaction between Coping and Controllability would be observed, such that:

- In the High Controllability condition, Active Coping would be more advantageous than Passive Coping. It would be associated with greater decreases in the following dependent variables following the coping task:
    - State anxiety
    - Negative affect
    - Systolic blood pressure reactivity
    - Diastolic blood pressure reactivity
    - Time to baseline systolic recovery
    - Time to baseline diastolic recovery

    - Time to baseline heart rate recovery
- In the Low Controllability condition, Passive Coping would be more advantageous than the Active Coping condition. It would be associated with greater decreases in the following dependent variables following the coping task:
    - State anxiety
    - Negative affect
    - Systolic blood pressure reactivity
    - Diastolic blood pressure reactivity
    - Time to baseline systolic recovery
    - Time to baseline diastolic recovery
    - Time to baseline heart rate recovery

• Aim 2. To investigate the lasting effects of Coping Strategy and Perceived Control when the same perceived discrimination stressor was re-administered. It was generally expected that the readministration of the perceived discrimination stressor would cause increased arousal and heightened negative mood and anxiety. Based on these assumptions, the following were hypothesized:

Hypothesis 2a. The Passive Coping / Low Controllability group would exhibit less reactivity (i.e., smaller increases) in the following dependent variables following the second stressor presentation compared to all other groups:

- State anxiety
- Negative affect

- Systolic blood pressure reactivity
- Diastolic blood pressure reactivity
- Time to baseline systolic recovery
- Time to baseline diastolic recovery
- Time to baseline heart rate recovery

2b. The Passive Coping / Low Controllability condition would be associated with greater self-efficacy. It was expected that this group would be protected from decreases in self-efficacy, relative to other groups, due to experience of coping with the uncontrollable discriminatory situation using passive coping.

Chapter 2: Methods

Design Overview

This research study employed a 2x2 randomized, between-subjects experimental design. Cyberball, a simulated computer game typically used as a laboratory analogue of social ostracism, served as the perceived discrimination stressor (van Beest & Williams, 2006; Williams, Cheung, & Choi, 2000; Zadro, Williams, & Richardson, 2004). Two levels of Coping, Active and Passive, were examined. Two perceived discrimination stressor conditions relating to Perceived Control, High and Low, were also tested. To minimize the effects of the experimenter on participant response, all selection and laboratory procedures were executed by the student investigator.

Apparatus & Measures

Information regarding the various study variables and how they were measured is summarized in Table 1. Copies of the measures used in this study may be found in Appendix B: Instruments.

Physical Location. The research study was conducted in the Laboratory of Human Psychophysiology at the University of Maryland, College Park. The laboratory features a private space with a desk and desktop computer.

Psychophysiological Equipment. Cardiovascular measurements were taken using the SD-700A Automated Blood Pressure Pulse Rate Monitor. All cardiovascular measurements were taken on the nondominant upper arm (i.e., brachial artery).

Ethnic / Racial Discrimination Stimulus. This study featured a laboratory analogue of subtle ostracism due to race. Cyberball (Williams, Cheung, & Choi, 2000) is a computer ball-tossing game between the participant and three fictitious players. It has shown to be a powerful analogue of social exclusion and ostracism, inducing changes in the anterior cingulate and right ventral prefrontal cortices (Eisenberger, Lieberman, & Williams, 2003). It also causes distress and feelings of not belonging (van Beest & Williams, 2006; Zadro, Williams, & Richardson, 2004). Cyberball was chosen as an analogue of uncontrollable, subtle perceived discrimination, which probably more accurately describes the majority of the perceived discrimination most minorities experience today (Sue, Bucceri, Lin, Nadal, & Torino, 2007). In this study, the other players depicted were Caucasian individuals

for two primary reasons. First, Caucasians are frequently conceptualized as the "dominant" or "majority" race, facilitating a racial ingroup vs. outgroup dynamic. Second, using Caucasian faces as the other players kept race constant across all participants.

The game was programmed such that the three fictional players excluded the participant by tossing the ball primarily amongst themselves. Furthermore, it opened in a web-browser and names and pictures of the players (which were fabricated by the experimenter) were included to enhance face validity. The participant was thus given the illusion that s/he was playing a live, real-time game with participants in other laboratories. Additionally, to control for effects due to gender, the other players were matched based on the gender of the participant (i.e., male-male, female-female). In all conditions, each fictional player committed ten throws, only one of which was directed at the participant. Thus, the participant was thrown the ball only three times during the entire game; furthermore, these throws occur within the first third of the game. Each Cyberball game lasted for approximately four minutes. The Cyberball game was played twice during the protocol, both before and after the coping task.

Coping Task. In line with theoretical and empirical writing (e.g., Lazarus & Folkman, 1984), problem solving was chosen for the active coping task. Because problem-solving has been explicated as involving five discrete steps (Problem Orientation, Problem Definition and Formulation, Generation of Alternatives, Decision Making, and Solution Implementation and Verification), similar steps were

created for the purposes of this study (D'Zurilla & Nezu, 1999; 2001; Nezu & Nezu, 2001).

As passive coping is conceptualized as being emotion-focused, with less emphasis on acting on the stressor itself, the current task was chosen to approximate this coping strategy. Insofar as passive coping skills training is not incorporated into mainstream interventions, guidelines for passive coping tasks were not available. Therefore, the passive coping task developed for this study was designed to be emotion-specific, encouraging the participant to focus inwardly on how the discriminatory event affects him / her.

Because active coping has been shown to increase cardiovascular reactivity when task demand and effort are high, or when the coping task involves preparation (Gerin et al., 1992), the coping conditions used here were made as similar as possible. For example, the passive coping task involved similar task demand and preparation (i.e., attending to and comparing items using a Likert scale). Both tasks were created to be as structured as possible to avoid incidental coping effects. For example, items in the problem-solving coping task were directed away from emotion-based coping by limiting participant responses to predetermined responses.

Controllability. Controllability of perceived discrimination was manipulated using a deception procedure. Controllability in this study was operationalized as a sense of personal empowerment (or lack thereof), and thus is intended to resemble control in real-life situations involving unfair treatment (e.g., filing a lawsuit of workplace discrimination, complaining about discriminatory service). As such

incidents typically involve appealing to an authoritative third party (e.g., judge, restaurant manager) and requesting some measure of redress or justice (e.g., monetary fine, reprimand), Controllability in the current study was operationalized to reflect these elements. Scripts used to convey instructions and maintain the deception procedure are provided in Appendix C: Protocol.

Scripts used to instruct participants referred to the other players using masculine or feminine pronouns depending upon the gender of the participant. Participants in the High Control condition were instructed that they were randomly chosen based upon a number they chose earlier in the protocol to be the "primary player" during Cyberball. They were instructed that they would be responsible for awarding participation points or money (depending upon the compensation chosen) to the other players based on their sportsmanship behavior. In addition, they were told that they would have to provide this feedback to the other players before the game was played a second time. High Control participants were also told that the other players would not be allowed to evaluate him / her.

By contrast, participants in the Low Control condition were informed that the coping task was simply a means to process their reactions to the Cyberball game. Like High Control participants, they were asked to complete the coping tasks in anticipation of the second game of Cyberball. However, in order to minimize a sense of control on the other players, Low Control participants were not told that their responses would be seen by the other players. Instead, they were simply asked to submit their responses to the experimenter.

Screening Form. This instrument was administered during the screening process in order to assess for eligibility as delineated above. As this form has been created to query about inclusion / exclusion criteria specific to this study, no reliability or validity information is available.

Mood / Affect. The Positive & Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988) was used to measure changes in affective states. It features 20 items relating to mood. Positive affect refers to the tendency to feel energetic and pleasure, while negative affect refers to feelings of distress and aversive mood states. Developed using college students, the two scales of this questionnaire are negatively correlated (-0.09), are internally reliable (PA=0.86, NA=0.87), and have high test-retest reliabilities (PA=0.79, NA=0.81). It also has demonstrated construct validity in a general, non-clinical adult population using a confirmatory factor analysis (Crawford & Henry, 2004). The PANAS has been used in a number of studies regarding the psychological functioning of African-Americans (e.g., McCabe & Barnett, 2000) and at least one study has reported that it is a valid measure of stress emotions in this sample (Brown, 2004).

State Anxiety. The State-Trait Anxiety Inventory (STAI; Spielberger, 1983) is a widely used measure of self-reported anxiety. The State Subscale (STAI-S), which was used in this study, is a 20-item measure of experiences relating to anxiety, such as feelings of tension, apprehension, or worry. The state subscale is distinguished from the trait subscale because the former measures changes in anxiety in response to external stimuli while the latter reflects long-standing tendencies to experience

anxiety. Norms are available to assess the deviancy of responses. The STAI-S correlates highly with other measures of anxiety, such as the Taylor Manifest Anxiety Scale. Because it is thought to measure changes in anxiety as a function of environmental circumstances, reliabilities can range from .16-.62. The STAI has been previously used in coping research in African-American samples (e.g., Kellow & Jones, 2005; Knight, Silverstein, McCallum, & Fox, 2000; Woods, Antoni, Ironson, & Kling, 1999).

Self-efficacy. The General Self-Efficacy Scale (GSE; Schwarzer & Jerusalem, 1995) is a ten-item measure scored on a four-point Likert scale. It is widely used in many countries and has demonstrated sufficient validity (Cronbach alpha = 0.76-0.90). Because the scale measures general self-efficacy, which pertains to an individual's belief that s/he can successfully cope with adversity, Bandura (1986) and Schwarzer & Fuchs (1996) have recommended adapting measures of general self-efficacy to be task specific. Previous studies (e.g., Smith, Kass, Rotunda, & Schneider, 2006) have also created new scales measuring specific self-efficacy by adapting existing general self-efficacy scales following these recommendations, with little demonstrable effect on reliability or validity. Therefore, minor alterations to the original GSE were made to make the items more context-specific, such as by using past tense. The GSE has been previously used in African-American samples (e.g., Wesley, 2005).

Personality. Traits such as neuroticism and extraversion have been shown to affect cognitive appraisals of stressful situations (Hemenover, 2001; Matthews et al.,

2006). Therefore, measures of these two traits were administered and controlled for in the data analysis. The Revised Eysenck Personality Questionnaire – Short Form (EPQR-S; Eysenck, Eysenck, & Barrett, 1985) is a measure of the dimensions of Eysenck & Eysenck's (1969) three factor theory of personality. Three scales measure neuroticism (N), psychoticism (P), and extraversion (E) using 12 items. Each subscale was scored by summing affirmative responses (i.e., yes / no question format). For the purposes of this study, only the N and E scales were administered. These scales have been reported to have adequate internal consistency, with Cronbach's α ranging from .79-.84 for N and .78-.88 for E (Eysenck, Eysenck, & Barrett, 1985; Francis, Brown, & Philipchalk, 1992). Previous studies have demonstrated no differences in personality scores on the EPQR between Caucasian- and African-Americans (Roy, 2003).

Perceived Ethnic / Racial Discrimination. As the level of discrimination an individual has previously experienced may affect his / her perception of and engagement in the laboratory tasks (e.g., Lepore et al., 2006), past experiences with perceived discrimination were also measured and controlled for in the analysis. The Brief Perceived Ethnic Discrimination Questionnaire—Community Version (PEDQ; Brondolo et al., 2005) is a modification of the Perceived Ethnic Discrimination Questionnaire (Contrada et al., 2001), which was developed to assess exposure to everyday occurrences of ethnic discrimination among college students. As such, the PEDQ is appropriate for use in both college and community samples. Seventeen items assess perceived discrimination in a variety of situations including the media,

public places, and the workplace. Items are scored on a five-point Likert scale. The PEDQ-CV was normed using a heterogeneous sample of minorities, the majority of which were African-American, and thus is acceptable for use with most ethnic samples. This measure demonstrated sufficient inter-item reliability (Cronbach's α = .90), and sufficient discriminant, convergent, and construct validity (Brondolo et al., 2005).

Demographics. Because demographic variables such as age, gender, and socioeconomic status may affect an individual's ability to cope with perceived discrimination or perceived control over stressful perceived discrimination (e.g., Liang, Alvarez, Juang, & Liang, 2007; Moody-Ayers, Stewart, Covinsky, Inouye, 2005), these variables were also measured and controlled for in the statistical analysis.

Depression & Anxiety. Although ratings of depressive and anxiety symptoms were not used to screen out potential participants and are not part of the laboratory protocol, this information was collected for descriptive purposes. To this end, the Center for Epidemiological Studies – Depression Scale (CES-D; Radloff, 1977) was administered to measure depressive symptoms. In addition, the STAI Trait Subscale (STAI-T; Spielberger, 1983) was used to assess stable or trait-like indications of anxiety.

Procedure

Participant Selection

This study was approved by the UMCP Institutional Review Board on January 31, 2008 (IRB# 07-0614). Participants were recruited from a variety of sources, including posted paper advertisements, Internet postings, classroom announcements and the departmental research pool to complete the online screening form, which was used to determine eligibility. The screening form was used to ensure that participants met two basic inclusion criteria: (1) age 18-22 and (2) African-American, with both parents identified as African-American. The screening form was also used to ensure that participants did not meet the following exclusion criteria: (1) Age other than 18-22 (2) Past or current cardiovascular and other health conditions, including stroke, heart disease, arrhythmia, hypertension, congenital heart defect, obesity, or diabetes (3) current medication or psychoactive drug use in past 24 hours, (4) previous knowledge or familiarity with the Cyberball task, (5) one or both parents of a race other than African-American. A copy of the screening form may be found in Appendix B: Instruments.

Potential participants were contacted and informed that they qualified to participate in the laboratory protocol. At this time, they were instructed that the current investigation intended to study "peer interaction." The purpose of this deception was to prevent any demand characteristics on the part of the participant while undergoing laboratory procedures. For example, it was possible that being aware of the central research question of the study may reduce the credibility of the perceived discrimination stressor used in the laboratory protocol, thereby affecting the participant's cardiovascular and mood measurements.

The participant was asked to schedule one laboratory visit. Participants were instructed to refrain from consuming caffeine or any other psychoactive drugs for the 24 hour period prior to participation.

Laboratory Session

Each participant was randomized to one of four conditions: Active Coping / High Control; Active Coping / Low Control; Passive Coping / High Control; and Passive Coping / Low Control. Participants were assigned to conditions using a predetermined code used to designate the condition. This code was developed and stored by another doctoral student and was not made available to the experimenter until data analysis. This code corresponded to computer files (e.g., those used to provide directions to tasks) used in the laboratory protocol to maximize the blinding procedure. Directions for all tasks were provided on the computer during each respective task to prevent the experimenter from learning the participant's condition. Except for the Cyberball task, all other tasks (self-report questionnaires, coping exercise) were administered through an online data collection website.

The laboratory protocol is summarized in Table 2. The participant was first acquainted with the laboratory, given an overview of the study procedures, and asked to provide informed consent. To ensure the face validity of the Cyberball task (which occurred later in the protocol), the participant was asked to pose for a digital photograph. S/he was told that this photograph would be downloaded and used to identify him / her to the other participants during the game. In order to enhance face

validity, the experimenter also conducted a fictitious phone call to the "other laboratories" in which the fictitious players were purportedly waiting. Participants in the High Control conditions were then asked to choose a number between 1-10 in order to create the impression that they were randomly chosen to be the "primary player" later in the protocol.

The participant was connected to the psychophysiological recording device, and asked to sit quietly for twenty minutes to normalize blood pressure and heart rate. Cardiovascular measurements then began and were taken every 30 seconds while the participant sat quietly. As measures of baseline mood and anxiety, the participant then completed the PANAS and STAI-S in the last five minutes of the baseline period. After baseline measurements were taken, the participant was instructed to complete the Cyberball task after being given the scripted directions (Appendix C). Following the end of the Cyberball task, the experimenter immediately readministered the PANAS and STAI-S, and was also administered the GSE for the first time.

Next, the participant was given information pertaining to the Controllability manipulation. Using written instructions on the computer screen, High Control participants were told that based on the number they chose earlier, that they were designated the "primary player." They were instructed that this prevented them from being evaluated by the other players and also allowed them to determine the number of points their fellow players should be awarded for their sportsmanship during the game. Low Control participants were asked to engage in the exercise as preparation

for the second match and were not given any information about points, judging the other players, or communicating with the other players (Appendix C).

All participants were asked to engage in the coping exercise determined by the assigned condition (Appendix C). Afterwards, High Control participants were asked to type the number of points or money they wished to allocate to each of the other players, and were instructed that this information would be sent directly through the website to the other participants. Shortly thereafter, a notification on the computer stated that the message containing the number of points allocated had been opened by each player. Participants in the Low Control condition were simply asked to submit their coping exercise through the website to the experimenter. Following the end of the coping task, the experimenter immediately readministered the PANAS, STAI-S, and GSE. The participant was then instructed to sit quietly for ten minutes while cardiovascular measurements continued in order to determine recovery to baseline scores.

The participant then completed the Cyberball task a second and final time. The task was essentially the same as during the first administration, however, participants were not given as extensive instructions (Appendix C). Immediately following the Cyberball task, the experimenter immediately readministered the PANAS, STAI-S, and GSE. The participant was again instructed to sit quietly for ten minutes while cardiovascular measurements were taken in order to determine recovery scores. The GSE, PANAS, and STAI-S were readministered a final time. This concluded the laboratory session.

Following the laboratory session, the participant was asked to complete the Brief PEDQ-CV, EPQR-S, CES-D, STAI-T, and Demographics Form. Finally, the participant was asked to complete the Manipulation Check Form and was debriefed about the purpose of the study using the Debriefing Script (Appendix C). Participants who successfully completed the study were awarded either two experimental points or $10 as compensation.

Chapter 3: Results

Sample Demographics

This study was approved by the UMCP Institutional Review Board on January 31, 2008 (IRB# 07-0614). Participants were recruited from a variety of sources, including posted paper advertisements, Internet postings, classroom announcements and the departmental research pool. Of the 126 participants who completed the online screening form, 53 were deemed eligible and completed the laboratory session. In order to sufficiently analyze the collected data, only participants who had two samples per laboratory period were included in the analysis. Of the 53 participants who completed the laboratory session, one participant's data did not meet this criterion, possibly due to malfunction of the physiological recording device. Therefore, the data from this respondent were omitted from all descriptive and inferential analyses, reducing the total sample size to $N = 52$ ($n = 13$).

Sample demographics are summarized in Table 3. In the remaining sample, the average participant was female and approximately 19 years old. The majority of participants described themselves as Christian and as having a family income of $76-85,000 per year. The mean score on the CES-D was 12.75 ($SD = 6.79$), indicating non-clinically significant levels of depressive symptoms. The mean score on the STAI-T was 37.50 ($SD = 6.36$), suggesting that the average participant rated low in anxiety. The mean score on the PEDQ was 33.04 ($SD = 8.28$), suggesting modest levels of personal experience with discrimination. On average, the sample was low on Neuroticism ($M = 3.67$, $SD = 3.05$) and moderately high on Extroversion ($M = 9.04$,

SD = 2.93). All participants spoke English as their primary language and were undergraduate students at UMCP at the time of their participation.

Analysis of Covariance

To measure differences in covariates among groups, χ^2 goodness of fit tests were first conducted for the following categorical variables: Gender, Income, and Religion (Table 4). These analyses revealed that there were no significant differences among groups as a function of Gender ($\chi^2 = .87$, $df = 3$, $p = .064$), Income ($\chi^2 = 26.30$, $df = 27$, $p = .839$), or Religion ($\chi^2 = 6.85$, $df = 9$, $p = .653$). In addition, one-way analyses of variance (ANOVAs) were conducted with each of the following continuous variables: Age, Extroversion, Neuroticism, and Past Discrimination (Table 5). No significant differences between groups were found for Age [$F(3,48) = .74$, $p = .535$], Neuroticism [$F(3,48) = .10$, $p = .403$], or Past Discrimination [$F(3,48) = .33$, $p = .802$]. However, there was a significant difference for Extroversion [$F(3,48) = 3.22$, $p = .031$]. Therefore, Extroversion was treated as a covariate in all subsequent analyses.

Data Reduction

Data were reduced through a series of steps. First, as detailed in Table 6, each portion of the protocol was separated into a "period" to correspond to laboratory events. Physiological samples, each consisting of systolic blood pressure, diastolic blood pressure, and heart rate, were then separated into these periods (e.g., Baseline, Cyberball 1, Post Cyberball 1, Coping Task, Post Coping, Recovery 1, Cyberball 2,

Post Cyberball 2, Recovery 2, and Final). As stated above, only participants who had at least two physiological samples per laboratory period were included in the analyses. Finally, in line with the study hypotheses, calculations were then performed on each period (e.g., peaks, minimums and means). Because calculations of sampling periods were used in the statistical analyses, rather than the raw samples themselves, this procedure accounted for variations in the number of samples between participants. Therefore, it was not necessary to interpolate missing data.

Cardiovascular Reactivity Scores. In line with methods reported by Davig, Larkin & Goodie (2000), residualized change scores were chosen as the measure of reactivity for all hypotheses. It is preferable to use residualized change scores over simple difference scores because they control for baseline values and account for individual variation. Residualized change scores were calculated by predicting the lowest Post-Coping values of each variable from the Baseline Average and Cyberball 1 Peak values (Hypothesis 1a, 1b, and 1c) and by predicting the Peak Cyberball 2 values of each variable from the Recovery 1 values (Hypothesis 2a). Residualized change scores for Hypothesis 2b (self-efficacy) were calculated by predicting the Post Cyberball 2 values from the Post Cyberball 1 values. Residuals were determined by subtracting each predicted score from each actual score. Residuals were then used in subsequent statistical analyses.

Cardiovascular Recovery Times. Recovery times were determined by calculating the time difference (in minutes) between the Coping Task Peak value and the Minimum Post-Coping / Recovery 1 value (Hypothesis 1a, 1b, and 1c) and by

calculating the time difference between the Peak Cyberball 2 value and the Minimum Post Cyberball 2 / Recovery 2 value (Hypothesis 2a).

As the dependent variables used in this study were generally not highly correlated with one another, it was inappropriate to combine these variables into a composite variable for multivariate analysis. Therefore, a series of ANCOVAs was used to perform the inferential analyses discussed below. Correlations for the dependent variables may be found in Table 7 (for Hypothesis 1) and Table 8 (for Hypothesis 2).

Hypothesis Testing

Hypotheses 1a – Main Effects of Coping

Reactivity Scores. To test the effect of Coping, separate univariate analyses of covariance (ANCOVAs) were conducted for each of the four reactivity dependent variables: Systolic BP, Diastolic BP, Negative Mood, and State Anxiety. As described above, Extroversion was used as a covariate in each of these analyses. No significant effects were observed for Coping in reference to blood pressure [Systolic BP, $F(1,47) = 1.70$, $p = .199$, Table 7; Diastolic BP, $F(1,47) = .42$, $p = .521$, Table 8]. Additionally, no significant main effects were found for State Anxiety [$F(1,47) = 1.23$, $p = .273$, Table 9]. However, a significant effect of Coping on Negative Affect was observed [$F(1,47) = 42.10$, $p = .000$, Table 10], indicating that Active Coping was associated with less Negative Affect. Thus, Hypothesis 1a was partially supported by the current reactivity data.

