Coping and Psychological and Physiological Distress among Black and White Men in the U.S.

by

Julie Ober Allen

A dissertation submitted in partial fulfillment
of the requirements for the degree of
Doctor of Philosophy
(Health Behavior and Health Education)
in The University of Michigan
2018

Doctoral Committee:

Professor Cleopatra Howard Caldwell, Co-Chair
Associate Professor Daphne C. Watkins, Co-Chair
Professor Linda M. Chatters
Assistant Professor Vicki Johnson-Lawrence, Michigan State University

Julie Ober Allen
joallen@umich.edu
ORCID iD: 0000-0002-3969-8130

DEDICATION

This dissertation is dedicated to my super supportive son, Bem, and my beloved husband, Jeff.

ACKNOWLEDGEMENTS

Although a dissertation is attributed to a single author, writing one is not a solo endeavor. My deepest thanks go my dissertation committee members, Cleopatra Howard Caldwell (co-chair and my doctoral program advisor), Daphne C. Watkins (co-chair and primary mentor), Linda Chatters, and Vicki Johnson-Lawrence, for their invaluable support, encouragement, and thoughtful feedback. I cannot convey how much you have contributed to this dissertation research and my development as a scholar. I also thank my colleagues, community partners, and friends in the University of Michigan (UM) School of Public Health; the Gender and Health Research Lab in the UM School of Social Work; Derek M. Griffith and the former Center on Men's Health Disparities; the Prevention Research Center of Michigan; the Center for Research on Ethnicity, Culture, and Health; and Katherine Alaimo.

Many friends and family members supported me over the years and while completing this dissertation. Although I cannot mention everyone by name, I would like to recognize my parents, Carol and Rick Ober; my sister, Molly, and her family; my husband, Jeff Fordice; my son, Bem; Graham and Paige; my grandparents; and my HBHEDoc friends for helping to keep me grounded, happy, and healthy.

This dissertation research was funded in part by fellowships and grants from the UM Rackham Graduate School; the Center for Research on Ethnicity, Culture, and Health; the Department of Health Behavior and Health Education; and the Gender and Health Research Lab.

The longitudinal study titled "Midlife in the United States" (MIDUS) managed by the Institute on Aging at the University of Wisconsin provided the data used in this dissertation. This research was supported by a grant from the National Institute on Aging (P01-AG020166). My sincerest thanks go to the MIDUS participants and everyone who takes the time to participate in survey research. Your input helps researchers such as myself to track the distribution of health within populations, understand key factors and mechanisms influencing health; identify priorities and advocate for resources, and design effective health promotion interventions and public policy.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ABSTRACT

Black men have poorer health and shorter lifespans than other race and gender groups in the U.S., largely due to disparities in aging-related health conditions such as hypertension, heart disease and stroke, cancers, and diabetes. Physiological distress is increasingly examined as a key proximal outcome of stress and coping processes through which exposure to chronic stressors are posited to generate health disparities.

The purpose of this dissertation was to document, better understand, and identify racial differences in physiological distress and relationships between physiological distress and antecedent stress and coping processes among midlife and older Black and White men. Our goal was to identify how proximal health factors and different coping strategies contributed to racial health disparities among men. We also explored the relationships between coping and two dimensions of distress, physiological and psychological distress, to determine if coping differences accounted for the paradox in which Black men experience more physical health problems but better mental health than their White counterparts. This research will be used to identify priorities and leverage points for intervention to improve health outcomes and reduce health disparities among men.

We completed three empirical studies using linked data from 700 Black and White men who participated in the National Survey of Midlife Development in the United States (MIDUS II) and the National Study of Daily Experiences (NSDE II). Our primary outcome variable for all three studies was physiological distress, as indicated by blunted diurnal cortisol slopes. In Chapter 2, we documented more physiological distress among Black men than White men and most pronounced racial disparities in older age groups than in younger age groups. Having common medical conditions (e.g., hypertension, heart disease, diabetes) was associated with more physiological distress among Black men but was unrelated to White men's physiological distress levels. Psychological distress and functional limitations were unrelated to both Black and White men's physiological distress. In Chapter 3, we showed that Black and White men reported similar use of 12 different coping strategies, though Black men reported greater reliance on

positive reinterpretation, denial, drug use, and physical inactivity. Religious and spiritual coping was protective for White men's physiological distress, but not Black men's. Black men who used drugs had less physiological distress than those who abstained. In Chapter 4, we found that none of the coping strategies tested demonstrated similar relationships for both physiological and psychological distress, providing further evidence that these dimensions of distress are distinct. Most coping strategies predicted psychological distress in anticipated ways but not physiological distress.

Implications include: 1) physiological distress measures are useful in men's health research; 2) many factors assumed to influence physiological distress (e.g., psychological distress, functional limitations, smoking, and coping) may not warrant attention in interventions to improve physical health outcomes among aging men, because they are not relevant for this sociodemographic group; 3) interventions that enhance midlife and older men's coping skills and access to supportive resources may have no effect on their physiological health but may benefit their psychological health; and 4) interventions to improve physical health outcomes and reduce health disparities among men should prioritize evidence-based predictors of men's physiological distress including eliminating stressors rooted in social inequities and reducing the harmful effects of common medical conditions on Black men's lives.

CHAPTER 1

Introduction and Literature Review

Black[1] men have poorer physical health and shorter average lifespans than other race, ethnic, and gender groups in the U.S. population (Miniño, 2013; USDHHS, 2001; Warner & Hayward, 2006). This is a result, in large part, of disparities in aging-related chronic physical health conditions such as hypertension, heart disease and stroke, cancers, and diabetes (Arias, Heron, & Tejada-Vera, 2013; CDC, 2014a; Warner & Hayward, 2006). Further, Black men develop these conditions earlier in life, and their conditions tend to be more poorly controlled, more severe, and accompanied by more serious complications and greater disability (Geronimus, Keene, Hicken, & Bound, 2007; Gornick, 2003; Heffernan, Jae, Wilund, Woods, & Fernhall, 2008; Olives, Myerson, Mokdad, Murray, & Lim, 2013; Williams, 2003). A robust and well-established literature links racial health disparities to political, economic, historic, and social inequities in the U.S. (Braveman, Egerter, & Williams, 2011; Geronimus & Thompson, 2004; Gilbert et al., 2016; Warner & Hayward, 2006; Williams & Mohammed, 2013). Understanding how these broad social and structural factors get "under the skin" to affect health is essential for developing evidence-based interventions to reduce racial health disparities among men.

Chronic distress is increasingly examined as a key predictor and precursor of several health outcomes (Adam et al., 2017; Das, 2013; Dressler, Bindon, & Neggers, 1998; Geronimus, 1992; Geronimus, 2013; Geronimus, Bound, Waidmann, Colen, & Steffick, 2001; Juster, McEwen, & Lupien, 2010; Paradies, 2006; Russ et al., 2012; Schneiderman, Ironson, & Siegel, 2005; Sparrenberger et al., 2009; Torres & Nowson, 2007). The focus on distress is due, in part, to the acknowledged role of chronic distress as a proximal outcome in stress and coping processes theorized to contribute to overall health and health disparities (Braveman et al., 2011;

[1] We consider "Black" and "White" to be complex, socially-constructed racial categories that reflect an array of historic, geographic, cultural, political, and economic factors that coalesce to shape individuals' lived experiences and, ultimately, health. We use these broad terms that reference skin color and appearance, rather than self-identification with a particular ethnic group, because external perceptions and categorizations of people's race influence exposure to stressors and access to opportunities in the U.S. (Jones, 2000). Blacks continue to experience interpersonal and institutional racism and social marginalization, while Whites benefit from the privileges associated with affiliation with the dominant White racial group in the U.S. that, collectively, possesses the bulk of political, economic, and social power.

Das, 2013; Geronimus, 1992; Geronimus, 2013; Geronimus, Hicken, Keene, & Bound, 2006; Juster et al., 2010; Paradies, 2006; Schneiderman et al., 2005; Warner & Hayward, 2007). Several researchers contend that chronic distress resulting from social inequities may represent a key mechanism through which fundamental social determinants of health (e.g., race, sex, age group) generate and reproduce racial health disparities (Braveman et al., 2011; Geronimus, 2013; Geronimus et al., 2007; 2006; Link & Phelan, 1995; Warner & Hayward, 2007). Questions remain, however, about the different dimensions of distress, key antecedent factors that predict distress, and whether relationships between stress and coping processes and resultant distress differ for different sociodemographic groups.

In this paper, we define ***chronic distress*** as a damaging and ongoing state of imbalance that occurs when coping and adaptation processes are insufficient for mitigating the harmful effects of sources of stress on individuals (Selye, 1975). Sources of stress, hereafter referred to as ***stressors***, are subjective and objective threats to one's homeostasis and well-being. Although the term "***stress***" is defined and applied in different ways, we limit the use of this term to refer to overarching stress and coping processes and mechanisms, which may include constructs such as antecedent social and contextual circumstances, stressors, appraisal, coping, distress, and subsequent outcomes.

Distress has distinct physiological and psychological dimensions. Physiological distress and psychological distress both play important mediational roles between stress and coping processes and health outcomes. The relationship between these two dimensions of distress, however, is not well understood (Chida & Hamer, 2008; Chida & Steptoe, 2009; Russell, Koren, Rieder, & Van Uum, 2012; Stalder & Kirschbaum, 2012; Staufenbiel, Penninx, Spijker, Elzinga, & van Rossum, 2013). In fact, much of the theoretical literature does not clearly distinguish between these two forms of distress or identify them as fulfilling distinct roles in stress and coping processes related to health. ***Physiological distress*** represents the activation and dysregulation of the healthy functioning of the biological systems involved in the stress response (Juster et al., 2010). Biomarkers of physiological distress, such as salivary cortisol, play a central role in this field of research because they allow for the examination of physiological reactions to stressors and the cumulative effects of unmitigated physiological distress over time. ***Psychological distress*** is a generalized, subjective sense of discomfort and strain due to unpredictable, uncontrollable, or overwhelming demands (Cohen, Kamarck, & Mermelstein,

1983). Understanding similarities and differences between physiological and psychological distress, their relationships to antecedent stress and coping processes, and how these may differ for Black men compared to other sociodemographic groups can provide important information about the mechanisms responsible for generating and reproducing the burden of physical health disparities among Black men. Additionally, this knowledge can inform the development of effective intervention strategies to reduce health disparities among men.

The purpose of this dissertation was to document, better understand, and identify racial differences in the relationships between stress and coping processes and physiological distress and psychological distress among midlife and older U.S. Black and White men. Our goal was to provide insight on how proximal health factors and different coping strategies contribute to the disproportionate burden of physical health disparities affecting Black men. This dissertation was completed in the three-paper format, with Chapters 2, 3, and 4 each representing a separate study intended for stand-alone publication. Therefore, details on the samples, measures, and methods for each study are described in their respective chapters. All three studies involved secondary analysis of linked data from the second waves of the National Survey of Midlife in the United States (MIDUS II) and the National Study of Daily Experiences (NSDE II). The current chapter introduces key concepts, terms, and literature relevant to this dissertation. We begin by briefly describing health disparities and differences affecting Black men when compared to other race and gender groups in the U.S. Next, we provide an overview of the theoretical frameworks, conceptual model, and key constructs that guided this dissertation. We conclude with the specific aims for the three studies included within this dissertation.

Health Disparities and Differences Affecting Black Men

Despite medical advances and increased attention on health disparities in the United States during the 21st century, Black men continue to have poorer overall health and shorter average lifespans than other race, ethnic, and gender groups in the U.S. population (Miniño, 2013; USDHHS, 2001; Warner & Hayward, 2006). A significant portion of excess morbidity and mortality is due to the disproportionate burden of chronic health conditions and diseases affecting Black men, including hypertension, heart disease, stroke, cancers, and diabetes (Arias et al., 2013; CDC, 2014a; Warner & Hayward, 2006). Black men in the U.S. are more likely to be diagnosed with hypertension than any other racial or ethnic group of men (Yoon, Fryar, & Carroll, 2015). Hypertension is believed to be the principal risk factor for disease burden and

mortality among males worldwide (Forouzanfar et al., 2015), and is a key risk factor for heart disease, stroke, and kidney disease (CDC, 2009; AHA et al., 2012). Black men have the highest age-adjusted heart disease and stroke mortality rates when compared to other racial and ethnic groups of men (CDC, 2014a; NHLBI, 2012). The diabetes rate is nearly 50% higher among Black males (9.3 per 100 people) than White males (6.3) (CDC, 2014b), and Black males with diabetes are more than twice as likely to die from complications of diabetes than their White counterparts (42.6 vs. 19.5; CDC, 2009). Blacks have higher overall cancer incidence rates and lower survival rates compared to other ethnic and racial groups; researchers have documented significant prostate, colorectal, lung, and pancreatic cancer disparities affecting Black men (NCI, 2008). Compared to other race, ethnic, and gender groups, Black men also tend to be at greater risk for developing these conditions at earlier ages; having undiagnosed conditions; and having poorly controlled conditions (even when they have higher screening and treatment levels). Further, Black men are a greater risk of having more severe cases, experiencing complications and functional impairments, and dying prematurely (CDC, 2014a; Geronimus et al., 2007; Gornick, 2003; Heffernan et al., 2008; Olives et al., 2013; Valderrama, Gillespie, & Mercado, 2013; Williams, 2003; Williams et al., 2007).

Given the social and structural disadvantages associated with living in the racially-stratified U.S., we might anticipate that Black men would also have high rates of mental health disorders associated with exposure to stressors. National surveys, however, have consistently documented a paradox such that, when compared to Whites, Blacks experience a disproportionate burden of morbidity and mortality associated with physical health outcomes but lower rates of common mental health conditions (Breslau et al. 2006; Mezuk et al., 2010; Miniño, 2013; USDHHS, 2001). This paradox is evident for both males and females. The Black-White health paradox is not merely a reflection of issues with measurement, sampling, or differential rates of formal diagnosis (Mezuk et al., 2013). Less is known, however, about the factors contributing to this paradox, and how they might be leveraged to reduce the burden of poor physical health and premature death among Black men (Mezuk et al., 2013).

Emergent research documenting racial differences in physiological and psychological distress is largely consistent with the Black-White health paradox. The literature currently lacks studies that examined race-based differences in physiological distress in exclusively male samples. In the majority of mixed gender studies, Blacks had more physiological distress than

Whites and men had more physiological distress than women (Cohen et al., 2006; DeSantis et al., 2007; Fuller-Rowell, Doan, & Eccles, 2012; Geronimus et al., 2006; 2015; Skinner, Shirtcliff, Haggerty, Coe, & Catalano, 2011). Blacks have been documented as having either similar or lower levels of psychological distress than Whites (Breslau et al., 2006; Lincoln, Taylor, Watkins, & Chatters, 2011; Riolo, Nguyen, Gredlen, & King, 2005). Research findings comparing Black and White men's levels of self-reported psychological distress are mixed, though Black men tend to report low levels of self-reported psychological distress (Breslau et al., 2006; Lincoln et al., 2011; Riolo et al., 2005).

Theoretical Framework and Conceptual Model

The theoretical framework of this dissertation is informed by several theories and bodies of research. These situate our research within a larger body of literature focusing on the mechanisms through which intersections of socially-constructed categories of identity (e.g., sex/gender, race, and age group) influence health outcomes and health disparities in the U.S. They also inform our conceptual model (Figure 1.1), portions of which we test in the three empirical studies conducted in this dissertation.

We are particularly interested in how race (Black-White) and male gender intersect to differentially shape: 1) the stressors men experience; 2) mediating stress and coping processes; and 3) chronic physiological distress health outcomes. Transactional Model of Stress and Coping provides the basic framework for our research and conceptual model. It facilitates examination of the mediating stress and coping processes through which stressors influence health outcomes such as chronic physiological distress (Folkman, 1997; Folkman & Moskowitz, 2000; Lazarus, 1991; Lazarus & Folkman, 1984). We are also informed by the Weathering Hypothesis of health disparities (Geronimus, 1992; Geronimus et al., 2006), which acknowledges the psychological and behavioral stress responses emphasized in the Transactional Model, while also emphasizing the importance of physiological stress responses. Therefore, we augment our framework with research on stress physiology (Juster, McEwen, & Lupien, 2010; McEwen & Gianaros, 2010), which describes the parallel physiological processes that accompany a stress response. The Weathering Hypothesis also highlights how social inequities, particularly those patterned according to race, shape: the overall number, types, severity, and chronicity of stressors individuals' experience; acute and chronic physiological responses; coping; and resultant racial disparities in morbidity and mortality. As with race, it is important to consider how male gender

influences stress and coping processes and associated health outcome. Therefore, we integrate Gender Role Strain (Bowman, 1989; 2006; Griffith, Gunter, & Allen, 2011) into our framework, which calls attention to how masculine ideologies can function as stressors in men's lives and influence coping, and may do so differently depending on the barriers and priviledges men experience based on their affiliation with a socially marginalized or dominant racial group.

In this section, we provide an in-depth discussion of the different theoretical frameworks informing our research and conceptual model (Figure 1.1). For our conceptual model, theoretical constructs are indicated by boxes, which are assigned numbered circles (e.g., ⑨) that are referred to in the text for clarity of presentation. Relationships are indicated by arrows connecting boxes. The portions of the conceptual model emphasized with blue shading and their associated relationships are tested in the three empirical studies and are the primary focus in this dissertation. Therefore, we define and review the empirical and theoretical research related to these key model constructs and their associated relationships next. Although other factors and relationships have been linked to coping and distress, this conceptual model depicts factors and relationships most relevant to the purpose and specific aims of this dissertation.

Transactional Model of Stress and Coping

This framework posits that when faced with a stressor ②, individuals first engage in cognitive appraisal processes ③ to determine the level of threat posed (primary appraisal) and what they can do to address the situation (secondary appraisal) (Folkman, 1997; Folkman & Moskowitz, 2000; Lazarus, 1991; Lazarus & Folkman, 1984). Although appraisal is traditionally conceptualized as a two-stage process, more recent research emphasizes that primary and secondary appraisal processes often function interdependently, iteratively, and without a temporal order (Kessler, 1998; Lazarus & Folkman, 1987). For these reasons and because appraisal is not a key construct in this dissertation, appraisal is represented as a single box in the conceptual model. Appraisal processes inform what coping strategies ⑤ individuals employ, which then influence psychological ⑧ and physiological ⑨ distress. The Transactional Model of Stress and Coping emphasizes the importance of person-environment interactions. It acknowledges that individuals' sociodemographic characteristics ⑩ and appraisals ③ influence the extent to which features of the social, contextual, and physical environment ① are perceived as threatening stressors ② with the potential to cause distress ⑧/⑨.

Stress Physiology

When faced with a stressor ②, individuals experience a combination of interdependent physiological, psychological, and/or behavioral responses. A cascade of physiological responses ④ begins that allows the body to react in a "fight or flight" manner, as needed. The nervous system activates the hypothalamic-pituitary-adrenocorticoid (HPA) axis, which releases a flood of stress hormones such as adrenaline and cortisol. Individuals may start sweating. Their heartbeat and breathing rates increase, and their muscles may tense up. After effective coping ⑤, individuals' bodies return to a normal state of homeostasis, thereby mitigating physiological ⑨ distress. This pattern of responses to a stressor is adaptive and an essential part of healthy human functioning.

When, however, individuals face chronic stressors ② and their coping strategies ⑤ are insufficient, their bodies are prevented from returning to a normal state of functioning. Instead, they experience chronic physiological distress ⑨. Chronic physiological distress has a cumulative influence on the body and its systems over the life course. The HPA axis becomes dysregulated, resulting in the body being constantly flooded with high levels stress hormones or unable to generate a surge in hormones when necessary or as part of natural, daily fluctuations (Miller, Chen, & Zhou, 2007). Other systems in the body deteriorate, causing premature aging and "weathering" (Geronimus, 1992; McEwen & Gianaros, 2010). Over the life course, this leads to the development of disability, chronic disease, and premature mortality (Juster et al., 2010).

Unlike the Transactional Model of Stress and Coping, which emphasizes conscious appraisal ③ and decision-making about what coping strategies ⑤ to employ, research on stress physiology recognizes that individuals may not recognize stressors ② and may unconsciously enact coping strategies ⑤ through innate (sensory-motor) and learned (scheme-based) processes (Scherer, 2001). For example, some stressors ② (e.g., structural racism) may sometimes be too subtle to evoke detection and appraisal, yet can still affect coping, distress, and other health outcomes (Chae et al., 2014; Ellis, Griffith, Allen, Thorpe, & Bruce, 2015; Gee, 2002; Steele, 2010; Williams & Mohammed, 2009). Objective biomarkers of physiological distress ⑨ capture the impact of these and other stressors on the body, even when individuals are unable to accurately report their exposure and responses to stressors. This may be especially valuable in research with men, given that men have been shown to misattribute or minimize stressors and resultant psychological distress ⑧ (Good, Robertson, Fitzgerald, Stevens, & Bartels, 1996;

Kaiser & Miller, 2001). Rates of self-reported psychological distress may be low among men because they are biased by male gender ideology, which encourages men to ignore and not share their feelings (Addis & Cohane, 2005; Courtenay, 2000; Pederson & Vogel, 2007).

The Weathering Hypothesis

Although everyone experiences stressors, socially and structurally marginalized populations experience more stressors overall, more chronic stressors, and have fewer mitigating resources to facilitate effective coping (Geronimus, 1992). The Weathering Hypothesis describes a general pathway linking social inequities, stress and coping processes, and health disparities (Geronimus et al., 2006). In our conceptual model, social inequities are social and contextual conditions ① that promote the marginalization of certain groups in the United States based on their sociodemographic characteristics ⑩ (e.g., Blacks, women, poor) while privileging other groups (e.g., Whites, men, wealthy) through differential access to political, economic, and social power. Social inequities encapsulate and reproduce the dominant power dynamics of social stratification within United States society. Patterning of social inequities is shaped by socially-constructed, hegemonic racial and gender ideologies regarding the characteristics, roles, rights, and responsibilities of different racial groups and genders (Eagleton, 2007; Levant, 2011; Sawyer & Palmer, 2014). These directly contribute to chronic stressors ②, because they establish the value-laden expectations against which people are judged and may judge themselves (Griffith, 2012; Griffith, Metzl, & Gunter, 2013b).

The Weathering Hypothesis (Geronimus, 2013; Geronimus et al., 2006) posits that members of socially marginalized groups face many objective and subjective chronic stressors ②. Unmitigated physiological stress responses ④ combined with high-effort coping ⑤ result in chronic physiological distress ⑨, which contributes to racial disparities in physical health conditions at the population level. A growing body of research provides empirical support for the Weathering Hypothesis and its theorized contribution to racial/ethnic disparities in chronic health conditions, mortality, and other physical health outcomes (Das, 2013; Geronimus, 1992; Geronimus et al., 2001; 2006; Juster et al., 2010; Paradies, 2006; Schneiderman et al., 2005).

Gender Role Strain

Gender role strain provides an insightful lens for understanding how gender ideologies ① can function as stressors ②, influence coping strategies ⑤, and cause psychological ⑧ and physiological ⑨ distress and associated health problems (Griffith, Gunter, & Allen, 2011;

Griffith, Ellis, & Allen, 2013a). Role strain is a theoretical framework that posits that individuals experience gender role strain when they struggle to fulfill valued social roles or when fulfilling those roles is hazardous to their health (Thompson & Pleck, 2005). Gender role strain draws attention to the ways in which male gender norms and roles influence men's health behaviors and outcomes. The severity and chronicity of gender role strain as a stressor can vary greatly between and within individuals, depending on their sociodemographic characteristics ⑩, social and contextual factors ①, and in relationship to different behaviors such as adoption of coping strategies ⑤ (Bowman, 1989; 2006). Social inequities and marginalization can heighten gender role strain for individuals who face numerous economic, social, and structural barriers to achieving success in one or many salient gender roles (Bowman, 1989; 2006; Griffith et al., 2011). Gender role strain enhances our conceptual model by expanding consideration of how gender and race ⑩ can, separately and in conjunction, intersect with social and contextual conditions ① to shape the types, severity, and chronicity of stressors ② different sociodemographic groups experience.

Black men, for example, face distinct stressors ② associated with the intersection of their membership in a socially marginalized racial group and being male (Gilbert et al., 2016). These include: 1) interpersonal and structural racism and discrimination (Adam et al., 2015; Chae et al., 2014; Griffith et al., 2013a; Williams & Mohammed, 2009); 2) negative, narrow stereotypes of Black men (Smith, Allen, & Danley, 2007); 3) hypervigilance (Steele, 2010); 4) poverty, unemployment, and underemployment (Cohen et al., 2006; Williams, 2003); 5) living in racially-segregated, disadvantaged neighborhoods (Lichter, Parisi, & Taquino, 2012); 6) inadequate healthcare (Cheatham, Barksdale, & Rogers, 2008); 7) community surveillance and policing (Smith et al., 2007); 8) negative interactions with the criminal justice system (Mauer, 2011; Goffman, 2014); and 9) difficulties fulfilling socially and culturally important masculine roles (Bowman, 2006; Griffith et al., 2011). Black men may also adopt gendered coping strategies ⑤ that reflect the limited opportunities and resources available in the disadvantaged communities where they are more likely to live (Courtenay, 2000; Evans, Frank, Offile, & Gregory, 2011; Jackson, Knight, & Rafferty, 2010; Mezuk et al., 2013). These coping strategies may include the use of tobacco, alcohol, and drugs; denial; social isolation; physical inactivity; and consumption of unhealthy comfort foods (Griffith et al., 2013a; Mezuk et al., 2013). Jackson, Mezuk, and colleagues (Jackson et al., 2010; Mezuk et al., 2013) argue that Black

men's adoption of these types of coping strategies may reduce their risk for psychological distress ⑧ and poor mental health outcomes while increasing their physiological distress ⑨ and risk for physical health problems and premature death, thus explaining the Black-White health paradox (Mezuk et al., 2013).

Key Model Constructs and Relationships

Coping strategies ⑤ can directly or indirectly mediate the effect of exposure to stressors ② on psychological ⑧ and physiological ⑨ distress. Coping is considered a key process that mediates exposure to stressors and their effects on health and wellbeing (Folkman, 1997; Folkman & Moskowitz, 2000; Lazarus, 1991; Lazarus & Folkman, 1984). Although effective coping can reduce the negative consequences of stressors on people's lives, coping efforts can also be ineffectual, harmful, or have mixed results that improve some health outcomes while exacerbating others. Factors affecting coping responses and their effectiveness include interactions involving individual (personality traits, preferred coping approaches), contextual (types and chronicity of stressors, access to coping resources), and societal (masculine and racial ideologies, roles, and expectations) influences. We were interested in relatively stable approaches to coping that men tended to employ on a regular basis. We conceptualized coping strategies as both general orientations, as well as behaviors that men may or may not consciously employ in response to stressors. Some researchers do not consider unconscious strategies to be reflective of coping responses; however, individuals do not always recognize stressors and may unconsciously enact coping efforts through innate (sensory-motor) and learned (scheme-based) processes (Scherer, 2001). For example, men participating in a qualitative study by Ellis and colleagues (Ellis, Griffith, Allen, Thorpe, & Bruce, 2015), described how stressors influenced their lives and their behavior, yet they often did not consider these responses as being reflective of coping.

Coping is generally recognized as having several dimensions, although there is little consensus in the field about what these are. The Transactional Model of Stress and Coping (Folkman, 1997; Folkman & Moskowitz, 2000; Lazarus, 1991; Lazarus & Folkman, 1984) categorizes coping strategies as either problem-focused (i.e., individuals seek to directly address stressors) or involving emotional regulation (i.e., individuals try to change their emotional response to stressors). Although widely used, this categorization overlooks coping strategies that reduce physiological responses to stressors. Other common approaches to categorizing coping

strategies consider whether strategies are: 1) cognitive or behavioral; 2) characterized by engagement or disengagement; or 3) adaptive (i.e., "good") or maladaptive (i.e., "bad") (Skinner, Edge, Altman, & Sherwood, 2003). Coping strategies commonly categorized as adaptive include positive reinterpretation, active problem solving, seeking social support, religious and spiritual coping, and being physically active. Coping strategies commonly considered maladaptive include denial, behavioral disengagement, social isolation, and avoidance or self-medication with overconsumption of comfort foods, drug use, or alcohol abuse. Overall, categorizing coping strategies is problematic conceptually and in application (Mezuk et al., 2017; Skinner et al., 2003). This practice risks masking the different effects a single coping strategy may have for different health outcomes. Further, relationships between coping strategies and health outcomes may vary according to individuals' sociodemographic characteristics (e.g., gender, race) or over different time spans (i.e., short- versus long-term effects). For these reasons, we opted to examine individual coping strategies (Chapters 3 and 4), rather than constructing composite coping variables that merged several strategies.

Number of common medical conditions ⑥ was one of three proximal health factors linked to physiological distress ⑨in previous studies with mixed gender and female samples (Adam et al., 2017; Sturmberg, Bennett, Martin, & Picard, 2017) that we tested with our exclusively male sample in Chapter 2. For this dissertation we were interested in common physical health conditions that are major sources of morbidity and mortality and racial health disparities among U.S. men (Arias et al., 2013; CDC, 2014a; 2014b; NCI, 2008; NHLBI, 2012; Ward & Schiller, 2013; Yoon et al., 2015). These include hypertension, heart disease, stroke, cancer, diabetes, chronic lower respiratory diseases, and bone and joint conditions. Although our focus was on whether number of common medical conditions predicted physiological distress, we acknowledge that these constructs have reciprocal influences on each other. Having more medical conditions increases physiological distress (Chiodini et al., 2007; Gunn et al., 2012; Marengoni et al., 2011), which can then exacerbate existing medical conditions and can lead to the development of new ones. This cyclical process can result in increasing challenges in medical condition management, more functional limitations and disability, multimorbidity, and premature death.

Functional limitations ⑦ represent another proximal health factors that has been linked to physiological distress ⑨ in previous studies (Fiorentino, Saxbe, Alessi, Woods, & Martin, 2012;

Heaney, Phillips, & Carroll, 2012; Weinrib et al., 2010). Functional limitations refer to how much individuals' health limits their capacity to independently (without assistance or special accommodations) participate in or complete specific activities or tasks. Limitations can be caused by a wide range of physical and mental health conditions. They can affect various functional areas including mobility, interpersonal skills, communication, self-direction, self-care, and capacity to maintain employment (i.e., work tolerance and skills). In this dissertation, we are interested in functional limitations that prevent men from carrying out routine activities of daily living and self-care such as walking, climbing stairs, and carrying groceries. Functional limitations can be assessed either by self-report of function (e.g., Physical Functioning Subscale, PF-10 of the Medical Outcomes Study; Ware & Sherbourne, 1992; White, Wilson, & Keysor, 2011) or healthcare provider ratings of individuals' ability to complete physical performance measures (e.g., strength or balance testing) (Reiman & Manske, 2011). Findings regarding the nature of the relationship between functional limitations and physiological distress is mixed, though this is likely due to the use of different physiological distress and functional limitations measures (Heaney et al., 2012). Collectively, findings suggest that more severe functional limitations are associated with more indications of HPA axis dysregulation.

Psychological distress ⑧ serves as both a potential proximal health predictor of physiological distress ⑨ in Chapter 2 and an outcome variable, along with physiological distress, in Chapter 4. Psychological distress is a subjective sense of unease or strain due to unpredictable, uncontrollable, or overwhelming demands. It is typically conceptualized as a generalized, nonspecific feeling or mood resulting from the cumulative impact of various stressors. Psychological distress can be challenging to cope with and can interfere with daily life. Psychological distress shares some symptoms with depression and anxiety; however, it is a distinct theoretical construct that tends to be more general in nature and does not necessarily reach thresholds for mental disorders (Derogatis & Coons, 1993). Psychological distress is measured with a myriad of different instruments, though most often by individuals' self-report of how often they experience certain feelings, moods, or symptoms theorized to capture expressions of psychological distress. The Negative Affect Scale (which we used in Chapters 2 and 4), for example, assesses how often respondents experienced a broad range of negative mood states in the past month, including those associated with depression and anxiety (e.g., worthless, nervous) as well as other negative moods (e.g., angry, irritable) (Piazza, Charles, Stawski, & Almeida,

2013).

Psychological distress can also be acute or chronic. A thirty-day response timeframe is appropriate for capturing chronic psychological distress, because respondents typically take into account both contextual and personality factors when responding for this timeframe (Mroczek & Kolarz, 1998). It is difficult for participants to recall distress over a longer timeframe, so responses are more biased by personality influences; a shorter timeframe captures daily mood and/or reactivity to an acute stressor. Psychological distress measures capture perceived distress to the extent that respondents choose to report it. Therefore, they can be inaccurate or biased. For example, individuals may underreport psychological distress because they do not recognize it, are not in touch with their feelings, or have high baseline (normal) levels of psychological distress. Psychological distress may also be underreported due to social stigma surrounding mental illness. It may also be underreported by men, especially, because of masculine ideologies that discourage men from being in touch with and sharing their feelings (Addis & Cohane, 2005; Courtenay, 2000; Martin, Neighbors, & Griffith, 2013). Psychological distress has been associated with physiological distress ⑨ in previous studies (Paradies, 2006; Staufenbiel et al., 2013), though questions remain about the nature of the relationship between these two forms of distress (Chida & Hamer, 2008).

Physiological distress ⑨ represents the activation and dysregulation of the healthy functioning of the biological systems involved in the stress response. Biomarkers of physiological distress include blood pressure, heart rate, catecholamine, α-amylase, allostatic load indices, dehydroepiandrosterone (DHEA), anti-inflammatory cytokines, telomere length, and various cortisol-based measures (Piazza, Almeida, Dmitrieva, & Klein, 2010). Research using physiological distress biomarkers is still relatively new. Currently, the most widely used biomarkers in research examining stress processes and population-level health outcomes are associated with the HPA axis and involve measuring cortisol levels and patterns (Adam & Kumari, 2009). Prominent cortisol measures in large-scale survey research include diurnal cortisol slopes (i.e., changes in cortisol levels over a period of time during the day), cortisol awakening responses (CAR; i.e., magnitude of morning surge), area under the curve (AUC; i.e., the area under the cortisol trajectory curve from waking to bedtime), and simultaneous assessment of several measures using multilevel modeling techniques (Adam & Kumari, 2009). Researchers have not yet come to consensus on which cortisol measures are appropriate for which applications or how best to

operationalize each different type of measure (Adam & Kumari, 2009).

In this dissertation, we utilized diurnal cortisol slopes as our measure of physiological distress. Diurnal cortisol slopes become dysregulated and blunted following chronic exposure to unmitigated stressors. Therefore, they are believed to be an indicator of chronic physiological distress (Miller et al., 2007). Diurnal cortisol slopes have demonstrated good predictive validity for a broad range of mental and physical health outcomes (Adam et al., 2017). Although cortisol levels and patterns fluctuate daily, diurnal cortisol slopes have better reliability than other commonly used cortisol measures, especially when data from several days are averaged to increase stability (Doane, Chen, Sladek, Van Lenten, & Granger, 2015; Wang et al., 2014). Ross and colleagues (Ross, Murphy, Adam, Chen, & Miller, 2014) suggest that diurnal cortisol slopes demonstrate only moderate stability over longer periods of time (i.e., a year); however, three of the four studies they reviewed involved adolescent samples, and findings may be different for adults. To our knowledge, there are no published longitudinal studies that have tracked within-person change in any of these cortisol measures over long periods of time (e.g., multi-year).

Research on the best practices for cortisol protocols and analytic choices is also still emerging (Hansen, Garde, & Persson, 2008). One challenge to cortisol research in large-scale community surveys is that cortisol levels are sensitive to a variety of factors that can bias readings and are difficult to control or track outside of the laboratory setting. Some factors are typically statistically controlled for (e.g., smoking status), while others are used to justify removing data and/or participants from analyses (i.e., use of certain medications, atypical sleep schedule, and poor adherence to protocols). Excluding participants whose cortisol levels and patterns may be affected by these types of lifestyle factors could, however, bias the findings. For example, smoking and atypical sleep schedules (e.g., working third shift) may be covariates of cortisol, but they can also be stressors. Given that smoking and atypical sleep schedules are more common among individuals of lower socioeconomic status, excluding these individuals from the study sample would result in a sample than is healthier and of higher socioeconomic status than the population as a whole. Additionally, excluding participants reduces statistical power, which is problematic when analyses involve relatively small sociodemographic subgroups. These issues are relevant to this dissertation research, so we elected to statistically control for key covariates of cortisol measures, rather than using them as exclusion criteria.

Sociodemographic characteristics ⑩ have been empirically and theoretically

suggested to moderate stress and coping processes at multiple junctures, as illustrated by the vertical arrows in the model. These include race, gender/sex, age, and educational attainment, (Adam & Kumari, 2009; Byrd, 2012; Courtenay, 2000; Cohen et al., 2006; Ellis et al., 2015; Griffith et al., 2013a; Ice, 2005; Paradies, 2006).

Dissertation Purpose and Specific Aims

The purpose of this dissertation was to document, better understand, and identify racial differences in the relationships between stress and coping processes and physiological distress and psychological distress among midlife and older U.S. Black and White men. This will provide important insight into: 1) how stress and coping processes may contribute to the disproportionate burden of physical health disparities for Black men; and 2) how to improve intervention strategies to address the unique needs and experiences of Black men. Each chapter tests a portion of our conceptual model (Figure 1.1).

Chapter 2 had two specific aims. First, we characterized and compared physiological distress among Black and White men, and then among Black and White men belonging to different age groups, thereby addressing a current gap in the literature regarding physiological distress patterns at the intersection of race, male gender, and age. Next, we explored whether key proximal health factors (number of common medical conditions ⑥, functional limitations ⑦, and psychological distress ⑧) that have been linked to physiological distress ⑨ in previous studies within mixed gender and female samples applied to males, and whether race moderated those relationships ⑩.

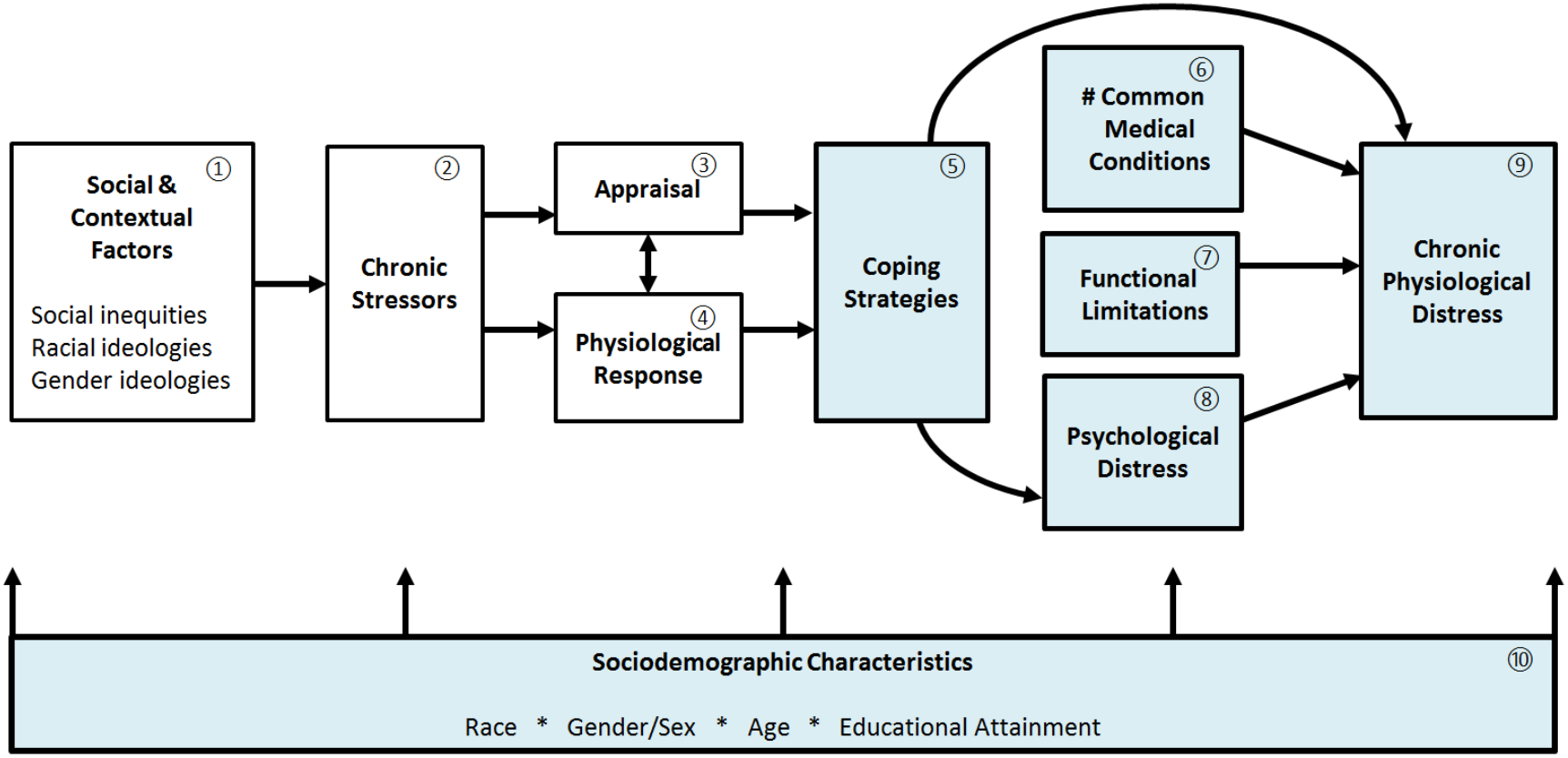
Chapter 3 had two specific aims. First, we documented race-based differences in men's reported reliance on different coping strategies. Next, we explored the extent to which different coping strategies ⑤ predicted physiological distress ⑨ among men, and whether race moderated these relationships ⑩. This allowed us to: 1) determine whether differences in the coping strategies used and/or differing relationships (strength, direction) between coping and physiological distress might contribute to racial disparities in physical health among midlife and older men; and 2) assess the validity of assumptions about what constitutes good and bad coping strategies.

Chapter 4 also had two aims. First, we examined the relationships (strength and direction) between coping strategies ⑤ and two dimensions of distress: physiological distress ⑨ and psychological distress ⑧. Next, we tested whether race moderated any of these

relationships ⑩.

Chapter 5 summarizes the key findings from this dissertation. We also discussed the implications of this research for public health and social science research, practice, and policy.

Figure 1.1. Conceptual Model of Coping and Physiological and Psychological Distress



References

Adam, E.K., Heissel, J.A., Zeiders, K.H., Richeson, J.A., Ross, E.C., Ehrlich, K.B., ... & Peck, S.C. (2015). Developmental histories of perceived racial discrimination and diurnal cortisol profiles in adulthood: A 20-year prospective study. *Psychoneuroendocrinology, 62*, 279-91.

Adam, E.K., & Kumari, M. (2009). Assessing salivary cortisol in large-scale, epidemiological research, *Psychoneuroendocrinology, 34*, 1423-36.

Adam, E.K., Quinn, M.E., Tavernier, R., McQuillan, M.T., Dahlke, K.A., & Gilbert, K.E. (2017). Diurnal cortisol slopes and mental and physical health outcomes: A systematic review and meta-analysis. *Psychoneuroendocrinology, 83, 25-41*.

Addis, M.E., & Cohane, G.H. (2005). Social scientific paradigms of masculinity and their implications for research and practice in men's mental health. *Journal of Clinical Psychology, 61*(6), 633-47.

American Heart Association (AHA) WRITING GROUP MEMBERS, Roger, V.L., Go, A.S., Lloyd-Jones, D.M., Benjamin, E.J., Berry, J.D., … & Turner, M.B. (2012). Heart disease and stroke statistics—2012 update: A report from the American Heart Association. *Circulation, 125*(1), e2–e220.

Arias, E., Heron, M., & Tejada-Vera, B. (2013). U.S. life tables eliminating certain causes of death, 1999-2001. *National Vital Statistics Report, 61*(9). Hyattsville, MD: National Center for Health Statistics.

Bowman, P.J. (1989). Research perspectives on Black men: Role strain and adaptation across the adult life cycle. In R. L. Jones (Ed.), *Black Adult Development and Aging* (pp. 117-150). Berkeley, CA: Cobb & Henry Publishers.

Bowman, P.J. (2006). Role strain and adaptation issues in the strength-based model: Diversity, multilevel, and life-span considerations. *Counseling Psychologist, 34*, 118-33.

Braveman, P., Egerter, S., & Williams, D.R. (2011). The social determinants of health: Coming of age. Annual Review of Public Health, 32, 381-98.

Breslau, J., Aguilar-Gaxiola, S., Kendler, K.S., Su, M., Williams, D., & Kessler, R.C. (2006). Specifying race-ethnic differences in risk for psychiatric disorder in a USA national sample. P*sychological Medicine, 36*, 57–68.

Byrd, D.R. (2012). Race/ethnicity and self-reported levels of discrimination and psychological distress, California, 2005. Preventing Chronic Disease, 9, 120042. doi: http://dx.doi.org/10.5888/pcd9.120042

Centers for Disease Control and Prevention (CDC). (2009). Age-adjusted death rates for hyperglycemic crises as underlying cause per 100,00 diabetic population, by race and sex, United States, 1980-2009. Atlanta, GA: Division of Vital Statistics, National Center for Health Statistics, CDC.

Centers for Disease Control and Prevention (CDC). (2014a). *Leading Causes of Death in Males by Race and Age Group-United States, 2014.* Atlanta, GA: Division of Vital Statistics, National Center for Health Statistics, CDC.