Recovery Scores. Separate ANCOVAs were also conducted for each of the following Recovery scores: Systolic BP, Diastolic BP, and Heart Rate. These analyses revealed no main effects of Coping on Systolic BP [$F(1,47) = .37$, $p = .545$, Table 11] or Heart Rate [$F(1,47) = .58$, $p = .451$, Table 12]. However, a main effect of Coping on Diastolic BP was observed [$F(1,47) = 4.74$, $p = .035$, Table 13], indicating that Active Coping was associated with significantly higher recovery time. In other words, participants in the Active Coping condition took significantly longer to return to their baseline diastolic blood pressure readings. Therefore, Hypothesis 1a was not supported by the current recovery data; in fact, these results were contrary to the expected direction.

Hypotheses 1b – Main Effects of Control

Reactivity Scores. The same procedure as outlined for Hypothesis 1a was utilized to test the effect of Control of each of the four reactivity dependent variables for Hypothesis 1b. No significant effects were observed for Control in reference to blood pressure [Systolic, $F(1,47) = .33$, $p = .568$, Table 7; Diastolic, $F(1,47) = .00$, $p = .975$, Table 8]. Additionally, no significant main effects were found for State Anxiety [$F(1,47) = 1.94$, $p = .170$, Table 9]. However, a significant effect of Control on Negative Affect was observed [$F(1,47) = 92.46$, $p = .000$, Table 10], indicating that High Control was associated with less Negative Affect. Thus, Hypothesis 1b was partially supported by the current reactivity data.

Recovery Scores. Recovery scores were analyzed in the same manner as for Hypothesis 1a. No main effects of Control were found for Systolic BP [$F(1,47) = .12$, $p = .731$, Table 11], Heart Rate [$F(1,47) = 1.18$, $p = .283$, Table 12], or Diastolic BP [$F(1,47) = .09$, $p = .764$, Table 13]. Therefore, recovery data did not support Hypothesis 1b.

Hypothesis 1c – Interaction Effects

Reactivity Scores. ANCOVAs revealed that interactions of Coping and Control with respect to Systolic BP [$F(1,47) = .12$, $p = .734$, Table 7] and Diastolic BP [$F(1,47) = .02$, $p = .899$, Table 8] were nonsignificant. However, interactions of Coping and Control with respect to State Anxiety [$F(1,47) = 4.79$, $p = .034$, Table 9] and Negative Mood [$F(1,47) = 72.21$, $p = .000$, Table 10] and were significant. Contrary to this hypothesis, Passive Coping was associated with less Negative Affect in the High Control condition, whereas in the Low Control condition, Active Coping was associated with less Negative Affect (Figure 1). These results also indicated that, as expected, Active Coping was associated with less State Anxiety in the High Control condition compared to Passive Coping (Figure 2). These results suggest mixed support for Hypothesis 1c.

Recovery Scores. No significant interactions were observed for any of the dependent variables [Systolic, $F(1,47) = .72$, $p = .400$, Table 11; Heart Rate, $F(1,47)$

= .12, p = .732, Table 12; Diastolic, $F(1,47)$ = .25, p = .623, Table 13]. Therefore, recovery data did not support Hypothesis 1c.

Hypothesis 2a – Preparatory Coping

Reactivity Scores. To test the hypothesis that the Passive Coping / Low Control group would exhibit less reactivity compared to all other groups, four separate ANCOVAs were conducted to test the effects of Coping and Control on each of the reactivity variables. Extroversion was entered as a covariate in each of these analyses. No significant main effects of Coping were found with respect to any of the four dependent variables, Systolic [$F(1,47)$ = .41, p = .526, Table 14], Diastolic [$F(1,47)$ = .15, p = .700, Table 15], Negative Mood [$F(1,47)$ = 1.60, p = .212, Table 16], and State Anxiety [$F(1,47)$ = 2.39, p = .129, Table 17]. Similarly, Control did not demonstrate a significant main effect with respect to Systolic [$F(1,47)$ = .04, p = .839, Table 14], Diastolic [$F(1,47)$ = .42, p = .520, Table 15], Negative Mood [$F(1,47)$ = .63, p = .431, Table 16], or State Anxiety [$F(1,47)$ = .37, p = .544, Table 17]. Additionally, there were no significant interactions of Coping and Control with respect to Systolic [$F(1,47)$ = 2.42, p = .126, Table 14], Diastolic [$F(1,47)$ = 1.78, p = .189, Table 15], Negative Mood [$F(1,47)$ = .01, p = .923, Table 16], or State Anxiety [$F(1,47)$ = .26, p = .610, Table 17]. Based on these results, the Passive Coping / Low Control group did not appear to exhibit significantly less reactivity than the other three conditions. Therefore, Hypothesis 2a was not supported by the current reactivity data.

Recovery Scores. Separate ANCOVAs conducted with each of the three cardiovascular recovery measures revealed nonsignificant results for the main effect of Control on Systolic BP [$F(1,47) = .01$, $p = .914$, Table 18], Diastolic BP [$F(1,47) = .64$, $p = .426$, Table 19] and Heart Rate [$F(1,47) = 3.18$, $p = .081$, Table 20]. Similarly, there was no significant effect of Coping on Systolic BP [$F(1,47) = .70$, $p = .408$, Table 18] or Diastolic BP [$F(1,47) = .27$, $p = .607$, Table 19]. However, Coping had a significant effect on Heart Rate recovery [$F(1,47) = 5.54$, $p = .023$, Table 20], indicating that Active Coping was again associated with greater recovery times compared to Passive Coping. Post hoc LSD comparisons demonstrated that the Passive Coping / Low Control group exhibited significantly smaller heart rate recovery times than the Active Coping / Low Control group only ($p = .035$). Finally, Coping X Control with respect to Systolic BP [$F(1,47) = 1.84$, $p = .182$, Table 18], Diastolic BP [$F(1,47) = .43$, $p = 516$, Table 19], and Heart Rate [$F(1, 47) = .45$, $p = .506$, Table 20] was not significant. These recovery data thus suggest minimal support for Hypothesis 2a.

Hypothesis 2b – Self Efficacy

An ANCOVA was conducted to test whether, as hypothesized, the Passive Coping / Low Control group experienced smaller decreases in self-efficacy, relative to the other groups. Results indicated that there was a significant difference between groups [$F(3,47) = 5.05$, $p = . 004$]. Post hoc LSD comparisons indicated that the Passive Coping / Low Control group exhibited significantly greater decreases in self-

efficacy compared to the Active Coping / Low Control (p = .003), Passive Coping / Low Control (p = .018), and Passive Coping / High Control (p = .002) groups. This result was essentially the reverse of what was hypothesized.

Manipulation Check

Item 1. Most participants (57.7%) indicated that they felt "not at all" or "a little" discriminated against during the first Cyberball administration. There were no significant differences between groups in responses to this item (p = .324).

Item 2. The majority of participants (65.4%) reported that they felt "not at all" or "a little" discriminated against during the second Cyberball administration. Again, there were no significant differences between groups in responses to this item (p = .140).

Item 3. Most participants (69.3%) indicated that they did not believe or believed "a little bit" that they were interacting with three real life people during the Cyberball administrations. There were no significant differences in responses to this item between groups (p = .854).

Item 4. Seventy-five percent of participants indicated that they did not feel they had any control over how many points the other Cyberball players received for participating. There was a significant difference in responses to this item among groups (p = .009). Specifically, the High Control / Passive Coping group responded with significantly higher ratings on the scale than the Low Control / Active Coping group (p = .015) and the Low Control / Passive Coping group (p = .038).

Item 5. Seventy-five percent of participants reported that did not believe or believed "a little bit" that the number of points they awarded the other Cyberball players would affect their behavior in the second Cyberball administration. There was a significant difference in responses to this item between groups (p = .005). Again, the High Control / Passive Coping group responded with significantly higher ratings on the scale than the Low Control / Active Coping group (p = .004) and the Low Control / Passive Coping group (p = .037).

Post Hoc Analyses

To assess whether the limitations of the deception influenced the reported results, the analyses above were reconducted using only data from "believer" participants. "Believers" were defined as those participants who rated at least a 3 or higher on both questions 1 and 2 of the Manipulation Check Form (n = 19). These questions ask about the level of discrimination participants experienced during each Cyberball game; a rating of 3 is "moderate," with higher scores indicating a greater level of discrimination.

Post hoc ANCOVAs largely confirmed the findings of the primary analyses, with four exceptions. First, the post hoc analysis demonstrated that, in reference to Hypothesis 1a, there were no significant effects of coping on diastolic blood pressure recovery time [$F(1,14) = .03$, $p = .870$]. This is contrasted with the initial data analysis, which showed that Active Coping was associated with longer diastolic recovery times. Second, regarding Hypothesis 1c, the post hoc analysis showed that

there was no significant interaction between Coping and Control in reference to State Anxiety [$F(1,14) = .73$, $p = 408$]. However, the initial data analysis showed that this was a significant interaction. Third, in reference to Hypothesis 2a, the post hoc results indicated that there was no significant effect of Coping on heart rate recovery time [$F(1,14) = 2.12$, $p = .168$]. This contradicts the findings of the primary analysis, which showed that Active Coping was associated with longer heart rate recovery times. Finally, the post hoc analysis found nonsignificant differences in self-efficacy with respect to Hypothesis 2b [$F(3,14) = ..37$, $p = .776$]. This differs from the results of the primary analysis, which found that that the Passive Coping / Low Control group demonstrated the significantly less self-efficacy than the other groups.

Chapter 4: Discussion

General Discussion

As far as is known, the current study is the first to study both the physiological and psychological effects of racial discrimination using a laboratory paradigm. The objectives of this investigation were to test the effects of two common coping strategies, problem (active) and emotion (passive) focused coping, in confronting racial discrimination. In addition, this study sought to examine whether effective coping hinged upon the controllability of the discrimination being experienced. Finally, this study asked whether previous coping with discrimination could prepare individuals to cope more effectively when faced with the uncontrollable discriminatory event a second time. In order to address these questions, this

discussion will first focus on the findings of the initial data analysis. However, it must be stated that given the results of the manipulation check, all conclusions described below must be considered tentative and should be interpreted with caution until more conclusive data are available. With this caveat, the discussion below is offered as speculative at this time.

The first research question in this study was concerning the optimal combinations of coping and control needed to decrease both physiological and psychological arousal. It was first hypothesized that both the Active Coping and High Control conditions would generally be associated with greater decreases in anxiety, negative affect, and blood pressure following the discriminatory stressor (Hypotheses 1a and 1b). The results of this study indicated main effects of both Active Coping and High Control on Negative Affect only, suggesting partial support for this hypothesis. This was also supported by the fact that the effect sizes relating to the effect of Control and Coping on Negative Affect were considerably high, accounting for up to 66% of the variance, which were the largest found in the study. Consistent with previous studies that have investigated the link between controllability and mood, active coping and high levels of controllability are superior when it comes to self-reported psychological states (Caughy, O'Campo, & Muntaner, 2004; David & Suls, 1999; DeGenova, Patton, Jurich, & MacDermid, 2001; Dixon, Heppner, Burnett, Anderson, & Wood, 1993; Endler, Macrodimitris, & Kocovski, 2000; Frazier, Mortensen, & Steward, 2005; Ravindran, Matheson, Griffiths, Merali, & Anisman, 2002). From the perspective of Folkman & Lazarus' (1984) transactional theory of

coping, active coping and high controllability facilitate positive mood and dampen anxiety by mobilizing the individual to address external threats to its psychological well-being. It appears, based on the limited findings of the current study, that participants may typify this tendency to be protected from negative mood states by focusing on the external environment.

However, it seems that active coping and high control, as manipulated and operationalized in this study, were not sufficient to render significant effects on cardiovascular reactivity. This was evidenced by the lack of significant findings and very low effect sizes, accounting for 10% or less of the variance. This is surprising, especially since the majority of the discrimination literature demonstrates that African-Americans who engage in passive coping tend to exhibit elevated resting blood pressure (Krieger, 1990; Krieger & Sidney, 1996; Moghaddam, Taylor, Ditto, Jacobs, & Bianchi, 2002) and heightened cardiovascular reactivity (Armstead et al., 1989; Shwerdtfeger, Schmukle, & Egloff, 2005). With respect to controllability, on the other hand, these results may reflect the confusing and contradictory findings already reported in the extant literature (e.g., Baker & Stephenson, 2000; Bongard, 1995; Bongard & Hodapp, 1997). It is possible that this is due to the robustness of the manipulations themselves (discussed in the *Limitations* section below).

Also with regard to Hypotheses 1a and 1b, a fascinating result was that Active Coping was associated with longer diastolic blood pressure recovery times, suggesting that there may be a "trade-off" between subjective mood and physiological arousal. In other words, engaging in active coping may cause

individuals to feel less reactive to discrimination in terms of mood, however, this type of coping appears to be accompanied by increased vascular effort. This finding may be consistent with the small but noteworthy John Henryism literature, which shows that persistence in the face of an insurmountable stressor can lead to prolonged sympathetic activation (Arriola, 2002; James et al., 1983; 1984). Although the passive and coping tasks were matched as closely as possible, it may be that the active coping exercise was sufficiently more effortful so as to produce longer recovery times. However, if this were the case, significant differences in cardiovascular reactivity would also be observed. A more likely alternative is that the active coping was inherently arousing because of its action-focused orientation, and that engaging in this task caused prolonged – though not initially heightened - sympathetic activation. This interpretation would be in line with the theoretical basis for John Henryism, which is discussed in more detail below.

It was also hypothesized that there would be an interaction between coping and control, such that passive coping would be more advantageous in the low control condition whereas active coping would be more beneficial in the high control condition (Hypothesis 1c). Based on the current limited data, the benefits of either active or passive coping do not appear to be systematically tied to the level of perceived controllability over the discriminatory episode**.** Data from this study found significant interactions between coping and control with regard to Negative Affect and State Anxiety, suggesting mixed support for this hypothesis. With regards to Anxiety, active coping was more beneficial than passive coping in the high control

condition, which was as expected. Conceptually, this is in line with the coping literature, which has demonstrated that the combination of active coping and high controllability are associated with less self-reported stress (Endler, Macrodimitris, & Kocovski, 2000; Mallett & Swim, 2006). Again, this is thought to be the case because high controllability and active coping tend to focus the individual on reducing the effects of external stressors, thereby mitigating their impact. However, the unexpected result with regard to the interaction of control and coping on negative affect is more difficult to understand on a theoretical level. The finding that passive coping is more helpful than active coping in high control situations has not been widely documented in previous studies, although one study has demonstrated that passive coping diminishes the effect of discrimination on depressive symptoms (Noh, Beiser, Kaspar, Hou, & Rummens, 1999).

However, it is also difficult to ascertain why active coping would be more useful than passive coping in reducing negative affect, specifically in low control situations. In the current study, it may have been that when participants perceived little control over the Cyberball game, active coping protected them against negative mood by off-setting ruminative responses. In other words, perhaps participants who already felt that the discrimination they were experiencing could not be helped may have benefitted from a problem-solving approach rather than ruminating about the injustice. By focusing on action rather than ruminating about one's feelings, they may have protected themselves against negative mood. Conversely, passive coping may have been more beneficial in high control conditions than active coping because

participants in this condition may feel they have the luxury of processing their emotional responses to discrimination before rectifying the injustice. Based on the results of this study, it appears that this explanation is specific to Negative Affect and does not apply to Anxiety. In fact, mood and anxiety are considered to be highly correlated (Mineka, Watson, & Clark, 1998), with anxiety being one component of negative affect (Andrade, Gorenstein, Vieira-Filho, Tung, & Artes, 2001). This theory is reflected in the inclusion of anxiety-related items, such as jitteriness and nervousness, on the PANAS. However, factor analytic studies have shown that anxiety and mood are related but distinct factors (Clark, Beck, & Stewart, 1990; Clark, Steer, & Beck, 1994). Based on the results at this time, in appears that Anxiety and Negative Affect are distinct variables that may be considered separately when discussing the effects of discrimination.

Taken together, findings pertaining to Hypothesis 1 modestly support the hypothesis that active coping and high levels of controllability are somewhat beneficial, when considering self-reported psychological states. Strangely, however, results from the present study suggest that these variables are not associated with any additional benefits, including decreased cardiovascular reactivity and recovery. To quite the contrary, the finding that active coping resulted in longer diastolic blood pressure recovery times suggests that while active coping may dampen the affective effects of discrimination, it may inadvertently lead to prolonged physiological arousal. To this end, the current findings may potentially illustrate the slippery and often double-edged nature of coping as documented in the minority coping literature,

particularly the concept of John Henryism, which has been posited to explain the high prevalence of hypertension in African-Americans (James et al., 1983; 1984). This phenomenon suggests that perseverance in the face of discrimination may act as a trade-off, whereby physiological functioning is sacrificed for emotional well-being. In line with seminal findings, the current findings suggest that John Henryism is associated with diastolic blood pressure (James et al., 1983). In this early work, the authors found that African-American men who ranked low on education but high on John Henryism exhibited higher resting diastolic blood pressure rates. James and his colleagues concluded that minority individuals with fewer resources who persevere against racial discrimination exhibit a mismatch between the psychological and physiological benefits of active coping. The current study differs from James et al.'s paper on a number of respects, including the fact that the latter is non-experimental design examining only correlations between education, John Henryism, and resting blood pressure. Despite these differences, however, both studies suggest that active coping may lead to elevations in diastolic blood pressure.

Indeed, it is likely a common occurrence that some minority individuals diligently confront discrimination with action to the best of their abilities, considering it the best route in feeling competent and secure about the situation. Indeed, social environments present an array of problem-oriented options for seeking redress including filing lawsuits, making formal complaints, protesting and other political activities, and continued discourse and education about the effects of discrimination. It is feasible that although these activities may, in the long run, mitigate the effects of

discrimination by reducing discrimination in the first place, they are also effortful, time-consuming, and demanding ways of coping. Furthermore, while these activities might be inherently gratifying and may instill a sense of control and power in discrimination victims, it is possible that seeking solutions to this stressor on a routine basis may result in adverse cardiovascular effects. Therefore, the current research appears to corroborate previous research indicating that discrimination may be one pathway through which African-Americans contract hypertension, the "silent" epidemic (Krieger, 1990; Krieger & Sidney, 1996; Moghaddam, Taylor, Ditto, Jacobs, & Bianchi, 2002).

To this end, discrimination may present as a unique source of stress for minority individuals, adding to general sources of stress, such as stressful life events and hassles (Armstead et al., 1989; Fang & Myers, 2001). It is also important to place the stress factor in hypertension in the context of the current multifactorial model in medicine. The relevant medical literature has shown that biological and environmental factors are the predominant causes of hypertension and, more generally, the primary factors in blood pressure. Major biological factors include arteriosclerosis, aortic coarctation, nutrition, genetics, smoking, obesity, obstructive sleep apnea, lack of exercise, and sodium chloride intake (Clark, 2005; Coy, 2005; De Caro, Trocchio, Smeraldi, Calevo, & Pongiglione, 2007; Hua, Brown, Hains, Godwin, & Parlow, 2009; Krzesinski, & Cohen, 2007; Nesbitt, 2005; Ruesser & McCarron, 2006; Sajkov & McEvoy, 2009; Smith, Gholkar, Mann, & Toward, 2007). While these are the major factors, chronic stress is also known to contribute to

hypertension, although the studies are somewhat mixed (Sparrenberger et al., 2009). Given the latter findings, stress may confer greater risk for the development of hypertension in African Americans. In addition, psychosocial risk factors, such as access to health care, treatment disparities, and medication adherence, are also vitally important (Davis, Vinci, Okwuosa, Chase, & Huang, 2007; Hyman & Pavlik, 2002; Watson, 2008). In fact, newer studies have looked at the role of epigenetics and the interplay between biological and environmental factors in increased cardiovascular disease burden in African Americans (Kuzawa & Sweet, 2009). Thus, in the context of the current findings, African-Americans may possess elevated risk for hypertension and other cardiovascular conditions as a result of the stress of chronic discrimination and the prolonged exertion of active coping, in addition to biological factors.

The second hypothesis posed at the outset of this study was concerned with how resilient each group would be if the discriminatory stressor were re-administered (Hypothesis 2a). It was expected that the Passive Coping / Low Control group, which had presumably experienced uncontrollable discrimination during the first trial and coped with it using an emotion-based exercise, would experience less reactivity to the stressor the second time around. In other words, it was expected that this group would have developed a "toughness" toward the discriminatory experience due to already perceiving it as an uncontrollable situation and having coped with it as such. Contrary to expectation, the current results demonstrated no significant differences in reactivity among groups during the second presentation, suggesting few preparatory advantages

of coping. However, an alternative explanation is that the coping exercise, perhaps due to its brevity, did not produce lasting effects. Thus, within a few minutes of the coping exercise, it is possible that the groups equalized on reactivity, becoming indistinguishable. While this is a plausible explanation, it cannot be conclusively deduced based on the current data whether this interpretation is accurate. In terms of recovery data, the available results suggest minimal support for hypothesis that the Passive Coping / Low Control group was the most resilient. In fact, Active Coping was associated with longer heart rate recovery times, and the post hoc LSD comparisons conducted indicated that in the Low Control condition, participants in the Passive Coping group had significantly lower heart rate recovery times than those in the Active Coping group. These results again suggest possible support for the concept of John Henryism and point to the relative – albeit minimal - benefits of passive coping when perceived controllability is low.

Furthermore, the results of the current study might provide additional insights into Lazarus & Folkman's (1984) transactional coping theory, and subsequent adaptations regarding discrimination (Clark et al., 1999). These theories both discuss coping as a mechanism that reduces the magnitude and duration of heightened physiological and psychological responses to stressful environmental challenges. Empirical studies stemming from Folkman & Lazarus' seminal work have demonstrated that active coping is generally more effective than passive coping because it abates the environmental situation that is precipitating the organism's stress response (Amirkhan, 1990; DeGenova, Patton, Jurich, & MacDermid, 1994;

Dixon et al., 1993; Folkman & Lazarus, 1988; Nezu, 1987; Ravindran et al., 2002; Wegner & Zanakos, 1994). However, the current results indicate that coping may not as simple a proposition as these theories would suggest. The finding that active coping was associated with certain, but not all, positive outcomes suggests that coping may not be a tidy or simple phenomenon. Thus, it is possible that various forms of coping act on certain systems, such as either physiological or psychological, without necessarily impacting others. This conjecture would also be supported by the concept of John Henryism, as discussed above. However, future data will have to confirm whether these differential effects of coping can be replicated.

In regards to self-efficacy (Hypothesis 2b), the results were generally the opposite of the expected direction. Contrary to the hypothesis, the Passive Coping / Low Control group actually demonstrated significantly greater decreases in self-efficacy compared to the other three groups. . Therefore, it seems possible that this particular group felt less prepared and less competent at handling discrimination by the end of the second Cyberball administration. This finding is in line with previous findings which have indicated that emotion-based coping is associated with low self-efficacy (Devonport & Lane, 2006; Levin, Ilgen, & Moos, 2007) and suggests tentative evidence for the position that emotion-based strategies are less beneficial than problem-focused strategies for preparatory coping. As passive coping largely involves processing emotional responses to a stressor, this finding is also consistent with Bandura's (1977) theory of self-efficacy that passive coping, due to its internal focus, precludes opportunities to develop skills of mastery and a sense of confidence.