Centers for Disease Control and Prevention (CDC). (2014b). Age-adjusted rates of diagnosed diabetes per 100 civilian, non-institutionalized population, by race and sex, United States, 1980-2014 (National Health Interview Survey data). Atlanta, GA: Division of Vital Statistics, National Center for Health Statistics, CDC.

Chae, D.H., Nuru-Jeter, A.M., Adler, N.E., Brody, G.H., Lin, J., Blackburn, E.H., & Epel, E.S. (2014). Discrimination, racial bias, and telomere length in African-American men.

American Journal of Preventive Medicine, 46(2), 103-11.
Cheatham, C.T., Barksdale, D.J., & Rodgers, S.G. (2008). Barriers to health care and health-seeking behaviors faced by black men. *Journal of the American Association of Nurse Practitioners, 20*(11), 555-62.
Chida, Y., & Hamer, M. (2008). Chronic psychosocial factors and acute physiological responses to laboratory-induced stress in healthy populations: A quantitative review of 30 years of investigations. *Psychological Bulletin, 134*(6), 829-85.
Chida, Y., & Steptoe, A. (2009). Cortisol awakening response and psychosocial factors: A systematic review and meta-analysis. *Biological psychology, 80*(3), 265-78.
Chiodini, I., Adda, G., Schillitani, A., Coletti, F., Morelli, V., Di Lembo, S., … & Arosio, M. (2007). Cortisol secretion in patients with Type 2 diabetes. *Diabetes Care, 30*(1), 83-8.
Cohen, S., Kamarck, T., & Mermelstein, R. (1983). A global measure of perceived stress. *Journal of Health and Social Behavior*, 385-96.
Cohen, S., Schwartz, J.E., Epel, E., Kirschbaum, C., Sidney, S., & Seeman, T. (2006). Socioeconomic status, race, and diurnal cortisol decline in the Coronary Artery Risk Development in Young Adults (CARDIA) Study. *Psychosomatic Medicine, 68*, 41–50.
Courtenay, W.H. (2000). Constructions of masculinity and their influence on men's well-being: A theory of gender and health. *Social Science & Medicine, 10*, 1385–1401.
Das, A. (2013). How does race get "under the skin"?: Inflammation, weathering, and metabolic problems in late life. *Social Science and Medicine, 77*, 75-83.
Derogatis, L.R., & Coons, H.L. (1993). Self-report measures of stress. IN L. Goldberg & S. Breznitz (eds.), *Handbook of Stress*, 2nd edition, (pp. 200-33). NY: Free Press.
DeSantis, A.S., Adam, E.K., Doane, L.D., Mineka, S., Zinbarg, R.E., & Craske, M.G. (2007). Racial/ethnic differences in cortisol diurnal rythms in a community sample of adolescents. *Journal of Adolescent Health, 41*, 3-13.
Doane, L.D., Chen, F.R., Sladek, M.R., Van Lenten, S.A., & Granger, D.A. (2015). Latent trait cortisol (LTC) levels: Reliability, validity, and stability. *Psychoneuroendocrinology, 55*, 21-35.
Dressler, W.W., Bindon, J.R., & Neggers, Y.H. (1998). John Henryism, gender, and arterial blood pressure in an African American community. *Psychosomatic Medicine, 60*(5), 620-4.
Eagleton, T. (2007). *Ideology: An Introduction*. London: Verso Books.
Ellis, K.R., Griffith, D.M., Allen, J.O., Thorpe, R.J. Jr., & Bruce, M.A. (2015). "If you do nothing about stress, the next thing you know, you're shattered": Perspectives on African American men's stress, coping and health from African American men and key women in their lives. *Social Science & Medicine, 139*, 107-14.
Evans, J., Frank, B., Offile, J.L., & Gregory, D. (2011). Health, Illness, Men and Masculinities (HIMM): A theoretical framework for understanding men and their health. *Journal of Men's Health, 8*(1), 7-15.
Fiorentino, L., Saxbe, D., Alessi, C.A., Woods, D.L., & Martin, J.L. (2012). Diurnal cortisol and functional outcomes in post-acute rehabilitation patients. *Journals of Gerontology Series A: Biomedical Sciences and Medical Sciences, 67*(6), 677-82.
Folkman, S. (1997). Positive psychological states and coping with severe stress. *Social Science & Medicine, 45*, 1207-21.
Folkman, S., & Moskowitz, J.T. (2000). Positive affect and the other side of coping, *American Psychologist, 55*, 647-54.

Forouzanfar, M.H., Alexander, L., Anderson, H.R., Bachman, V.R., Biryukov, S., Brauer, M., … & Delwiche, K. (2013). Global, regional, and national comparative risk assessment of 79 behavioural, environmental and occupational, and metabolic risks or clusters of risks in 188 countries, 1990–2013: A systematic analysis for the Global Burden of Disease Study. *The Lancet , 386*(10010), 2287-323.

Fuller-Rowell, T. E., Doan, S. N., & Eccles, J. S. (2012). Differential effects of perceived discrimination on the diurnal cortisol rhythm of African Americans and Whites. *Psychoneuroendocrinology, 37*(1), 107-118.

Gee, G.C. (2002). A multilevel analysis of the relationship between institutional and individual racial discrimination and health status. *American Journal of Public Health, 92*, 615-23.

Geronimus, A.T. (1992). The weathering hypothesis and the health of African-American women and infants: Evidence and speculations. *Ethnicity and Disease, 2*, 207–21.

Geronimus, A.T. (2013). Jedi Public Health: Leveraging contingencies of social identity to grasp and eliminate racial health inequality. In L. Gomez & N. Lopez (eds), *Mapping 'Race' and Inequality: A Critical Reader on Health Disparities Research* . New Brunswick, NJ: Rutgers University Press.

Geronimus, A.T., Bound, J., Waidmann, T.A., Colen, C.G., & Steffick, D. (2001). Inequality in life expectancy, functional status, and active life expectancy across selected Black and White populations in the U.S. *Demography, 38*, 227-51.

Geronimus, A.T., Hicken, M., Keene, D., & Bound, J. (2006). "Weathering" and age patterns of allostatic load scores among Blacks and Whites in the United States. *American Journal of Public Health, 96*(5), 826-33.

Geronimus, A.T., Keene, D., Hicken, M., & Bound, J. (2007). Black-White differences in age trajectories of hypertension prevalence among adult women and men, 1999-2002. *Ethnicity and Disease, 17*(1), 40-8.

Geronimus, A.T., Pearson, J.A., Linnenbringer, E., Schulz, A.J., Reyes, A.G., Epel, E.S., ... & Blackburn, E.H. (2015). Race-ethnicity, poverty, urban stressors, and telomere length in a Detroit community-based sample. *Journal of Health and Social Behavior*, *56*(2), 199-224.

Geronimus, A.T., & Thompson, J.P. (2004). To denigrate, ignore, or disrupt: Racial inequality in health and the impact of a policy-induced breakdown of African American communities. *Due Bois Review, 1*(2), 247-79.

Gilbert, K.L., Ray, R., Siddiqi, A., Shetty, S., Baker, E.A., Elder, K., & Griffith, D.M. (2016). Visible and invisible trends in Black men's health: Pitfalls and promises for addressing racial, ethnic, and gender inequities in health. *Annual Reviw of Public Health, 37*, 295-311.

Goffman, A. (2014). *On the Run: Fugitive Life in an American City*. Chicago, IL: University of Chicago Press.

Good, G.E., Robertson, J.M., Fitzgerald, L.F., Stevens, M., & Bartels, K.M. (1996). The relation between masculine role conflict and psychological distress in male university counseling clients. *Journal of Counseling & Development, 76*, 44-9.

Gornick, M.E. (2003). A decade of research on disparities in Medicare utilization: Lessons for the health and health care of vulnerable men. *American Journal of Public Health, 93*(5), 753-9.

Griffith, D.M. (2012). An intersectional approach to men's health. *Journal of Men's Health, 9*(2), 106-12.

Griffith, D.M., Ellis, K.R., & Allen, J.O. (2013a). An intersectional approach to social determinants of stress and African American men's health: Men's and women's perspectives. *American Journal of Men's Health, 7(Suppl. 4), S19-30*.

Griffith, D.M., Gunter, K., & Allen, J.O. (2011). Male gender role strain as a barrier to African American men's physical activity. *Health Education and Behaviors, 38*(5), 482-91.

Griffith, D.M., Metzl, J.M., & Gunter, K. (2013b). Considering intersections of race and gender in interventions that address US men's health disparities. *Public Health, 125*(7), 417-23.

Gunn, J.M., Ayton, D.R., Densley, K., Pallant, J.F., Chondros, P., Herman, H.E., & Dowrick, C.F. (2012). The association between chronic illness, multimorbidity and depressive symptoms in an Australian primary care cohort. *Social Psychiatry and Psychiatric Epidemiology, 47*, 175-84.

Hansen, A.M., Garden, A.H., & Persson, R. (2008). Sources of biological and methodological variation in salivary cortisol and their impact on measurement among health adults: A review. *Scandinavian Journal of Clinical & Laboratory Investigation, 68*(6), 448-58.

Heaney, J.L., Phillips, A.C., & Carroll, D. (2012). Ageing, physical function, and the diurnal rhythms of cortisol and dehydroepiandrosterone. *Psychoneuroendocrinology, 37*(3), 341-9.

Heffernan, K.S., Jae, S.Y., Wilund, K.R., Woods, J.A, & Fernhall, B. (2008). Racial differences in central blood pressure and vascular function in young men. *American Journal of Physiology-Heart Circulatory Physiology, 295*, H2380–7.

Ice, G.H. (2005). Factors influencing cortisol level and slope among community dwelling older adults in Minnesota. *Journal of Cross-Cultural Gerontology, 20*(2), 91-108.

Jackson, J.S., Knight, K.M., & Rafferty, J.A. (2010). Race and unhealthy behaviors: Chronic stress, the HPA axis, and physical and mental health disparities over the life course. *American Journal of Public Health, 100*, 933-9.

Jones, C.P. (2000). Levels of racism: A theoretical framework and a gardener's tale. *American Journal of Public Health, 90*, 1212-5.

Juster, R-P., McEwen, B.S., & Lupien ,S.J. (2010). Allostatic load biomarkers of chronic stress and impact on health and cognition. *Neuroscience & Biobehavioral Reviews, 35*(1), 2-16.

Kaiser, C.R., Miller, C.T. (2001). Stop complaining! The social costs of making attributions to discrimination. *Personality and Social Psychology Bulletin, 27*(2), 254-63.

Kessler, T.A. (1998). The Cognitive Appraisal of Health Scale: Development and psychometric evaluation. *Research in Nursing & Health, 21*, 73-82.

Lazarus, R.S. (1991). *Emotion and Adaptation*. NY: Oxford University Press.

Lazarus, R.S., & Folkman, S. (1984). *Stress, Appraisal, and Coping*. NY: Springer.

Lazarus, R.S., & Folkman, S. (1987). Transactional theory and research on emotions and coping. *European Journal of Personality, 1*, 141-69.

Levant, R.F. (2011). Research in the psychology of men and masculinity using the gender role strain paradigm as a framework. *American Psychologist, 66*(8), 765-76.

Lichter, D.T., Parisi, D., & Taquino, M.C. (2012). The geography of exclusion: Race, segregation, and concentrated poverty. *Social Problems, 59*(3), 364-88.

Lincoln, K.D., Taylor, R.J., Watkins, D.C., & Chatters, L.M. (2011). Correlates of psychological distress and major depressive disorder among African American men. *Research on Social Work Practice, 21*(3), 278-88.

Link, B.G., & Phelan, J. (1995). Social conditions as fundamental causes of disease. *Journal of Health and Social Behavior, 35*, 80-94.

Marengoni, A., Angleman, S., Melis, R., Mangialasche, F., Karp, A., Garmen, A., ... & Fratiglioni, L. (2011). Aging with multimorbidity: A systematic review of the literature. *Ageing Research Reviews, 10*(4), 430-9.

Martin, L.A., Neighbors, H.W., & Griffith, D.M. (2013). The experience of symptoms of depression in men vs women: Analysis of the National Comorbidity Survey Replication. *JAMA Psychiatry, 70*(10), 1100-6.

Mauer, M. (2011). Addressing racial disparities in incarceration. *The Prison Journal, 91*(3), 87S-101S.

McEwen, B.S., & Gianaros, P.J. (2010). Central role of the brain in stress and adaptation: Links to socioeconomic status, health, and disease. *Annals of the New York Academy of Sciences, 1186*, 190-222.

Mezuk, B., Rafferty, J.A., Kershaw, K.N., Hudson, D., Abdou, C.M., Lee, H., ... & Jackson, J.S. (2010). Reconsidering the role of social disadvantage in physical and mental health: Stressful life events, health behaviors, race, and depression. *American Journal of Epidemiology, 172*(11), 1238-49.

Mezuk, B., Abdou, C.M., Hudson, D., Kershaw, K.N., Rafferty, J.A., Lee, H., & Jackson, J.S. (2013). "White box" epidemiology and the social neuroscience of health behaviors: The Environmental Affordances Model. *Society and Mental Health,* 3, 79-95.

Mezuk, B., Ratliff, S., Concha, J.B., Abdou, C.M., Rafferty, J., Lee, H., & Jackson, J.S. (2017). Stress, self-regulation, and context: Evidence from the health and retirement survey. *SSM-Population Health, 3*, 455-63.

Miller, G.E., Chen, E., & Zhou, E.S. (2007). If it goes up, must it come down? Chronic stress and the hypothalamic-pituitary-adrenocortical axis in humans. *Psychological Bulletin, 133*(1), 25-45.

Miniño, A.M. (2013). *Death in the United States, 2011*. NCHS data brief, no 115. Hyattsville, MD: National Center for Health Statistics.

Mroczek, D.K., & Kolarz, C.M. (1998). The effect of age on positive and negative affect: A developmental perspective on happiness. *Journal of Personality and Social Psychology, 75*(5), 1333-49.

National Cancer Institute (NCI). (2008). *Cancer Health Disparities FactSheet.* Accessed 2016.07.15 from www.cancer.gov.

National Heart, Lung, and Blood Institute (NHLBI). (2012). *Fact Book, Fiscal Year 2012*. NHLBI, National Institutes of Health, U.S. Department of Health and Human Services.

Olives, C., Myerson, R., Mokdad, A.H., Murray, C.J.L., & Lim, S.S. (2013). Prevalence, awareness, treatment, and control of hypertension in U.S. counties, 2001–2009. *PLoS ONE, 8*(4): e60308.

Paradies, Y. (2006) A review of psychosocial stress and chronic disease for 4th world indigenous people and African Americans. *Ethnicity & Disease, 16*, 195-308.

Pederson, E.L., & Vogel, D.L. (2007). Male gender role conflict and willingness to seek counseling: Testing a mediation model on college-aged men. *Journal of Counseling Psychology, 54*(4), 373-48.

Piazza, J.R., Almeida, D.M., Dmitrieva, N.O., & Klein, L.C. (2010). Frontiers in the use of biomarkers of health in research on stress and aging. *Journal of Gerontology: Psychological Science, 65B*(5), 513-25.

Piazza, J.R., Charles, S.T., Stawski, R.S., & Almeida, D.M. (2013). Age and the association between negative affective states and diurnal cortisol. *Psychology and Aging, 28*(1), 47-

56.
Reiman, M.P., & Manske, R.C. (2011). The assessment of function: How is it measured? A clinical perspective. *Journal of Manual & Manipulative Therapy, 19*(2), 91-9.
Riolo, S.A., Nguyen, T.A., Greden, J.F., & King, C. A. (2005). Prevalence of depression by race/ethnicity: Findings from the National Health and Nutrition Examination Survey III. *American Journal of Public Health, 95*, 998-1000.
Ross, K.M., Murphy, M.L.M., Adam, E.K., Chen, E., & Miller, G.E. (2014). How stable are diurnal cortisol activity indices in healthy individuals/ Evidence from three multi-wave studies. *Psychoneuroendocrinology, 39*, 184-93.
Russ, T.C., Stamatakis, E., Hamer, M., Starr, J.M., Kivimaki, M., & Batty, G.D. (2012). Association between psychological distress and mortality: Individual participant pooled analysis of 10 prospective cohort studies. *British Medical Journal, 345*, e4933.
Russell, E., Koren, G., Rieder, M., & Van Uum, S. (2012). Hair cortisol as a biological marker of chronic stress: Current status, future directions and unanswered questions. *Psychoneuroendocrinology, 37*, 589—601.
Sawyer, D.C., & Palmer, R.T. (2014). A different kind of black, but the same issues: Black males and counter stories at a predominantly white institution. *Journal of Progressive Policy and Practice, 2*(3), 255-72.
Scherer, K.R. (2001). Appraisal considered as a process of multilevel sequential checking. In K.R. Scherer, A. Schorr, & T. Johnstone (Eds.), *Appraisal Processes in Emotion: Theory, Methods, Research* (pp. 92-120). Oxford, Englad: Oxford University Press.
Schneiderman, N., Ironson, G., & Siegel, S.D. (2005). Stress and health: Psychological, behavioral, and biological determinants. *Annual Review of Clinical Psychology, 1*, 607-28.
Selye, H. (1975). Confusion and controversy in the stress field. *Journal of Human Stress, 1*, 37-44.
Skinner, E.A., Edge, K., Altman, J., & Sherwood, H. (2003). Searching for the structure of coping: A review and critique of category systems for classifying ways of coping. *Psychological bulletin, 129*(2), 216-69.
Skinner, M.L., Shirtcliff, E.A., Haggerty, K.P., Coe, C.L., & Catalano, R.F. (2011). Allostasis model facilitates understanding race differences in the diurnal cortisol rhythm. *Development and Psychopathology, 23*(4), 1167-86.
Smith, W.A., Allen, W.A., & Danley, L.L. (2007). "Assume the position…you fit the description": Psychosocial experiences and racial battle fatigue among African American male college students. *American Behavioral Scientist, 51*(4), 551-78.
Sparrenberger, F., Cichelero, F.T., Ascoli, A.M., Fonseca, F.P., Weiss, G., Berwanger, O., …& Fuchs, F.D. (2009). Does psychosocial stress cause hypertension? A systematic review of observational studies. *Journal of Human Hypertension, 23*, 12–9.
Stalder, T., & Kirschbaum, C. (2012). Analysis of cortisol in hair-Sate of the art and future directions. *Brain, Behavior, and Immunity, 26*, 1019-29.
Staufenbiel, S.M., Penninx, B.W.J.H., Spijker, A.T., Elzinga, B.M., & van Rossum, E.F.C. (2013). Hair cortisol, stress exposure, and mental health in humans: A systematic review. *Psychoneuroendocrinology, 38*, 1220-35.
Steele, C.M. (2010). *Whistling Vivaldi: How Stereotypes Affect Us and What We Can* Do. NY: W.W. Norton & Co.
Sturmberg, J.P., Bennett, J.M., Martin, C.M., & Picard, M. (2017). 'Multimorbidity' as the

manifestation of network disturbances. *Journal of Evaluation in Clinical Practice, 23*(1), 199-208.
Thompson, E. H., Jr., & Pleck, J. H. (2005). Masculinity ideologies: A review of research instrumentation on men and masculinities. In R. F. Levant & W. S. Pollack (Eds.), *A New Psychology of Men* (pp. 129-163). New York, NY: Basic Books.
Torres, S.J., & Nowson, C.A. (2007). Relationship between stress, eating behavior, and obesity. *Nutrition, 23*(11–12), 887–94.
U.S. Department of Health and Human Services (USDHHS), Office of Disease Prevention and Health Promotion. (2001). *Healthy People 2000 Final Review*. Hyattsville, MD: Public Health Service.
Valderrama, A.L., Gillespie, C., & Mercado, C. (2013). Racial/ethnic disparities in the awareness, treatment, and control of hypertension-U.S., 2003-2010. *MMWR, 62*(18), 351-5.
Wang, X., Sánchez, B.N., Golden, S.H., Shrager, S., Kirschbaum, C., Karlamangla, A.S., … & Roux, A.V.D. (2014). Stability and predictors of change in salivary cortisol measures over six years: MESA. *Psychoneuroendocrinology, 49*, 310-20.
Ward, B.W., & Schiller, J.S. (2013). Prevalence of multiple chronic conditions among US adults: Estimates from the National Health Interview Survey, 2010. *Preventing Chronic Disease, 10*, 120203.
Ware, J.E., Jr., & Sherbourne, C.D. (1992). The MOS 36-item short-form health survey (SF-36): Conceptual framework and item selection. *Medical Care, 30*, 473–83.
Warner, D.F., & Hayward, M.D. (2007). Early-life origins of the race gap in men's mortality. *Journal of Health and Social Behavior, 47*(3), 209-26.
Weinrib, A.Z., Sephton, S.E., DeGeest, K., Penedo, F., Bender, D., Zimmerman, B., … & Lutgendorf, S.K. (2010), Diurnal cortisol dysregulation, functional disability, and depression in women with ovarian cancer. *Cancer, 116*, 4410–9.
White, D.K., Wilson, J.C., & Keysor, J.J. (2011). Measures of adult general functional status. *Arthritis Care & Research, 63*(S11), S297-307.
Williams, D.R. (2003). The health of men: Structured inequalities and opportunities. *American Journal of Public Health, 93*(5), 724-731.
Williams, D.R., Gonzalez, H.M., Neighbors, H., Nesse, R., Abelson, J.M., Sweetman, J., & Jackson, J.S. (2007). Prevalence and distribution of major depressive disorder in African Americans, Caribbean Blacks, and non-Hispanic Whites: Results from the National Survey of American Life. *Archives of General Psychiatry, 64*, 305-15.
Williams, D.R., & Mohammed, S.A. (2009). Discrimination and racial disparities in health: Evidence and needed research. *Journal of Behavioral Medicine, 32*(1), 20-47.
Williams, D.R., & Mohammed, S.A. (2013). Racism and health I: Pathways and scientific evidence. *American Behavioral Scientist, 57*(8), 1152-73.
Yoon, S.S., Fryar, C.D., & Carroll, M.D. (2015). *Hypertension Prevalence and Control among Adults: United States, 2011–2014*. NCHS Data Brief, no 220. Hyattsville, MD: National Center for Health Statistics. 2015.

CHAPTER 2

Disparities and Differences in Physiological Distress among Aging Black and White Men in the U.S.

Abstract

Chronic distress experienced over the life course accelerates biological aging and is linked to chronic illness, poor quality of life, and premature mortality. Biomarkers such as cortisol provide a way of examining physiological reactions to stressors and the cumulative effects of unmitigated physiological distress on the body. These biomarkers represent a key proximal outcome of stress and coping processes through which social determinants of health, such as race and gender, are posited to generate health disparities. This study examined patterns and predictors of chronic physiological distress among midlife and older Black and White male participants in the National Survey of Midlife Development in the United States (MIDUS) II. Black men manifested more chronic physiological distress than White men, as indicated by blunted diurnal cortisol slopes suggesting impaired functioning of the biological systems involved in the stress response. Racial differences were most pronounced in the oldest age group (aged 65-84 years). Findings indicated that racial disparities in the magnitude of men's physiological distress might be partly attributable to differences in the functioning of underlying stress mechanisms. Race moderated the relationship between existing health problems and physiological distress, such that Black men with health problems manifested more distress than their White counterparts. Implications for interventions to reduce racial health disparities among men include tailoring interventions to racial differences in stress mechanisms, and identifying critical junctures at multiple levels for interrupting stress processes contributing to Black men's poor health outcomes.

Introduction

Black[2] men have poorer health and shorter average lifespans than other race/ethnic and gender groups in the U.S. population (Miniño, 2013; USDHHS, 2001; Warner & Hayward, 2006). Black men develop aging-related diseases earlier in life, and their conditions tend to be more poorly controlled, more severe, and accompanied by more serious complications (Geronimus, Keene, Hicken, & Bound, 2007; Gornick, 2003; Heffernan, Jae, Wilund, Woods, & Fernhall, 2008; Olives, Myerson, Mokdad, Murray, & Lim, 2013; Williams, 2003). A robust and well-established literature links racial health disparities to political, economic, historic, and social inequities in the U.S. (Braveman, Egerter, & Williams, 2011; Geronimus & Thompson, 2004; Gilbert et al., 2016; Warner & Hayward, 2006; Williams & Mohammed, 2013). These social and structural determinants of men's health are deeply entrenched in our society and altering them is a challenging and protracted process. Research efforts that provide a better understanding of how broad social and structural factors get "under the skin" to affect health may offer insight into specific leverage points for more immediate intervention to reduce racial health disparities among men.

Several researchers contend that chronic distress resulting from social inequities is a proximal outcome of stress and coping mechanisms that generate and reproduce racial health disparities (Braveman et al., 2011; Das, 2013; Geronimus, 1992; Geronimus, Hicken, Keene, & Bound, 2006; Juster, McEwen, & Lupien, 2010; Paradies, 2006; Schneiderman, Ironson, & Siegel, 2005; Warner & Hayward, 2007). Although distress has distinct psychological and physiological dimensions, questions remain regarding physiological distress among Black men, and whether patterns and predictors of physiological distress differ for Black men compared to other groups. The purpose of the current study was to explore racial differences in levels and proximal health predictors of physiological distress among midlife and older U.S. men.

Stress Processes and Health

When faced with a stressor—a source of stress that is a threat to one's homeostasis and well-being—individuals experience a combination of interdependent psychological, physiological, and behavioral responses. Cognitive processes may involve appraising the stressor

[2] We consider "Black" and "White" to be complex, socially-constructed racial categories that reflect an array of historic, geographic, cultural, political, and economic factors that coalesce to shape individuals' lived experiences and, ultimately, health. We use these broad terms that reference skin color and appearance, rather than self-identification with a particular ethnic group, because external perceptions and categorizations of people's race influence exposure to stressors and access to opportunities in the U.S. (Jones, 2000). Blacks continue to experience interpersonal and institutional racism and social marginalization, while Whites benefit from the privileges associated with affiliation with the dominant White racial group in the U.S. that, collectively, possesses the bulk of political, economic, and social power.

to assess the level of threat and available coping options. The nervous system activates the hypothalamic-pituitary-adrenocorticoid (HPA) axis, which releases a flood of stress hormones such as cortisol that allow the body to react in a fight or flight manner, as needed. An individual may consciously or unconsciously change his or her behavior and adopt strategies to cope with the stressor and mitigate resultant distress, which then allows the body, including cortisol levels, to return to a normal state. This pattern of events following exposure to a stressor is an adaptive response.

When, however, individuals face stressors over a prolonged period and their coping and adaptation attempts are insufficient, their nervous systems' stress responses become dysregulated. In response to stressors, the HPA axis does not generate a surge in stress hormones when necessary and as a part of naturally occurring daily fluctuations (Miller, Chen, & Zhou, 2007), a condition termed chronic physiological distress. Furthermore, other systems in the body are also affected and deteriorate over time (McEwen & Gianaros, 2010), which, over the life course, can lead to the development of a variety of chronic mental and physical health conditions and premature mortality (Juster et al., 2010).

Due to the cumulative effects of exposure to stressors on biological systems over the life course, aging has been consistently linked to physiological distress. Levels of physiological distress are generally believed to increase with age, because this is one of the mechanisms believed to contribute to age-related decline (Juster et al., 2010). Older adults are also likely to be more vulnerable to the negative health ramifications of stressors they experience, because their biological systems are less able to generate a normal stress response and take longer to return to homeostasis (Charles, 2010). Although many studies have documented more physiological distress with increasing age and among older adults when compared to younger adults, findings are not entirely consistent and depend, in part, on the measure of physiological distress used (Dmitrieva, Almedia, Dmitrieva, Loken, & Pieper, 2013; Heaney, Phillips, & Carroll, 2012a; Ice, Katz-Stein, Himes, & Kane, 2004).

Previous research also documents sex differences in physiological distress and its relationships with different predictors and health outcomes, especially among older adults (Kudielka & Kirschbaum, 2005; Paris et al., 2010). Characterizing these sex differences, however, is challenging, because they vary based on the stressors and/or health outcomes examined, the measure of physiological distress used, and other factors. Further, sex differences

in physiological distress and associated stress and coping mechanisms could be due to biological sex differences, the influences of gender ideologies, or both. Gender-specific research is critical to better understand and address physiological distress and its mechanisms among men.

Biomarkers of physiological distress play a central role in this field of research. Biomarkers allow for the objective examination of physiological reactions to stressors and the cumulative effects of unmitigated physiological distress on the body over time. Biomarkers of physiological distress include blood pressure, heart rate, catecholamine, α-amylase, allostatic load indices, cortisol, dehydroepiandrosterone (DHEA), anti-inflammatory cytokines, and telomere length (Piazza, Almeida, Dmitrieva, & Klein, 2010). Cortisol has been most widely used in research examining stress processes and population-level health outcomes. Objective biomarkers may be especially valuable in men's health disparities research, since men tend to misattribute and minimize stressors and resultant psychological distress, especially when associated with discrimination (Good, Robertson, Fitzgerald, Stevens, & Bartels, 1996; Kaiser & Miller, 2001).

Stress Processes and Health Disparities

Although everyone experiences stressors, socially and structurally marginalized populations experience more stressors overall, more chronic stressors, and have fewer mitigating resources (Geronimus, 1992). The Weathering Hypothesis describes a general pathway linking social inequities, stress processes, and health disparities (Geronimus et al., 2006). Social inequities are social and contextual conditions that promote marginalization of certain sociodemographic groups (e.g., Blacks, women, poor) while privileging others (e.g., Whites, men, wealthy) through differential access to political, economic, and social power. The Weathering Hypothesis posits that exposure to objective and subjective stressors and high-effort coping get under the skin by causing chronic distress and subsequent physical deterioration and negative health outcomes. Some stressors (e.g., those rooted in institutional racism) are especially difficult to measure because they are embedded in social and contextual conditions that reflect dominant social values and cultural expectations. These types of stressors, while eluding detection and self-report, are still relevant for and can affect coping, distress, and associated health outcomes (Ellis, Griffith, Allen, Thorpe, & Bruce, 2015, 2015; Scherer, 2001). Biomarkers of physiological distress measure the effects of these stressors on health, even if researchers struggle to capture and quantify stressors associated with social inequities,

themselves. A growing body of research provides empirical support for the Weathering Hypothesis and its theorized contribution to racial/ethnic disparities in chronic health conditions, mortality, and other health outcomes (Das, 2013; Geronimus, 1992; Geronimus et al., 2006; Geronimus, Bound, Waidmann, Colen, & Steffick, 2001; Juster et al., 2010; Paradies, 2006; Schneiderman et al., 2005).

Black men occupy a unique position in the U.S. and face distinct stressors associated with the intersection of membership in a socially marginalized racial group and being male (Gilbert et al., 2016). The psychosocial stressors linked to poor health outcomes for Black men include: 1) interpersonal and structural racism and discrimination (Adam et al., 2015; Chae et al., 2014; Griffith, Ellis, & Allen, 2013; Williams & Mohammed, 2009); 2) negative, narrow stereotypes of Black men (Smith, Allen, & Danley, 2007); 3) hypervigilance (Steele, 2010); 4) poverty, unemployment, and underemployment (Cohen et al., 2006; Williams, 2003); 5) living in racially-segregated, disadvantaged neighborhoods (Lichter, Parisi, & Taquino, 2012); 6) inadequate healthcare (Cheatham, Barksdale, & Rogers, 2008); 7) community surveillance and policing (Smith et al., 2007); 8) negative interactions with the criminal justice system (Mauer, 2011; Goffman, 2014); and 9) difficulties fulfilling socially and culturally important masculine roles (Bowman, 2006; Griffith, Gunter, & Allen, 2011b). The magnitude, chronicity, and cumulative nature of stressors experienced by Black men suggest that they have more physiological distress than more privileged groups that experience fewer stressors (i.e., White men). Further, physiological distress is a causative factor in the disproportionate burden of chronic disease and early mortality within this group. More research is needed, however, to ascertain if Black men do, in fact, have more physiological distress than White men and whether stress mechanisms function similarly for Black men and White men. Race often has a moderating role in social science research. For example, although education is associated with social mobility, Blacks do not benefit from education to the same degree as Whites (i.e., race moderates the relationship between education and social mobility; Assari, 2017). Differences in stress mechanism function by race indicate the need for more targeted approaches to reducing racial health disparities among men.

Study Purpose

The purpose of this study was to explore racial differences in patterns and proximal health predictors of physiological distress among men. The aims were twofold. First, we

characterized and compared physiological distress (using the biomarker of diurnal cortisol slopes) among Black and White men, and then among Black and White men belonging to different age groups, thereby addressing a current gap in the literature regarding physiological distress patterns at the intersection of race and male gender. We hypothesized that Black men would exhibit more physiological distress than White men due to their greater exposure to chronic stressors generated by the social and structural inequities that affect the lives of Black men in the U.S. We also anticipated that racial disparities in physiological distress would be more pronounced among older age groups than among younger age groups, because the cumulative effects of exposure to chronic stressors would cause more rapid deterioration and dysregulation of Black men's physiological stress responses as compared to White men's. Next, we explored whether key proximal health factors linked to physiological distress in previous studies within mixed gender and female samples applied to males, and whether race moderated those relationships. We hypothesized that psychological distress, number of common medical conditions, and functional limitations predicted men's physiological distress. Further, we tested whether race moderated those relationships, such that Black men exhibited weaker relationships between physiological distress and psychological distress than did White men, but had stronger relationships between physiological distress and number of common medical conditions and functional limitations.

Findings from the study would provide insight into the nature of race-based differences in physiological distress among men. They would indicate whether differences in physiological distress were largely due to racial differences in the magnitude of antecedent risk and protective factors experienced by Black and White men (i.e., race does not moderate relationships between proximal predictors and physiological distress) or at least partly due to racial differences in more proximal factors (i.e., race does act as a moderator). These distinctions have important implications for interventions to reduce racial disparities in physiological distress among men. The former possibility suggests that stress processes among men may be universal; thus, previous research on stress and coping processes is applicable to Black men and intervention efforts should focus on reducing the severity and chronicity of stressors Black men face, building coping skills, and providing access to supportive resources. The latter possibility suggests that a targeted approach is important. In this case, we must develop a better understanding of the proximal health factors influencing stress mechanisms among Black men, how these may differ

for Black men compared to other groups, and critical junctures for interrupting stress processes leading to poor health outcomes for Black men.

Methods

Data Source

This study used linked data from participants in the second waves of the National Survey of Midlife in the United States (MIDUS II) and the National Study of Daily Experiences (NSDE II), which included a random subsample of MIDUS II participants (Almeida, 2005; Almeida, McGonagle, & King, 2009). MIDUS II consisted of an interview and self-administered questionnaire that assessed: sociodemographic, family, and lifestyle characteristics; psychological constructs; health behaviors; and health outcomes. NSDE II was an in-depth study of daily stressors, physiological distress biomarkers (i.e., cortisol), and health indicators in which participants completed telephone interviews for eight consecutive days and provided cortisol samples on half of those days (Almeida, 2005; Almeida et al., 2009). Physiological distress and biomarker control variables were collected in NSDE II between 2004 and 2009, after participants had already provided information on all other predictor and sociodemographic variables in MIDUS II between 2004 and 2006. The present study was exempt from Internal Review Board evaluation because it involved secondary analysis of a publically available deidentified dataset (45 CFR 46; USDHHS, 2009).

Sample. The MIDUS sample was identified using a stratified probability sampling design. MIDUS II included 5,555 English-speaking, community-residing adults who were in midlife or older (35-85 years of age) and resided in the contiguous United States (Radler & Ryff, 2010; Ryff et al., 2006; 2012). A total of 2,022 MIDUS II participants provided data for NSDE II (78% response rate), and 1,735 (85.8%) of these provided saliva samples. For the current study, we limited the analytic sample to the 59 Black and 636 White men who completed the MIDUS II interview and self-administered questionnaire and provided sufficient salivary cortisol sample data for calculating the physiological distress measure.

Physiological distress data collection. Cortisol, a biomarker of physiological distress, was collected from saliva. Participants used Salivette kits (Sarstedt, Rommelsdorft, Germany) to collect four saliva samples each day for four consecutive days, for a total of 16 samples per person. Participants collected samples upon waking (T1), 30 minutes after waking (T2), before lunch (T3), and at bedtime (T4). Salivary cortisol samples were collected using standard

procedures and protocols used in large-scale epidemiological research (Adam & Kumari, 2009); details are described elsewhere (Almeida et al., 2009; Stawski, Cichy, Piazza, & Almeida, 2013). Participants indicated the times they collected samples with a paper-pencil log and during nightly telephone interviews; correlations were above .90 (Almeida et al., 2009). Participants mailed their samples to a lab where raw salivary cortisol concentrations were measured with luminescence immunoassays; intra- and inter-assay coefficients were below 5%.

Measures

Outcome variable: physiological distress. Physiological distress was operationalized as diurnal cortisol slopes from 30 minutes after waking (T2), which is when they typically peak, to before lunch (T3), averaged over four days. Cortisol slopes for this portion of the day are declining, so slope values are negative (e.g., -.20). More blunted (i.e., horizontal, closer to 0) diurnal cortisol slopes represent more physiological distress, because they are indicative of reduced cortisol reactivity and disrupted physiological stress response (Adam et al., 2017; Adam & Kumari, 2009). We used diurnal cortisol slopes from this portion of the day because preliminary analyses indicated notable racial differences in diurnal cortisol slopes, especially between T2 and T3, which would increase statistical power to detect significant race differences, should they exist (see Table 2.2 and Figure 2.1).

Research on the properties and best practices for using different cortisol measures as indicators of physiological distress is still emerging. Diurnal cortisol slopes have demonstrated good predictive validity for a broad range of mental and physical health outcomes (Adam et al., 2017). Although cortisol levels and patterns are known to fluctuate daily, diurnal cortisol slopes have better reliability than other commonly used cortisol measures, especially when data from several days are averaged to increase stability (Doane, Chen, Sladek, Van Lenten, & Granger, 2015; Wang et al., 2014).

Diurnal cortisol slopes were calculated for each day for each individual by dividing the difference in the times of T2 and T3 cortisol collection by the difference in the natural logs of the T2 and T3 cortisol values. Raw cortisol values were natural log transformed to adjust for skew, consistent with previous cortisol research (Adam & Kumari, 2009). Diurnal cortisol slopes were calculated for the four cortisol collection days and then averaged to obtain the physiological distress measure used in this study.

Predictor variables. We included three key proximal predictor variables in this study that have been theoretically and empirically associated with physiological distress in previous

research: psychological distress (Paradies, 2006; Staufenbiel, Penninx, Spijker, Elzinga, & van Rossum, 2013), number of common medical conditions (Adam et al., 2017; Sturmberg, Bennett, Martin, & Picard, 2017), and functional limitations (Fiorentino, Saxbe, Alessi, Woods, & Martin, 2012; Heaney, Phillips, & Carroll, 2012b; Weinrib et al., 2010).

Psychological distress was measured with the fourteen-item Negative Affect Scale created for the MIDUS study, which captures non-specific psychological distress (Almeida et al., 2007; Piazza, Charles, Stawski, & Almeida, 2013). The Negative Affect Scale includes a broad range of mood states including moods theorized to capture expressions of distress specifically among men (Addis, 2008; Leimkűhler, Heller, & Paulus, 2007). Participants were asked, "In the past 30 days, how much of the time did you feel: nervous, restless or fidgety, hopeless, that everything was an effort, worthless, so sad nothing could cheer you up, afraid, jittery, irritable, ashamed, upset, lonely, angry, and upset?" Participants responded using a five-point scale ranging from All the Time (1) to None of the Time (5). Responses were reverse coded and averaged, so higher scores indicated more psychological distress. The Negative Affect Scale has demonstrated good internal validity and reliability in other studies, though its psychometric properties have only previously been examined with mixed race and mixed gender samples (Piazza et al., 2013). The scale demonstrated good reliability for the Black and White men in this sample (Cronbach's alphas .95 and .90, respectively).

Number of common medical conditions represented the number of common medical conditions participants reported, from a list of seven conditions that are major sources of morbidity and mortality and racial health disparities among U.S. men (Arias, Heron, & Tejada-Vera, 2013; CDC, 2014a; 2014b; NCI, 2008; NHLBI, 2012; Ward & Schiller, 2013; Yoon, Fryar, & Carroll, 2015). Participants indicated if they had ever been diagnosed with the following: hypertension/high blood pressure, heart disease/heart attack, a stroke, or cancer. They were also asked if, in the past 12 months, they had or been treated for diabetes, chronic lower respiratory disease (including asthma), or arthritis/bone-joint diseases.

Functional limitations were assessed using a variation on the valid and reliable Physical Functioning Subscale (PF-10) from the short form of the Medical Outcomes Study (Ware & Sherbourne, 1992; White, Wilson, & Keysor, 2011). Individuals provided self-reports on how much their health limited ten different activities of daily living (e.g., walking, climbing stairs, carrying groceries, moderate activity) using a four-point scale ranging from A Lot (1) to Not At

All (4). Responses were reversed coded and averaged to obtain a summary score, with higher scores representing greater functional limitation. The measure demonstrated good reliability for the Black and White men in the current study (Cronbach's alphas .95 and .93, respectively).

Sociodemographic control variables. We were limited in the number of variables we could control for, so we prioritized two sociodemographic variables that have consistently been shown to be associated with physiological distress in previous research, including age (Ice, 2005) and educational attainment (Cohen et al., 2006). There were no missing sociodemographic data. ***Age*** represented participants' age, rounded to the nearest year at the time of MIDUS II data collection. ***Educational attainment*** was measured using four ordinal categories based on participant report of their highest level of schooling completed: no high school degree and no GED (1); high school graduate or obtained a GED (2), bachelor's degree (3), and advanced graduate or professional degree (4). ***Race*** was self-reported.

Biomarker control variables. We controlled for several variables that previous researchers have identified as correlates of cortisol levels and diurnal cortisol patterns, including smoking (Badrick, Kirschbaum, & Kumari, 2007), taking medications known to affect cortisol (Masharani et al., 2005), atypical sleep schedule (Federenko et al., 2004), and not adhering to cortisol collection protocols (Adam & Kumari, 2009). There were no missing data for biomarker control variables. ***Smoker*** indicated whether participants reported smoking one or more cigarettes on NSDE II data collection days, with nonsmoker as the reference group. ***Medications*** indicated whether participants used any over-the-counter or prescription medications that could affect cortisol levels on NSDE II data collection days. Medications included were those containing steroids or hormones and those used to treat allergies, depression, and anxiety (Granger, Hibel, Fortunato, & Kapelewski, 2009). No medications was the referent category. ***Atypical sleep schedule*** indicated whether a participant reported an atypical sleep schedule on cortisol sample data collection days. Atypical schedule was defined as waking before 4am or after 11am and/or being awake for more than 20 hours or less than 12 hours (Dmitrieva et al., 2013). Typical sleep schedule was the referent category. ***Lunch protocol non-adherent*** indicated whether participants appeared to have diverged from the T3 collection protocol, which directed them to collect the T3 saliva sample prior to eating lunch. Evidence of a T3 cortisol surge, when T3 is more than 10 nmol/L higher than T2, indicated that the participant probably ate before providing the T3 sample. Men whose cortisol data showed evidence of a T3 surge on cortisol

sample collection days were coded as non-adherent. Adherent was the reference group.

Data Analysis

We conducted exploratory data analyses with all study variables to identify potential confounding variables for inclusion as control variables, examine missing data, explore variable distributions and conduct appropriate transformations, and assess internal reliability and conduct data reduction (e.g., Cronbach's alpha and factor analysis) of scaled measures to ensure that we were using the most psychometrically sound scales. We calculated basic descriptive statistics, including comparisons by race using two-tailed *t*, χ^2, and Mann-Whitney tests. We also examined and graphed raw cortisol levels and patterns by race. All statistical analyses were conducted in SPSS version 24 (IBM Corp., Armonk, NY), with the exception of the multilevel models which were conducted in Stata version 14 (StataCorp, College Station, TX).

We used hierarchical ordinary least squares linear regression to examine racial similarities and differences in predictors of physiological distress. We regressed the predictor, sociodemographic, and biomarker control variables on physiological distress. To test whether race moderated the relationships between physiological distress and any of the predictor variables, we added interaction terms. We created interaction terms by taking the product of the race indicator variable and any predictor variables that approached statistical significance in the first model. To further investigate the moderating role of race, we graphed significant interactions, holding all other variables at their average values to illustrate the interaction for the average participant (Jaccard, 2001). Given the differing profiles of Black and White men in the sample (Table 2.1), this was a conservative depiction of race-based differences. We also conducted simple slopes analyses, by conducting *t*-tests of the slopes divided by their standard errors (Aiken, West, & Reno, 1991).

To further examine racial differences in the relationships between physiological distress, predictor variables, and control variables, we created race-stratified models with the same variables used in the previous models, eliminating the race indicator variable and interaction terms. Partial regression coefficients for the race-stratified models were compared using two-tailed *z*-tests of the coefficient differences divided by the square root of the sum of each coefficient standard error squared (Clogg, Petkova, & Haritou, 1995).