Bandura's theory (1977) posits that coping and self-efficacy are a bi-directional process, in which self-efficacy both determines and is determined by opportunities to advance one's skills in bringing about a desirable outcome. According to this theory, it appears that, compared to other groups, individuals in the Passive Coping / Low Control might not have the opportunity to experience their own behavior as effecting a change in their circumstances. In short, the current data indicate that there may not be many advantages associated with preparatory passive coping in relation to an uncontrollable, subtle discriminatory stressor. To the contrary, passive coping appears to be potentially damaging to self-efficacy, based on the current data.

However, it is important to remember that the Passive Coping / Low Control group also scored significantly lower on self efficacy than the Passive Coping / High Control group, suggesting that passive coping alone is not enough to account for this lack of self efficacy. Thus, based on these results, low controllability also appears to be an important factor in developing self-efficacy. This finding points to the possibility that when minority individuals are confronted with having less control over a discriminatory event, their self-efficacy drops. Furthermore, the short duration of the current study suggests that this lapse may be apparent almost immediately. Therefore, the current results support extant findings from the literature that low perceived controllability is associated with less self-efficacy (Rokke, Fleming-Ficek, Siemens, Hegsted, 2003; Thompson, Sobelew-Shubin, Galbraith, Schwankovsky, & Cruzen, 1993). As with the other issues described above, conclusions regarding self-

efficacy must await support through additional, carefully designed studies in order to be validated.

Because the majority of participants reported on the Manipulation Check Form that they experienced little or no discrimination during the Cyberball games, a set of exploratory post hoc analyses were performed to determine whether the belief that the deception was real influenced the results. These post hoc analyses found that some of the above results were nonsignificant, such as the finding that Active Coping was associated with longer diastolic and heart rate recovery times, the interaction between Coping and Control with respect to Anxiety, and the differences in self-efficacy after the second Cyberball administration. These post hoc analyses suggest that any differences among groups may not exist when restricting the sample to "believers" only.

These findings are, of course, not what one would expect, since they represent a reduction in significance when believers alone are analyzed. It does not fit conceptually that significant relationships disappear when only examining the participants who believed the deception the most – and would thus be most affected by it in terms of cardiovascular and psychological indices. Therefore, a likely explanation is that the small sample sizes in the post hoc analyses resulted in insufficient power to detect differences. A further discussion of the limitations of the manipulations used in this study appears in the *Limitations* section below.

In summary, some common threads run through the current findings and are worthy of outlining. First, a notable yet surprising aspect of the current findings is

that coping and controllability were more related to self-reported mood than to physiological arousal. This finding was unexpected because self-report data are considered by some to be less "pure" than biological data, even when psychological manipulations are used (Blascovich et al., 2001a; Mendes et al., 2002). These studies have demonstrated that cardiovascular threat responses (e.g., blood pressure and heart rate reactivity) occur even when individuals fail to endorse changes in mood and anxiety. Similarly, other studies have demonstrated a disconnect between objective and subjective measures in areas such as sleep, and sexual arousal (Argyropoulos et al., 2003; Palace & Gorzalka, 1992). It seems, through the results of this study, that when these indices are compared side by side within one individual, coping with discrimination may play a more central role in affective, rather than physiological, regulation. The current findings are in line with current theory and empirical support, suggesting that emotional experience is regulated through the complex interaction between multiple physiological and cognitive response systems rather than simply through physiological arousal (Bauer, 1998; Crucian et al., 2000). Second, in line with previous research on John Henryism (Arriola, 2002; James et al., 1983; 1984), active coping may be potentially thought of as a trade-off between positive subjective well-being and increases in sympathetic arousal, particularly with respect to diastolic blood pressure and heart rate recovery. Finally, active coping and high controllability were generally associated with less negative affect, less anxiety, and higher self-efficacy in this study. Collectively, these results point to the interplay among internal coping processes, including physiological systems, cognition, affective functioning,

and environmental factors. These results may potentially underscore the idea that coping is a complex activity whose effects might be better understood by examining the many domains of functioning.

Limitations

This study is the first laboratory study conducted to test the effects of coping strategies and controllability on experiencing discrimination. However, this study poses several noteworthy limitations that warrant discussion.

With respect to limitations, the single largest source of concern is regarding the manipulations. As was noted in the Results section, is the fact that the majority of participants indicated that they were not deceived by the Cyberball game. The cause of this weakness is uncertain; however, there are a number of possible explanations. One set of explanations focus on methodological concerns, such as the face validity of Cyberball, face validity of the general laboratory protocol, and the sensitivity of the Manipulation Check Form. First, it is possible that Cyberball may not useful at deceiving participants in all research designs. Although previous research using this method confirmed participants' subjective impressions of exclusion and ostracism through self-report questionnaires, they did not directly assess whether participants believed the manipulation. For example, van Beest & Williams (2003) and Eisenberger, Lieberman, & Williams (2003) administered self-report measures of negative mood and distress in order to assess the efficacy of the Cyberball manipulation, but did not directly ask participants to rate the credibility of their experiences in the laboratory, simply proceeding to the debriefing. This was also the

case in other Cyberball studies (Gonsalkorale & Williams, 2006; Williams, Cheung, & Choi, 2000). One paper did report a series of studies in which a postexperimental measure was administered to assess suspicion among other things, but did not provide details as to what was asked (Williams et al., 2002). Only one study clearly and directly assessed whether participants could recognize the true intention of Cyberball and found that a small number of participants did not believe that they were playing against human beings during the game, presumably due to a computer malfunction (Zadro, Williams, & Richardson, 2004). This suggests that participants in previous Cyberball studies also may not have "fallen" for the game, however, this is difficult to ascertain as previous studies did not measure and/or report this type of data. Therefore, as the current study appears to be the first to administer Cyberball to induce feelings of racial discrimination, results indicate that Cyberball perhaps may not be as potent in creating this impression among participants.

Related to this question is also the possibility that Cyberball may not induce feelings of discrimination, per se. In other words, it is possible that Cyberball may have successfully elicited feelings of social exclusion or ostracism rather than racial discrimination. This interpretation would account for the fact that most participants did not feel they were discriminated against, per their reports on the Manipulation Check Form. Thus, the definition of "discrimination" as it was experienced in this study is inconclusive. Since there is no evidence to suggest that participants perceived that discrimination was actually occurring, therefore, the results of this study must be elucidated by future research that would distinguish whether Cyberball creates the

specific impression of racial discrimination (discussed in more detail in the *Future Directions* section below). Although this lack of clarity is possibly reflective of the nature of subtle discrimination (i.e., lack of clear attribution that someone is being mistreated specifically due to race), it remains to be seen whether Cyberball is simply an analogue of social ostracism. In this way, Cyberball may also present with a lack of ecological validity in that it does not adequately capture the experience of discrimination as it occurs in human social world. This problem may have been compounded by the fact that one of the pictures of the fictitious players shown during the game was ambiguous in terms of race (e.g., dark complexioned). If ecological validity was indeed low, this might have contributed to participants' sense that social exclusion, rather than discrimination, was occurring. Another reason Cyberball might have failed to dupe participants is because the present sample was drawn from the undergraduate psychology pool, through which students learn about psychological research methods. Some courses indeed may have covered Cyberball as a deception tool by the time of participation, and it is possible subjects neglected to report this on the screener. In fact, during debriefing many subjects stated that they already knew that the other Cyberball players were not real or felt there was a strong possibility that they were being "set up," knowing that it was a "psych experiment." This impression might have been supported by the fact that the experimenter was a person of color. Participants may have rationalized that they were being deceived based on the assumption that another minority individual would not allow them to suffer through a discriminatory episode. Also, participants might have guessed that, as the

experimenter was also a minority, that she might feasibly be interested in studying discrimination. To this end, the participants might have concluded that it was reasonable that the present study was about discrimination, and thus, involved a "setup."

On the other hand, some participants appeared upset during the debriefing and stated that they really felt the other players were real. One participant even asked the experimenter during the protocol, "Why are the other girls so mean?" Therefore, it is possible that the variability in believability may have been attributable to the Cyberball task. Although studies of Cyberball have showed its utility in creating feelings of ostracism toward racist individuals (Gonsalkorale & Williams, 2006), its believability might be improved in future studies by careful evaluation of Cyberball's utility in creating feelings of discrimination, for example, through qualitative feedback provided by focus groups.

It is also possible that other aspects of the laboratory protocol alerted participants about the deception. Although no participants mentioned specific reasons during the debriefing, it is possible that the absence of confederates (e.g., the other labs, experimenters, and subjects referred to in the scripts) might have caused participants to question the veracity of the Cyberball game. Future studies might do well to include other measures to support the deception of Cyberball, such as the presence of confederates. In terms of methodology and design, a third explanation is that the Manipulation Check Form itself might itself be a flawed measure of the deception. For example, the presence of the form in and of itself may have suggested

to the participants that deception was used in the protocol, thereby cuing their responses. Furthermore, the items on this scale were not open-ended, which might have heightened the suggestibility of the questions. A better approach would have been to first ask participants if they could guess the study hypotheses, and if so, to ask them to specify the point at which they first suspected the deception.

Another set of explanations for the failure of the deception involve impression management and other motivations that might have influenced participants' reports. For instance, it is possible that some participants did believe the game was real but may have had trouble admitting this on the form. In fact, studies have shown that individuals who experience discrimination are reluctant to report it. For example, Sechrist, Swim, & Stangor (2004) conducted a study in which women were exposed to a discriminatory event in a laboratory setting. Women who were asked to make public, non-anonymous judgments of their experience not only made self attributions for the discrimination, but also reported greater levels of discomfort compared to those making private judgments. The authors concluded that the participants were motivated to underreport their experience with discrimination due to the social costs of alleging discrimination. Other studies have confirmed findings that individuals who make claims of discrimination are stigmatized, providing motivation for victims to avoid making public claims of unfair treatment (Kaiser & Miller, 2001; Stangor, Swim, Van Allen, Sechrist, 2002). In addition to this rather serious reason for underreporting discrimination, participants may additionally have felt stupid,

embarrassed or uneasy to admit that they were discrimination victims due to the possible effect on their self-esteem.

Despite this limitation, there are some reasons to believe that the current results are not completely invalidated by manipulation check findings. First, given the ratio of participants claiming they were not duped, it would be expected that null findings would have been found across all hypotheses. Since results did show significant differences among groups in reference to the benefits of active coping and high controllability, this suggests that the manipulations were successful to some degree. For example, it is possible that although participants were not completely "sold" on the deception, the experience of Cyberball evoked schemas relating to social exclusion, discrimination, and power, among other things. In this sense, Cyberball may have served as a trigger for memories relating to past experiences with discrimination, evoking negative affect, anxiety, and cardiovascular responses. Therefore, it is possible that subjects need not have been entirely duped by the manipulations in order for them to have had an effect on behavior. This would explain why participants might have reported low levels of deception but also exhibited some significant differences among conditions. It is probable that given a more deceiving lab setup, more significant effects would have been uncovered. Secondly, results from the Manipulation Check Form indicate that there were no significant differences among groups in terms of questions 1-3, which focus on the face validity of Cyberball. This indicates that "believers" were evenly distributed among the groups. Thus, it is unlikely that the observed differences among groups are

an artifact of bias. Thirdly, results from questions 4 and 5 on the manipulation check form indicate that, as intended, there were significant differences in responses among groups. In both cases, one of the High Control groups indicated that they perceived significantly more control over the discriminatory stressor compared to both of the Low Control groups. Thus, it appears that although the manipulations may not have unquestionably deceived participants, they did create some of the intended perceptions.

Another potential source of error is regarding the role of time intervals in measurements. One possible limitation is the fact that laboratory periods differed in length between individuals. To minimize this problem, the laboratory protocol created at the outset of the study provided an outline of the length of each period, however, these guidelines could not account for individual differences in speed. Therefore, it is possible that this might have caused differences in the ways that participants responded to the protocol. For example, it is tenable that a participant who went through the coping task very quickly may not have engaged in the task as well as one who completed the task deliberately and thoughtfully. However, it is unlikely that these differences are not tied systematically to any particular condition to the point that the above results are invalidated.

Furthermore, as the laboratory design used here was short-term and used only small intervals of time (e.g., minutes), this limits the generalizability of findings to everyday life. For example, the time taken to complete the coping task was less than ten minutes for the majority of participants, which is arguably much less time than is

ordinarily spent on coping in real life situations. Moreover, in "real world" conditions, an individual's coping response is not always halted in order to move onto the next task – individuals may cope in their preferred ways for several minutes to many hours without interruption. However, in the laboratory, their attention was rather quickly diverted to the next task. These obvious differences in the coping process may cause some of the current findings to poorly translate to real-life settings. Additionally, this limitation may also apply to other laboratory tasks, such as the discriminatory Cyberball game.

Another consideration has to do with the selective sample utilized. Descriptive data collected for the study describe the current sample as young, educated, predominantly female, and from high socioeconomic background. Clearly, this sample is not representative of all African-Americans, and may not capture the multiple challenges facing African-Americans of lower socioeconomic standing. However, it is notable that significant results were found even in this highly select sample, suggesting that the current hypotheses might be supported in a "real-life" sample. Unfortunately, it is impossible to ascertain whether the current results extend to other demographic groups based on the present data.

Finally, a curious observation from this study is the paucity of significant physiological findings. One potential explanation for this lack of significant findings is the sensitivity of cardiovascular measurements as they were conducted for this study. While blood pressure and heart rate measurements were chosen based on previous findings from the research literature, it is possible that given the laboratory

setup utilized, these were not sensitive enough to detect changes in sympathetic activation over short time intervals. It would thus be interesting to examine the effects of Control and Coping on other biological indices of sympathetic activation, such as cortisol level and skin conductance.

Conclusion

The current study sought to investigate the optimal combinations of two factors, Controllability and Coping, in determining cardiovascular and psychological outcomes with respect to racial discrimination. First, it was hypothesized that active coping and high controllability would be associated with greater decreases in cardiovascular reactivity / recovery, negative mood, and anxiety. Data analysis using a series of ANCOVAs demonstrated main effects of both Coping and Control on Negative Mood. Active Coping and High Control were associated with less Negative Mood, however, Active Coping was also associated with longer diastolic recovery times, suggesting modest and mixed support for this hypothesis. Second, it was hypothesized that there would be an interaction between coping and control. Contrary to expectation, results indicated passive coping was associated with less negative affect in the high control condition, and active coping was associated with less negative affect in the low control condition. Consistent with predictions, active

coping was associated with less anxiety compared to passive coping in the high control condition. These results suggested mixed support for the hypothesis. Finally, it was hypothesized that individuals in the Low Control/Passive Coping condition would exhibit less cardiovascular reactivity / recovery, negative mood and anxiety and higher self-efficacy when the uncontrollable discriminatory event was re-experienced. However, results did not support the hypothesis that the Low Control/Passive Coping group was more resilient during the second discriminatory event compared to the other groups on cardiovascular or self-report indices. In addition, this group scored significantly lower on subjective self-efficacy than all other conditions. Therefore, the final hypothesis was not supported by the current data.

Post hoc analyses were generally consistent with the above findings, but also demonstrated additional null results, probably due to low power. It is concluded that high controllability and active coping may be more beneficial for subjective, psychological outcomes than for cardiovascular indices, providing support for the concept of John Henryism. A second conclusion arising from this study is that the benefits of either active or passive coping may not be related to the level of perceived controllability over the discriminatory episode. Finally, the current data indicate that there do not appear to be manyadvantages associated with preparatory passive coping in relation to an uncontrollable, subtle discriminatory stressor. In fact, such coping might be potentially damaging to self-efficacy. Because many subjects reported not believing the deception used, the above findings are reported as tentative. Future

studies can extend these findings by improving upon the limitations of the current laboratory study while attempting to increase ecological validity.

Future Directions

This study is one of many that have attempted to bridge the literatures on coping and discrimination. Future work in this area may continue to benefit psychology's understanding of this complex relationship by being mindful of several goals.

Based on the limitations of this study discussed above, future research should address these weaknesses in continued laboratory experiments on discrimination. First and foremost, it would be beneficial to feature a very powerful, evocative discriminatory experience to sufficiently elicit feelings of social exclusion and ostracism due to race. This may be accomplished by using a focus group or other trial subjects to "test run" the stressor before it is used to collect data. In doing so, it will also be important to determine whether Cyberball simply causes feelings of social exclusion or whether it creates a sense of unfair social treatment based on race. As this is a vital foundational step in designing future discrimination studies using Cyberball, it would be helpful to subject this task to a rigorous comparison to other conditions. For example, it would be possible to administer this task as it was used in the current study, and compare it to a condition in which the other Cyberball "players" were of the same race as the participant. This design would help elucidate whether the Cyberball condition used in this study is sufficient to produce negative

outcomes, such as negative mood, anxiety, and cardiovascular reactivity, that are above and beyond that of pure social ostracism.

As far as coping tasks are concerned, it would also be suitable to model these activities after real-life coping strategies. For instance, active coping may involve making a complaint to the experimenter or approaching the perpetrator of the discrimination, while passive coping may entail discussing one's reaction to discrimination with another individual. Second, leaving the manipulation check as open-ended as possible to detect suspiciousness among participants would probably allow for a more direct test of whether the deception was successful. To this end, future laboratory studies should conduct a manipulation check in a less suggestive manner than was conducted in this study. For example, it would be preferable to ask participants to guess the study hypotheses or relationships between the study variables, based on their experiences as research subjects.

In terms of basic research, future research should also seek to increase ecological validity. For instance, one interesting paradigm would be to study ambulatory blood pressure and heart rate alongside daily ratings of discriminatory events and coping episodes. Such a research design would allow for a snapshot of how coping functions in concrete, demanding, and emotionally salient situations that laboratories cannot always replicate. In addition, new studies should also study a wider array of coping strategies, particularly those that are specific to African American culture, such as spirituality / religion, looking to historical figures, music,

and social support. It is anticipated that comparing a variety of frequently utilized techniques will provide a richer representation of coping in the context of the African American experience. Finally, this study emphasizes the importance of studying the comprehensive effects of discrimination, which may be further fleshed out and augmented in future laboratory investigations. For example, the current study examined the effects of coping and control on mood, anxiety, self-efficacy, and cardiovascular functioning. Future studies would do well to document additional cognitive variables, such as expectancy beliefs, or personality variables, such as need for closure. In so doing, the research literature can be ever more cognizant of the totality of effects of this social ill.

As a great deal of information has already been gathered about the harmful effects of discrimination, future research must also look toward developing interventions to assist African Americans in coping with it. To this end, teaching active coping methods, such as problem-solving and seeking instrumental support, are likely to be the core of successful interventions. However, the current research (along with other empirical findings) bears implications for John Henryism as a potentially problematic means of coping with discrimination. Interventions, such as providing psychoeducation about the trade-offs associated with active coping and exploring ways that clients can strike a balance between active and other coping strategies to offset the prolonged exertion that might accompany problem solving, are especially interesting. Perhaps most significantly, the current findings suggest that high controllability is not associated with the same protracted cardiovascular recoveries

that accompany active coping. Therefore, an important way to enhance individuals' efficacy with coping is to assist them systemically, such as by empowering them to utilize environmental resources. By assisting clients in focusing on the controllable aspects of discrimination, interventions may foster a sense of power. Furthermore, such interventions may simultaneously allow clients to exercise their active coping skills, in a positive way that increases self-efficacy and competence, while dampening the potential "side effects" of prolonged problem-solving.

Table 1

Overview of Study Variables and Instruments

Variable Type	Variable	Instrument
Independent	Active / Passive Coping	Experimental Manipulation
	Controllability	Experimental Manipulation
Dependent	Negative mood	PANAS
	State anxiety	STAI-S
	Cardiovascular reactivity	Systolic / Diastolic Blood Pressure
	Cardiovascular recovery	Systolic / Diastolic Blood Pressure; Heart Rate
	Self-efficacy	GSE (adapted)
Covariate	Demographics	Demographics Form
	Personality	EPQR-S
	Past perceived discrimination experience	Brief PEDQ-CV

Table 2

Summary of Sequence of Tasks for Laboratory Protocol

Time	Task(s)	Time	Task(s)
-25	Photo taken of participant	+30	First Recovery Period
-20	Baseline physio measurements	+40	Second Cyberball Administration
-15	PANAS	+45	PANAS
	STAI-S		STAI-S
			GSE
0	First Cyberball Administration	+50	Second Recovery Period

+10	PANAS	+60	PANAS
	STAI-S		STAI-S
	GSE		GSE
+15	Controllability Manipulation	+65	PEDQ-CV
	Coping Task		EPQR-S
			Demographics Form
+25	PANAS	+80	Manipulation Check Form
	STAI-S		Debriefing Script
	GSE		

Table 3

Sample Characteristics

Demographics	
Age	19.63 (1.53)
CES-D	12.75 (6.79)
STAI-T	37.50 (6.36)
Gender	Female (76.9%)
Income	$76-85,000 (21.2%)

Religion		Christian (84.6%)
	Covariates	
Neuroticism		3.67 (3.05)
Extroversion		9.04 (2.93)
PEDQ		33.04 (8.28)

Note. Mean values are reported with standard deviations in parentheses, except for the following variables: Gender, Income and Religion. For these variables, modal values instead of means are reported, with the percent endorsing the mode in parentheses.