We examined indicators and the potential biasing influences of misspecification, multicollinearity, heteroskedasticity, and outliers. We also conducted a series of sensitivity analyses

to determine if findings differed with alternative statistical techniques: 1) multiple imputation; 2) multilevel modeling; and 3) more parsimonious models. We repeated all analyses using multiple imputation to account for missing data (Raghunathan, 2004). We used the Markov chain Monte Carlo method, which was appropriate given missing data analyses suggesting data were missing at random. All variables used to create the study measures were used to impute missing values, constrained to the bounds of possible values. Five datasets with imputed values were generated and pooled for a single set of results. We then used multilevel modeling to ascertain the contributions of individual fluctuations in daily physiological distress, over the four days of cortisol collection (intraindividual variability), in predicting physiological distress. We created a series of mixed models including: 1) a fully unconditional, one-way analysis of variables (ANOVA) with random effects to determine the extent to which intraindividual and interindividual factors accounted for variation in physiological distress, including calculation of the interclass correlation coefficient; 2) a model with the addition of the data collection day variable; and 3) the full model including all the predictor and control variables. Physiological distress, atypical sleep schedule, and lunch protocol non-adherent were longitudinal (time-varying) variables; all other variables were treated as time invariant. Finally, we tested more parsimonious models in order to assess the stability of partial regression coefficients for key variables, particularly for the race-stratified model with the relatively small sample of Black men. This was done by eliminating control variables that did not meaningfully contribute to any of the models and were logical candidates for exclusion based on correlational matrix analyses (i.e., they were not confounding; Cohen, Cohen, West, & Aiken, 2003).

Results

Sample Characteristics

Table 2.1 describes the sociodemographic and health characteristics of participants by race. The total sample included 695 men, 8.5% of whom were Black (n=59) and 91.5% of whom were White (n=636). Participants ranged from 34 to 83 years old and were, on average, in their mid-50s. Black participants were slightly younger than White participants (M=54.3, SD=10.0 vs. M= 57.1, SD=12.0, t(693)=2.07, p=.042) and were less likely to be married or cohabitating with a romantic partner at the time of data collection (62.7% vs. 83.2%, χ^2=14.96, p<.001). The majority of both Black and White men were parents. Overall, socioeconomic status was lower among Black men in the sample than White men: Black men had less education; were less likely to

have supervisory responsibilities (31.6% vs. 51.8%, χ^2=8.56, *p*=.004) and decision autonomy at work (*M*=19.44, *SD*=6.27 vs. *M*=23.04, *SD*=4.86, *t*(509)=3.70, *p*=.001). Black men had median annual household incomes 40% lower than the White men's ($39,000 vs. $65,625, *p*<.001). Comparable proportions of Black and White men were employed. Black men also reported worse health than White men: Black men were less likely to consider themselves to be in good physical health (72.9% vs. 89.0%, χ^2=12.93, *p*=.001) and reported more psychological distress (*M*=1.73, *SD*=.81 vs. *M*=1.51, *SD*=.44, *t*(693)= -2.10, *p*=.040) and functional limitations (*M*=1.74, *SD*=.87 vs. *M*=1.50, *SD*=.66, *t*(693)= -2.10, *p*=.048) than White men. Although the average number of common medical conditions Black and White men reported was comparable (*M*=1.46, *SD*=1.15 and *M*=1.15, *SD*=1.18, respectively), more Black men reported two of the seven conditions included in this study than White men: hypertension (55.9% vs. 36.8%, χ^2=8.36, *p*=.005) and diabetes (23.7% vs. 10.5%, χ^2=9.13, *p*=.005). Most Black and White men had health insurance.

Cortisol Data and Physiological Distress among Black and White Men

Cortisol data and physiological distress for Black and White men are presented in Table 2.2 and depicted in Figure 2.1. Average raw cortisol levels upon waking (T1), before lunch (T3), and at bedtime (T4) did not differ by race. Cortisol levels collected 30 minutes after waking (T2), which is when cortisol levels typically peak, were significantly lower among Black men than White men (*M*=14.48 nmols/L, *SD*=9.33 vs. *M*=25.68 nmols/L, *SD*=38.76, *t*(693)=2.12, *p*=.027). Reflective of this, Black men had more physiological distress than White men, as indicated by more blunted (closer to 0) T2 to T3 diurnal cortisol slopes (*M*= -.15, *SD*=.15 vs. *M*= -.21, *SD*=.11, *t*(693)= -2.97, *p*=.004). This racial disparity was evident when we examined physiological distress by age group, though racial differences were only statistically detectable among the early midlife (34-49 years) and senior (65+ years) age groups. The biomarker control variables indicated that Black men were more likely than White men to smoke (32.2% vs. 15.4%, χ^2=10.88, *p*=.003) and report atypical sleep schedules (28.8% vs. 8.8%, χ^2=22.99, *p*<.001) but less likely to use medications known to bias cortisol levels and patterns (11.9% vs. 28.0%, χ^2=7.19, *p*=.006). Data suggested that Black and White men were non-adherent to the lunch cortisol collection protocol at comparable rates..

Multivariate Analyses of Physiological Distress Predictors

When we regressed physiological distress on the predictor, sociodemographic, and biomarker control variables (Table 2.3, Model 1), number of common medical conditions was

marginally associated with physiological distress (*b*=.009, *SE*=.005, *p*=.057), but psychological distress and functional limitations were not. Being Black and lunch protocol non-adherent were also associated with more physiological distress (*b*=.048, *SE*=.016, *p*=.002 and *b*=.161, *SE*=.020, *p*<.001, respectively). None of the other sociodemographic and biomarker control variables were associated with physiological distress. We added the interaction of number of common medical conditions * race in Model 2 and found that race moderated the relationship between number of common medical conditions and physiological distress (*b*=.042, *SE*=.013, *p*=.002). Lunch protocol non-adherent was the only other variable associated with physiological distress (*b*=.159, *SE*=.020, *p*<.001) in Model 2.

Figure 2.2 depicts the interaction of number of common medical conditions and race on physiological distress. We graphed the conditional effects of Black and White race on three levels of common medical conditions: one standard deviation below the average number of conditions, which coincided with no conditions (none); the average number of conditions, which was 1.18 (average); and one standard deviation above the average, which coincided with 2.36 conditions (many). Simple slopes tests indicated that number of common medical conditions predicted physiological distress for Black men (*b*=.047, *t*(683)=3.56, *p*<.001) but not for White men (*b*=.005, *t*(683)=1.09, *p*=.277). The findings showed that Black and White men with no common medical conditions exhibited comparable levels of physiological distress. Among White men, physiological distress levels remained consistent regardless of how many common medical conditions they reported. In contrast, the more common medical conditions Black men had, the more physiological distress they had.

The race-stratified models (Table 2.4) confirmed that the number of common medical conditions was associated with physiological distress for Black men (*b*=.061, *SE*=.021, *p*=.005) but not White men, and the partial regression coefficient difference test indicated the coefficients for Black and White men were significantly different (*p*=.008). Lunch protocol non-adherent was associated with physiological distress for White men (*b*=.156, *SE*=.020, *p*<.001); although it did not achieve statistical significance in the model with Black men, this may be due to the small subsample size. None of the other measures were associated with physiological distress in the race-stratified models, and none differed by race.

The model with the full sample (Table 2.3, Model 2) explained 14.0% of the variability in physiological distress among Black and White men (*F*(11, 683)=10.10, *p*<.001). Notable

differences emerged, however, with the race-stratified models (Table 2.4). The predictor and control variables examined accounted for a moderate amount (10.8%) of variability in physiological distress among White men ($F(9,626)=8.44$, $p<.001$). In contrast, these same variables accounted for nearly three times as much (29.9%) variability in physiological distress among Black men ($F(9, 49) = 2.32$, $p=.03$), suggesting greater utility of these factors in understanding physiological distress among Black men.

Sensitivity Analyses

We replicated the main analyses after using multiple imputation to account for missing data. Only one variable was missing data for more than 5% of the sample (5.6%), which is a common benchmark below which multiple imputation is often unwarranted. Multiple imputation increased the sample size from 695 to 702. Pooled results were similar to those presented. We also used multilevel longitudinal modeling to differentiate individual fluctuations in physiological distress across the four cortisol collection days from differences between individuals. These results were also consistent with the findings presented. The interclass coefficient was .219, indicating a moderate amount of individual variability in physiological distress across days. Finally, we assessed the stability of the partial regression coefficients for the key variables of interest (e.g., # of common medical conditions and the interaction of race and # of common medical conditions) in more parsimonious models, eliminating age, medications, and/or atypical sleep schedule, with the full sample and the race-stratified samples, in turn. The direction, magnitude, and statistical significance in predicting physiological distress of the coefficients remained consistent when compared to the models presented herein.

Discussion

This study documented significant racial disparities in physiological distress among midlife and older U.S. men, in which Black men exhibited more blunted diurnal cortisol slopes indicative of impaired functioning of the biological systems involved in the stress response than White men. Racial disparities were more pronounced among older age groups of men than among younger men. This study also identified racial differences in proximal health predictors of physiological distress. The predictor and control variables examined in this study have been linked to physiological distress in previous research conducted with mixed gender and female samples (Adam et al., 2017; Adam & Kumari, 2009; Badrick et al., 2007; Cohen et al., 2006; Federenko et al., 2004; Fiorentino et al., 2012; Heaney et al., 2012b; Ice, 2005; Masharani et al.,

2005; Paradies, 2006; Staufenbiel et al., 2013; Sturmberg et al., 2017; Weinrib et al., 2010). The majority of these predictors, however, were not associated with physiological distress in the current study with men. Only one key predictor was associated with men's physiological distress, and it was moderated by race. Having a greater number of common medical conditions predicted more physiological distress for Black men but did not appear to be related to White men's physiological distress levels.

This study documented differences in physiological distress among men by race. Our findings, however, contribute to the larger literature focusing on inequities patterned according to the positioning of groups within the racially-stratified U.S. Race has profound meaning as one of the major categories of social identity and differentiation in the U.S. (LaVeist, 2000). Race can serve as a proxy for shared experiences of discrimination (for Blacks and other marginalized racial groups), privilege (for Whites), and the social and structural inequities linked to race within the contemporary U.S. (Geronimus & Thompson, 2004). For this reason, we elected to focus on the physiological implications of race, as opposed to self-reported racism or discrimination, in our analysis in order to capture the detrimental health effects of racism present at multiple levels and across multiple domains in men's lives.

Race also intersects with gender, age group, and other sociodemographic characteristics to shape lived experiences, exposure to stressors, access to coping opportunities and resources, and, ultimately, health (Gilbert et al., 2016). For example, Black men nationwide and in our study are less likely to be married/cohabitating and more likely to be of lower socioeconomic status. Although other researchers have demonstrated that these sociodemographic characteristics do not fully account for racial health disparities (Redmond, Baer, & Hicks, 2011), they do result in Black men being multiply marginalized, which exacerbates existing stressors, generates additional stressors, and creates barriers to effective coping (Jackson, Williams, & VanderWeele, 2016). Despite benefiting from male privilege in some ways, gender role strain can generate additional stressors in the lives of Black men, as social inequities and marginalization cause numerous economic, legal, and structural barriers to Black men achieving success in valued gender roles associated with hegemonic masculinity, particularly family economic provider and involved father (Bowman, 2006; Edin & Nelson, 2013; Gilbert et al., 2016; Griffith et al., 2011b).

The racial disparities and age-related patterns of men's physiological distress documented

in this study provide support for the growing body of evidence that stress and coping processes, and resultant chronic physiological distress, are key mechanisms through which social determinants of health (e.g., race and gender) generate and reproduce health disparities (Adam et al., 2017; Das, 2013; Geronimus, 1992; Geronimus et al., 2006; McEwen & Gianaros, 2010; Paradies, 2006; Schneiderman et al., 2005). If we extrapolate the findings from our cross-sectional study of men representing different age groups to reflect physiological distress trajectories over the life course, we would speculate that White men demonstrate fairly stable levels of physiological distress from early midlife on, but Black men do not. In addition, since young and midlife U.S. Black male adults have higher mortality rates than their counterparts belonging to other race and gender groups (CDC, 2015), our findings may reflect survival bias of hardier and healthier Black men who lived into the older age range of the MIDUS II sample (Preston, Hill, & Drevenstedt, 1998). Therefore, our findings may, in fact, underestimate racial disparities in physiological distress among adult Black and White men.

This study is one of the few to focus on physiological distress in an exclusively male sample. Sex differences in biology and hormone production linked to cortisol production are well known, even if sex differences in cortisol levels and patterns are less clear (Kudielka & Kirschbaum, 2005; Paris et al., 2010). This suggests that physiological distress measures and associated processes may not be comparable across gender. A key benefit of using physiological distress measures in men's health research is that they are objective. Rates of self-reported psychological distress are lower among men than women and may be biased by gender ideology (Addis & Cohane, 2005). Accordingly, because men are socialized to ignore and not share their feelings, they may be less likely to endorse the types of items typically included in mental health scales (Courtenay, 2000; Martin, Neighbors, & Griffith, 2013; Pederson & Vogel, 2007). Although the current study did not shed light on why men report low levels of psychological distress, we demonstrated that men do experience measurable physiological distress and that their levels of physiological distress varied in a manner consistent with membership in a marginalized racial group and due to proximal health factors (i.e., number of common medical conditions).

It is also notable that physiological distress was not associated with self-reported psychological distress in this study. This finding was consistent with a meta-analysis by Chida and Hamer (2008) that also found no associations between indicators of psychological distress

and physiological distress. Despite the fact that they are assumed to be closely related and are often conflated in the theoretical literature on stress processes, the absence of a relationship between these two dimensions of distress further emphasizes the need to recognize physiological and psychological distress as distinct concepts, at least for men. Further, these findings suggest that physiological and psychological distress may be differentially affected by stressors and stress and coping mechanisms and have different long-term health consequences. Jackson, Knight and Rafferty (2010) asserted that Blacks may develop behavioral strategies for coping with chronic stressors that favor their mental health while harming their physical health, such as overindulging on unhealthy comfort foods, smoking, and abusing drugs and alcohol.

More research is needed that identifies similarities and differences between psychological and physiological distress and the implications of these differences for efforts to improve men's health outcomes and reduce racial health disparities among men. For example, psychological distress measures are widely used in large-scale survey research intended to document and understand population-level health and health disparities in the U.S., such as the National Health and Nutrition Examination Survey (NHANES) and National Health Interview Survey (NHIS). If, however, physiological distress measures are found to be superior in predicting morbidity and mortality and/or explaining racial health disparities among men, this would justify the expansion of biomarker collection and, potentially, reassessment of the utility of including psychological distress measures.

Number of common medical conditions emerged as a driving force in explaining variations in physiological distress levels among Black men and disparities in physiological distress between Black and White men. Common medical conditions, such as those examined in this study (hypertension, heart disease, stroke, cancer, diabetes, chronic lower respiratory diseases, and bone-joint diseases) may have inherently different and more harmful effects on the lives and health of Black men than their White counterparts. If conditions generally considered to be more severe (e.g. heart disease, stroke, cancer) or more consistently linked to physiological distress (i.e., immune and inflammatory conditions, cancer; Adams et al., 2017) were distributed more heavily among the Black men in our study than the White men, that would help us to understand these findings, but that was not the case. Diabetes was more prevalent among the Black men, and can be accompanied by many complications, but hypertension was also more common, which many people live with for a long time without any obvious symptoms.

Additionally, in a systematic review and meta-analysis, cardiovascular conditions were not associated with physiological distress and studies examining diabetes showed small or null effects (Adams et al., 2017). Another possible explanation for our findings is that, on average, Black men have more severe and more poorly managed medical conditions than other sociodemographic subgroups (Gornick, 2003; Olives et al., 2013; Valderrama, Gillespie, & Mercado, 2013). This may be partly attributable to racial discrimination in healthcare settings, which has been linked to lower healthcare utilization and delayed receipt of care, lower rates of screening and adherence to medical recommendations, poor quality provider-patient communication and mistrust, more symptoms and complications, and poor health outcomes among Blacks in the U.S. and Black men, specifically (Assari et al., 2017; Shavers et al., 2012). Poorly managed common medical conditions are harder to cope with and interfere with men's lives and capacity to fulfill key social roles. Having multiple poorly managed medical conditions increases the likelihood that the conditions exacerbate and complicate each other, causing a constellation of interrelated and overlapping symptoms (Marengoni et al., 2011). Therefore, although the Black and White men in this study reported roughly the same number of common medical conditions, these conditions may add significantly more to the stressors that Black men experience and, as a consequence, their physiological distress. This suggests that preventing common medical conditions and improving their management may be effective strategies for reducing physiological distress among Black men.

The findings from the current study provide important information to guide intervention efforts to reduce physiological distress among men. First, objective measures of physiological distress may be superior for understanding and examining the effects of chronic stressors on men's bodies and men's health than self-report measures of psychological distress. Second, many factors assumed to influence physiological distress (e.g., psychological distress, functional limitations, smoking) may not warrant attention in interventions with men, either because their effects are unjustifiably small or because they are not relevant for men (Kudielka & Kirschbaum, 2005). Third, interventions need to attend to racial differences in patterns and predictors of physiological distress. Build on the findings from the current study, additional research can further our understanding of the interrelationships between psychological, physiological, and behavioral factors within stress mechanisms among Black men, and whether they differ from other race/ethnic and gender groups. Fourth, racial disparities in the magnitude of men's

physiological distress are likely attributable to both differences in distal risk and protective factors (e.g., severity and chronicity of stressors) and in more proximal factors (e.g., number of common medical conditions) related to the functioning of underlying stress mechanisms. This suggests a social ecological approach (Stokol, 1992) to understanding and intervening to reduce racial health disparities among men with complementary short- and long-term intervention strategies across multiple levels. Strategies likely need to address distal social and structural inequities that function as stressors in Black men's lives, enhance intermediary coping strategies and resources, and intervene upon key proximal predictive health factors. Finally, more immediate intervention strategies should seek to mitigate the effect of number of common medical conditions on Black men's physiological distress. There are a variety of strategies to improving the management of medical conditions involving formal healthcare. Black men would benefit from integrated, multidisciplinary approaches to healthcare provision that recognize the complexities of treating and managing co-occuring medical conditions. Further, patient-centered approaches that adopt a more holistic perspective on Black men's health may identify more effective strategies for reducing the negative ramifications of common medical conditions on Black men's lives (Sturmberg et al., 2017). This likely necessitates improvements in patient-provider communication and trust as well as attention to the factors that inhibit Black men from seeking healthcare or implementing provider recommendations, (Allen, Zebrack, Wittmann Hammelef, & Morris, 2014; Dunlop, 2002; Griffith, Allen, & Gunter, 2011a). Healthcare-based strategies to address common medical conditions among Black men can be paired with alternative approaches to providing men with health care and information. For example, it may be beneficial to engage trusted members of men's social networks who influence their health behaviors, especially female family members and partners (Allen, Griffith, & Gaines, 2013; Griffith, Ellis, & Allen, 2012), or to share physiological distress test results with men, since Black men have reported trusting test results more than healthcare providers (Griffith et al., 2011a).

Limitations

This study provided insight into racial differences in patterns and predictors of physiological distress among men. These findings should be interpreted in light of acknowledged limitations. First, given the variety of sampling strategies used in MIDUS II and NSDE II, findings were not weighted to be nationally representative. Second, sample size constrained our

analyses in several ways. We were unable to include comparisons to men of other races/ethnicities because their numbers were insufficient for generating robust findings in comparative analyses. The small subsample of Black men prevented us from conducting more complex age-group specific analyses and determining how many common medical conditions differentiated Black men's physiological distress levels from White men's. We were also limited in the number of variables we could include while maintaining sufficient power. Therefore, we did not examine indicators of socioeconomic status other than educational attainment. Racial health disparities generally persist after controlling for socioeconomic status, which often interacts with race in complex ways (Farmer & Ferraro, 2005; Williams, Mohammed, Leavell, & Collins, 2010). Examining the moderating role of SES on the relationship between race and physiological distress, however, was outside the scope of the current study. We may also have lacked statistical power in the race-stratified analyses to identify predictors of Black men's physiological distress with small effect sizes. This, however, further emphasizes the strength of the relationship between number of common medical conditions for Black men's physiological distress, as this predictor had a large enough effect size to be statistically significant even with the small sample size. Third, although diurnal cortisol slopes are one of the best measures for capturing chronic physiological distress currently available, they can be biased by lifestyle and measurement factors and demonstrate only moderate stability (Ross, Murphy, Adam, Chen, & Miller, 2014). To mitigate these shortcomings, we controlled for several biomarker cofounding factors, averaged slopes over four days, and conducted a series of sensitivity analyses. Some of these methods diverged from practices adopted by other cortisol researchers (e.g., controlling for confounders such as atypical sleep schedule rather than dropping those cases from the sample, not presenting multilevel model analyses); however, the objectives of this study and the relatively small subsample of Black men involved required a different approach. Fourth, as data reflect a cross-section of men belonging to different age groups, we could not examine changes in physiological distress over the life course. Forthcoming waves of MIDUS and NSDE data make this topic possible in future study. Finally, it is unknown how the time gap between when participants completed MIDUS II and NSDE II may have influenced the findings; although measures were selected to capture constructs that were fairly stable over time, the physiological distress data could reflect individual changes in predictor variables that occurred after that data were collected. We also cannot determine causality because neither the physiological distress

measure nor the common medical conditions measure captured time of onset. In all likelihood, the two concepts exerted reciprocal relationships, with medical conditions increasing some men's physiological distress while the distress increased their risk of developing new medical conditions.

Conclusions

This study enriches the literature on the underlying mechanisms of racial health disparities among men. We documented more physiological distress among Black men than among White men, which may account, in part, for the disproportionate burden of poor health outcomes affecting Black men found in national data. This study also identified racial differences in proximal predictors of physiological distress, specifically the relevance of number of common medical conditions for physiological distress among Black men, but not White men. The findings provide direction for intervention efforts aiming to reduce physiological distress disparities among men.

Table 2.1. Participant sociodemographic and health characteristics, by race

Characteristic	Black Men		White Men		$p^{\dagger}$
	%	*M* (*SD*)	%	*M* (*SD*)	
Sociodemographic					
Age, in years		54.3 (10.0)		57.1 (12.0)	**.042**
Married/cohabitating	62.7		83.2		**<.001**
Parent	86.4		84.0		.712
Educational attainment					
No HS degree/GED	13.6		4.7		**.011**
HS degree/GED	66.1		47.0		**.006**
BA/BS degree	10.2		30.7		**<.001**
Graduate/professional degree	10.2		17.6		.203
Employed	57.6		68.6		.109
Supervisory role, current/last job	31.6		51.8		**.004**
Decision autonomy, current/last job[a]		19.4 (6.27)		23.0 (4.86)	**.001**
Annual household income, median		$39,000		$65,625	**<.001**
Health					
Good physical health, self-assessed	72.9		89.0		**.001**
Psychological distress[b]		1.73 (.81)		1.51 (.44)	**.040**
# of common medical conditions		1.46 (1.15)		1.15 (1.18)	.058
Functional limitations[c]		1.74 (.87)		1.50 (.66)	**.048**
With health insurance	83.3		94.4		.083
Total *N*	59 (8.5%)		636 (91.5%)		

† two-tailed *t*, χ^2, and Mann-Whitney tests comparing Black and White men. Bold text indicates $p \leq .05$.

[a] Decision Authority Subcale (Karasek & Theorell, 1990); scores range from 5 (none) to 30 (a great deal).

[b] Negative Affect Scale; 1=none of the time; 2=a little of the time; 3=some of the time; 4=most of the time; 5=all of the time

[c] PF-10; 1=not at all; 2=a little; 3=some; 4=a lot

Table 2.2. Cortisol data and physiological distress, by race

Variables	Black Men		White Men		$p^{\dagger}$
	%	*M* (*SD*)	%	*M* (*SD*)	
Cortisol levels, raw values in nmols/L[a]					
Upon waking (T1)		11.31 (6.41)		20.06 (40.67)	.099
30 mins. after waking (T2)		14.48 (9.33)		25.68 (38.76)	**.027**
Before lunch (T3)		6.86 (3.11)		9.01 (10.97)	.134
Bedtime (T4)		4.84 (3.21)		7.37 (35.32)	.582
Physiological distress					
Overall		-.15 (.15)		-.21 (.11)	**.004**
Early midlife (34-49 yrs)		-.16 (.11)		-.22 (.11)	**.026**
Later midlife (50-64 yrs)		-.16 (.17)		-.21 (.11)	.168
Senior (65+ yrs)		-.11 (.18)		-.20 (.12)	**.010**
Biomarker controls					
Smoker	32.2		15.4		**.003**
Medications	11.9		28.0		**.006**
Atypical sleep schedule	28.8		8.8		**<.001**
Lunch protocol non-adherent	6.8		4.9		.528

† two-tailed *t* and χ^2 tests comparing Black and White men. Bold text indicates $p \leq .05$.
[a] Averaged over all collection days

Table 2.3. Predictors of men's physiological distress, full sample

Variables	Model 1			Model 2		
	b	*SE*	*p*†	*b*	*SE*	*p*†
Predictor						
Psychological distress	-.013	.010	.195	-.016	.010	.106
# common medical conditions	.009	.005	.057	.005	.005	.246
Functional limitations	.007	.008	.332	.006	.008	.436
Sociodemographic						
Age, in years	-.001	<.001	.142	-.001	<.001	.197
Educational attainment	-.008	.005	.160	-.009	.005	.107
Race (Black)	.048	.016	**.002**	-.011	.025	.656
Biomarker						
Smoker	.014	.012	.260	.014	.012	.241
Medications	.009	.010	.349	.010	.010	.315
Atypical sleep schedule	.009	.014	.540	.009	.014	.515
Lunch protocol non-adherent	.161	.020	**<.001**	.159	.020	**<.001**
Interaction						
# common medical conditions*race				.042	.013	**.002**
Intercept	-.167	.035	**<.001**	-.158	.035	**<.001**
R^2	.128			.140		
$F\ \Delta R^2$ (p)	10.01 (**<.001**)			9.73 (**.002**)		

† Bold text indicates $p \leq .05$

Table 2.4. Comparison of predictors of physiological distress for White and Black men

Variables	Black Men			White Men			$p^{‡}$
	b	*SE*	$p^{†}$	*b*	*SE*	$p^{†}$	
Predictor							
Psychological distress	-.051	.032	.116	-.007	.011	.513	.193
# common medical conditions	.061	.021	**.005**	.004	.005	.348	**.008**
Functional limitations	-.004	.034	.897	.007	.008	.392	.753
Sociodemographic							
Age, in years	-.002	.046	.406	<.001	<.001	.362	.948
Educational attainment	.015	.026	.559	-.010	.005	.069	.345
Biomarker							
Smoker	-.022	.046	.631	.021	.012	.089	.366
Medications	.022	.058	.709	.008	.010	.386	.812
Atypical sleep schedule	.055	.045	.227	.003	.015	.840	.273
Lunch protocol non-adherent	.147	.077	.063	.156	.020	**<.001**	.910
Intercept	-.093	.157	.557	-.178	.036	**<.001**	.597
R^2	.299			.108			
F	2.32 (**.029**)			8.44 (**<.001**)			

† Bold text indicates $p \leq .05$

‡ Two-tailed *z*-test comparing coefficients for Black and White men. Bold text indicates $p \leq .05$

Figure 2.1. Diurnal cortisol patterns

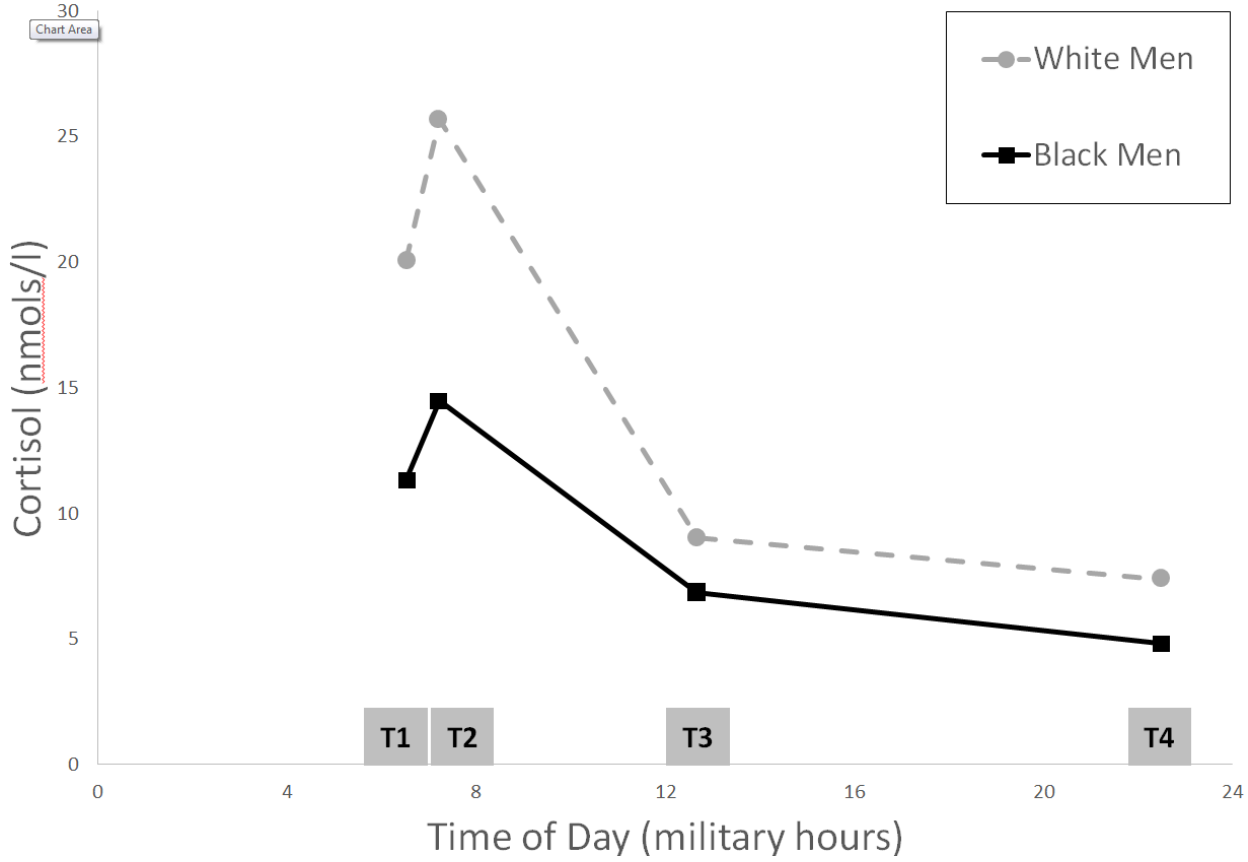
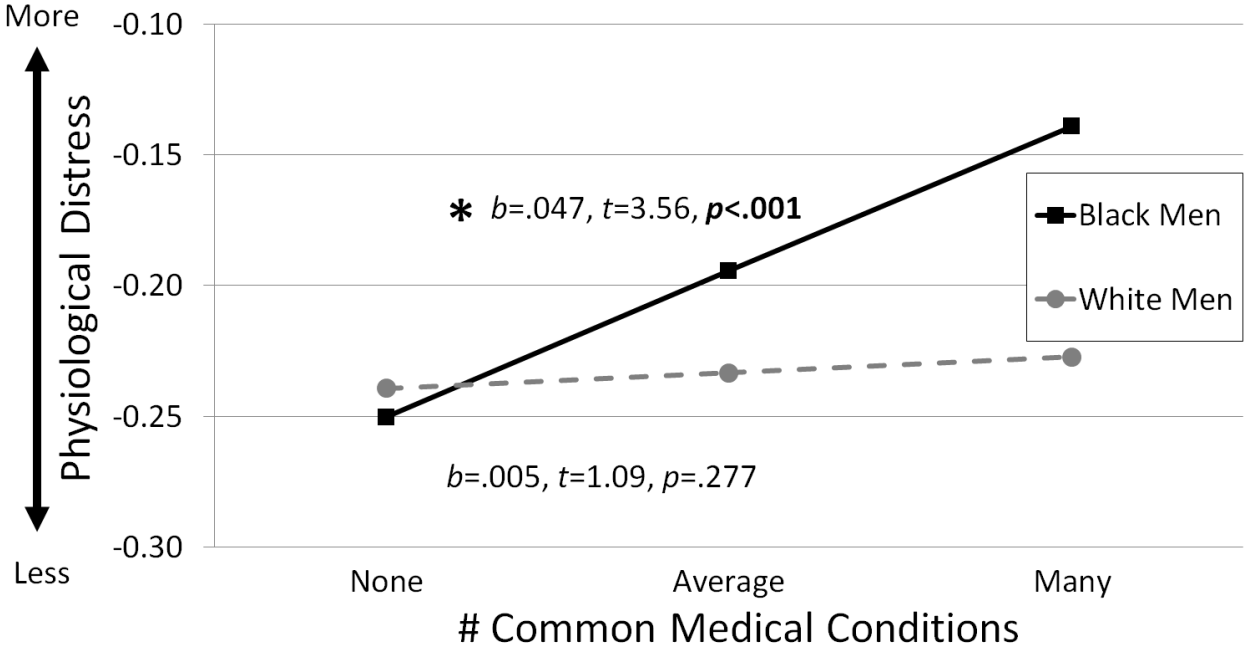


Figure 2.2. Relationships between physiological distress and # of common medical conditions for Black and White men



Based on average values for all other predictor, demographic, and biomarker control variables

References

Adam, E.K., Heissel, J.A., Zeiders, K.H., Richeson, J.A., Ross, E.C., Ehrlich, K.B., ... & Peck, S.C. (2015). Developmental histories of perceived racial discrimination and diurnal cortisol profiles in adulthood: A 20-year prospective study. *Psychoneuroendocrinology, 62*, 279-91.

Adam, E.K., & Kumari, M. (2009). Assessing salivary cortisol in large-scale, epidemiological research, *Psychoneuroendocrinology, 34*, 1423-36.

Adam, E.K., Quinn, M.E., Tavernier, R., McQuillan, M.T., Dahlke, K.A., & Gilbert, K.E. (2017). Diurnal cortisol slopes and mental and physical health outcomes: A systematic review and meta-analysis. *Psychoneuroendocrinology, 83, 25-41*.

Addis, M.E. (2008). Gender and depression in men. *Clinical Psychology; Science and Practice, 15*(3), 153-68.

Addis, M.E., & Cohane, G.H. (2005). Social scientific paradigms of masculinity and their implications for research and practice in men's mental health. *Journal of Clinical Psychology, 61*(6), 633-47.

Aiken, L.S., West, S.G., & Reno, R.R. (1991). *Multiple Regression: Testing and Interpreting Interactions*. Thousand Oaks, CA: Sage.

Allen, J.O., Griffith, D.M., & Gaines, H.C. (2013). "She looks out for the meals, period": African American men's perceptions of how their wives influence their eating behavior and dietary health. *Health Psychology, 32*(4), 447-55.

Allen, J.O., Zebrack, B., Wittmann, D., Hammelef, K., & Morris, A.M. (2014). Expanding the NCCN guidelines for distress management: A model of barriers to the use of coping resources. *The Journal of Community and Supportive Oncology, 12*(8), 271-7.

Almeida, D. M. (2005). Resilience and vulnerability to daily stressors assessed via diary methods. *Current Directions in Psychological Science, 14*, 64–8.

Almeida, D.M., Ayanian, J.S., Carr, D.S., Cleary, P.D., Coe, C., Davidson, R., … & Williams, D. (2007). Documentation of scales in Milwaukee Survey. *Midlife Development in the United States (MIDUS II): Milwaukee African American Sample, 2005-2006*. Madison, WI: Institute on Aging, University of Wisconsin.

Almeida, D.M., McGonagle, K.A., & King, H. (2009). Assessing daily stress processes in social surveys by combining stressor exposure and salivary control. *Biodemography and Social Biology, 55*, 220–38.

Arias, E., Heron, M., & Tejada-Vera, B. (2013). U.S. life tables eliminating certain causes of death, 1999-2001. *National Vital Statistics Report, 61*(9). Hyattsville, MD: National Center for Health Statistics.

Assari, S. (2017). Unequal gain of equal resources across racial groups. *International Journal of Health Policy and Management*. Advance online publication. doi: 10.15171/ijhpm.2017.90.

Assari, S., Lee, D.B., Nicklett, E.J., Lankarani, M.M., Piette, J.D., & Aikens, J.E. (2017). Racial discrimination in health care is associated with worse glycemic control among Black men byt not Black women with Type 2 diabetes. *Frontiers in Public Health, 5*, 235.

Badrick, E., Kirschbaum, C., & Kumari, M. (2007). The relationship between smoking status and cortisol secretion. *The Journal of Clinical Endocrinology & Metabolism, 92*(3), 819-24.

Bowman, P.J. (2006). Role strain and adaptation issues in the strength-based model: Diversity, multilevel, and life-span considerations. *Counseling Psychologist, 34*, 118-33.

Braveman, P., Egerter, S., & Williams, D.R. (2011). The social determinants of health: Coming

of age. Annual Review of Public Health, 32, 381-98.
Centers for Disease Control and Prevention (CDC). (2014a). *Leading Causes of Death in Males by Race and Age Group-United States, 2014*. Atlanta, GA: Division of Vital Statistics, National Center for Health Statistics, CDC.
Centers for Disease Control and Prevention (CDC). (2014b). Age-adjusted rates of diagnosed diabetes per 100 civilian, non-institutionalized population, by race and sex, United States, 1980-2014 (National Health Interview Survey data). Atlanta, GA: Division of Vital Statistics, National Center for Health Statistics, CDC.
Centers for Disease Control and Prevention (CDC). (2015). Deaths, percent of total deaths, and death rates for the 15 leading causes of death in 5-year age groups, by race and sex. United States, 2015, LCWK1. (National Vital Statistics System, Mortality 2015 data). Atlanta, GA: Division of Vital Statistics, National Center for Health Statistics, CDC.
Chae, D.H., Nuru-Jeter, A.M., Adler, N.E., Brody, G.H., Lin, J., Blackburn, E.H., & Epel, E.S. (2014). Discrimination, racial bias, and telomere length in African-American men. *American Journal of Preventive Medicine, 46*(2), 103-11.
Charles, S.T. (2010). Strength and Vulnerabilities Integration: A model of emotional well-being across adulthood. *Psychological Bulletin, 136*(6), 1068-91.
Cheatham, C.T., Barksdale, D.J., & Rodgers, S.G. (2008). Barriers to health care and health-seeking behaviors faced by black men. *Journal of the American Association of Nurse Practitioners, 20*(11), 555-62.
Chida, Y., & Hamer, M. (2008). Chronic psychosocial factors and acute physiological responses to laboratory-induced stress in healthy populations: A quantitative review of 30 years of investigations. *Psychological Bulletin, 134*(6), 829-85.
Clogg, C.C., Petkova, E., & Haritou, A. (1995). Statistical methods for comparing regression coefficients between models. *American Journal of Sociology, 100*(5), 1261-93.
Cohen, J., Cohen, P., West, S.G., & Aiken, L.S. (2003). *Applied Multiple Regression/Correlation Analysis for the Behavioral Sciences, 3rd Edition*. New York: Routledge.
Cohen, S., Schwartz, J.E., Epel, E., Kirschbaum, C., Sidney, S., & Seeman, T. (2006). Socioeconomic status, race, and diurnal cortisol decline in the Coronary Artery Risk Development in Young Adults (CARDIA) Study. *Psychosomatic Medicine, 68*, 41–50.
Courtenay, W.H. (2000). Constructions of masculinity and their influence on men's well-being: A theory of gender and health. *Social Science & Medicine, 10*, 1385–1401.
Das, A. (2013). How does race get "under the skin"?: Inflammation, weathering, and metabolic problems in late life. *Social Science and Medicine, 77*, 75-83.
Dmitrieva, N.O., Almedia, D.M., Dmitrieva, J., Loken, E., & Pieper, C.F. (2013). A day-centered approach to modeling cortisol: Diurnal cortisol profiles and their associations among U.S. adults. *Psychoneuroendocrinology, 38*, 1254-65.
Doane, L.D., Chen, F.R., Sladek, M.R., Van Lenten, S.A., & Granger, D.A. (2015). Latent trait cortisol (LTC) levels: Reliability, validity, and stability. *Psychoneuroendocrinology, 55*, 21-35.
Dunlop, D.D. (2002). Gender and ethnic/racial disparities in health care utilization among older adults. *The Journals of Gerontology; Series A; Biological Sciences and Medical Sciences, 57*, S221-33.
Edin, K., Nelson, T.J. (2013). *Doing the Best I Can*. Berkley, CA: University of California Press.
Ellis, K.R., Griffith, D.M., Allen, J.O., Thorpe, R.J. Jr., & Bruce, M.A. (2015). "If you do nothing about stress, the next thing you know, you're shattered": Perspectives on African

American men's stress, coping and health from African American men and key women in their lives. *Social Science & Medicine, 139*, 107-14.
Farmer, M.M., & Ferraro, K.F. (2005). Are racial disparities in health conditional on socioeconomic status? *Social Science & Medicine, 60*(1), 191-204. doi: 10.1016/j.socscimed.2004.04.026.
Federenko, I., Wust, S., Hellhammer, D.H., Dechoux, R., Kumsta, R., & Kirschbaum, C. (2004). Free cortisol awakening responses are influenced by awakening time. *Psychoneuroendocrinology 29*, 174-84.
Fiorentino, L., Saxbe, D., Alessi, C.A., Woods, D.L., & Martin, J.L. (2012). Diurnal cortisol and functional outcomes in post-acute rehabilitation patients. *Journals of Gerontology Series A: Biomedical Sciences and Medical Sciences, 67*(6), 677-82.
Geronimus, A.T. (1992). The weathering hypothesis and the health of African-American women and infants: Evidence and speculations. *Ethnicity and Disease, 2*, 207–21.
Geronimus, A.T., Bound, J., Waidmann, T.A., Colen, C.G., & Steffick, D. (2001). Inequality in life expectancy, functional status, and active life expectancy across selected Black and White populations in the U.S. *Demography, 38*, 227-51.
Geronimus, A.T., Hicken, M., Keene, D., & Bound, J. (2006). "Weathering" and age patterns of allostatic load scores among Blacks and Whites in the United States. *American Journal of Public Health, 96*(5), 826-33.
Geronimus, A.T., Keene, D., Hicken, M., & Bound, J. (2007). Black-White differences in age trajectories of hypertension prevalence among adult women and men, 1999-2002. *Ethnicity and Disease, 17*(1), 40-8.
Geronimus, A.T., & Thompson, J.P. (2004). To denigrate, ignore, or disrupt: Racial inequality in health and the impact of a policy-induced breakdown of African American communities. *Due Bois Review, 1*(2), 247-79.
Gilbert, K.L., Ray, R., Siddiqi, A., Shetty, S., Baker, E.A., Elder, K., & Griffith, D.M. (2016). Visible and invisible trends in Black men's health: Pitfalls and promises for addressing racial, ethnic, and gender inequities in health. *Annual Reviw of Public Health, 37*, 295-311.
Goffman, A. (2014). *On the Run: Fugitive Life in an American City*. Chicago, IL: University of Chicago Press.
Good, G.E., Robertson, J.M., Fitzgerald, L.F., Stevens, M., & Bartels, K.M. (1996). The relation between masculine role conflict and psychological distress in male university counseling clients. *Journal of Counseling & Development, 76*, 44-9.
Gornick, M.E. (2003). A decade of research on disparities in Medicare utilization: Lessons for the health and health care of vulnerable men. *American Journal of Public Health, 93*(5), 753-9.
Granger, D.A., Hibel, L.C., Fortunato, C.K., & Kapelewski, C.H., 2009. Medication effects on salivary cortisol: Tactics and strategy to minimize impact in behavioral and developmental science. *Psychoneuroendocrinology 34*, 1437-48.
Griffith, D.M., Allen, J.O., & Gunter, K. (2011a). Social and cultural factors influence African American men's medical help-seeking. *Research on Social Work Practice, 21*(3), 337-47.
Griffith, D.M., Ellis, K.R., & Allen, J.O. (2012). How does health information influence African American men's health behavior? *American Journal of Men's Health, 6*(2), 156-63.
Griffith, D.M., Ellis, K.R., & Allen, J.O. (2013). An intersectional approach to social determinants of stress and African American men's health: Men's and women's

perspectives. *American Journal of Men's Health, 7(Suppl. 4), S19-30*.
Griffith, D.M., Gunter, K., & Allen, J.O. (2011b). Male gender role strain as a barrier to African American men's physical activity. *Health Education and Behaviors, 38*(5), 482-91.
Heaney, J.L., Phillips, A.C., & Carroll, D. (2012a). Aging, health behaviors, and the diurnal rhythm and awakening response of salivary cortisol. *Experimental Aging Research, 38*(3), 295-314.
Heaney, J.L., Phillips, A.C., & Carroll, D. (2012b). Ageing, physical function, and the diurnal rhythms of cortisol and dehydroepiandrosterone. *Psychoneuroendocrinology, 37*(3), 341-9.
Heffernan, K.S., Jae, S.Y., Wilund, K.R., Woods, J.A, & Fernhall, B. (2008). Racial differences in central blood pressure and vascular function in young men. *American Journal of Physiology-Heart Circulatory Physiology, 295,* H2380–7.
Ice, G.H. (2005). Factors influencing cortisol level and slope among community dwelling older adults in Minnesota. *Journal of Cross-Cultural Gerontology*, *20*(2), 91-108.
Ice, G.H., Katz-Stein, A., Himes, J., & Kane, R.L. (2004). Diurnal cycles of salivary cortisol in older adults. *Psychoneuroendocrinology, 29*, 355-70.
Jaccard, J. (2001). *Interaction Effects in Logistic Regression*. Thousand Oaks, CA: Sage.
Jackson, J.S., Knight, K.M., & Rafferty, J.A. (2010). Race and unhealthy behaviors: Chronic stress, the HPA axis, and physical and mental health disparities over the life course. *American Journal of Public Health, 100,* 933-9.
Jackson, J.W., Williams, D.R., & VanderWeele, T.J. (2016). Disparities at the intersection of marginalized groups. *Social Psychiatry and Psychiatric Epidemiology*, *51*(10), 1349-59.
Jones, C.P. (2000). Levels of racism: A theoretical framework and a gardener's tale. *American Journal of Public Health, 90*, 1212-5.
Juster, R-P., McEwen, B.S., & Lupien ,S.J. (2010). Allostatic load biomarkers of chronic stress and impact on health and cognition. *Neuroscience & Biobehavioral Reviews, 35*(1), 2-16.
Kaiser, C.R., Miller, C.T. (2001). Stop complaining! The social costs of making attributions to discrimination. *Personality and Social Psychology Bulletin, 27*(2), 254-63.
Karasek, R.A., & Theorell, T. (1990). *Healthy Work: Stress, Productivity, and the Reconstruction of Working Life.* New York: Basic Books.
Kudielka, B.M., & Kirschbaum, C. (2005). Sex differences in HPA axis responses to stress: A review. *Biological Psychology, 69*(1), 113-132.
LaVeist, T.A. (2000). On the study of race, racism, and health: A shift from description to explanation. *International Journal of Health Services,* 30(1), 217–9.
Leimkűhler, A.M.M., Heller, J., & Paulus, N.-C. (2007). Subjective well-being and 'male depression' in male adolescents. *Journal of Affective Disorders, 98*(1-2), 65-72.
Lichter, D.T., Parisi, D., & Taquino, M.C. (2012). The geography of exclusion: Race, segregation, and concentrated poverty. *Social Problems*, *59*(3), 364-88.
Marengoni, A., Angleman, S., Melis, R., Mangialasche, F., Karp, A., Garmen, A., ... & Fratiglioni, L. (2011). Aging with multimorbidity: A systematic review of the literature. *Ageing Research Reviews*, *10*(4), 430-9.
Martin, L.A., Neighbors, H.W., & Griffith, D.M. (2013). The experience of symptoms of depression in men vs women: Analysis of the National Comorbidity Survey Replication. *JAMA Psychiatry, 70*(10), 1100-6.
Masharani, U., Shiboski, S., Eisner, M.D., Katz, P.P., Janson, S.L., Grainger, D.A., & Blanc, P.D., 2005. Impact of exogenous glucocorticoid use on salivary cortisol measurements