Table 4

Goodness of fit Tests Examining Demographic Differences Between Groups

Source	*df*	*N*	χ^2	*p*
Gender	3	52	.87	.064
Income	27	52	26.30	.839
Religion	9	52	6.85	.653

Table 5

Oneway Analysis of Variance Examining Differences in Covariate Measures Between Groups

Source	*df*	*F*	*p*
Age	3, 48	.74	.535
Neuroticism	3, 48	.10	.403
Extroversion	3, 48	3.22*	.031
Past Discrimination	3, 48	.33	.802

*p < .05

Table 6

Summary of Laboratory Session Periods

Period	Calculation Performed
Baseline	Average of last 3 samples
Cyberball 1	Peak
Post Cyberball 1	Peak
Coping Task	Peak
Post Coping	Minimum

Recovery 1	Minimum (Hypothesis 1) Average (Hypothesis 2)
Cyberball 2	Peak
Post Cyberball 2	Peak
Recovery 2	Minimum
Final	Minimum

Table 7

Hypothesis 1: Intercorrelations Among Dependent Variables

Variable	1	2	3	4	5	6	7
1. Systolic BP Reactivity	-	0.49**	.07	-.08	.23	.17	-.15
2. Diastolic BP Reactivity		-	.00	.14	.01	.37**	.05
3. Negative Affect Reactivity			-	.11	.21	-.12	-.11
4. State Anxiety Reactivity				-	.09	.18	-.18
5. Systolic BP Recovery					-	.05	-.09
6. Diastolic BP Recovery						-	.27
7. Heart Rate Recovery							-

**$p < .01$

Table 8

Hypothesis 2: Intercorrelations Among Dependent Variables

Variable	1	2	3	4	5	6	7	8
1. Systolic BP Reactivity	-	.58**	.15	.11	.18	.03	-.03	-.09
2. Diastolic BP Reactivity		-	.14	-.15	-.13	.20	.07	-.04
3. Negative Affect Reactivity			-	.08	-.22	.22	-.09	-.23
4. State Anxiety Reactivity				-	.18	.13	-.18	.36**
5. Systolic BP Recovery					-	-.03	.07	-.05
6. Diastolic BP Recovery						-	.15	-.23
7. Heart Rate Recovery							-	.14
8. Self-efficacy								-

**$p < .01$

Table 9

Hypothesis 1: Univariate Analysis of Covariance for Effects of Coping and Control on Systolic BP Reactivity

Source	*df*	*F*	*p*	η_p^2
Coping	1, 47	1.77	.199	.035
Control	1, 47	.33	.568	.007
Coping X Control	1, 47	.12	.734	.002

Table 10

Hypothesis 1: Univariate Analysis of Covariance for Effects of Coping and Control on Diastolic BP Reactivity

Source	*df*	*F*	*p*	η_p^2
Coping	1, 47	.42	.521	.009
Control	1, 47	.00	.975	.000
Coping X Control	1, 47	.02	.899	.000

Table 11

Hypothesis 1: Univariate Analysis of Covariance for Effects of Coping and Control on State Anxiety Reactivity

Source	*df*	*F*	*p*	η_p^2
Coping	1, 47	1.23	.273	.026
Control	1, 47	1.94	.170	.040
Coping X Control	1, 47	4.79*	.034	.092

*p < .05

Table 12

Hypothesis 1: Univariate Analysis of Covariance for Effects of Coping and Control on Negative Mood Reactivity

Source	*df*	*F*	*p*	η_p^2
Coping	1, 47	42.10**	.000	.472
Control	1, 47	92.46**	.000	.663
Coping X Control	1, 47	72.21**	.000	.606

**p < .01

Table 13

Hypothesis 1: Univariate Analysis of Covariance for Effects of Coping and Control on Systolic BP Recovery

Source	*df*	*F*	*p*	η_p^2
Coping	1, 47	.37	.545	.008
Control	1, 47	.12	.731	.003
Coping X Control	1, 47	.72	.400	.015

Table 14

Hypothesis 1: Univariate Analysis of Covariance for Effects of Coping and Control on Heart Rate Recovery

Source	*df*	*F*	*p*	η_p^2
Coping	1, 47	.58	.451	.012
Control	1, 47	1.18	.283	.024
Coping X Control	1, 47	.12	.732	.003

Table 15

Hypothesis 1: Univariate Analysis of Covariance for Effects of Coping and Control on Diastolic BP Recovery

Source	*df*	*F*	*p*	η_p^2
Coping	1, 47	4.74*	.035	.092
Control	1, 47	.09	.764	.002
Coping X Control	1, 47	.25	.623	.005

*p < .05

Table 16

Hypothesis 2: Univariate Analysis of Covariance for Effects of Coping and Control on Systolic BP Reactivity

Source	*df*	*F*	*p*	η_p^2
Coping	1, 47	.41	.526	.009
Control	1, 47	.04	.839	.001
Coping X Control	1, 47	2.42	.126	.049

Table 17

Hypothesis 2: Univariate Analysis of Covariance for Effects of Coping and Control on Diastolic BP Reactivity

Source	*df*	*F*	*p*	η_p^2
Coping	1, 47	.15	.700	.003
Control	1, 47	.42	.520	.009
Coping X Control	1, 47	1.78	.189	.036

Table 18

Hypothesis 2: Univariate Analysis of Covariance for Effects of Coping and Control on Negative Mood Reactivity

Source	*df*	*F*	*p*	η_p^2
Coping	1, 47	1.60	.212	.033
Control	1, 47	.63	.431	.013
Coping X Control	1, 47	.01	.923	.000

Table 19

Hypothesis 2: Univariate Analysis of Covariance for Effects of Coping and Control on State Anxiety Reactivity

Source	*df*	*F*	*p*	η_p^2
Coping	1, 47	2.39	.129	.048
Control	1, 47	.19	.669	.004
Coping X Control	1, 47	1.01	.319	.021

Table 20

Hypothesis 2: Univariate Analysis of Covariance for Effects of Coping and Control on Systolic BP Recovery

Source	*df*	*F*	*p*	η_p^2
Coping	1, 47	.70	.408	.015
Control	1, 47	.01	.914	.000
Coping X Control	1, 47	1.84	.182	.038

Table 21

Hypothesis 2: Univariate Analysis of Covariance for Effects of Coping and Control on Diastolic BP Recovery

Source	*df*	*F*	*p*	η_p^2
Coping	1, 47	.27	.607	.006
Control	1, 47	.64	.426	.014
Coping X Control	1, 47	.43	.516	.009

Table 22

Hypothesis 2: Univariate Analysis of Covariance for Effects of Coping and Control on Heart Rate Recovery

Source	*df*	*F*	*p*	η_p^2
Coping	1, 47	5.54*	.023	.105
Control	1, 47	3.18	.081	.063
Coping X Control	1, 47	.45	.506	.009

*p < .05

Figure 1

Interaction of Coping and Control on Negative Affect Reactivity

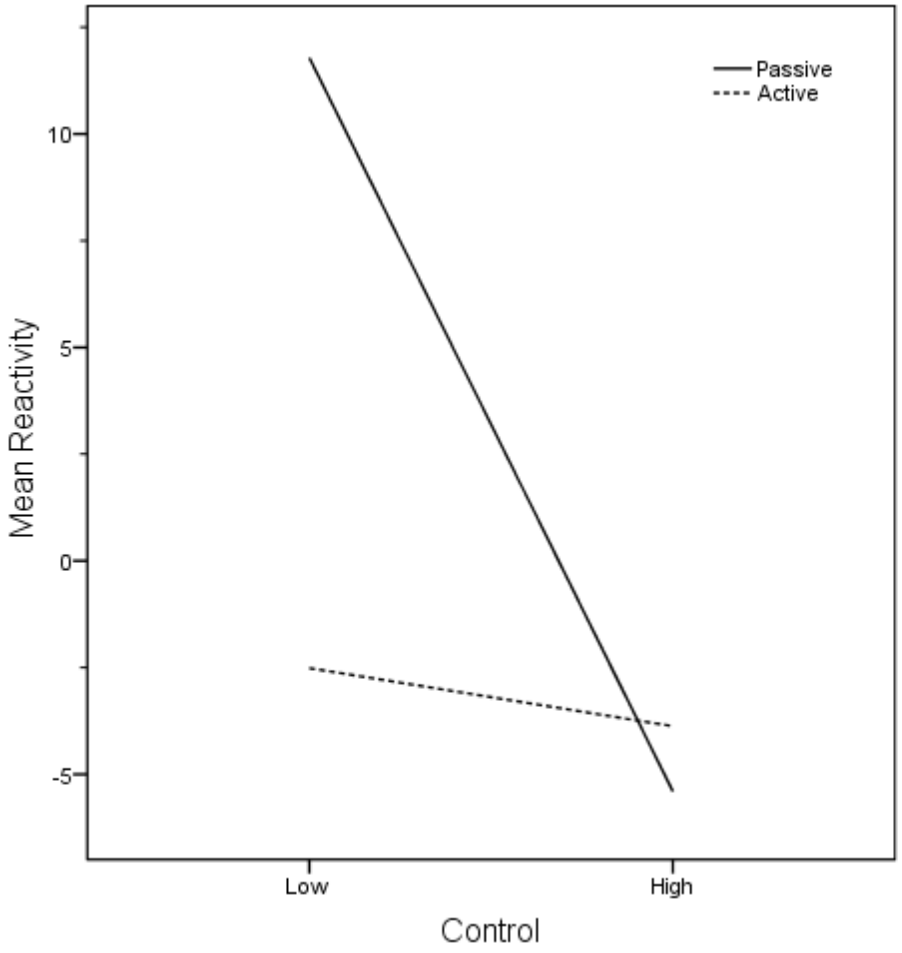
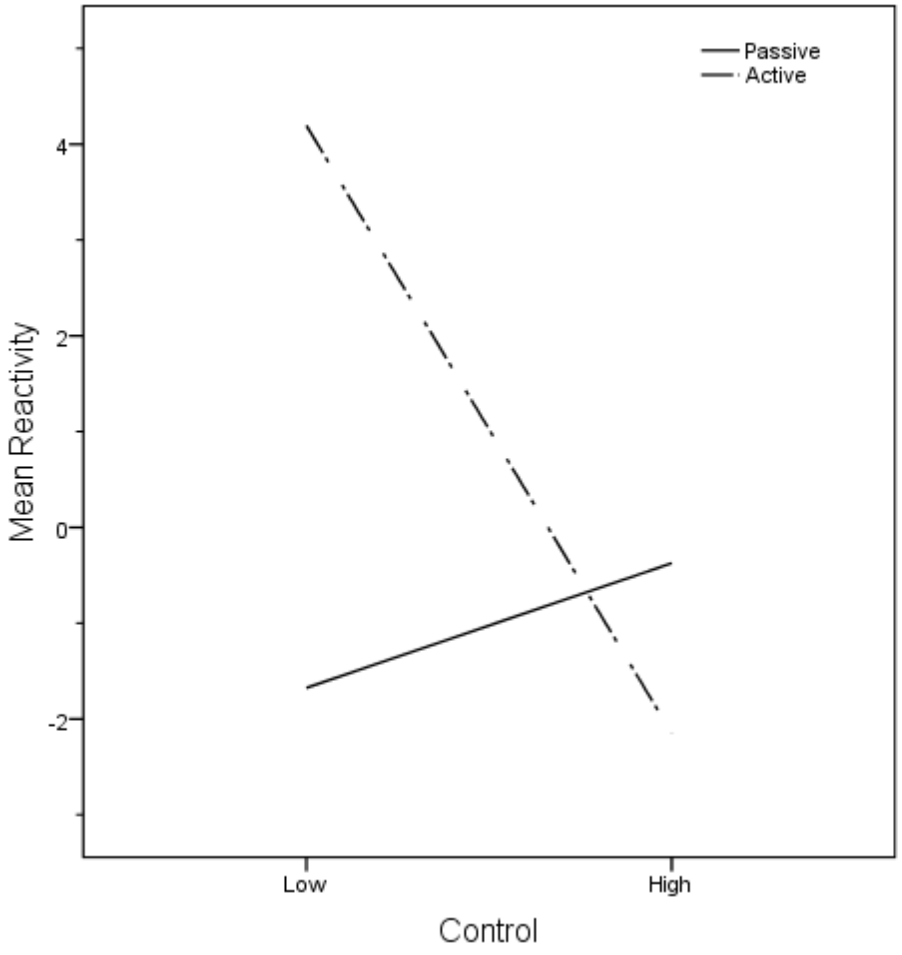


Figure 2

Interaction of Coping and Control on State Anxiety Reactivity



Appendix A: Literature Review

Perceived Ethnic & Racial Discrimination

Perceived ethnic / racial discrimination is a broad concept that is not consistently defined in the literature. However, many definitions of discrimination seem to encompass three basic characteristics (Boutain & Cooke, 2001). First, a cognition or belief about a particular social group is involved. Affective responses are also part and parcel of discrimination and typically include fear or anger. Finally, behaviors such as avoidance, exclusion, and violence are an expression of the underlying discrimination. Discrimination can be directed at a variety of social groups including but not limited to ethnic group, race, gender, sexual orientation, age, religion, and social class. Clark et al. (1999) refer to racism as "beliefs, attitudes, institutional arrangements, and acts that tend to denigrate individuals or groups because of phenotypic characteristics or ethnic group affiliation" (p. 805).

This literature has examined mostly African-Americans, perhaps due to historical reasons, and children and students, perhaps because of the attention toward developmental pathways in recent years. Carlson & Chamberlain (2004) list three reasons why perceived discrimination has historically been understudied in those experiencing it - a focus on the pathology of the instigator; large differences in experiences relating to race between instigators and victims; and minimization of group characteristics and social causes and focus on individual or biological causes of perceived discrimination. Chakraborty & McKenzie (2002) add that clinical science

has thus far adhered to universalist explanations of psychopathology, obscuring the role of individual and group differences. The majority of theoretical and empirical work conducted in the area of perceived discrimination has conceptualized it from a stress and / or stress-diathesis perspective, in which perceived discrimination represents a sociocultural stressor within a biopsychosocial framework (Clark et al., 1999). Perceived discrimination may thus represent conflict within a cultural group (e.g., one African-American individual discriminating against another), as well as between cultural groups, as is the traditional conceptualization of the term (Brondolo et al., 2005; Clark et al., 1999). However, Bourhis and colleagues (1997) have proposed an alternate theory about the cause of perceived discrimination. They theorize that perceived discrimination arises from the discordance between the acculturation orientations of both minority and dominant cultures. For instance, if a dominant society prefers its minorities to be marginalized, yet the minority individuals themselves seek to integrate, the discordance rate is high, resulting in high levels of conflict and aggression directed towards the minority group.

Nevertheless, perceived discrimination has been found to be prevalent in many immigrant and minority groups. The rates of perceived discrimination are considerable in North America, as can be evidenced by 30% of respondents endorsing all the items (Romero & Roberts, 2003; in Latino Americans) to 85% of respondents endorsing at least one of the items in a perceived discrimination scale (Noh & Kaspar, 2003; in Korean-Canadians). Segregation, arguably a form discrimination, as well as other forms of discrimination such as unfair treatment, disrespectful behavior or

comments, and pressure to conform to stereotypes, have been demonstrated to exist on American campuses even today (Ancis et al., 2000). There is also evidence that non-minority groups tend to be less aware of the perceived discrimination experiences of minorities, even though ethnic and minority groups report high levels of these experiences (Biasco, Goodwin, & Vitale, 2001; Marcus et al., 2000). Perceived discrimination is generally measured using self-report questionnaires, and at least one study has shown that minorities, such as African-Americans, report more perceived discrimination than do Caucasian-Americans (Barnes, De Leon, Wilson, Bienias, Bennett, & Evans, 2004). A series of research studies conducted by Stangor, Swim, Sechrist, and their colleagues highlight at least two groups of factors in how discrimination is reported. First, the *audience* with whom the victim of discrimination shares this experience is important. Minorities tend to minimize attributions of negative events to perceived discrimination in the presence of individuals from nonstigmatized, majority groups (Stangor, Swim, Van Allen, & Sechrist, 2002). Similarly, individuals who experience discrimination are more likely to report them in private, rather than public, conditions, possibly due to the social costs involved with the latter (Sechrist, Swim, & Stangor, 2004). Reports of perceived discrimination may also be influenced by the perceived intent of the individual who is engaging in the alleged discrimination as well as by the perceptions of harm resulting from perceived discrimination (Swim, Scott, Sechrist, Campbell, & Stangor, 2003). *Individual differences* may also be involved. For example, reporting discrimination is likely to be higher in individuals who have a greater need or desire for control (Sechrist,

Swim, & Stangor, 2004). Furthermore, perceptions of the frequency of discriminatory events may be influenced by past experiences with discrimination. To this end, Stangor, Sechrist, & Swim (1999) found that women who reported that they themselves and women in general experience frequent discrimination were more likely to overestimate the number of discrimination-related stimuli they had witnessed during a laboratory procedure. This suggests that women who experience more discrimination may be more likely to be sensitive to these stimuli, to the extent that they overestimate them.

The Cardiovascular Effects of Perceived Discrimination

Physiological reactivity refers to changes in endocrinological, neurobiological, and other physiological parameters that occur following the introduction of an environmental stressor (Kibler & Ma, 2004; Sharpley, 2002). It has been hypothesized that the autonomic nervous system, particularly as it shifts from parasympathetic to sympathetic dominance in response to a stimulus, is key in physiological adaptations to environmental stimuli (Dawson, Schell, & Catania, 1977; Porges, 2003).

A subset of physiological reactivity, cardiovascular reactivity, is routinely used as a measure of autonomic activation resulting from environmental stress. Typically, paradigms using an analogue of mental (e.g., emotional or cognitive, such as film clip, speech writing, or arithmetic tasks) or physical stress (i.e., cold pressor, orthostatic challenge) are used to measure an individual's ability to adapt

successfully. Two parameters are chiefly used in this regard: measures of systemic resistance (e.g., blood pressure) and measures of cardiac output (e.g., heart rate). Concerns have been expressed that because cardiovascular reactivity is measured as a baseline to peak difference score, it is inherently unreliable (e.g., Kamarck & Lovallo, 2003). Cardiovascular recovery measurements (i.e., time taken for heart rate or blood pressure to return to its baseline value) appear to be more stable and important components of cardiovascular reactivity, and represent another way to measure the effect of an environmental stressor on autonomic functioning (Stewart, Janicki, & Kamarck, 2006).

Cacioppo & Tassinary (1990) summarize the merits of using physiological data to understand psychological phenomena. These authors contend that in particular, physiological data can be used as indices of psychological states, such as stress. A physiological perspective can also afford psychology a deeper understanding of the physiological mechanisms involved in affective states. Because perceived discrimination research is potentially relevant to important health issues such as hypertension, and to mental health issues such as depression and anxiety, it is deserving of attention. Finally, although this research has been accumulating over the past twenty years, many unanswered questions remain, and more systematic inquiry is needed to provide crucial progress in understanding perceived discrimination.

Most researchers agree that perceived discrimination was first studied in reference to cardiovascular reactivity as a direct result of the disparities in health status, namely heart disease and hypertension, between African- and Caucasian-

Americans (Boutain & Cooke, 2001; Krieger, 1990; Williams & Neighbors, 2001). For example, there is a dose-response relationship between the amount of perceived discrimination experienced by ethnic individuals in New Zealand and rates of cardiovascular disease (Harris et al., 2006). Williams & Neighbors (2001) discuss how institutional perceived discrimination can affect hypertension. One of the most important ways this can occur is by creating socioeconomic differentials which then lead to lower education and poor health-protective resources. Second, it can affect the delivery of goods and services to underserved minority groups, such as African-Americans, in areas such as disparities in health care access. Third, widespread acceptance of the purported racial differences (such as "African-Americans are not as intelligent as Whites") can lead to an internalization of these beliefs, affecting psychological well-being, and in turn weakening health. Finally, institutional perceived discrimination can spur a variety of related stressors that ultimately lead to stress-related conditions and disorders, including hypertension. Thus, it is clear that perceived discrimination may engage in several different pathways to affect the cardiovascular health of ethnic and minority individuals, but it has yet to be determined which of these hypotheses are most plausible.

According to a review conducted by Harrell, Hall, & Taliaferro (2003), cardiovascular reactivity paradigms fall under two broad categories: survey and laboratory. These authors found that four basic paradigms are widely employed in this literature. *Self-report correlational* studies measure and correlate indices of physiology such as blood pressure and heart rate or personality characteristics with

retrospective and current measures of perceived discrimination. Typically, these studies are only able to make descriptive statements about the relationship between perceived discrimination and cardiovascular functioning; also, they are unable to comment on reactivity and instead focus upon general cardiovascular functioning. *Basic psychophysiologi*cal studies are experimental, using laboratory analogues of racism and physiology. Investigations in this category allow for causal determinations, but usually test for acute effects. Psychophysiological outcome variables can include either cardiovascular functioning or reactivity variables. *Moderated psychophysiological* studies search for individual differences (e.g., Big 5 traits, coping styles, personality types, cultural orientation, and past racism experiences) in physiological responses to perceived discrimination. These experiments are often similar in methodology to basic psychophysiology studies but have added personal variables to the model. Finally, *mediated psychophysiology* studies attempt to identify causal pathways using experimental setups. However, these studies use variables such as the ambiguity of the racist event, or inability to express emotion at racist event in their models.

Self-report Correlational Studies

As mentioned above, these studies attempt to associate self-report measures of perceived discrimination with basic cardiovascular functioning. A small subset of these studies has uncovered positive correlations between perceived discrimination scores and blood pressure. A recent example, The Atlanta Heart Study, examined over 300 African-Americans living in the area (Din-Dzietham et al., 2004). More than

half of these respondents reported work-based intra- and inter-racial discrimination, from African-American or non-African-American individuals respectively. The self-reported stress arising from such encounters was associated with hypertension as measured by two blood pressure measurements taken by a doctor. The increase in blood pressure was more pronounced when racist events were perceived as coming from other African-Americans, indicating that intra-racial discrimination may in fact be more noxious than inter-racial discrimination. Regardless of the source, this study demonstrated a rather clear, positive correlation between blood pressure and perceived discrimination.

However, inverse relationships between perceived discrimination and blood pressure have also been found and may be alternatively explained. One study used the random-digit dialing method to interview African-American and Caucasian women about their responses to unfair treatment related to gender and race. Krieger (1990) found that those who used more passive coping styles (i.e., keeping "quiet" about it) were more than four times more likely to indicate that they also suffered from hypertension compared to African-American women who exhibited more active coping styles (i.e., talking to others, seeking action). When the risk ratio was adjusted for age, passive copers were still two to three times more likely to report high blood pressure than active copers. Furthermore, there was also a correlation between recalling few or no racist incidents and a passive coping style. Among White respondents, however, no significant patterns were observed. The results reported by this study are provocative and a good starting point for such research, however, as an

"early" study it is limited by important shortcomings, such as observer bias, self-report hypertension measures, and a small sample. Importantly, however, these limitations (particularly the latter two) suggest that had improvements been made, the results would indicate an even higher, more consistent level of significance. A later study conducted by Krieger & Sidney (1996) likewise found a negative correlation. Over 4000 African-American and Caucasian males and females were examined as part of the CARDIA study. The researchers found that perceptions of mistreatment and PD were related to higher blood pressure – those reporting little or none of it tended to have higher blood pressure. These effects persisted even after controlling for conventional factors such as fitness and waist-to-hip ratios. It was interpreted that individuals who report little or no perceived discrimination have actually internalized racist views but are unwilling or unable to articulate them, triggering telling somatic effects.

In one of the few studies of the effects of perceived discrimination on cardiovascular functioning conducted in a non-African-American sample, Moghaddam and colleagues (2002) made visits to the homes of South Asian women. During these visits, participants were asked to fill out an inventory of racism-related experiences and have blood pressure measured. It was found that the respondents who reported fewer racist experiences exhibited markedly higher blood pressure than those who had indicated more perceived discrimination experiences. The authors of the study concluded that participants rating low on perceived discrimination experiences were in a form of denial, which resulted in somatization of the stress involved.

Therefore, these participants had higher blood pressure while those who had volunteered information on perceived discrimination experiences had lower blood pressure. While a causal mechanism could not be established due to the nature of the study, Moghaddam and colleagues nevertheless provide an intriguing hypothesis that is consistent with Krieger's work.

Null findings are not absent in this literature, however. Matthews et al. (2005) for instance, asked African-American and Caucasian adolescent volunteers to wear a device that measures ambulatory blood pressure (ABP) over two days. Experiences of unfair treatment due to a variety of reasons such as gender, race, and physical appearance, were then used as predictors of ABP, and it was found that ABP was best predicted by unfair treatment due to physical appearance (as measured by body-mass index) while unfair treatment due to race was not a significant predictor. As this was the first study concerning blood pressure and perceived discrimination in non-adults, however, it may be questioned to what extent the adolescent respondents were accurately characterizing experiences with perceived discrimination. For example, conceptions of appearance may be closely tied to phenotypic racial characteristics, making it difficult to distinguish between them. In contrast, another well-known study found the opposite effect: self-report experiences of perceived discrimination were independently associated with higher ABP, particularly in waking ABP (Steffen et al., 2003).

In sum, the majority of self-report correlational evidence suggests that there is an inverse relationship between the amount of perceived discrimination and blood

pressure; that is, individuals reporting few or no perceived discrimination experiences are more likely to exhibit high blood pressure than those who articulate these experiences. Further, this relationship may be affected by the coping style of the individual, such that active coping results in attenuated blood pressure. The topic of coping styles, however, is best considered in light of experimental evidence (discussed further below).

This category of research proves limiting for several reasons. As with all correlational research, only tentative conclusions can be drawn regarding the effect of perceived discrimination on cardiovascular functioning. Second, cardiovascular reactivity is not typically explored in these types of studies; rather, resting blood pressure and heart rate and hypertension diagnosis are the outcome variables of interest. Therefore, these studies say little about cardiovascular reactivity, which may be a better indicator of stress directly resulting from perceived discrimination experiences. Next, it is difficult to draw consistent conclusions from this literature because procedures are so varied from study to study. For example, some studies have taken direct measurements of blood pressure, while others asked participants to report hypertension without objective verification. Additionally, subjects were polled on the phone, in their homes, and while at school; the context of the measurements may have led to such differing results. Finally, a pervasive problem in this literature is the domain of perceived discrimination being studied and the measurements used. Some questionnaires refer exclusively to work-based perceived discrimination (e.g., Din-Dzietham et al., 2004), while others inquire about more general domains.

Basic Psychophysiology

Studies in this section examine the very basic links between perceived discrimination and cardiovascular functioning. Because these are laboratory paradigms, reactivity is also studied. There is some evidence to suggest that perceived discrimination enhances cardiovascular reactivity. Blascovich and colleagues (2001b) used stereotype threat as the discriminatory independent variable. Stereotype threat can be defined as a version of perceived discrimination because "…members of such groups experience stereotype threat when they are in situations in which other people may view them stereotypically in ways likely to increase performance pressures, i.e., stress" (p. 225). Each participant sat in a psychophysiological chamber and had his / her mean arterial pressure recorded while completing the Remote Associates Task. This cognitive test was completed after hearing either a Caucasian psychologist talk about differences in test performance between Caucasian and African-American students or an African-American psychologist talk about this debate briefly but ultimately describe the task as unbiased and fair. It was found that the presence of a stereotype threat (i.e., the Caucasian psychologist condition) increased mean arterial pressure in African-Americans subjects as compared to both Caucasian subjects and compared to African-American subjects experiencing little or no stereotype threat (i.e., the African-American psychologist condition). The former group also made more mistakes, however, blood pressure effects remained even when controlling for performance. Results such as those found by Blascovich et al. are not limited to only

discriminatory lab stimuli, however. Clark (2000) found that perceived racism (as measured by a subjective instrument) was related to diastolic reactivity in response to a speaking task on animal rights. This persisted even when potential confounders were accounted for, indicating that the effects of perceived discrimination on cardiovascular reactivity may be subsequently generalized to both racist and nonracist challenges.

Thus, a central question in this line of research is whether stress caused by perceived discrimination is qualitatively different from other sources of stress. Some evidence (e.g. Armstead et al., 1989) suggests that blood pressure significantly increases during the introduction of perceived discrimination-related stimuli in a laboratory setting as compared to non-racist anger-provoking and neutral stimuli. Basic physiological studies on perceived discrimination do not unequivocally support the hypothesis that discrimination is a special status stressor; that is, it is possible that discrimination one of many adverse, stress-inducing stimuli that have profound physiological and psychological effects. Using a within-subjects design, one investigation showed African-American and Caucasian males three clips of neutral stimuli, anger-provoking stimuli, and a racist event. In the two latter cases the victims in the clips were the race of the individual and the subjects were asked to identify with the victims emotionally (Fang & Myers, 2001). Both anger-provoking and racist clips induced greater cardiovascular reactivity (in terms of DBP) in both Caucasian and African-Americans, however, there was no significant difference between these two conditions in either group. Because African-Americans are more prone to report

experiences of noxious racist events, however, the researchers concluded that this could lead to sustained high DBP over time. Interestingly, personality may also have been involved: trait hostility was found to be related to high levels of autonomic persistence even after the stressor was removed. One limitation of this study is that the sample utilized was quite small (N=62), but studies such as this illustrate that at least for some individuals, perceived discrimination may not be qualitatively distinct from other stressors.

Regardless of whether perceived discrimination is a unique stressor, however, it appears from the evidence discussed above that it does cause cardiovascular effects in minority individuals. However, these studies focus primarily upon acute reactivity, and understandably, long-term effects are not easily tested. At least one finding suggests that baseline measures of cardiovascular reactivity to stressful stimuli are not necessarily predictive of future systolic blood pressure when age and baseline blood pressure are controlled (Carroll et al., 2001). However, physiological arousal need not equal harm, distress, and disease (Dienstbier, 1989). It is important to recognize positive connotations of arousal, such as the fact that optimal level of arousal can prove beneficial to performance and can help develop “toughness” via intermittent exposure to stressors which increase brain catecholamine availability. However, because chronically high levels of cortisol and catecholamines tend to be related to distress, disorders, and negative personality traits, it is important to distinguish between chronic and intermittent stressors when discussing emotional stimuli such as discrimination.

Subtle perceived discrimination in particular has also been compared to blatant perceived discrimination, and effects have been consistent with the literature above. For example, one study showed that African-American women exhibited higher diastolic blood pressure reactivity to a perceived discrimination stressor and lower heart rate during the recovery period following the stressor compared to their Caucasian counterparts (Lepore et al., 2006). This study employed speech writing tasks as analogues of subtle perceived discrimination- and non-perceived discrimination stress. Guyll, Matthews, & Bromberger (2001) also found that a subtle perceived discrimination stressor in the form of a speech-writing task was associated with greater diastolic blood pressure reactivity in African American than in Caucasian, women. Similarly, participants placed in a subtle racism laboratory condition showed higher diastolic blood pressure reactivity as compared to a blatant perceived discrimination condition (Merritt, Bennett, Williams, Edwards & Sollers, 2006).

Moderated Psychophysiology

Skin tone. At least one study has attempted to understand the general topic of hypertension as resulting from perceived discrimination in relation to skin tone. In an attempt to elucidate findings that darker skinned African-Americans have higher rates of hypertension, Klonoff & Landrine (2000) utilized self-assigned categories of skin color, and found that darker skinned African-Americans tended to experience more stressful racist events than lighter individuals. It is important to recognize that these

authors did not measure cardiovascular functioning. Though this evidence is preliminary and should be approached with a cautious eye, it is interesting to conceive of skin color as an underlying factor in perceived discrimination, which may thereby lead to increased hypertension. Significantly however, skin color should not be used as a proxy for perceived discrimination (Krieger, Sidney, & Coakley, 1998). When these authors did use skin color instead of self-report questionnaires, they found the opposite effect that Klonoff & Landrine (2000) found, thus suggesting that further research in this area is needed to tease apart the complexities of this relationship.

Socioeconomic status. Socioeconomic status (SES) has been proposed to be an influential variable where perceived discrimination and cardiovascular reactivity are concerned. Other studies, however, show that SES accounts for only a small portion of the variance in cardiovascular reactivity, and that a larger portion could be explained by social information processing attitudes, which includes perceptions of hostile intent (Chen & Matthews, 1999). Although this study did not focus on perceived discrimination experiences, the proposition that cognitive expectancies are involved as a result of SES is interesting: the authors theorize that living in low SES conditions where situations are often unpredictable can give rise to the adoption of such processing biases. These biases, in turn, influence cardiovascular reactivity changes in the face of a stressor. SES may also be involved inasmuch as it relates to John Henryism, discussed below.

Racial identity. There has been little work conducted on the relationship between perceived discrimination, ethnic / racial identity, and psychophysiology, though it presents a potential deeper understanding of how personal variables come to bear on how perceived discrimination is ultimately processed, manifested, and resolved. One such study found in a small sample of African-American college students that cardiovascular reactivity covaries with identity accumulation (Torres & Bowens, 2000). Using a racial identity scheme developed by Cross (1978), it was determined that students who could be classified into the Internalization phase of identity development (which is characterized by an acceptance of one's own racial identity and the racial identities of others) were most reactive when presented with either a high affective racial provocation task (speaking on a racial topic) or a stressful mental mathematics task with low affective potential. Because the study could not provide conclusive deductions regarding why this was true, the authors tentatively speculated that enhanced racial identity may serve to make individuals more aware of perceived discrimination. However, given the high prevalence of family history for cardiovascular diseases (70%), this may have been a confounding variable. Interestingly, there is also research to suggest that cardiovascular reactivity is not related to parental hypertension, but this finding is complicated by the fact that it was determined using participants' report of their respective parents' cardiovascular condition (Clark, 2003). Other traits such as anger have also been shown, to a lesser extent, to be related to blood pressure during the presentation of perceived discrimination-related stimuli (Armstead et al., 1989).

Mediated Psychophysiology

Social support. In addition to coping responses (discussed in a later section), social support is a potential area of interest as well. For instance, two relatively early studies found that social support is an important variable in mediating cardiovascular reactivity. A frequently cited study by Kamarck and colleagues (1995) found that social affiliation or support attenuated blood pressure reactivity in conditions of high social threat. This experiment created a situation where a domineering, evaluative, high status figure gave instructions in an impatient way to the participant. In another condition, the confederate was amiable, not evaluating the participant, and was of a lower social status, but in both conditions, participants were either asked to be alone, or had one of their friends available in the room. The presence of a friend was associated with lower reactivity during the high threat situation and persisted even when the friend was asked the leave the room, suggesting that members of a social support network need not be physically present in order to buffer the stressful effects of social interaction. Furthermore, the close friend of the participant did not verbalize any support, suggesting that indirect knowledge of support can be sufficient. Though this study did not conduct any analysis of perceived discrimination-related stimuli, it is well-regarded as a powerful demonstration of the effect of social support on autonomic stress responses. Another study found that a controversial racial topic induced greater cardiovascular reactivity than a nonracial controversial topic, and that these effects persisted until ten minutes past the end of the experiment (McNeilly et al., 1995). While social support, as delivered in the experiment through a confederate

who listened to and agreed with the participant's emotions regarding the topic, did not have a main effect on cardiovascular reactivity, self-reported levels of anger were highest in the racist provocation with no social support condition. This indicated an interaction with the type of provocation, suggesting that social support may actually have special implications for perceived discrimination-related stress. Interestingly, the authors concluded that due to the uniquely charged nature of race-related discussions, social support may actually increase rather than decrease arousal, but put forth alternate explanations for this surprising result. For example, they contend that the lack of efficacy of social support demonstrated in this study could be due to poor manipulation of the social support condition, or because laboratory social support is not as salient as real-life, external support.

More recently, Clark (2003) has found that perceived discrimination did not independently predict changes in blood pressure reactivity, however, perceived discrimination did interact with quality and/or quantity of social support to predict both systolic and diastolic blood pressure changes. Some limitations of this study include the use a non-racism stressor to induce blood pressure changes (i.e. an arithmetic task) and the small sample size (N=64).

One of the general limitations of this coping research is that individuals often use more than one strategy depending upon the situation (Folkman & Lazarus, 1984), and one study found that almost 80% of respondents used both active and passive means of coping (Clark, 2000). However, the majority of this research indicates that

social support is a powerful buffer against the potentially harmful effects of pronounced cardiovascular reactivity.

Methodological Considerations

A relatively recent review examined studies regarding perceived discrimination and blood pressure and found that out of six published studies, the results were half positive and half negative (Brondolo et al., 2003). The reviewers concluded that methodological differences such as use of validated instruments to measure perceived discrimination, measuring perceived discrimination in different domains of life (i.e. work, shopping, police), and the use of self-report questions regarding hypertension history in a sample of individuals that has been documented to be unaware of their conditions. According to this critique, epidemiological studies present with differential uses of mediators and moderators; these yield a richer representation of the relationship between perceived discrimination and cardiovascular reactivity, but because they are not consistently employed throughout the literature, it becomes difficult to understand the nuances involved. Finally, laboratory studies may be limited by their frequent use of overt racist events (as opposed to more subtle perceived discrimination analogues that arguably approximate real life situations more accurately) but on the whole, more consistently illustrate that cardiovascular reactivity is related to perceived discrimination.

Significantly, active coping may also involve greater effort, which can potentially confound cardiovascular reactivity effects. In order to more directly address the hypothesis that passive coping is associated with high cardiovascular

reactivity, one study compared a control group not instructed on how to cope with active and passive coping experimental groups, who were given little control over the outcome of their performance (Gerin, Pieper, Marchese, & Pickering, 1992). It was found that when effort was held constant among the conditions, the passive coping group exhibited greater cardiovascular reactivity than the other two groups. This suggests that passive coping is associated with greater arousal and that the effort associated with active coping may have confounded previous results indicating that passive coping is less effective than active coping.

Other cogent criticisms have been voiced as well. Boutain & Cooke (2001) argue that the definitions of discrimination, prejudice, racism, and other related terms are variable from paper to paper, that there is lack of long-term investigations studying autonomic reactivity. Boutain and Cooke (2001) also note a refusal among investigators to engage research subjects in a dialogue about their understandings of the effects of perceived discrimination.

Indeed, there are several other considerations in addition to those echoed by these reviewers. One important gap in the literature is the lack of research conducted on non-African-American samples. As indicated earlier, only one article to date (Moghaddam et al., 2002) has investigated perceived discrimination and cardiovascular functioning in a sample of non-African-American minorities. Research indicating similarities and differences in cardiovascular reactivity using multiethnic samples is vital to understanding the prevalence of these reactions in a variety of minority and ethnic groups. In addition, using empirically observed differences and

similarities between ethnic groups as a basis for new research may ultimately lead to a better understanding of perceived discrimination and its effect on cardiovascular reactivity. Second, a closer look at the roles of religion and spirituality as coping styles is in order. Though some research (Bowen-Reid & Harrell, 2002; V. Clark, 2001) has looked at it more generally and found it to have beneficial effects on health and well-being, the use of religious and spiritual practices in many minority groups could qualify as another mediator in the cardiovascular effects of perceived discrimination. Thirdly, models employed in research frequently do not take into account traditional risk factors before examining perceived discrimination as a variable, making it difficult to understand the relative importance of perceived discrimination in producing potentially harmful outcomes such as hypertension.

The Psychological Effects of Perceived Discrimination

Stress and coping may entail two major effects on the individual, affective and physiological, which are inextricably linked. Lazarus (1993) characterized stress emotions as being a subset of general emotions that are specifically in reaction to psychological stress. More recently, Gendolla & Richter (2005) have reviewed evidence suggesting that negative affect is accompanied by higher cardiovascular reactivity (especially systolic blood pressure) and this relationship is mediated by demand appraisals. These data suggest that participants realize that greater effort is needed in challenging situations that precipitate negative mood states. Thus, greater effort in the face of distress leads to an increase in cardiovascular reactivity.

However, the authors argue that mood must be accompanied by task performance in order to show any effect on cardiovascular reactivity. In summary, Gendolla & Richter's thesis is that people use their moods as sources of information for demand appraisals.

In line with stress-coping models, perceived discrimination has been consistently found to be associated with stress-related psychiatric conditions. A large body of research literature suggests that perceived discrimination is both correlationally and longitudinally associated with substance use disorders. A recent prospective study artfully demonstrated this link in African-American adults and their children (Gibbons et al., 2004). Perceived discrimination was shown to be the strongest predictor of substance use among the parents, even after controlling for base rates of substance use, at an average follow-up time of twenty months later. Level of discrimination also predicted an increase of use in adults, and use and vulnerability to use in their children at follow-up. Finch and colleagues (2003) found that employment discrimination in Mexican migrant farmworkers was significantly related alcohol abuse and dependence in the past year. Other studies have also shown the link between perceived discrimination and cigarette smoking (Guthrie et al., 2002; Landrine & Klonoff, 2000), problem drinking (Martin et al., 2003), and alcohol abuse (Whitbeck et al., 2004).

A sizable literature also suggests that perceived discrimination is associated with depressive symptoms and negative mood. According to Fernando (1984), perceived discrimination may precipitate depression through a number of factors,

such as by threatening self-esteem and increasing a sense of helplessness. Noh & Kaspar (2003) found that there was a strong correlation between depression and perceived discrimination after demographic variables had been controlled for, however, when emotional response was introduced as a moderator, the link between perceived discrimination and depression reduced by almost 40%. The authors concluded that coping styles used to deal with perceived discrimination were more effective when acculturative stress was low and that support by members of one's ethnic group can buffer the effects of perceived discrimination. A longitudinal design by Brody and colleagues (2006) recently found that increases in perceived discrimination were prospectively related to depressive symptoms in a sample of more than 700 African American youths; this effect persisted independent of socioeconomic status. Another study found in a sample of African-American college students that those who reported higher levels of perceived discrimination also endorsed significantly more depressive symptoms and lower life satisfaction (Prelow et al., 2006). Similarly, Mossakowski (2003) found that Filipino-Americans who reported higher levels of lifetime perceived discrimination also endorsed higher levels of depressive symptoms.

Less is known about the link between perceived discrimination and anxiety, as variables such as subjective state anxiety and anxiety diagnosis tend not to be measured in this literature. However, some evidence suggests that perceived discrimination is associated with elevated state anxiety (Armstead et al., 1989).

The Transactional Theory of Coping

Coping is generally defined as a collection of responses, both external and internal, used to minimize the effect of environmental challenges, loss, demands, or threats that precipitate stress in the individual (Fleming, Baum, & Singer, 1984). The seminal and most influental psychosocial theory of coping has been conducted by Richard Lazarus and Susan Folkman (1984). These authors' Transactional Theory of Coping characterize coping as a dynamic, effortful process whereby an individual responds to a change in the environment. Three features characterize Lazarus and Folkman's definition of coping: 1) a process- rather than trait-oriented approach 2) emphasis on purposeful rather than automated behavior, and 3) focus on continuous reappraisals of the environment and one's coping resources. They advocate for understanding coping behavior in a particular context, as well as how these coping behaviors change over time as a function of the environment. In doing so, the individual assesses a variety of situational circumstances in order to produce the appropriate coping response, including novelty, predictability, and ambiguity of the situation. Furthermore, stressful situations involve two main assessments (Lazarus & Folkman, 1987). *Primary appraisal* involves assessing whether one's well being is at stake during the stressful situation. *Secondary appraisal* involves the act of assessing one's resources to cope effectively.

According to Lazarus & Folkman (1984), coping involves three stages that may vary given a particular stressor, situation, or individual. *Anticipation* involves a preparatory stage immediately prior to the introduction of a stressor. *Impact* refers to

the period where the individual is coping with the stressor, which is currently at hand. Finally, *postimpact* involves coping after the stressor has abated or been withdrawn. Coping thus refers to efforts to manage, and not necessarily master, the stressor at each of these periods. Coping strategies are complex and although they are empirically derived, usually overlap and co-occur in the same instance, and thus, may be difficult to measure.

Coping behavior according to the transactional perspective has been characterized as having two main subsets: active and passive. Active (also problem-based or instrumental) coping refers to acting on environmental factors to change the stressful situation itself, thereby alleviating stress. Passive, or emotion-based, coping on the other hand is inwardly focused – individuals using this style tend to adapt to a stressor by exploring their feelings and cognitions about the situation. Passive coping is thought to be less effective than active coping for two main reasons (Lazarus & Folkman, 1984). First, it is believed that because passive coping is inwardly focused toward an individual's reaction to the stressor, that the individual changes little about his / her environment. This causes the stressor to persist and even worsen, prolonging the state of stress. A second reason why passive coping is generally regarded as ineffective is because it is not preparatory – by focusing on one's personal, internal experiences with a particular, an individual is unable to develop a sense of preparedness should the stressor re-occur (Lazarus & Folkman, 1984). Unfortunately, no studies to date have directly tested this hypothesis.

A number of studies in the mainstream coping literature suggest the efficacy of active coping, particularly in preventing depression, and these have culminated in theoretical frameworks positing problem-solving as a protective factor in depressive pathogenesis (e.g., Nezu, 1987). Folkman & Lazarus (1988) found that coping mediated the relationship between an initial emotional reaction to stress and subsequent mood. Caucasian individuals residing in the community who used planful problem-solving tended to experience less negative emotion and more positive emotion in time, whereas those using emotion-based coping strategies, such as distancing, positive reappraisal, and confrontive coping (i.e., "venting") fared worse. As another example, in a sample of HIV-positive individuals, those who coped with their illness using emotion-based strategies were significantly more likely to experience depressive symptoms (DeGenova, Patton, Jurich, & MacDermid, 2001). Amirkhan (1990) found that the problem-solving dimension of his Coping Strategy Indicator questionnaire was inversely and significantly correlated with scores on the Center for Epidemiological Studies – Depression Scale (CES-D; Radloff, 1977). Mallett & Swim (2006) found that heavy women who used primary control coping efforts, which are designed to change a weight discrimination situation and thus are related to problem-solving, were likely to have more positive interpersonal interactions. In addition, these participants were able to alleviate the stress resulting from potential discriminatory encounters (i.e., receiving rude comments or looks from others at a party) by engaging in preparatory primary control coping efforts *before* the event.

Conversely, studies have also demonstrated the ineffectiveness of passive coping. One prospective study of college students showed that ineffective problem-solving was longitudinally related to depressive symptoms (Dixon, Heppner, Burnett, Anderson, & Wood, 1993). Furthermore, these results ruled out the possibility that experiencing depression causes deficits in problem-solving, suggesting a causal pattern between passive coping and subsequent depression. Another study found not only that emotion-based coping was associated with depressive symptoms, but that it also predicted greater symptom severity (Ravindran, Matheson, Griffiths, Merali, & Anisman, 2002).

Despite the popularity of the Transactional Theory, three major criticisms of the Lazarus & Folkman's (1984) formulation have been cited. First, although Lazarus & Folkman (1984) conceptualize coping more as a behavior than as a trait, more recent research has suggested that it may have a stable, traitlike component. Li (2006) found that active coping could also be represented as a trait, rather than purely as a diathesis. She reasoned that if coping was stable across a variety of domains and not differentially activated by the level of stress in a variety of situations, that it would resemble a trait rather than be context-specific. She found evidence that coping was a stable in a variety of domains and that is appeared to be relatively constant despite the level of stress reported in each situation. She also found that performance-related trait (self-efficacy) predicted active coping in performance-related stressful situations, while a relation related trait (secure attachment) predicted active coping in relation-related stressful situations. Li concluded that active coping is a stable trait rather than

a response based on a stressful situation; these results consistent with work by others, such as Niall Bolger and Paul Costa. In a similar vein, researchers have also found that two personality traits, neuroticism and extraversion, are highly correlated with certain coping styles. For example, David & Suls (1999) found that individuals high in neuroticism and extraversion tend to use emotion-based coping.

A second criticism of the Transactional Theory of Coping and associated work is its overreliance on active coping, and whether active coping is to some extent culture-specific. In fact, some researchers have found using factor analytic techniques that a two-factor model based on active and passive coping did not represent the ways in which their respective samples coped (e.g., Compas et al., 2006, in cancer patients). In cultural terms, coping may be a reflection of larger societal expectations, norms, or philosophies that may not be reflected in the Transactional Theory. Lazarus & Folkman (1984) themselves acknowledge that:

> In keeping with deeply ingrained Western values regarding individualism and mastery and the Darwinian impact on psychological thought, these definitions tend to venerate mastery over the environment as the coping ideal. Coping is viewed as tantamount to solving problems by acting effectively to obviate them. The problem here is not that solving problems is undesirable, but that not all sources of stress in living are amenable to mastery, or even fit within a problem-solving framework…Coping processes that are used to tolerate such difficulties, or to minimize, accept, or ignore them, are just as important in the

person's adaptational armamentarium as problem-solving strategies that aim to master the environment. (p. 138-139)

Some theorists have recently proposed, for example, that collectivist societies may feature unique coping behaviors, such as relying upon religion and looking to the present and past struggles of their respective ethnic groups for strength (Heppner et al., 2006; Lewis-Coles & Constantine, 2006; Shorter-Gooden, 2004). These may not be readily characterized as problem-focused approaches but may still represent culturally-specific and effective strategies for coping with perceived discrimination. For example, some culturally sanctioned passive coping strategies may actually take environmental context into account. A study conducted by Noh and colleagues found that forbearance, a culturally-specific form of passive acceptance and avoidance, diminished the strength of association between perceived discrimination and depressive symptoms in a sample of Southeast Asian refugees (Noh, Beiser, Kaspar, Hou, & Rummens, 1999). The authors reasoned that a confrontational, problem-solving approach may be inappropriate for the subtle discrimination that the respondents reported experiencing frequently. Similarly, another investigation studying Asians found that active coping was effective only when perceived discrimination experienced was infrequent (Yoo & Lee, 2005). In line with these findings, stress responses are lower in some ethnic groups that are reported to commonly use passive coping strategies, such as Asian-Americans (Shen, Stroud, & Niaura, 2004; Stoney, Hughes, Kuntz, West, & Thornton, 2002; Suchday & Larkin, 2004).