among adults with asthma and rhinitis. *Psychoneuroendocrinology, 30,* 744-52.
Mauer, M. (2011). Addressing racial disparities in incarceration. *The Prison Journal, 91*(3), 87S-101S.
McEwen, B.S., & Gianaros, P.J. (2010). Central role of the brain in stress and adaptation: Links to socioeconomic status, health, and disease. *Annals of the New York Academy of Sciences, 1186,* 190-222.
Miller, G.E., Chen, E., & Zhou, E.S. (2007). If it goes up, must it come down? Chronic stress and the hypothalamic-pituitary-adrenocortical axis in humans. *Psychological Bulletin, 133*(1), 25-45.
Miniño, A.M. (2013). *Death in the United States, 2011*. NCHS data brief, no 115. Hyattsville, MD: National Center for Health Statistics.
National Cancer Institute (NCI). (2008). *Cancer Health Disparities FactSheet.* Accessed 2016.07.15 from www.cancer.gov.
National Heart, Lung, and Blood Institute (NHLBI). (2012). *Fact Book, Fiscal Year 2012*. NHLBI, National Institutes of Health, U.S. Department of Health and Human Services.
Olives, C., Myerson, R., Mokdad, A.H., Murray, C.J.L., & Lim, S.S. (2013). Prevalence, awareness, treatment, and control of hypertension in U.S. counties, 2001–2009. *PLoS ONE, 8*(4): e60308.
Paradies, Y. (2006) A review of psychosocial stress and chronic disease for 4th world indigenous people and African Americans. *Ethnicity & Disease, 16,* 195-308.
Paris, J.J., Franco, C., Sodano, R., Freidenberg, B., Gordis, E., Anderson, D.A., … & Frye, C.A. (2010). Sex differences in salivary cortisol in response to acute stressors among healthy participants, in recreational or pathological gamblers, and in those with posttraumatic stress disorder. *Hormones and Behavior, 57*(1), 35-45.
Pederson, E.L., & Vogel, D.L. (2007). Male gender role conflict and willingness to seek counseling: Testing a mediation model on college-aged men. *Journal of Counseling Psychology, 54*(4), 373-48.
Piazza, J.R., Almeida, D.M., Dmitrieva, N.O., & Klein, L.C. (2010). Frontiers in the use of biomarkers of health in research on stress and aging. *Journal of Gerontology: Psychological Science, 65B*(5), 513-25.
Piazza, J.R., Charles, S.T., Stawski, R.S., & Almeida, D.M. (2013). Age and the association between negative affective states and diurnal cortisol. *Psychology and Aging, 28*(1), 47-56.
Preston, S. H., Hill, M.E., & Drevenstedt, G.L. (1998). Childhood conditions that predict survival to advanced ages among African–Americans. *Social Science & Medicine, 47*(9), 1231-46.
Radler, B.T., & Ryff, C.D. (2010). Who participates? Accounting for longitudinal retention in the MIDUS National Study of Health and Well-Being. *Journal of Aging Health, 22*, 307-31.
Raghunathan, T.E. (2004). What do we do with missing data? Some options for analysis of incomplete data. *Annual Review of Public Health, 25*, 99-117.
Redmond, N. Baer, H.J., & Hicks, L.S. (2011). Health behaviors and racial disparity in blood pressure control in the National Health and Nutrition Examination Survey. *Hypertension, 57*, 383-9**.**
Ross, K.M., Murphy, M.L.M., Adam, E.K., Chen, E., & Miller, G.E. (2014). How stable are diurnal cortisol activity indices in healthy individuals/ Evidence from three multi-wave

studies. *Psychoneuroendocrinology, 39*, 184-93.
Ryff, C., Almeida, D.M., Ayanian, J.S., Carr, D.S, Cleary, P.D., Coe, C., …Williams, D. (2006). *Midlife in the United States (MIDUS), 2004–2006.* ICPSR04652-v6. Ann Arbor, MI: Inter-university Consortium for Political and Social Research [distributor], 2012-04-18. https://doi.org/10.3886/ICPSR04652.v6
Ryff, C., Almeida, D., Ayanian, J.S., Carr, D.S, Cleary, P.D., Coe, C., …Williams, D. (2012). *Midlife Development in the United States (MIDUS II): Milwaukee African American Sample, 2005-2006* (ICPSR 22840). ICPSR22840-v2. Ann Arbor, MI: Inter-university Consortium for Political and Social Research [distributor], 2012-05-21. https://doi.org/10.3886/ICPSR22840.v2
Scherer, K.R. (2001). Appraisal considered as a process of multilevel sequential checking. In K.R. Scherer, A. Schorr, & T. Johnstone (Eds.), *Appraisal Processes in Emotion: Theory, Methods, Research* (pp. 92-120). Oxford, Englad: Oxford University Press.
Schneiderman, N., Ironson, G., & Siegel, S.D. (2005). Stress and health: Psychological, behavioral, and biological determinants. *Annual Review of Clinical Psychology, 1*, 607-28.
Shavers, V.L., Fagan, P., Jones, D., Klein, W.M., Boyington, J., Moten, C., & Rorie, E. (2012). The state of research on racial/ethnic discrimination in the receipt of health care. *American Journal of Public Health*, *102*(5), 953-66.
Smith, W.A., Allen, W.A., & Danley, L.L. (2007). "Assume the position…you fit the description": Psychosocial experiences and racial battle fatigue among African American male college students. *American Behavioral Scientist, 51*(4), 551-78.
Staufenbiel, S.M., Penninx, B.W.J.H., Spijker, A.T., Elzinga, B.M., & van Rossum, E.F.C. (2013). Hair cortisol, stress exposure, and mental health in humans: A systematic review. *Psychoneuroendocrinology, 38*, 1220-35.
Stawski, R.S., Cichy, K.E., Piazza, J.R., & Almeida, D.M. (2013). Associations among daily stressors and salivary cortisol: Findings from the national study of daily experiences. *Psychoneuroendocrinology, 38*, 2654–65.
Steele, C.M. (2010). *Whistling Vivaldi: How Stereotypes Affect Us and What We Can* Do. NY: W.W. Norton & Co.
Stokols, D. (1992). Establishing and maintaining health environments: Toward a social ecology of health promotion. *American Psychologist, 47*(1), 6-22.
Sturmberg, J.P., Bennett, J.M., Martin, C.M., & Picard, M. (2017). 'Multimorbidity' as the manifestation of network disturbances. *Journal of Evaluation in Clinical Practice, 23*(1), 199-208.
U.S. Department of Health and Human Services (USDHHS), Office of Disease Prevention and Health Promotion. (2001). *Healthy People 2000 Final Review*. Hyattsville, MD: Public Health Service.
U.S. Department of Health and Human Services (USDHHS). (2009). Code of Federal Regulations, Title 45: Public welfare, Part 46: Protection of Human Subjects. Accessed 10/20/2017 from www.hhs.gov. www.hhs.gov/ohrp/regulations-and-policy/regulations/45-cfr-46/index.html#46.101
Valderrama, A.L., Gillespie, C., & Mercado, C. (2013). Racial/ethnic disparities in the awareness, treatment, and control of hypertension-U.S., 2003-2010. *MMWR, 62*(18), 351-5.
Wang, X., Sánchez, B.N., Golden, S.H., Shrager, S., Kirschbaum, C., Karlamangla, A.S., … & Roux, A.V.D. (2014). Stability and predictors of change in salivary cortisol measures

over six years: MESA. *Psychoneuroendocrinology, 49*, 310-20.
Ward, B.W., & Schiller, J.S. (2013). Prevalence of multiple chronic conditions among US adults: Estimates from the National Health Interview Survey, 2010. *Preventing Chronic Disease, 10*, 120203.
Ware, J.E., Jr., & Sherbourne, C.D. (1992). The MOS 36-item short-form health survey (SF-36): Conceptual framework and item selection. *Medical Care, 30*, 473–83.
Warner, D.F., & Hayward, M.D. (2007). Early-life origins of the race gap in men's mortality. *Journal of Health and Social Behavior, 47*(3), 209-26.
Weinrib, A.Z., Sephton, S.E., DeGeest, K., Penedo, F., Bender, D., Zimmerman, B., … & Lutgendorf, S.K. (2010), Diurnal cortisol dysregulation, functional disability, and depression in women with ovarian cancer. *Cancer, 116*, 4410–9.
White, D.K., Wilson, J.C., & Keysor, J.J. (2011). Measures of adult general functional status. *Arthritis Care & Research, 63*(S11), S297-307.
Williams, D.R. (2003). The health of men: Structured inequalities and opportunities. *American Journal of Public Health, 93*(5), 724-731.
Williams, D.R., & Mohammed, S.A. (2009). Discrimination and racial disparities in health: Evidence and needed research. *Journal of Behavioral Medicine, 32*(1), 20-47.
Williams, D.R., & Mohammed, S.A. (2013). Racism and health I: Pathways and scientific evidence. *American Behavioral Scientist, 57*(8), 1152-73.
Williams, D.R., Mohammed, S.A., Leavell, J., & Collins, C. (2010). Race, socioeconomic status, and health: Complexities, ongoing challenges, and research opportunities. *Annals of the New York Academy of Sciences, 1186*(1), 69-101. doi: 10.1111/j.1749-6632.2009.05339.x.
Yoon, S.S., Fryar, C.D., & Carroll, M.D. (2015). *Hypertension Prevalence and Control among Adults: United States, 2011–2014*. NCHS Data Brief, no 220. Hyattsville, MD: National Center for Health Statistics. 2015.

CHAPTER 3

Coping and Physiological Distress among Black and White Men in the U.S.

Abstract

Chronic distress accelerates biological aging and is linked to chronic illness, poor quality of life, and premature mortality. Physiological distress biomarkers, such as cortisol, represent a key proximal outcome of stress and coping processes through which social determinants of health, such as race and gender, are posited to generate health disparities. This study examined the effectiveness of several coping strategies in predicting chronic physiological distress among Black and White midlife and older male participants in the National Survey of Midlife Development in the United States (MIDUS) II. Overall, Black and White men reported similar coping strategies, including those they consciously adopted as well as coping behaviors that men may not be aware they employed in response to stressors. Exceptions were that Black men reported more positive reinterpretation, denial, drug use, and physical inactivity than White men. Out of 12 coping strategies tested, ten coping strategies were unrelated to physiological distress for both Black or White men. Religious and spiritual coping was protective for White men against physiological distress but not among Black men. Black men who reported drug use had less physiological distress than those who abstained, while drug use was unrelated to White men's physiological distress. Implications to reduce racial health disparities among men include focusing on distal determinants of physiological distress, such as stressors associated with social inequities (e.g., institutional racism). Additionally, more research investigating unanticipated findings from this study holds promise for the development of tailored interventions to reduce racial disparities in physiological distress among men.

Introduction

Black[3] men have poorer health and shorter average lifespans than other

[3] We consider "Black" and "White" to be complex, socially-constructed racial categories that reflect an array of historic, geographic, cultural, political, and economic factors that coalesce to shape individuals' lived experiences and, ultimately, health.

race/ethnic and gender groups in the U.S. population (Miniño, 2013; USDHHS, 2001; Warner & Hayward, 2006). Black men develop aging-related diseases earlier in life, and their conditions tend to be more poorly controlled, more severe, and accompanied by more serious complications and greater disability (Geronimus, Keene, Hicken, & Bound, 2007; Heffernan, Jae, Wilund, Woods, & Fernhall, 2008; Olives, Myerson, Mokdad, Murray, & Lim, 2013; Williams, 2003). A robust and well-established literature links racial health disparities to political, economic, historic, and social inequities in the U.S. (Braveman, Egerter, & Williams, 2011; Geronimus & Thompson, 2004; Gilbert et al., 2016; Warner & Hayward, 2006; Williams & Mohammed, 2013). These social and structural determinants of men's health are deeply entrenched in our society and altering them is a challenging and protracted process. Research efforts that provide a better understanding of how broad social and structural factors get "under the skin" to affect health may offer insight into specific leverage points for more immediate intervention to reduce racial health disparities among men.

Several researchers contend that chronic distress resulting from social inequities is a proximal outcome of stress and coping mechanisms that generate and reproduce racial health disparities in the U.S. (Braveman et al., 2011; Das, 2013; Geronimus, 1992; Geronimus, Hicken, Keene, & Bound, 2006; Juster, McEwen, & Lupien, 2010; Paradies, 2006; Schneiderman, Ironson, & Siegel, 2005; Warner & Hayward, 2007). Researchers have linked stressors associated with social inequities (e.g., racism and discrimination) to psychological distress (Paradies et al., 2015). Research using indicators of physiological distress, however, is still relatively new. In Chapter 2, we established that midlife and older Black men demonstrated more physiological distress than their White counterparts. We know less, however, about whether how men cope explains disparities in physiological distress. For example, are there race-based differences in the types of coping strategies men employ that contribute to racial disparities in physiological distress? Is there differential return on coping strategies for Black and White men's physiological distress, such that Black men benefit less or are more vulnerable to being harmed more by certain strategies? The purpose of the current study was to explore race-based differences in the relationships between different coping strategies and physiological distress

---

We use these broad terms that reference skin color and appearance, rather than self-identification with a particular ethnic group, because external perceptions and categorizations of people's race influence exposure to stressors and access to opportunities in the U.S. (Jones, 2000). Blacks continue to experience interpersonal and institutional racism and social marginalization, while Whites benefit from the privileges associated with affiliation with the dominant White racial group in the U.S. that, collectively, possesses the bulk of political, economic, and social power.

among midlife and older Black and White men. This allowed us to examine the importance of different coping strategies in predicting men's physiological distress. In addition, we were able to compare our findings to previous research examining prominent models that link coping to racial disparities in physical health outcomes such as the Environmental Affordances Framework (Jackson, Knight, & Rafferty, 2010; Mezuk et al., 2013) and John Henryism (Bennett et al., 2004; James, Hartnett, & Kalsbeek, 1983; James, Keenan, Strogatz, Browning, & Garrett, 1992; James, Strogatz, Wing, & Ramsey, 1987).

Stress and Coping Processes and Men's Health

When faced with a stressor—a source of stress that is a threat to one's homeostasis and well-being—individuals experience a combination of interdependent psychological, physiological, and behavioral responses. Cognitive processes may involve appraising the stressor to assess the level of threat and available coping options. The nervous system activates the hypothalamic-pituitary-adrenocorticoid (HPA) axis, which releases a flood of stress hormones such as cortisol that allow the body to react in a fight or flight manner, as needed. An individual may alter their emotional response and/or behavior by adopting one or more coping strategies. Effective coping can mitigate resultant distress, enabling the body and its various systems to return to a normal state. This response to a stressor is adaptive and an essential part of healthy human functioning. When, however, individuals face stressors over a prolonged period and their coping efforts are insufficient, their nervous systems' stress responses become dysregulated. In response to stressors, the HPA axis does not generate a surge in stress hormones when necessary or as a part of natural occurring daily fluctuations (Miller, Chen, & Zhou, 2007), a condition termed chronic physiological distress. Furthermore, other systems in the body are affected and deteriorate over time (McEwen & Gianaros, 2010), which, over the life course, can lead to the development of a variety of chronic mental and physical health conditions and premature mortality (Juster et al., 2010).

Coping is considered a key process that mediates exposure to stressors and their effects on health and wellbeing (Folkman, 1997; Folkman & Moskowitz, 2000; Lazarus, 1991; Lazarus & Folkman, 1984). Although effective coping can reduce the negative consequences of stressors on people's lives, coping efforts can also be ineffectual, harmful, or have mixed results that improve some health outcomes while exacerbating others. Factors affecting coping responses and their effectiveness include interactions involving individual (personality traits, preferred

coping approaches), contextual (types and chronicity of stressors, access to coping resources), and societal (masculine and racial ideologies, roles, and expectations) influences. We conceptualized coping strategies as including both general orientations, as well as behaviors that men may or may not consciously employ in response to stressors. Some researchers do not consider unconscious strategies to reflect coping; however, individuals do not always recognize stressors and may unconsciously enact coping efforts through innate (sensory-motor) and learned (scheme-based) processes (Scherer, 2001). Further, men often have unconscious responses to stressors and may be aware of how stressors influence their lives and behavior even if they do not consider these responses as being reflective of coping (Ellis, Griffith, Allen, Thorpe, & Bruce, 2015).

Coping is generally recognized as having several dimensions, although there is little consensus in the field about what these are. The Transactional Model of Stress and Coping (Folkman, 1997; Folkman & Moskowitz, 2000; Lazarus, 1991; Lazarus & Folkman, 1984) categorizes coping strategies as either problem-focused (i.e., individuals seek to directly address stressors) or involving emotional regulation (i.e., individuals try to change their emotional response to stressors). Although widely used, this categorization of coping strategies overlooks coping strategies that reduce physiological responses to stressors. Other common approaches to categorizing coping strategies consider whether strategies are: 1) cognitive or behavioral; 2) characterized by engagement or disengagement; or 3) adaptive (i.e., "good") or maladaptive (i.e., "bad") (Skinner, Edge, Altman, & Sherwood, 2003). Coping strategies commonly categorized as adaptive include positive reinterpretation, active problem solving, seeking social support, religious and spiritual coping, and being physically active. Coping strategies commonly considered maladaptive include denial, behavioral disengagement, social isolation, and avoidance or self-medication through eating comfort foods, drug use, or alcohol abuse. Overall, categorizing coping strategies by dimensions is problematic conceptually and in application (Mezuk et al., 2017; Skinner et al., 2003). This practice risks masking the different effects a single coping strategy may have for different health outcomes. Further, relationships between coping strategies and health outcomes may vary according to individuals' sociodemographic characteristics (e.g., gender, race) or over different time spans (i.e., short- versus long-term effects).

Previous research documents sex and gender differences in stressors, coping, and

associated health outcomes, including physiological distress (Bowman, 1989; 2006; Courtenay, 2000; Davis, Matthews, & Twamley, 1999; Evans, Frank, Offile, & Gregory, 2011; Kudielka & Kirschbaum, 2005; McDonough & Walters, 2001; Paris et al., 2010). Men, as compared to women, tend to employ more problem-focused strategies and less emotion-focused strategies (Courtenay, 2000; Nolen-Hoeksema, 2012). Men may also engage in other gendered strategies to cope with stressors such as denial, social isolation, and drug and alcohol use (Courtenay, 2000; Evans et al., 2011). Stress and coping processes and their influences on health reflect the interplay of biological, social, and contextual factors. We do not know, however, to what extent sex-based differences in the relationships between coping and health are due to biological sex difference or the influences of gender ideologies, roles, and expectations. Given this, sex- and gender-specific research is critical to better understand and address stress and coping mechanisms and their effects on physiological distress.

Biomarkers of physiological distress play a central role in research on stress and coping processes and associated health outcomes. Biomarkers allow for the examination of physiological reactions to stressors, the cumulative effects of unmitigated physiological distress over time, as well as the effectiveness of different coping strategies. Biomarkers of physiological distress include blood pressure, heart rate, catecholamine, α-amylase, cortisol, dehydroepiandrosterone (DHEA), anti-inflammatory cytokines, and telomere length (Piazza, Almeida, Dmitrieva, & Klein, 2010). Cortisol has been most widely used in research examining stress processes and population-level health outcomes. Objective biomarkers may be especially valuable in men's health disparities research, as men tend to misattribute and minimize stressors and resultant psychological distress, especially when associated with discrimination (Good, Robertson, Fitzgerald, Stevens, & Bartels, 1996; Kaiser & Miller, 2001).

Stress Processes and Health Disparities

Although everyone experiences stressors, socially and structurally marginalized populations experience more stressors overall, more chronic stressors, and have fewer mitigating resources (Geronimus, 1992). The Weathering Hypothesis describes a general pathway linking social inequities, stress processes, and health disparities (Geronimus et al., 2006). Social inequities are social and contextual conditions that promote marginalization of certain sociodemographic groups (e.g., Blacks, women, poor) while privileging others (e.g., Whites, men, wealthy) through differential access to political, economic, and social power. The

Weathering Hypothesis posits that exposure to objective and subjective stressors and high-effort coping get under the skin by causing chronic distress and subsequent physical deterioration and negative health outcomes. Some stressors (e.g., those rooted in institutional racism) are especially difficult to measure because they are embedded in social and contextual conditions that reflect dominant social values and cultural expectations. These types of stressors, while eluding detection and self-report, are still relevant to for and can affect coping, distress, and associated health outcomes (Ellis et al., 2015; Scherer, 2001). Biomarkers of physiological distress measure the effects of these stressors on health, even if researchers struggle to capture and quantify stressors associated with social inequities, themselves. A growing body of research provides empirical support for the Weathering Hypothesis and its theorized contribution to racial/ethnic disparities in chronic health conditions, mortality, and other health outcomes (Das, 2013; Geronimus, 1992; Geronimus et al., 2006; Geronimus, Bound, Waidmann, Colen, & Steffick, 2001; Juster et al., 2010; Paradies, 2006; Schneiderman et al., 2005).