Tweed & Conway (2006) have described several cultural characteristics or dimensions that may influence an individual's tendency to use a particular coping strategy. Some cultures, for example, feature a latent belief in the utility of effort, which presupposes that life outcomes are at least partially governed by an individual's labors. Such a belief may contribute toward active coping behaviors, such as persevering in the face of difficulty. Other examples given by Tweed & Conway are: belief in an entity view of the world (extent to which the self is malleable); belief in a benevolent purpose for events; cultural values (e.g., collectivism, fatalism); belief in the ubiquity of change, and belief in the utility of personal preparation.

A third and related criticism of The Transactional Theory and associated findings is that active coping may not always be more beneficial than passive coping; to this end, it is argued that the transactional approach does not specify environmental factors that influence coping. Certain coping behaviors that are traditionally characterized as being detrimental, such as denial, may actually be helpful and appropriate given the context (Lazarus, 1993). To explain this point, Lazarus (1993) uses the analogy of a heart attack: denial would not be useful in recognizing symptoms of a heart attack but once the heart attack has passed and the individual is in recovery, it may be helpful to deny feelings of fear. Finally, the selection of an appropriate coping strategy also depends on what is at stake. When self-esteem is involved, for example, planful problem solving is low but escape-avoidance is high, presumably due to the cost of failing (i.e., severe blow to one's self esteem). In

summary, a transactional approach to coping may not account for the trait-like qualities behind coping, the utility of passive coping, and cultural nuances of coping.

Coping & Perceived Control

An important potential moderator in determining the best coping strategy may be the amount of control an individual perceives over the stressful situation. It has been argued that active coping may more amenable to changeable situations, which impart a sense of control to the individual (Lazarus & Folkman, 1987). Micelli & Castelfranchi (2005) distinguish between what they refer to as the two components of perceived control, which are inversely related to state anxiety. *Pragmatic control* refers to the belief that the individual can manipulate or change the external stressor for one's own gain or well-being. *Epistemic control* is the individual's cognitive representation of self-preparation in imagining the consequences and of coping with the stressor. Similarly, Bryant (1989) has shown that there are four factors in perceived control: avoiding negative outcomes, coping effectively with negative outcomes, obtaining positive outcomes, and savoring positive outcomes.

In general, passive coping is associated with more helplessness and a lower sense of control. A series of studies conducted by Endler and colleagues (see Endler, Macrodimitris, & Kocovski, 2000) tested emotion- and problem-based coping in groups who were made to believe that they either did or did not have control over an interpersonal situation. They found that the low control situation was associated with emotion-based coping and increased anxiety as compared to the high control situation. These results persisted in a variety of tasks, including cognitive and

interpersonal. In sample of males from the community, David & Suls (1999) found that lower perceived control over daily life was associated with greater use of emotion-based coping strategies, such as distraction, acceptance, and seeking emotional support, rather with seeking instrumental support or problem-solving. Women who are victims of a sexual assault and perceive less control over their recoveries have been found to engage in more avoidant, passive coping (Frazier, Mortensen, & Steward, 2005).

The majority of research performed on coping and perceived control has been conducted in physically ill or disabled populations. High perceived control in and of itself is associated with more positive physiological outcomes (Schulz & Decker, 1985), and more positive psychological outcomes than low perceived control even when physiological functioning is controlled for (Thompson, Sobelew-Shubin, Galbraith, Schwankovsky, & Cruzen, 1993). Despite the multitude of findings that active coping is associated with increased perceived control, however, fewer studies have examined the effects of this combination. It has been suggested that higher levels of active coping and perceived control are associated with greater self-efficacy, possibly because those who perceive greater control and mastery feel more confident approaching problems directly rather than withdrawing, ruminating, or using other forms of passive coping (Rokke, Fleming-Ficek, Siemens, Hegsted, 2003). For example, in a sample of women at risk for ovarian cancer, an interaction between problem-focused coping and perceived control emerged over time, such that those women who perceived high levels of control and engaged in active coping actually

experienced greater psychological distress and less adherence to their health care regimens (Fang, Daly, Miller, Zerr, Malick, & Engstrom, 2006). A study of nurses found that problem-solving was perceived to be beneficial only during high controllability occupational events. For example, these nurses tended to express that active coping was beneficial only in situations where their efforts were likely to result in change. By contrast a form of passive coping, problem reappraisal, was deemed useful by participants in all events, whether high or low in perceived control (Bowman & Stern, 1995).

Coping & Perceived Discrimination

A key area of research in this area is of coping styles and how they are helpful or detrimental to processing experiences with discrimination. Two sources are most widely cited and employed in coping styles research in this area. Harrell (1979) suggests six cognitive coping styles frequently utilized by African-Americans: continued apathy, in which the individual recognizes but does not attempt to change racism; a piece of the action, who overlook the hazards of racism in favor of the potential benefits of participation in a capitalist society; obsessions with counter-culture alternatives lead to escapist behaviors away from racism-related issues; African-American nationalism is an effort to reject dominant, White institutions and to create African-American alternatives in their place; identification with authoritarian involves adherence to a group or institution that combats racism; and historically aware cognitive flexibility is present in individuals who appreciate the history of racism-related struggles and are highly adaptable to changes in racism.

Clark and colleagues (1999) explain cardiovascular reactivity in terms of Lazarus & Folkman's (1984) stress-coping response theory. Essentially, if a stressor is perceived as being racist, then it causes a variety of exaggerated physiological and psychological responses which necessitate coping responses. Over time, if the stressor is chronic and perceived to be hostile, it can cause health problems, and review of the literature by these authors suggests that perceived discrimination and cardiovascular reactivity are involved in a host of disorders such as heart disease, depression, low birthweight, and breast cancer survival. As in the mainstream coping literature, the emerging consensus is that active coping styles that allow for the expression of emotional reactions to discriminatory experiences can help buffer the effects of perceived discrimination. Other studies have also demonstrated the link between anger suppression in response to racist stimuli and increased blood pressure (Armstead et al., 1989).

One dissertation put African-American and Caucasian participants in two conditions (Dorr, 1999). Both began by having a debate on race-related topic with a White confederate; comments made by the confederate were designed to be perceived as racist and purposely made to evoke strong emotional responses. Shortly after this task, individuals in one experimental group only were allowed to express anger by discussing the interaction with the confederate in a written task; emotional responses by individuals in the other group were inhibited, as they were asked to write about their best friends. Results indicated that those whose emotional expression was inhibited took longer to resume a baseline level of normal cardiovascular reactivity.

There was also no consistent relationship between conscious appraisals of the stressors and cardiovascular response. Generally, these findings suggest that coping styles which allow for distancing, denial, and lack of expression may be an important part of long term physiological effects of discrimination. Other studies confirm passive coping strategies are associated with greater blood pressure and heart rate reactivity (e.g., Clark & Anderson, 2001).

Findings such as these are interesting in light of a qualitative analysis conducted by Boutain & Cooke (2001), which found that passive copers who avoided potentially racist encounters also expressed the belief that perceived discrimination-related experiences were not affecting their hypertension. By contrast, active copers believed that racist events, particularly those relating to their jobs and children, did influence their preexisting hypertensive conditions. Because Boutain & Cooke presumably intended this data to be a demonstration of the emic perspective needed in this research area, they did not actually collect information on blood pressure, and in fact, all the participants in this sample had been diagnosed with hypertension. Nevertheless, it is a noteworthy observation that 70% of the sample fell into the passive coper category.

As in the mainstream coping and stress literature, a key factor in whether a particular coping strategy is helpful is perceived control over the perceived discrimination stressor. Other studies have also found an association between active or problem-focused coping and perceived control in perceived discrimination. Scott (2004) found that adolescents who expressed greater control over discriminatory

experiences also endorsed more approach coping strategies, such as problem-solving and seeking social support. Another study has suggested that when perceived control is high, participants experiencing perceived discrimination tend to minimize it and instead, blame themselves (Ruggiero & Taylor, 1995). These authors suggested that participants who feel they have a high measure of responsibility or control over the outcome of a perceived discrimination-related event are less likely to feel comfortable acknowledging the role of others in these outcomes.

Perceived control may differentiate between situations in which active coping is considered appropriate and beneficial. The presence of an active coping style, in other words, is not necessarily indicative of positive results, and its helpfulness may vary as a function of the perceived controllability of a situation. James and colleagues (1983) demonstrated the deleterious effects of persistent use of active coping in the face of uncontrollable perceived discrimination. Based on the fabled character, they coined the term of John Henryism to refer to "an individual's self-perception that he can meet the demands of his environment through hard work and determination" (p. 263). They posited that prolonged, active, and effortful coping responses could lead to hypertension and present exploratory work to support this notion. In the 1983 paper, they found that African-American men who score low on education and high on John Henryism had significantly higher diastolic blood pressures than other men in the sample. The authors concluded that African-American men who engaged in active coping styles but did not have the requisite resources to deal effectively with perceived discrimination-related stresses were thus more likely to be at risk for high

blood pressure. This high risk group may not be able to flee a perceived discrimination stressor or to fight it effectively, whereas men who are high on both measures may experience a sense of mastery or self-efficacy over racist situations. Finally, resources associated with higher socioeconomic status, specifically education, may confer the ability to make more accurate appraisals of perceived discrimination-related stress. In a second study, James et al. (1984) demonstrated the relationship between John Henryism and occupational stressors on the resting blood pressure of African-American men. Since then, it has been demonstrated that the association between racism associated with high diastolic blood pressure is weakened when John Henryism is used as a mediator (Arriola, 2002). Another study has, on the other hand, found an inverse relationship between this coping style and systolic blood pressure reactivity in African-American women (Clark & Adams, 2004).

Because active coping strategies are widely taught in many mainstream therapeutic interventions (D'Zurilla, 1990), with less emphasis on situational factors in coping, studies are needed to shed light on alternate coping skills that may be feasible for use by ethnic / minority populations. Understanding the beneficial effects of various coping strategies with greater specificity and in light of contextual variables such as perceived control, clinical practice may better decide how to teach coping skills to minority clients, particularly to African-American individuals. In doing so, the therapeutic enterprise may become more fruitful for minority individuals.

Self-Efficacy

The term self-efficacy was originally coined by Albert Bandura (1977) and refers to the belief that one can successfully execute the behaviors needed to produce a desired or favorable outcome. Self-efficacy expectations may vary in *magnitude, generality*, and *strength*. According to Bandura's (1977) formulation, perceived self-efficacy may influence a wide range of coping choices, such as selecting behavioral situations to confront or avoid and deciding how much effort to expend on coping activities. Choices in coping may thus affect self-efficacy, creating a reciprocal, bidirectional pattern. For example, an individual low in self-efficacy who continually chooses to avoid situational challenges and shy away from opportunities to problem-solve is likely to reinforce her feelings of inadequacy and lack of mastery. This renewed sense of low self-efficacy is thus likely to affect coping choices once again.

Bandura (1977) theorized that self-efficacy expectations are derived from four sources of information, all rooted in his well-established social learning theory. In previous *performance accomplishments,* individuals may have successfully confronted a challenge, thereby exposing and sensitizing the individual to this general class of challenges. In so doing, it also provides the individual with a script or map of what to expect in future, similar challenges. Through *vicarious experience,* individuals may extract information about their potential self-efficacy from models who provide information about adaptive and maladaptive coping. *Verbal persuasion,* either by oneself or by others, can induce efficacy expectations through self-

instruction or interpretation. Finally, the *emotional arousal* that accompanies stressful situations may threaten or otherwise affect self-efficacy.

Available studies suggest that low self-efficacy is associated with passive or emotion-based coping, while high self-efficacy is related to active coping. For example, a recent study demonstrated that low self-efficacy related to abstinence was associated with a reliance on avoidance coping in a large sample of substance use disorder patients (Levin, Ilgen, & Moos, 2007). Another study of college students found that active coping in the form of instrumental support seeking and planning was related to increased self-efficacy in a number of academic domains, such as managing time and working in groups (Devonport & Lane, 2006). However, no studies to date have been conducted to specifically examine whether repeated use of a particular coping behavior (i.e., active, passive) contributes to an increasing sense of self-efficacy.

Appendix B:Instruments

I. Online Screening

Screening Form

1. Age _____
2. Sex: Male Female
3. What is your ethnic / racial affiliation?

_____

4. Biological mother's race / ethnicity

_____

5. Biological father's race / ethnicity

_____

6. Have you ever been diagnosed with the following conditions?

- Stroke
- Heart disease
- Irregular heartbeat
- High blood pressure
- Congenital heart defect
- Obesity
- Diabetes

___ Yes, I have been diagnosed with one or more of the above conditions.

___ No, I have never been diagnosed with any of the above conditions.

7. Do you currently use any prescription drugs? YES / NO
8. Can you abstain from using any recreational drugs (such as alcohol, caffeine, marijuana, cocaine, etc.) for 24 hrs prior to participating in a study? YES / NO
9. Have you ever participated in a study using computer tasks before? If so, what was the nature of the study?
   Describe: _____
10. Have you ever played a computer game called Cyberball before? If so, please describe it?
    _____

II. Laboratory Session

Informed Consent Quiz

Directions: In order to make sure you understand this study and what your participation entails, we would like to give you a short quiz. Please rate each item as true or false to the best of your ability.

1. For participating in this study today, I will receive two experimental research points. T / F
2. My participation today will last approximately 1.5 hours. T / F
3. Throughout my participation, I will be answering some personal questions about how I cope with stress, my previous life experiences, my demographics, and how I am feeling right now. T / F
4. I will be asked to play a frustrating computer game with other people that may make me feel upset or uncomfortable. T / F
5. My blood pressure and heart rate will be recorded throughout the study. T / F

Spielberger Anxiety Inventory – State

Directions: A number of statements which people have used to describe themselves are given below. Read each statement and then circle the appropriate number to the right of the statement to indicate how you feel *right* now, that is, *at this moment.* There are no right or wrong answers. Do not spend too much time on any one statement but give the answer which seems to describe your present feelings best.

1- Not at all
2- Somewhat
3- Moderately So
4- Very Much So

1. I feel calm
2. I feel secure
3. I am tense
4. I feel strained
5. I feel at ease
6. I feel upset
7. I am presently worrying over possible misfortunes
8. I feel satisfied
9. I feel frightened
10. I feel comfortable
11. I feel self-confident
12. I feel nervous
13. I am jittery
14. I feel indecisive
15. I am relaxed
16. I feel content
17. I am worried
18. I feel confused
19. I feel steady
20. I feel pleasant

Positive & Negative Affect Scales (PANAS)

Directions: Below are some words that refer to ways that people feel. Please rate how you feel RIGHT NOW using the following scale:

1 – very slightly / not at all
2 – a little
3- moderately
4 – quite a bit
5 – very much

1. Enthusiastic
2. Interested
3. Determined
4. Excited
5. Inspired
6. Alert
7. Active
8. Strong
9. Proud
10. Attentive
11. Scared
12. Afraid
13. Upset
14. Distressed
15. Jittery
16. Nervous
17. Ashamed
18. Guilty
19. Irritable
20. Hostile

<u>General Self-Efficacy Scale (adapted)</u>

Directions: Please answer each of the following questions using the scale below. Answer each item ONLY in reference to your interaction with the other Cyberball players today.

1 = Not at all true
2 = Hardly true
3 = Moderately true
4 = Exactly true

1. I managed to solve the problem of how I was treated during the game when I tried hard.
2. Someone opposed me, but I found the means and ways to get what I wanted during this game.
3. It was easy for me to stick to my aims and accomplish my goals during this game.
4. I am confident that I dealt efficiently with the unexpected event of being treated unfairly during this game.
5. Thanks to my resourcefulness, I knew how to handle this unforeseen situation of being treated unfairly.
6. I solved most of the problems that came up as a result of being treated unfairly during this game if I invested the necessary effort.
7. I remained calm when facing difficulties during the game because I could rely on my coping abilities.
8. When I was confronted with this problem of being treated unfairly during the game, I found several solutions.
9. When I was in trouble during the game, I could think of a solution.
10. I could handle what came my way during the game.

Revised Eysenck Personality Questionnaire – Short Form (EPQR-S)

Directions: Please answer the following questions about yourself by indicating YES or NO next to each item.

1. Does your mood often go up and down?
2. Are you a talkative person?
3. Do ever feel 'just miserable' for no reason?
4. Are you rather lively?
5. Are you an irritable person?
6. Do you enjoy meeting new people?
7. Are your feelings easily hurt?
8. Can you usually let yourself go and enjoy yourself at a lively party?
9. Do you often feel 'fed-up'?
10. Do you usually take the initiative in making new friends?
11. Would you call yourself a nervous person?
12. Can you easily get some life into a rather dull party?
13. Are you a worrier?
14. Do you tend to keep in the background on social occasions?
15. Would you call yourself 'tense' or 'highly strung'?
16. Do you like mixing with people?
17. Do you worry too long after an embarrassing experience?
18. Do you like plenty of bustle and excitement around you?
19. Do you suffer from 'nerves'?
20. Are you mostly quiet when you are with other people?
21. Do you often feel lonely?
22. Do other people think of you as being very lively?
23. Are you often troubled about feelings of guilt?
24. Can you get a party going?

Brief Perceived Ethnic Discrimination Questionnaire – Community Version

Directions: Think about your ethnicity / race as an ethnic / racial minority. How often have any of the things below happened to you because of your race/ ethnicity?

1 – never
2 – rarely
3 – sometimes
4 – often
5 – very often

1. Have you been treated unfairly by teachers, principals, or other staff at school?
2. Have others thought you couldn't do things or handle a job?
3. Have others threatened to hurt you (ex: said they would hit you)?
4. Have others actually hurt you and tried to hurt you (ex: kicked or hit you)?
5. Have policemen or security officers been unfair to you?
6. Have others threatened to damage your property?
7. Have others actually damaged your property?
8. Have others made you feel like an outsider who doesn't fit in because of your dress, speech, or other characteristics related to your ethnicity?
9. Have you been treated unfairly by co-workers or classmates?
10. Have others hinted that you are dishonest or can't be trusted?
11. Have people been nice to you to your face, but said bad things about you behind your back?
12. Have people who speak a different language made you feel like an outsider?
13. Have others ignored you or not paid attention to you?
14. Has your boss or supervisor been unfair to you?
15. Have others hinted that you must not be clean?
16. Have people not trusted you?
17. Has it been hinted that you must be lazy?

Center for Epidemiological Studies – Depression (CES-D)

Directions: Rate the following items using the scale below. Circle the number that best represents your answer for each statement DURING THE PAST WEEK.

1- Rarely or none of the time (<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- Most or 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 and friends.
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 most people disliked me.
20. I could not get going.
21. I was a lot less interested in most things.
22. I was unable to do the things I used to enjoy.

Spielberger Anxiety Inventory – Trait

Directions: A number of statement which people have used to describe themselves are given below. Read each statement and then circle the appropriate number to the right of the statement to indicate how you GENERALLY feel.

1 – almost never
2 – sometimes
3 – often
4 – almost always

1. I feel pleasant.
2. I feel nervous and restless.
3. I feel satisfied with myself.
4. I wish I could be as happy as others seem to be.
5. I feel like a failure.
6. I feel rested.
7. I am "calm, cool and collected."
8. I feel that difficulties are piling up so that I cannot overcome them.
9. I worry too much over something that doesn't really matter.
10. I am happy.
11. I have disturbing thoughts.
12. I lack self-confidence.
13. I feel secure.
14. I make decisions easily.
15. I feel inadequate.
16. I am content.
17. Some unimportant thought runs through my mind and bothers me.
18. I take disappointments so keenly that I can't put them out of my mind.
19. I am a steady person.
20. I get in a state of tension or turmoil as I think over my recent concerns and interests.

Demographics Form

Directions: Please answer the following questions, and be as specific as possible.

1. How many years have you lived in the U.S.?

2. Please circle the range below which corresponds to your family's combined annual income:

< $25,000
$25,000 - 35,000
$36,000 - 45,000
$46,000 - 55,000
$56,000 - 65,000
$66,000 - 75,000
$76,000 - 85,000
$86,000 - 95,000
> $95,000

3. Which language are you most comfortable speaking? _____

4. What is your religious identification (check all that apply)?

Hindu
Christian (Catholic, Protestant, etc.)
Muslim
Jewish
Buddhist
Agnostic
Atheist
Other: _____

Manipulation Check Form

Directions: Please take a moment to fill out the following questions about your experience as a study participant today. Use the scale below to rate your answer.

1 – very slightly / not at all
2 – a little
3- moderately
4 – quite a bit
5 – very much

1. _____ During the FIRST TIME I played Cyberball with the other study participants, I felt discriminated against due to my race or ethnicity.

2. _____ During the SECOND TIME I played Cyberball with the other study participants, I felt discriminated against due to my race or ethnicity.

3. _____ I felt that I was interacting with three real-life players during the Cyberball games.

4. _____ I felt that I had control over how many points the other participants received for participating.

5. _____ I believed that the number of points the other players received after the first game would affect how they treated me the second time we played the game.

Appendix C: Sample Protocol Forms & Scripts

I. Protocol Script

Time 0: Cyberball Stimulus Administration

Note: Information in brackets refers to changes in these scripts for participants being compensated with cash rather than experimental points.

General Directions (all participants): The next task is a computer game that you will play with three other people. These individuals are undergraduate students [participants] at other UMD labs we have partnered with for this project. Each participant you see on the screen is seated in a laboratory by himself / herself and another experimenter. Like you, they have all agreed to taking part in this experiment for experimental credit for their psychology classes [$10].

During this task, you will be asked to play catch with these other players using a computer game called Cyberball. You will be able to see them using their photographs, and they will also be able to see the photo we took of you earlier. The game you are about to play is the first of two games you will play with these individuals.

When you are done reading these instructions, please let the experimenter know, and she will set up the game for you. Please also let her know when the game ends.

Time +15: Controllability & Coping Manipulations

High Control Condition: Congratulations! Based on the number you chose earlier today, we have determined that you will be the "primary player" for this game. This means that you will be able to evaluate the other players for their sportsmanship based on their behavior during the game you just played. In order to do this, you will engage in an exercise that will allow you to communicate your impressions with your fellow players. At the end of this exercise you will be asked to provide each player with the number of points (0-2) you will award them for participating today. This information will then be sent directly to the other players and the experimenters assisting them will record it in their files. We generally recommend you give 0 or 1 point if you found their behavior to be a problem so that they can work on being more fair during the second game. Two points should be given if you were happy with the other players' sportsmanship and want them to keep up their current behavior. However, you should know that only one person per game can be designated the "primary player," therefore, the other players cannot evaluate you. This means that you will receive two points for participating today, no matter what.

Low Control Condition: Now you will have a chance to react to the game that you just played. You will now engage in an exercise that will allow you to process the interaction you just had with the other players in preparation for your next game with them. In order to do this, you will engage in an exercise that will allow you to communicate your impressions with the experimenter. Only the experimenter will see your responses to this exercise. When you are done with the exercise, you will send it

through this online system to the experimenter. The experimenter will take a look to make sure you've done it correctly and store it for data archiving purposes.

Active Coping Condition: Below is the exercise that we would like you to complete. Please read each item carefully and provide a thoughtful response. One rule for these items is not to talk about how the task made you feel. For example, you should not use words like angry, upset, annoying, or sad. Instead, you should focus directly on the question you are being asked without discussing your emotions.

You will have 10 minutes to complete this task. If you are finished before that time, let me know. Otherwise, I will stop you when time is up.

1. During the game, I was thrown the ball ____ times. Based on your experience during the game, was this a just and fair treatment of you?

a. Yes
b. No

2. Here are two potential solutions that the moderator could use to solve this problem. Using the following scale, please indicate the degree to which each item is likely to be a benefit or pro of each solution.

1 – not at all
2 – a little bit
3 – somewhat
4 – probably
5- definitely

Solution A: The moderator could withhold points from all of the other players. Therefore, all the other players (except me) should receive zero points today.

a. The other players would "learn their lesson"
b. The other players would receive the adequate punishment for behaving inappropriately
c. The other players could change their perceptions of me and give me a chance in the next game
d. The other players would think about their behaviors more seriously

e. The other players would apologize to me

f. The other players would encourage others in the future to act differently than they did

Solution B: The moderator could decrease the number of points the other players receive. Therefore, all of the other players (except me) should receive one, rather than two, points for participating today.

a. The other players would "learn their lesson"

b. The other players would receive adequate punishment for behaving inappropriately

c. The other players could change their perceptions of me and give me a chance in the next game

d. The other players would think about their behaviors more seriously

e. The other players would apologize to me

f. The other players would encourage others in the future to act differently than they did

3. Using the following scale, please indicate the degree to which each item is likely to be a limitation or con of each solution.

1 – not at all
2 – a little bit
3 – somewhat
4 – probably
5- definitely

Solution A: The moderator could withhold points from all of the other players. Therefore, all the other players (except me) should receive zero points today.

a. The other players could be upset and retaliate against me in the next game

b. The other players could play fairly in the next game but dislike me inside

c. The other players could avoid me altogether in the next game for fear of me

d. The other players may get a negative impression of me

e. The other players may ask to leave the study

Solution B: The moderator could decrease the number of points the other players receive. Therefore, all of the other players (except me) should receive one, rather than two, points for participating today.

a. The other players could be upset and retaliate against me in the next game

b. The other players could play fairly in the next game but dislike me inside

c. The other players could be avoid me altogether in the next game for fear of me

d. The other players may get a negative impression of me

e. The other players may ask to leave the study

4. Based on your responses for #2 and #3 above, which of the two solutions would you recommend to the moderator?

a. Solution A
b. Solution B

5. Using the following scale, please indicate the degree to which each item is likely to be an effective way for the moderator to implement the solution you chose in #4.

1 – not at all
2 – a little bit
3 – somewhat
4 – probably
5- definitely

a. Talk to the other players in person
b. Communicate with the other players using the computer
c. Give them a chance to explain their sides of the story
d. Don't ask questions – just lay down the law
e. Ask them why they behaved the way they did
f. Explain to them how others perceived their behavior and why it was wrong
g. Ask them for input on how others may help them act more appropriately
h. Threaten them with a worse punishment if they repeat the same behavior again

Passive Coping Condition only: Below is the exercise that you will be asked to complete. Please read each item carefully and provide a thoughtful response. One rule for these items is not to talk about what you would like to do about the situation. Instead, you should focus directly on the emotion you are being asked about without discussing strategies or plans.

You will have 10 minutes to complete this task. If you are finished before that time, let me know. Otherwise, I will stop you when time is up.

1. Using the following scale, please indicate the degree to which each item represents how you felt during the game.

1 – not at all
2 – a little bit
3 – somewhat
4 – probably
5- definitely

a. upset
b. annoyed
c. left out
d. sad
e. angry
f. resentful
g. helpless
h. oppressed
i. spiteful
j. anxious
k. relieved
l. indifferent
m. happy
n. content
o. confused

2. Using the following scale, please indicate the degree to which each item represents thoughts you had during the game.

1 – not at all
2 – a little bit
3 – somewhat
4 – probably
5- definitely

a. I am not good enough in the other players' eyes.
b. I don't understand why the other players are acting like this.
c. I don't belong in this game.
d. There is nothing I can do to help myself.
e. This game is very unfair.
f. I can't believe how the other players have been acting.
h. I don't really care how the other players are acting – that's their problem.
i. This game is a waste of my time.
j. It's nice not to have others take the lead during this game.
k. The other players are holding me down from acting as I normally would.

3. Using the following scale, please indicate the degree to which each item represents something you wanted to do as a result of the other players' behaviors.

1 – not at all
2 – a little bit
3 – somewhat
4 – probably
5- definitely

a. Scream at them
b. Make them pay for what they did
c. Tell them how I feel
d. Withdraw or quit the game
e. Cry
f. Physically harm them
g. Run away and hide from them
h. Make pretend this never happened
i. Accept their behavior as a part of life and just move on
j. Scold them for treating me like this

4. Using the following scale, please indicate to what degree each of the following things would make you feel better about the situation.

1 – not at all
2 – a little bit
3 – somewhat
4 – probably
5- definitely

a. Talking it out with someone I know
b. Taking a walk to clear my head
c. Hitting the other players
d. Having the other players apologize
e. Eating
f. Exercising
g. Having an alcoholic drink
h. Beating up a pillow or other object
i. Getting high
j. Doing something fun
k. Praying

5. Using the following scale, please indicate the degree to which you agree with the following statements.

1 – not at all
2 – a little bit
3 – somewhat
4 – probably
5- definitely

As a result of this game, I learned that:

a. People are not always what they seem to be.
b. You can only control your behaviors, not someone else's.
c. Sometimes the best thing to do is accept what life brings you and move on.
d. Human beings have a tendency to be bad or evil.
e. Human beings don't know better sometimes, and we should forgive them for their mistakes.
f. People will take advantage of you if you let them.
g. People can be good if you give them a chance to learn better ways.

High Control Condition Only: Now that you have finished your exercise, please allocate the number of points you would like to give each player:

Player 1:
Player 2:
Player 3:

Time +30: Stimulus Readministration

Now, we are going to try playing the Cyberball game again. You will play a new game but with the same three players. When the game is finished, please let me know.

Time +80: Debriefing

Now that you have completed our study, we would like to tell you more about it. The purpose of the study was to see how African-Americans cope with the distress of being discriminated against on the basis of their race or ethnicity. African-Americans have historically been the subjects of overt and subtle discrimination and

research indicates that many African-Americans still experience discrimination in various parts of their lives. We are interested in understanding how African-Americans cope with discrimination so that psychologists who are providing counseling services to them can better help them cope with this noxious stressor.

In order to answer our research questions, we simulated an experience involving discrimination, namely, the computer game that you played twice during this study. This game was designed by a psychologist in order to study the effects of exclusion and discrimination. This means that the people with whom you played Cyberball each time are fictitious. In other words, no people were discriminating against you, rather, the other players were programmed by a computer to exclude you during the game. Every participant who took part in this study was excluded in the same exact way by the computer.

We first wanted to see how people would react if we gave them a means of seeking justice for the discrimination they experienced. Therefore, some people were told that they could punish the other players by withholding participation points while others were not. This was done in order to give some participants the impression that they could seek justice for how they were treated during the game by withholding points from the other players. However, since the other players are fictitious, participants were not really withholding these points from them. We created this scenario in order to see whether participants who believed they had some control over how they were treated would experience discrimination differently than those who did not.

Second, we were also interested how people cope with these types of situations, and this is why we then asked you to engage in a coping exercise. We wanted to see to what extent the coping exercise we gave you was successful. We asked you to play Cyberball again to see whether the coping exercise we gave you influenced your responses to questions or your blood pressure and heart rate the second time around.

For both of these research questions, we measured your blood pressure and heart rate in order to see how discrimination, control, and coping affected you on a physiological level. We also asked you questions about how you were feeling to assess changes in your mood and anxiety level. Both self-report questions about mood and physiological measures were used in this study to get the full picture of how these events were affecting you.

We are very sorry to have misled you during your participation today, and apologize for any distress, embarrassment, and any other negative effects this may have caused. It was important to mislead you to see how you would cope with the situation as if it were really happening. By participating, you have provided us with valuable information about whether the level of control a person thinks they have over a situation affects how useful different coping strategies are.

Because this study is still in progress, and we need more people like you who are willing to help us, we ask that you please not discuss this study with any other students at UMD. This will allow our study to be more valid, and again, the results would be more useful.

We understand that you may be feeling confused or upset upon hearing the true nature of this study. We would like to give you an opportunity to discuss your honest feelings and reactions to this study with the experimenter. Also, you may now also ask the experimenter questions about things you do not understand. We thank you for participating in this study and hope that you have had an interesting time here today.

II. Protocol Form

Actual Time	**Lab Time**	**Time Completed**	**Tasks**	**Completed?**
	-25		-MRS -Photo	
	-20		Start physio	
	-15		-PANAS -STAI-S at -5	
	0		-Script -Cyberball	
	10		-PANAS -STAI-S -GSE	
	15		-Controllability Manipulation -Coping Task	
	25		-PANAS -STAI-S -GSE	
	30		-Physio Recovery	
	40		-Cyberball Task	
	45		-PANAS -STAI-S -GSE	
	50		-Physio Recovery	

	60		-PANAS -STAI-S -GSE	
	65		-PEDQ-CV -Personality -Demographics	
	80		-Manipulation Check -Debriefing	

References

Amirkhan, J.H. (1990). A factor analytically derived measure of coping: The Coping Strategy Indicator. *Journal of Personality and Social Psychology, 59(5),* 1066-1074.

Ancis, J.R., Sedlacek, W.E., & Mohr, J.J. (2000). Student perceptions of cultural climate by race. *Journal of Counseling & Development, 78(2),* 180-185.

Andrade, L., Gorenstein, C., Vieira-Filho, A.H., Tung, T.C., & Artes, R. (2001). Psychometric factors of the Portuguese version of the version of the State-Trait Anxiety Inventory applied to college students: Factor analysis and relation to the Beck Depression Inventory. *Brazilian Journal of Medical and Biological Research, 34(3),* 367-374.

Argyropoulos, S.V., Hicks, J.A., Nash, J.R., Bell, C.J., Rich, A.S., Nutt, D.J., & Wilson, S.J. (2003). Correlation of subjective and objective sleep

measurements at different stages of the treatment of depression. *Psychiatry Research, 120(2),* 179-190.

Armstead, C.A., Lawler, K.A., Gorden, G., Cross, J., & Gibbons, J. (1989). Relationship of racial stressors to blood pressure responses and anger expression in Black college students. *Health Psychology, 8(5),* 541-556.

Arriola, K.R.J. (2002). Suffering in silence: Racial discrimination and blood pressure among African-Americans. *Dissertation Abstracts International: Section B: The Sciences and Engineering, Vol 63(4-B),* 2106.

Baker, S.R., & Stephenson, D. (2000). Uncertainty of outcomes as a component of active coping: Influence of predictability and feedback on heart rate reactivity and task performance. *Journal of Psychophysiology, 14,* 241-251.

Bandura, A. (1986). From thought to action: Mechanisms of personal agency. *New Zealand Journal of Psychology, 15(1),* 1-17.

Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review, 84,* 191–215.

Barnes, L.L., De Leon, C.F.M., Wilson, R.S., Bienias, J.L., Bennett, D.A., & Evans, D.A. (2004). Racial differences in perceived discrimination in a community population of older Blacks and Whites. *Journal of Aging and Health, 16(3),* 315-337.

Barnes, P.W. & Lightsey, O.R. (2005). Perceived racist discrimination, coping, stress, and life satisfaction. *Journal of Multicultural Counseling and Development, 33,* 48-61.

Bauer, R.M. (1998). Physiologic measures of emotion. *Journal of Clinical Neuropsychology, 15(5),* 388-396.

Biasco, F., Goodwin, E.A., & Vitale, K.L. College students' attitudes towards racial discrimination. *College Student Journal, 35(4),* 523-528.

Blascovich, J., Mendes, W.B., Hunter, S.B., Lickel, B., & Kowai-Bell, N. (2001a). Perceiver threat in social interactions with stigmatized others. *Journal of Personality & Social Psychology, 80(2),* 253-267.

Blascovich, J., Spencer, S.J., Quinn, D., & Steele, C. (2001b). African Americans and high blood pressure: The role of stereotype threat. *Psychological Science, 12(3),* 225-229.

Bongard, S. (1995). Mental effort during active and passive coping: A dual-task analysis. *Psychophysiology, 32(3),* 242-248.

Bongard, S., & Hodapp, V. (1997). Active coping, work-pace, and cardiovascular responses; Evidence from laboratory studies. *Journal of Psychophysiology, 11(3),* 227-237.

Boutain, D.M., & Cooke, C. (2001). The association between racism and high blood pressure among Blacks. *Ethnicity & Disease, 11,* 793-799.

Bowen-Reid, T.L., & Harrell, J.P. (2002). Racist experiences and health outcomes: An examination of spirituality as a buffer. *The Journal of Black Psychology, 28(1),* 18-36.

Bowman, G.D., & Stern, M. (1995). Adjustment to occupational stress: The relationship of perceived control to effectiveness of coping strategies. *Journal of Counseling Psychology, 42(3),* 294-303.

Brody, G.H., Chen, Y., Murry, V.M., Ge, X., Simons, R.L., Gibbons, F.X., Gerrard, M., & Cutrona, C.E. (2006). Perceived discrimination and the adjustment of African American youths: A five-year longitudinal analysis with contextual moderation effects. *Child Development, 77(5),* 1170-1189.

Brondolo, E., Kelly, K.P., Coakley, V., Gordon, T., Thompson, S., Levy, E., Cassells, A., Tobin, J.N., Sweeney, M., & Contrada, R.J. (2005). The Perceived Ethnic Discrimination Questionnaire: Development and preliminary validation of a community version. *Journal of Applied Social Psychology, 35(2),* 335-365.

Brown, D.J. (2004). Everyday life for Black American adults. *Western Journal of Nursing Research, 26(5),* 499-514.

Bryant, F.B. (1989). A four-factor model of perceived control: Avoiding, coping, obtaining, and savoring. *Journal of Personality, 57(4),* 773-797.

Cacioppo, J.T., & Tassinary, L.G. (1990). Inferring psychological significance from physiological signals. *American Psychologist, 45(1),* 16-28.

Carlson, E.D., & Chamberlain, R.M. (2004). The Black-White perception gap and health disparities research. *Public Health Nursing, 21(4),* 372-379.

Carroll, D., Davey-Smith, G., Shipley, M., Steptoe, A., Brunner, E.J. & Marmot, M.G. (2001). Blood pressure reactions to acute psychological stress and future

blood pressure status: A 10-year follow-up of men in the Whitehall Study. *Psychosomatic Medicine, 63,* 737-743.

Caughy, M.O., O'Campo, P., & Muntaner, C. (2004). Experiences of racism among African American parents and the mental health of their preschool-aged children. *American Journal of Public Health, 94(12),* 2118-2124.

Chakraborty, A., & McKenzie, K. (2002).Does racial discrimination cause mental illness? British Journal of Psychiatry, 180, 474-477.

Chen, E., & Matthews, K.A. (1999). Socioeconomic differences in social information processing and cardiovascular reactivity. *Annals of the New York Academy of Science, 896,* 417-419.

Clark, D.A., Beck, A.T., & Stewart, B. (1990). Cognitive specificity and positive-negative affectivity: Complementary or contradictory views on anxiety and depression? *Journal of Abnormal Psychology, 99(2),* 148-155.

Clark, L.T. (2005). Issues in minority health: Atherosclerosis and coronary heart disease in African Americans. *The Medical Clinics of North America, 89(5),* 977-1001.

Clark, R. (2000). Perceptions of interethnic group racism predict increased vascular reactivity to a laboratory challenge in college women. *Annals of Behavioral Medicine, 22(3),* 212-222.

Clark, R., & Adams, J.H. (2004). Moderating effects of perceived racism on John Henryism and blood pressure reactivity in Black female college students. *Annals of Behavioral Medicine, 28(2),* 126-131.

Clark, R., & Anderson N.B. (2001). Efficacy of racism-specific coping styles as predictors of cardiovascular functioning. *Ethnicity & Disease, 11,* 286-295.

Clark, R., Anderson, N.B., Clark, V.R., & Williams, D.R. (1999). Racism as a stressor for African Americans: A biopsychosocial model. *American Psychologist, 54(10),* 805-816.

Clark, V.R. (2001). The perilous effects of racism on Blacks. *Ethnicity & Disease, 11,* 769-772.

Clark, R. (2003). Self-reported racism and social support predict blood pressure reactivity in Blacks. *Annals of Behavioral Medicine, 25(2),* 127-136.

Clark, D., Steer, R., & Beck, A. (1994). Common and specific dimensions of self-reported anxiety and depression: Implications for the cognitive and tripartite models. *Journal of Abnormal Psychology, 103(4),* 645-654.

Compas, B.E., Beckjord, E., Agocha, B., Sherman, M.L., Langrock, A., Grossman, C.I., Dausch, B., Glinder, J., Kaiser, C., Anderson-Hanley, C., & Luecken, L. (2006). Measurement of coping and stress responses in women with breast cancer. *Psycho-oncology, 15,* 1038-1054.

Compas, B.E. (1995). Promoting successful coping during adolescence. In M. Rutter (Ed.), *Psychological disturbances in young people: Challenges for prevention* (pp. 247-273). New York, NY: Cambridge University Press.

Contrada, R.J., Ashmore, R.D., Gary, M.L., Coups, E., Egeth, J.D., & Sewell, A. (2000). Measures of ethnicity-related stress: Psychometric properties, ethnic

group differences, and associations with well-being. *Journal of Applied Social Psychology, 31,* 1775-1820.

Coy, V. (2005). Genetics of essential hypertension. *Journal of the American Academy of Nurse Practitioners, 17(6),* 219-224.

Crawford, J.R., & Henry, J.D. (2004). The Positive and Negative Affect Schedule (PANAS): Construct validity, measurement properties and normative data in a large non-clinical sample. *British Journal of Clinical Psychology, 43(3),* 245-265.

Cross, W. (1978). Models of psychological nigrescence: A literature review. *Journal of Black Psychology, 5,* 13-31.

Crucian, G., Hughes, J., Barrett, A., Williamson, D., Bauer, R., Bowers, D., & Heilman, K. (2000). Emotional and physiological responses to false feedback. *Cortex, 36(5),* 623-647.

David, J.P., & Suls, J. (1999). Coping efforts in daily life: Role of big five traits and problem appraisals. *Journal of Personality, 67(2),* 265-294.

Davig, J.P., Larkin, K.T., Goodie, J.L. (2000). Does cardiovascular reactivity to stress measured in the laboratory generalize to thesis and dissertation meetings among doctoral students? *International Journal of Behavioral Medicine,7(3),* 216-235.

Davis, A.M., Vinci, L.M., Okwuosa, T.M., Chase, A.R., & Huang, E.S. (2007). Cardiovascular health disparities: A systematic review of health care interventions. *Medical Care Research & Review, 64(5),* 29S-100S.

Dawson, M.E., Schell, A.M., & Catania, J.J. (1977). Autonomic correlates of depression and clinical improvement following electroconvulsive shock therapy. *Psychophysiology, 14(6),* 569-578.

De Caro, E., Trocchio, G., Smeraldi, A., Calevo, M.G., & Pongiglione, G. (2007). Aortic arch geometry and exercise-induced hypertension in aortic coarctation. *American Journal of Cardiology, 99(9),* 1284-1287.

DeGenova, M.K., Patton, D.M., Jurich, J.A., & MacDermid, S.M. (2001). Ways of coping among HIV-infected individuals. *The Journal of Social Psychology, 134(5),* 655-663.

Devonport, T.J., & Lane, A.M. (2006). Cognitive appraisal of dissertation stress among undergraduate students. *Psychological Record, 56(2),* 259-266.

Dienstbier, R.A. (1989). Arousal and Physiological Toughness: Implications for Mental and Physical Health. *Psychological Review, 96(1),* 84-100.

Din-Dzietham, R., Nembhard, W.N., Collins, R., & Davis, S.K. (2004). Perceived stress following race-based discrimination at work is associated with hypertension in African-Americans: The Metro Atlanta Heart Disease Study, 1999-2001. *Social Science & Medicine, 58,* 449-461.

Dixon, W.A., Heppner, P.P., Burnett, J.W., Anderson, W.P., & Wood, P.K. (1993). Distinguishing among antecedents, concomitants, and consequences of problem-solving appraisal and depressive symptoms. *Journal of Counseling Psychology, 40(3),* 357-364.

Dorr, N.C. (1999). Blood pressure in African-Americans: Examining the role of coping with discrimination. *Dissertation Abstracts International: Section B: The Sciences and Engineering, Vol 59(7-B),* 3769.

D'Zurilla, T.J. (1990). Problem-solving training for effective stress management and prevention. *Journal of Cognitive Psychotherapy: An International Quarterly, 4(4),* 327-354.

D'Zurilla, T. J., & Nezu, A. M. (1999). *Problem-solving therapy: A social competence approach to clinical intervention* (2nd ed.). NY: Springer.

D'Zurilla, T., J., & Nezu, A. M. (2001). Problem-solving therapies. In K. S. Dobson (Ed.), *The handbook of cognitive-behavioral therapies* (2nd ed.; pp. 211-245). NY: Guilford.

Eisenberger, N.I., Lieberman, M.D., & Williams, K.D. (2003). Does rejection hurt? An fMRI study of social exclusion. *Science, 302(5643),* 290-292.

Endler, N.S., Macrodimitris, S.D., & Kocovski, N.L. (2000). Controllability in cognitive and interpersonal tasks: Is control good for you? *Personality and Individual Differences, 29(5),* 951-962.

Eysenck, H.J. & Eysenck, S.B.G. (1969). *Personality structure and measurement.* London: Routledge.

Eysenck, S.B., Eysenck, H.J., & Barrett, P. (1985). A revised version of the psychoticism scale. *Personality and Individual Differences, 6(1),* 21-29.

Fang, C.Y., Daly, M.B., Miller, S.M., Zerr, T., Malick, J., & Engstrom, P. (2006). Coping with ovarian cancer risk: The moderating effects of perceived control on coping and adjustment. *British Journal of Health Psychology, 11,* 561-580.

Fang, C.Y., & Myers, H.F. (2001). The effects of racial stressors and hostility on cardiovascular reactivity in African American and Caucasian men. *Health Psychology, 20(1),* 64-70.

Fernando, S. (1984). Racism as a cause of depression. *International Journal of Social Psychiatry, 30(1-2),* 41-49.

Finch, B.K., Catalano, R.C., Novaco, R.W., & Vega, W.A. (2003). Employment frustration and alcohol abuse / dependence among labor migrants in California. *Journal of Immigrant Health, 5(4),* 181-186.

Fleming, R., Baum, A., Singer, J.E. (1984). Toward an integrative approach to the study of stress. *Journal of Personality and Social Psychology, 46(4),* 939-949.

Folkman, S., & Lazarus, R.S. (1988). Coping as a mediator of emotion. *Journal of Personality and Social Psychology, 54(3),* 466-475.

Francis, L.J., Brown, L.B., & Philipchalk, R. (1992). The development of an abbreviated form of the Revised Eysenck Personality Questionnaire (EPQR-A): Its use among students in England, Canada, the U.S.A. and Australia. *Personality and Individual Differences,* 443-449.

Frazier, P.A., Mortensen, H., & Steward, J. (2005). Coping strategies as mediators of the relations among perceived control and distress in sexual assault survivors. *Journal of Counseling Psychology, 52(3),* 267-278.

Gendolla, H.E., & Richter, M. (2005). The role of mood states in the development of cardiovascular disease: Implications of a motivational analysis of cardiovascular reactivity in active coping. *Advances in Psychology Research, 33,* 141-159.

Gerin, W., Pieper, C., Marchese, L., & Pickering, T.G. (1992). The multi-dimensional nature of active coping: Differential effects of effort and enhanced control on cardiovascular reactivity. *Psychosomatic Medicine, 54,* 707-719.

Gibbons, F.X., Gerrard, M., Cleveland, M.J., Wills, T.A., & Brody, G. (2004). Perceived discrimination and substance use in African-American parents and their children: A panel study. *Journal of Personality and Social Psychology, 86(4),* 517-529.

Gonsalkorale, K., & Williams, K.D. (2006). The KKK won't let me play: ostracism even by a despised outgroup hurts. *European Journal of Social Psychology, 37(6),* 1176-1186.

Guyll, M., Matthews, K.A., & Bromberger, J.T. (2001). Discrimination and unfair treatment: Relationship to cardiovascular reactivity among African American and European American women. *Health Psychology, 20(5), 315-325.*

Guthrie, B.J., Young, A.M., Williams, D.R., Boyd, C.J., & Kintner, E.K. (2002). African American girls' smoking habits and day-to-day experiences with racial discrimination. *Nursing Research, 51(3),* 183-190.

Harrell, J.P. (1979). Analyzing Black coping styles: A supplemental diagnostic system. *Journal of Black Psychology, 5(2),* 99-108.

Harrell, J.P., Hall, S., & Taliaferro, J. (2003). Physiological responses to racism and discrimination: an assessment of the evidence. *American Journal of Public Health, 93*, 243-248.

Hemenover, S.H. (2001). Self-reported processing bias and naturally occurring mood: Mediators between personality and stress appraisals. *Personality and Social Psychology Bulletin, 27,* 387-394.

Heppner, P.P., Heppner, M.J., Lee, D., Wang, Y., Park, H., & Wang, L. (2006). Development and validation of a collectivist coping styles inventory. *Journal of Counseling Psychology, 53(1),* 107-125.

Hua, L., Brown, C.A., Hains, S., Godwin, M., & Parlow, J. (2009). Effects of low-intensity exercise conditioning on blood pressure, heart rate and autonomic modulation of heart rate in men and women with hypertension. *Biological Research for Nursing.*

Hyman, D.J. & Pavlik, V.N. (2002). Poor hypertension control: Let's stop blaming the patients. *Cleveland Clinic Journal of Medicine, 69(10)*, 793-799.

Ireland, S.J., McMahon, R.C., Malow, R.M., & Kouzekanani, K. (1994). Coping style as a predictor of relapse to cocaine abuse. *NIDA Research Monograph, 141*, 159.

James, S.A. (1994). John Henryism and the health of African-Americans. *Culture, Medicine and Psychiatry, 18,* 163-182.

James, S.A., Hartnett, S.A., & Kalsbeek, W.D. (1983). John Henryism and blood pressure differences among Black men. *Journal of Behavioral Medicine, 6(3),* 259-278.

James, S.A., LaCroix, A.Z., Kleinbaum, D.G., & Strogatz, D.S. (1984). John Henryism and blood pressure differences among Black men II : The role of occupational stressors. *Journal of Behavioral Medicine, 7(3),* 259-275.

Kaiser, C.R. & Miller, C.T. (2001). Stop complaining! The social costs of making attributions to discrimination. *Personality and Social Psychology Bulletin, 27(2),* 254-263.

Kamarck, T.W., Annunziato, B., & Amateau, L.M. (1995). Affiliation moderates the effects of social threat on stress-related cardiovascular responses: Boundary conditions for a laboratory model of social support. *Psychosomatic Medicine, 57,* 183-194.

Kamarck, T.W., & Lovallo, W.R. (2003). Cardiovascular reactivity to psychological challenge: Conceptual and measurement considerations. *Psychosomatic Medicine, 65,* 9-21.

Kellow, T.J., & Jones, B.D. (2005). Stereotype threat in African-American high school students: An initial investigation. *Current Issues in Education* [On-line], *8(15).* Available: http://cie.ed.asu.edu/volume8/number20/

Kibler, J.L., & Ma, M. (2004). Depressive symptoms and cardiovascular reactivity to laboratory behavioral stress. *International Journal of Behavioral Medicine, 11(2),* 81-87.

Klonoff, E.A., & Landrine, H. (2000). Is skin color a marker for racial discrimination? explaining the skin color–hypertension relationship. *Journal of Behavioral Medicine, 23(4),* 329-338.

Knight, B.G., Silverstein, M., McCallum, T.J., & Fox, L.S. (2000). A sociocultural stress and coping model for mental health outcomes among African American caregivers in southern California. *Journals of Gerontology: Series B: Psychological Sciences and Social Sciences, 55b(3),* 142-150.

Krieger, N. (1990). Racial and gender discrimination: Risk factors for high blood pressure? *Social Science & Medicine, 30(12),* 1273-1281.

Krieger, N., & Sidney, S. (1996). Racial discrimination and blood pressure: The CARDIA Study of young Black and White adults. *American Journal of Public Health, 86(10),* 1370-1378.

Krieger N., Sidney, S., and Coakley, E. (1998). Racial discrimination and skin color in the CARDIA study: Implications for public health research. *American Journal of Public Health, 88,* 1308–1313.

Krzesinski, J.M. & Cohen, E.P. (2007). Salt, the kidneys and arterial hypertension. *Acta Clinica Belgica, 62(5),* 348-357.

Kuzawa, C.W., & Sweet, E. (2009). Epigenetics and the embodiment of race: Developmental origins of US racial disparities in cardiovascular health. *American Journal of Human Biology, 21(1),* 2-15.

Landrine, H., & Klonoff, E.A. (2000). Racial segregation and cigarette smoking among Blacks: Findings at the individual level. *Journal of Health Psychology, 5(2),* 211-219.

Langston, C.A. (1994). Capitalizing on and coping with daily-life events: Expressive responses to positive events. *Journal of Personality and Social Psychology, 67(6),* 1112-1125.

Lazarus, R.S. (1993). Coping theory and research: Past, present, and future. *Psychosomatic Medicine, 55,* 234-247.

Lazarus, R. S., & Folkman, S. (1984). *Stress, appraisal, and coping.* New York: Springer.

Lazarus, R. S., & Folkman, S. (1987). Transactional theory and research on emotions and coping. *European Journal of Personality, 1,* 141-169.

Lepore, S.J., Revenson, T.A., Weinberger, S.L., Weston, P., Frisina, P.G., Roberston, R., Portillo, M.M., Jones, H., & Cross, W. (2006). Effects of social stressors on cardiovascular reactivity in Black and White women. *Annals of Behavioral Medicine, 31(2),* 120-127.

Levin, C., Ilgen, M., & Moos, R. (2006). Avoidance coping strategies moderate the relationship between self-efficacy and 5-year alcohol treatment outcomes.

Lewis-Coles, M.E.L., & Constantine, M.G. (2006). Racism-related stress, Africultural coping, and religious problem-solving among African Americans. *Cultural Diversity & Ethnic Minority Psychology, 12(3),* 433-443.

Li, M. (2006). Actively cope with stressful situations: Is active coping a trait or a match between traits and stressful situations? In G.R. Walz, J.C. Bleuer, & R.K. Yep (Eds.), *Vistas: Compelling perspectives on counseling 2006* (pp.179-182). Alexandria, VA: American Counseling Association.

Liang, C.T.H., Alvarez, A.N., Juang, .P., Liang, M.X. (2007). The role of coping in the relationship between perceived racism and racism-related stress for Asian Americans: Gender differences. *Journal of Counseling Psychology, 54(2),* 132-141.

Mallett, R.K., & Swim, J.K. (2005). Bring it on: Proactive coping with discrimination. *Motivation and Emotion, 29(4),* 411-441.

Marcus, A., Mullins, L.C., Brackett, K.P., Tang, Z., Allen, A.M., & Pruett, D.W. (2003). Perceptions of racism on campus. *College Student Journal, 37(4),* 611-626.

Martin, J.K., Tuch, S.A., & Roman, P.M. (2003). Problem drinking patterns among African Americans: The impacts of reports of discrimination, perceptions of prejudice, and "risky" coping strategies. *Journal of Health & Social Behavior, 44(3),* 408-425.

Matthews, G., Emo, A.K., Funke, G., Zeidner, M., Roberts, R.D., Costa, P.T., & Schulze, R. (2006). Emotional intelligence, personality, and task-induced stress. *Journal of Experimental Psychology: Applied, 12(2),* 96-107.

Matthews, K.A., Salomon, K., Kenyon, K., & Zhou, F. (2005). Unfair treatment, discrimination, and ambulatory blood pressure in Black and White adolescents. *Health Psychology, 24(3),* 258-265.

McCabe, K., & Barnett, D. (2000). First comes work, then comes marriage: Future orientation among African American young adolescents. *Family Relations, 49(1),* 63-70.

McConahay, J.B. (1986). Modern racism, ambivalence, and the Modern Racism Scale. In J.F. Dovidio & S.L. Gaertner (Eds.), *Prejudice, discrimination, and racism* (pp.91-125). San Diego: Academic Press.

McNeilly, M.D., Robinson, E.L., Anderson, N.B., Pieper, C.F., Shah, A., Toth, P.S., Martin, P., Jackson, D., Saulter, T.D., White, C., Kuchibatla, M., Collado, S.M., & Gerin, W. (1995). Effects of racist provocation and social support on cardiovascular reactivity in African American women. *International Journal of Behavioral Medicine, 2(4),* 321-338.

Mineka, S., Watson, D., & Clark, L.A. (1998). Comorbidity of anxiety and unipolar depressive disorders. *Annual Review of Psychology, 49,* 377-412.

Moody-Ayers, S.Y., Stewart, A.L., Covinsky, K.E., Inouye, S.K. (2005). Prevalence and correlates of perceived societal racism in older African American adults with type 2 diabetes mellitus. *Journal of the American Geriatrics Society, 53(12),* 2202-2208.

Mendes, W.B., Blascovich, J., Lickel, B., & Hunter, S. (2002). Challenge and threat during social interactions with White and Black men. *Personality and Social Psychology Bulletin, 28(7),* 939-952.

Merritt, M.M., Bennett, G.G., Williams, R.B., Edwards, C.L., & Sollers, J.J. (2006). Perceived racism and cardiovascular reactivity and recovery to personally relevant stress. *Health Psychology, 25(3),* 364-369.

Micelli, M. & Castelfranchi, C. (2005). Anxiety as an "epistemic" emotion: An uncertainty theory of anxiety. *Anxiety, Stress, and Coping, 18(4),* 291-319.

Moghaddam, F.M., Taylor, D.M., Ditto, B., Jacobs, K., & Bianchi, E. (2002). Psychological distress and perceived discrimination: A study of women from India. *International Journal of Intercultural Relations, 26(4),* 381-390.

Mossakowski, K.N. (2003). Coping with perceived discrimination: Does ethnic identity protect mental health? *Journal of Health and Social Behavior, 44,* 318-331.

Nesbitt, S.D. (2005). Hypertension in Black patients: Special issues and considerations. *Current Hypertension Reports, 7(4),* 244-248.

Nezu, A.M. (1987). A problem solving-formulation of depression: A literature review and proposal of a pluralistic model. *Clinical Psychology Review, 7(2), 121-144.*

Nezu, A.M., & Nezu, C.M. (2001). Problem solving therapy. *Journal of Psychotherapy Integration, 11(2),* 187-205.

Noh, S., Beiser, M., Kaspar, V., Hou, F., & Rummens, J. (1999). Perceived racial discrimination, depression, and coping: A study of southeast Asian refugees in Canada. *Journal of Health and Social Behavior, 40,* 193-207.

Noh, S., Kaspar, V. (2003). Perceived discrimination and depression: moderating effects of coping, acculturation, and ethnic support. *American Journal of Public Health, 93(2),* 232-239.

Palace, E.M. & Gorzalka, B.B. (1992). Differential patterns of arousal in sexually functional and dysfunctional women: Physiological and subjective components of sexual response. *Archives of Sexual Behavior, 21(2),* 135-159.

Phelps, E.A., O'Connor, K.J., Cunningham, W.A., Funayama, E.S., Gatenby, J.C., Gore, J.C., & Banaji, M. R. (2000). Performance on indirect measures of race evaluation predicts amygdale activation. *Journal of Cognitive Neuroscience, 12(5),* 729-738.

Porges, S.W. (2003). Social engagement and attachment: A phylogenetic perspective. *Annals of the NY Academy of Sciences, 1008,* 31-47.

Prelow, H.M. Mosher, C.E., & Bowman, M.A. (2006). Perceived racial discrimination, social support, and psychological adjustment among African American college students. *Journal of Black Psychology, 32,* 442-455.

Radloff, L.S. (1977). The CES-D scale: A self-report depression scale for research in the general population. *Applied Psychological Measurement, 1(3),* 385-401.

Ravindran, A.V., Matheson, K., Griffiths, J., Merali, Z., & Anisman, H. (2002). Stress, coping, uplifts, and quality of life in subtypes of depression: A

conceptual frame and emerging data. *Journal of Affective Disorders, 71,* 121-130.

Rokke, P.D., Fleming-Ficke, S., Siemens, N.M., & Hegstad, H.J. (2004). Self-efficacy and choice of coping strategies for tolerating acute pain. *Journal of Behavioral Medicine, 27(4),* 343-360.

Romero, A.J., & Roberts, R.E. (2003). Stress within a bicultural context for adolescents of Mexican descent. *Cultural Diversity and Ethnic Minority Psychology, 9(2),* 1099-9809.

Roy, A. (2003). African American and Caucasian attempters compared for suicide risk factors: A preliminary study. *Suicide and Life-Threatening Behavior, 33(4),* 443-447.

Ruesser, M.R., & McCarron, D.A. (2006). Reducing hypertensive cardiovascular disease risk of African Americans with diet: Focus on the facts. *The Journal of Nutrition, 136(4),* 1099-1102.

Ruggiero, K.M., & Taylor, D.M. (1995). Coping with discrimination: How disadvantaged group members perceive the discrimination that confronts them. *Journal of Personality and Social Psychology, 68(5),* 826-838.

Sajkov, D. & McEvoy, R.D. (2009). Obstructive sleep apnea and pulmonary hypertension. *Progress in Cardiovascular Diseases, 51(5),* 363-370.

Schulz, R., & Decker, S. (1985). Long-term adjustment to physical disability: The role of social support, perceived control, and self-blame. *Journal of Personality and Social Psychology, 48(5),* 1162-1172.

Schwarzer, R. & Fuchs, R. (1996). Self-efficacy and health behaviours. In M. Conner & P. Norman (Eds.), *Predicting health behavior: Research and practice with social cognition models* (pp. 163-196). Buckingham, England: Open University Press.

Schwarzer, R. & Jerusalem, M. (1995). Generalized Self-Efficacy Scale. In J. Weinman, S. Wright, & M. Johnston (Eds.), *Measures in Health Psychology: A User's Portfolio. Causal and Control Beliefs* (pp. 35–37). Windsor, UK: NFER-NELSON.

Schwerdtfeger, A., Schmukle, S.C., & Egloff, B. (2005). Interactive effects of avoidant coping and parental hypertension on rate pressure product reactivity in women. *Annals of Behavioral Medicine, 29(2),* 106-115.

Scott, L.D. (2004). Correlates of coping with perceived discriminatory experiences among African American adolescents. *Journal of Adolescence, 27,* 123-137.

Scott, L.D. & House, L.E. (2005). Relationship of distress and perceived control to coping with perceived racial discrimination among Black youth. *Journal of Black Psychology, 31,* 254-272.

Sechrist, G.B., Swim, J.K., Stangor, C. (2004). When do the stigmatized make attributions to discrimination occurring to the self and others? The roles of self-presentation and need for control. *Journal of Personality and Social Psychology, 87(1),* 111-122.

Sharpley, C.F. (2002). Heart rate reactivity and variability as psychophysiological links between stress, anxiety, depression, and cardiovascular disease:

Implications for health psychology interventions. *Australian Psychologist, 37(1),* 56-62.

Shen, B., Stroud, L.R., & Niayra, R. (2004). Ethnic differences in cardiovascular responses to laboratory stress: A comparison between Asian and White Americans. *International Journal of Behavioral Medicine, 11(3),* 181-186.

Shorter-Gooden, K. (2004). Multiple resistance strategies: How African American women cope with racism and sexist. *Journal of Black Psychology, 30(3),* 406-425.

Sparrenberger, F., Cichelero, F.T., Ascoli, A.M., Fonseca, F.P., Weiss, G., Berwanger, O., Fuchs, S.C., Moreira, L.B., & Fuchs, F.D. (2009). Does psychological stress cause hypertension? A systematic review of observational studies. *Journal of Human Hypertension, 23(1),* 12-19.

Smith, B.D., Gholkar, R., Mann, M., & Toward, N. (2006). Coronary heart disease: Caffeine and the multi-factorial causal model. In B.D. Smith, U. Gupta, & B.S. Gupta (Eds.), *Caffeine and Activation Theory.* Boca Raton: Taylor and Francis / CRC Press.

Smith, S.A., Kass, S.J., Rotunda, R.J., & Schneider, S.K. (2006). If at first you don't succeed: Effects of failure on general and task-specific self-efficacy and performance. *North American Journal of Psychology, 8(1),* 171-182.

Spielberger, C. D. (1983). *Manual for the State-Trait Anxiety Inventory (STAI).* Palo Alto, CA: Consulting Psychologists Press.

Stangor, C., Sechrist, G.B., & Swim, J.K. (1999). Sensitivity to sexism and perceptions of reports about sexist events. *Swiss Journal of Psychology, 58(4),* 251-256.

Stangor, C., Swim, J.K, Van Allen, K.L., & Sechrist, G.B. (2002). Reporting discrimination in public and private contexts. *Journal of Personality and Social Psychology, 82(1),* 69-74.

Steffen, P.R., McNeilly, M., Anderson, N., & Sherwood, A. (2003). Effects of perceived racism and anger inhibition on ambulatory blood pressure in African Americans. *Psychosomatic Medicine, 65,* 746-750.

Stewart, J.C., Janicki, D.L., & Kamarck, T.W. (2006). Cardiovascular reactivity to and recovery from psychological challenge as predictors of 3-year change in blood pressure. *Health Psychology, 25(2),* 111-118.

Stoney, C.M., Hughes, J.W., Kuntz, K.K., West, S.G., & Thornton, L.M. (2002). Cardiovascular stress responses among Asian Indian and European American women and men. *Annals of Behavioral Medicine, 24(2),* 113-121.

Suchday, S., & Larkin, K.T. (2004). Psychophysiology responses to anger provocation among Asian Indian and White men. *International Journal of Behavioral Medicine, 11(2),* 71-80.

Sue, D.W., Bucceri, J., Lin, A.I., Nadal, K.L., & Torino, G.C. (2007). Racial microgressions and the Asian American experience. *Cultural Diversity and Ethnic Minority Psychology, 13(1),* 72-81.

Swim, J.K., Scott, E.D., Sechrist, G.B., Campbell, B., & Stangor, C. (2003). The role of intent and harm in judgments of prejudice and discrimination. *Journal of Personality and Social Psychology, 84(5),* 944-959.

Thomas, K.S., Bardwell, W.A., Ancoli-Israel, & Dimsdale, J.E. (2006). The toll of ethnic discrimination on sleep architecture and fatigue. *Health Psychology, 25(5),* 635-642.

Thompson, S.C., Sobolew-Shubin, A., Galbraith, M.E., Schwankovsky, L., & Cruzen, D. (1993). Maintaining perceptions of control: Finding perceived control in low-control circumstances. *Journal of Personality and Social Psychology, 64(2),* 293-304.

Torres, A. & Bowens, L. (2000). Correlation between the internalization theme of Racial Identity Attitude Survey-B and systolic blood pressure. *Ethnicity & Disease, 10,* 375-383.

Tweed, R.G., & Conway, L.G. (2006). Coping strategies and culturally influenced beliefs about the world. In P.T.P. Wong & L.C.J. Wong (Eds.), *Handbook of multicultural perspectives on stress and coping* (pp. 133-153). New York: Springer.

Van Beest, I., & Williams, K.D. (2006). When inclusion costs and ostracism pays, ostracism still hurts. *Journal of Personality and Social Psychology, 91(5),* 918-928.

Watson, K.E. (2008). Cardiovascular risk reduction among African Americans: A call to action. *Journal of the National Medical Association, 100(1),* 18-26.

Watson, D., Clark, L.A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affects: The PANAS scales. *Journal of Personality and Social Psychology, 54(6), 1063-1070.*

Wegner, D.M. & Zanakos, S. (1994). Chronic though suppression. *Journal of Personality, 62(4),* 615-640.

Whitbeck, L.B., Chen, X., Hoyt, D.R., & Adams, G.W. (2004). Discrimination, historical loss, and enculturation: Culturally specific risk and resiliency factors for alcohol abuse among American Indians. *Journal of Studies on Alcohol, 65(4),* 409-418.

Williams, D.R., & Neighbors, H. (2001). Racism, discrimination and hypertension: Evidence and needed research. *Ethnicity & Disease, 11,* 800-816.

Williams, K.D., Cheung, C.K.T., & Choi, W. (2000). Cyberostracism: Effects of being ignored over the Internet. *Journal of Personality and Social Psychology, 79(5),* 748-762.

Williams, K.D., Govan, C.L., Croker, V., Tynan, D., Cruickshank, M., & Lam, A. (2002). Investigations into differences between social- and cyberostracism. *Group Dynamics: Theory, Research, and Practice, 6(1),* 65-77.

Woods, T.E., Antoni, M.H., Ironson, G.H., & Kling, D.W. (1999). Religiosity is associated with affective status in symptomatic HIV-infected African-American women. *Journal of Health Psychology, 4(3),* 317-326.

Yoo, H.C., & Lee, R.M. (2005). Ethnic identity and approach-type coping as moderators of the racial discrimination / well-being relation in Asian Americans. *Journal of Counseling Psychology*, *52(4),* 497-506.

Zadro, L., Williams, K.D., & Richardson, R. (2004). How low can you go? Ostracism by a computer is sufficient to lower self-reported levels of belonging, control, self-esteem, and meaningful existence. *Journal of Experimental Social Psychology*, *40,* 560-567.

.