Black men occupy a unique position in the U.S. and face distinct stressors associated with the intersection of membership in a socially marginalized racial group and being male (Gilbert et al., 2016). The psychosocial stressors linked to poor health outcomes for Black men include: 1) racial slights and discrimination (Adam et al., 2015; Chae et al., 2014; Griffith, Ellis, and Allen, 2013; Williams & Mohammed, 2009); 2) negative, narrow stereotypes of Black men (Smith, Allen, & Danley, 2007); 3) hypervigilance (Steele, 2010); 4) poverty, unemployment, and underemployment (Cohen et al., 2006; Williams, 2003); 5) living in racially-segregated, disadvantaged neighborhoods (Lichter, Parisi, & Taquino, 2012); 6) inadequate healthcare (Cheatham, Barksdale, & Rogers, 2008); 7) community surveillance and policing (Smith et al., 2007); 8) negative interactions with the criminal justice system (Mauer, 2011; Goffman, 2014); and 9) difficulties fulfilling socially and culturally important masculine roles (Bowman, 2006; Griffith, Gunter, & Allen, 2011). Given the magnitude, chronicity, and cumulative nature of stressors experienced by Black men, it is not surprising that Black men demonstrate greater physiological distress than White men (Chapter 2). Further, those racial disparities widen among older age groups (Chapter 2). Designing effective interventions to reduce racial health disparities among midlife and older men requires a better understanding of potential race differences in stress and coping mechanisms. For example, do Black and White men rely on the same coping strategies? Are some coping strategies more closely associated with men's physiological distress

levels than others? Are common assumptions of what constitute good and bad coping strategies accurate reflections of which coping strategies are protective and harmful for midlife and older men's physiological distress outcomes? Do the relationships between coping strategies and physiological distress differ among Black and White men?

The Environmental Affordances Model (Jackson et al., 2010; Mezuk et al., 2013) posits that the coping strategies individuals adopt may reflect the economic, social, and geographic contexts in which they live, which are themselves patterned by race. Blacks may habitually employ coping strategies that reflect the limited opportunities and resources available in the disadvantaged communities where Blacks are more likely to live. These coping strategies may include the use of tobacco, alcohol, and drugs; physical inactivity; and consumption of unhealthy comfort foods (Mezuk et al., 2013). Given environmental constraints, Blacks may be more likely to adopt these coping strategies than other coping strategies that are less accessible in their communities. Jackson, Mezuk, and colleagues (Jackson et al., 2010; Mezuk et al., 2013) argue that the adoption of coping strategies that are disproportionately available in Black communities may effectively mitigate psychological distress while increasing physiological distress and subsequent risk for developing chronic diseases and early mortality. This may account for the observed paradox whereby, when compared to Whites, U.S. Blacks experience a disproportionate burden of morbidity and mortality associated with chronic physical health conditions and diseases (e.g,. hypertension, heart disease, strokes, cancers, diabetes), yet have lower rates for common mental health conditions (Mezuk et al., 2013). Tests of the Environmental Affordances Framework have generated mixed findings and have not yet been conducted with an all-male sample (Jackson et al., 2010; Keyes, 2009; Keyes, Barnes, & Bates, 2011; Mezuk et al., 2010).

The construct of *John Henryism* (James et al., 1983; 1987; 1992) provides additional insight into potential racial differences in the relationships between coping and physical health outcomes. John Henryism suggests that active coping, which is often portrayed as a good and effective coping strategy, may be more harmful to Black men's health than helpful (Flaskerud, 2012). Many chronic stressors experienced by Black men are linked to social inequities and institutionalized racism (Griffith et al., 2013), which are outside individuals' control. In response to these conditions, Black men may engage in prolonged, high effort coping, characterized by personal determination and working hard, in hopes of achieving success despite considerable

odds. High effort coping may put significant strain on their physical health. Although empirical tests of John Henryism have produced mixed results (Bennett et al., 2004), it provides a plausible explanation for racial differences in the relationships between coping strategies and physical health outcomes (e.g., physiological distress) for Black and White men.

Study Purpose

The purpose of this study was to: 1) explore racial differences in the relationships between coping strategies and physiological distress among midlife and older men; and 2) assess the validity of assumptions about what constitutes good and bad coping strategies for Black and White men's physiological distress. The aims were twofold. First, we documented race-based differences in men's use of a diverse array of 12 coping strategies. We hypothesized that Black men would report using problem-focused coping strategies (i.e., active coping, planning, willingness to seek social support) less frequently and strategies involving emotion regulation (i.e., positive reinterpretation, venting, and religious and spiritual coping) and disengagement (i.e., denial, behavioral disengagement, stress eating, alcohol abuse, drug abuse, and physical activity) more frequently than White men did. Next, we explored the extent to which different coping strategies predicted physiological distress among men, and whether race moderated these relationships. We hypothesized that more coping behaviors that affect the body through direct pathways (e.g., stress eating, alcohol use, drug use, physical activity) would be associated with physiological distress than cognitively-oriented coping strategies (e.g., positive reinterpretation, denial). Furthermore, we hypothesized that problem-focused coping strategies would demonstrate less beneficial (or more harmful) relationships with physiological distress for Black men when compared to White men.

Methods

Data Source

This study used linked data from participants in the second waves of the National Survey of Midlife in the United States (MIDUS II) and the National Study of Daily Experiences (NSDE II), which included a random subsample of MIDUS II participants (Almeida, 2005; Almeida, McGonagle, & King, 2009). MIDUS II consisted of an interview and self-administered questionnaire that assessed: sociodemographic, family, and lifestyle characteristics; psychological constructs; health behaviors; and health outcomes. NSDE II was an in-depth study of daily stressors, physiological distress biomarkers (i.e., cortisol), and health indicators in which

participants completed telephone interviews for eight consecutive days and provided cortisol samples on half of those days (Almeida, 2005; Almeida et al., 2009). Participants provided physiological distress (our outcome measure) and biomarker control variable data in NSDE II between 2004 and 2009, after they had completed MIDUS II, which collected data between 2004 and 2006. The present study was exempt from Internal Review Board evaluation because it involved secondary analysis of a publically available deidentified dataset (45 CFR 46; USDHHS, 2009).

Sample. The MIDUS sample was identified using a stratified probability sampling design. MIDUS II included 5,555 English-speaking, community-residing adults who were in midlife or older (35-85 years of age) and resided in the contiguous United States (Radler & Ryff, 2010; Ryff et al., 2006; 2012). A total of 2,022 MIDUS II participants provided data for NSDE II (78% response rate), and 1,735 (86%) of these provided saliva samples. For the current study, we limited the analytic sample to the 60 Black and 642 White men who completed the MIDUS II interview and self-administered questionnaire and provided sufficient salivary cortisol sample data for calculating the physiological distress measure.

Physiological distress data collection. Cortisol, a biomarker of physiological distress, was collected from saliva. Participants used Salivette kits (Sarstedt, Rommelsdorft, Germany) to collect four saliva samples each day for four consecutive days, for a total of 16 samples per person. Participants collected samples upon waking (T1), 30 minutes after waking (T2), before lunch (T3), and at bedtime (T4). Salivary cortisol samples were collected using standard procedures and protocols used in large-scale epidemiological research (Adam & Kumari, 2009); details are described elsewhere (Almeida et al., 2009; Stawski, Cichy, Piazza, & Almeida, 2013). Participants indicated the times they collected samples with a paper-pencil log and during nightly telephone interviews; correlations were above .90 (Almeida et al., 2009). Participants mailed their samples to a lab where raw salivary cortisol concentrations were measured with luminescence immunoassays; intra- and inter-assay coefficients were below 5%.

Measures

Physiological distress. Our outcome measure was physiological distress, which was operationalized as diurnal cortisol slopes from 30 minutes after waking (T2), which is when they typically peak, to before lunch (T3), averaged over four days. Cortisol slopes for this portion of the day are declining, so slope values are negative (e.g., -.20). More blunted (i.e., horizontal,

closer to 0) diurnal cortisol slopes represent more physiological distress, because they are indicative of reduced cortisol reactivity and disrupted physiological stress response (Adam et al., 2017; Adam & Kumari, 2009). We used diurnal cortisol slopes from this portion of the day because analyses indicated notable racial differences in diurnal cortisol slopes, especially between T3 and T2, which would increase statistical power to detect significant race differences, should they exist (Chapter 2).

Research on the properties and best practices for using different cortisol measures as indicators of physiological distress is still emerging. Diurnal cortisol slopes have demonstrated good predictive validity for a broad range of mental and physical health outcomes (Adam et al., 2017). Although cortisol levels and patterns are known to fluctuate daily, diurnal cortisol slopes have better reliability than other commonly used cortisol measures, especially when data from several days are averaged to increase stability (Doane, Chen, Sladek, Van Lenten, & Granger, 2015; Wang et al., 2014).

Diurnal cortisol slopes were calculated for each day for each individual by dividing the difference in the times of T2 and T3 cortisol collection by the difference in the natural logs of the T2 and T3 cortisol values. Raw cortisol values were natural log transformed to adjust for skew, consistent with previous cortisol research (Adam & Kumari, 2009). Diurnal cortisol slopes were calculated for the four cortisol collection days and then averaged to obtain the physiological distress measure used in this study.

Coping strategies. We examined 12 general approaches to coping that individuals tend to employ on a regular basis when dealing with stressors. Some measures asked participants to report their use of a particular strategy explicitly for coping with stressors; others captured behaviors identified in the coping research literature as strategies men may consciously or unconsciously adopt to cope with stressors (e.g., social support, alcohol abuse, drug use, physical activity; Ellis et al., 2015; Park & Iacocca, 2013). Continuous measures were calculated so that higher scores indicated greater reliance on that coping strategy and all measures had the same range of possible scores (4-16) for ease of comparison across strategies. We calculated scales with missing item values by imputing missing values based on individual men's mean scores for other scale items (i.e., person mean substitution), a method recommended in the MIDUS protocols (Ryff et al., 2010) and suitable for our data (Hawthorne & Elliott, 2005).

Positive reinterpretation, active coping, planning, venting, denial, and ***behavioral disengagement*** were measured using subscales from the original COPE Inventory (Carver, 1997;

Carver, Scheier, & Weintraub, 1989). Participants were asked to evaluate how often they tended to respond to difficult or stressful events in their lives in specific ways. Response options ranged from Not At All (4) to A Lot (1). Each scale was calculated by summing the reverse-coded values of the four items in each subscale. The COPE Inventory has been previously used with diverse populations. Cronbach's alphas for this sample were: positive reinterpretation α=.802, active coping α=.725, planning α=.830, venting α=.801, denial α=.708, and behavioral disengagement α=.748.

Stress eating was assessed by two items that asked participants to indicate how often they responded to difficult or stressful events in their lives in the following ways: "I eat more than I usually do," and "I eat more of my favorite foods to make myself feel better." Response options ranged from Not At All (4) to A Lot (1). The measure was calculated by summing the reverse-coded responses to the two items and then multiplying by 2 to fit the desired scale range. Cronbach's α=.836 and Standardized Cronbach's α=.704.

Religious and spiritual coping was assessed with six items that asked participants to report how often they turned to their religious or spiritual practices and beliefs to help understand and deal with major problems in their lives using a four-point scale ranging from Never (4) to A Great Deal (1) (Fetzer Institute/NIA Working Group, 1999; Idler et al., 2003). Items were: "I seek comfort through religious or spiritual means such as praying, meditating, attending services, or talking to a religious or spiritual advisor," "I ask what my religious or spiritual beliefs suggest I should do," "I try to make sense of the situation and decide what to do without relying on God (reverse coded)," "I look to God for strength, support, and guidance," "I work together with God as partners," and "I think about how my life is part of a larger spiritual force." Responses were summed and multiplied by ⅔ to fit the desired scale range. Cronbach's α=.897.

Willingness to seek social support was assessed with two items that asked participants to report how well the following statements described how they approached social support seeking: "I don't like to ask others for help unless I have to" and "Asking others for help comes naturally for me." The four-point response options ranged from Not At All (4) to A Lot (1). The second item was reverse coded. The scale score was calculated by taking the sum of the two items and then multiplying by 2 to fit the desired scale range. Cronbach's α=.653 and Standardized Cronbach's α=.492.

Alcohol abuse was assessed with a four-item modified version of the Michigan Alcohol

Screening Test (MAST; Selzer, 1971). These items asked participants to report whether they had experienced various problems while drinking or because of alcohol in the past 12 months. Example items were: "Did you have such a strong desire or urge to use alcohol that you could not resist it or could not think of anything else?," and "Did you have a period of a month or more when you spent a great deal of time using alcohol or getting over its effects?" Alcohol abuse was treated as a dichotomous variable in which one or more affirmative response was categorized as indicative of alcohol abuse. No reported alcohol abuse was the reference group. Previous research (Grzywacz & Marks, 1999) indicated that this operationalization was valid and sensitive to population-level variation.

Drug use was a dichotomous variable indicating whether participants reported using any of the following within the past 12 months: 1) illegal drugs; 2) prescription medications without a prescription; or 3) prescription medications used in a manner that was inconsistent with the instructions. Drugs queried included: sedatives, tranquilizers, stimulants, painkillers, antidepressants, inhalants, marijuana, cocaine/crack, LSD/hallucinogens, and heroin. No reported drug use was the reference group.

Physically active was a dichotomous variable indicating whether participants regularly engaged in vigorous or moderate physical activity several times a week. Participants were asked to report how frequently they engaged in moderate and vigorous leisure time physical activity (assessed separately) during the summer and during the winter (four questions total). Participants who reported being physically active at least several times a week for two or more questions were considered active; participants who did not meet this criterion were the inactive reference group.

Sociodemographic control variables. We controlled for two sociodemographic variables that have consistently been shown to be associated with physiological distress in previous research, including age (Ice, 2005) and educational attainment (Cohen et al., 2006). There were no missing sociodemographic data. ***Age*** represented participants' age, rounded to the nearest year at the time of MIDUS II data collection. ***Educational attainment*** was measured using four ordinal categories based on participant report of their highest level of schooling completed: no high school degree and no GED (1); high school graduate or obtained a GED (2), bachelor's degree (3), and advanced graduate or professional degree (4). ***Race*** was self-reported.

Biomarker control variables. We controlled for several variables that previous

researchers have identified as having significant potential to bias cortisol levels and diurnal cortisol patterns, including smoking (Badrick, Kirschbaum, & Kumari, 2007), taking medications known to affect cortisol (Masharani et al., 2005), atypical sleep schedule (Federenko et al., 2004), and not adhering to cortisol collection protocols (Adam & Kumari, 2009). There were no missing data for biomarker control variables. ***Smoker*** indicated whether participants reported smoking one or more cigarettes on NSDE II data collection days, with nonsmoker as the reference group. ***Medications*** indicated whether participants used any over-the-counter or prescription medications that could affect cortisol levels on NSDE II data collection days. Medications included were those containing steroids or hormones and those used to treat allergies, depression, and anxiety (Granger, Hibel, Fortunato, & Kapelewski, 2009). No medications was the referent category. ***Atypical sleep schedule*** indicated whether a participant reported an atypical sleep schedule on cortisol sample data collection days. Atypical schedule was defined as waking before 4am or after 11am and/or being awake for more than 20 hours or less than 12 hours (Dmitrieva, Almedia, Dmitrieva, Loken, & Pieper, 2013). Typical sleep schedule was the referent category. ***Lunch protocol non-adherent*** indicated whether participants appeared to have diverged from the T3 collection protocol, which directed them to collect the T3 saliva sample prior to eating lunch. Evidence of a T3 cortisol surge, when T3 is more than 10 nmol/L higher than T2, indicated that the participant probably ate before providing the T3 sample. Men whose cortisol data showed evidence of a T3 surge on cortisol sample collection days were coded as non-adherent. Adherent was the reference group.

Data Analysis

We conducted exploratory data analyses with all study variables to identify potential confounding variables for inclusion as control variables, examine missing data, explore variable distributions and conduct appropriate transformations, and assess internal reliability and conduct data reduction (e.g., Cronbach's alpha and factor analysis) of scaled measures to ensure that we were using the most psychometrically sound scales. We determined that multiple imputation was not necessary due the exceedingly small amount of missing data and other data and analytic considerations (Cheema, 2014). We calculated basic descriptive statistics, including comparisons by race using two-tailed *t*, χ^2, and Mann-Whitney tests. Raw cortisol levels and patterns by race were reported in Chapter 2 in our study of proximal health predictors of Black and White men's physiological distress. All statistical analyses were conducted in SPSS version 24 (IBM Corp.,

Armonk, NY).

We conducted a series of multivariate analyses to identify: 1) the nature of the relationships between a diverse group of coping strategies and physiological distress among men, and 2) whether these relationships differed by race. We used ordinary least squares linear regression to regress physiological distress on each coping strategy, in turn, controlling for select sociodemographic (age, educational attainment, and race-indicator) and biomarker control (smoker, medications, atypical sleep schedule, and lunch protocol non-adherent) variables. The samples for these analyses varied slightly based on the number of men for whom a specific coping strategy measure could be calculated (see Table 3.2).

Next, we examined similarities and differences in the relationships between specific coping strategies and physiological distress for Black men and White men by adding interaction terms for the race indicator variable and appropriate coping strategy to the main effects models. We identified coping strategies potentially moderated by race that warranted additional analyses using a significance level of $p<.1$ for the interaction partial regression coefficient. We used $p<.1$ because we had limited power for identifying relationships that existed for Black men but not White men. This was due to the imbalanced racial distribution and relatively small number of Black men in the sample. We then graphed the interactions, holding all other variables at their average values to illustrate the interaction for the average participant (Jaccard, 2001). Given the differing profiles of Black and White men in the sample (Table 3.1), this was a conservative depiction of race-based differences. For continuous coping measures, we graphed the conditional effect of race at three coping values: the average for the sample and one standard deviation above and below. For dichotomous variables, we graphed race for participants who did and did not use that coping strategy.

We then conducted simple slopes analyses to ascertain which coping strategy partial regression coefficients differed from 0, thereby indicating a significant effect. To do this, we conducted *t*-tests of the slopes divided by their standard errors (Aiken, West, & Reno, 1991). We also created race-stratified models with all the variables included in main effects models other than the race indicator variable and interaction terms. Partial regression coefficients for the race-stratified models were compared to identify race-based differences in the relationships between physiological distress and predictor and control variables among men. To do this, we used two-tailed *z*-tests of the coefficient differences divided by the square root of the sum of each

coefficient standard error squared (Clogg, Petkova, & Haritou, 1995).

We examined indicators and the potential biasing influences of misspecification, multicollinearity, heteroskedasticity, and outliers. We also conducted a series of sensitivity analyses to examine: 1) the role of smoking; 2) findings with the subsample with complete data on all measures; and 3) coefficients stability. Out of recognition that smoking is both a factor known to bias physiological distress measures as well as a coping behavior, we examined the independent relationship between smoking and physiological distress, as well as the contributions of smoking to the other models. We repeated all analyses with the subsample of participants who had complete data on all measures to determine if results differed from those presented, based on the maximum sample sizes available for inclusion in each coping strategy model. We assessed the stability of the partial regression coefficients of coping strategies that warranted additional analysis for potential racial differences, particularly in the race-stratified model with the relatively small sample of Black men. This was done by testing more parsimonious models in which we excluded control variables that did not meaningfully contribute to any of the models and were logical candidates for exclusion based on correlational matrix analyses (i.e., they were not confounding; Cohen, Cohen, West, & Aiken, 2003).

Results

Descriptive Analyses

Sample characteristics. Table 3.1 describes the sociodemographic characteristics and physiological distress data for participants by race. The total sample included 702 men, 8.5% of whom were Black (*n*=60) and 91.5% of whom were White (*n*=642). Participants ranged from 34 to 83 years old and were, on average, in their mid-50s. Black participants were slightly younger than White participants (*M*=54.3, *SD*=.9.94 vs. *M*=57.2, *SD*=12.1, *t*(700)=2.10, *p*=.040) and less likely to be married or cohabitating with a romantic partner at the time of data collection (63.3% vs. 82.9%%, χ^2=13.71, *p*=.001); the majority of both Black and White men were parents. Overall, Black men reported lower socioeconomic status than White men: Black men had less education; and were less likely to have supervisory responsibilities (32.8% vs. 51.6%%, χ^2=7.58, *p*=.006) and decision autonomy at work (*M*=19.5, *SD*=6.24 vs. *M*=23.0, *SD*=4.88, *t*(513)=3.62, *p*=.001). Black men had median annual household incomes that were 40% lower than the White men's ($38,875 vs. $65,250, *p*=<.001). Comparable proportions of Black and White men were employed (58.3% and 68.4%, respectively). Black men had more physiological distress than White

men, as indicated by more blunted (closer to 0) diurnal cortisol slopes (*M*= -.15, *SD*=.15 vs. *M*= -.21, *SD*=.11, *t*(698)= -2.95, *p*=.004). The biomarker control variables indicated that Black men were more likely than White men to smoke (31.7% vs. 15.3%%, χ^2=10.63, *p*=.003) and report atypical sleep schedules (28.3% vs. 8.7%%, χ^2=22.65, *p*<.001), but less likely to use medications known to influence cortisol levels and patterns (11.7% vs. 27.9%%, χ^2=7.41, *p*=.006). Data suggested that Black and White men were non-adherent to the lunch cortisol collection protocol at comparable rates (6.7% and 4.8%).

Comparison of Black and White men's coping strategies. We reported coping strategies reported by Black and White men in Figure 3.1 and Table 3.2. Among the eight strategies men reported that they employed with the explicit purpose of coping with difficult or stressful events in their lives, both Black and White men reported responding with planning, positive reinterpretation, active coping, and religious and spiritual coping more often; stress eating, denial, and behavioral disengagement were reported less often. Black men were more likely than White men to report relying with positive reinterpretation (*M*=12.98, *SD*=2.07 vs. *M*=12.13, *SD*=2.37, *t*(692)= -2.68, *p*=.007) and denial (*M*=6.75, *SD*=2.26 vs. *M*=5.75, *SD*=1.89, *t*(691)= -3.33, *p*=.001). Although Black and White men reported religious and spiritual coping at comparable levels, Black men integrated religious and spiritual practices into their daily lives to a larger degree. Black men reported more frequent use of private religious practices (i.e., praying, meditating, reading religious literature; t(689)= -2.73, *p*=.007) and being more mindful because of their religious and spiritual beliefs (t(686)= -4.48, *p*<.001) than White men. Rates of religious congregation affiliation, Christian identification, and religious service attendance were comparable. For coping strategies men may not consciously adopt, Black men were more likely than White men to report drug use in the last 12 months (26.7% vs. 11.4%, χ^2=11.51, *p*=.002). In terms of specific drugs used, more Black men than White men reported having used marijuana (18.6% vs. 5.3%, χ^2=15.94, *p*=.001), cocaine/crack (10.0% versus .5%, χ^2=39.27, *p*<.001), and LSD/hallucinogenics (5.0% versus 0%, χ^2=32.14, *p*=.001). Black and White men reported using sedatives, tranquilizers, stimulants, painkillers, antidepressants, inhalants, and heroin at comparable rates. Black men were also less likely than White men to be physically active on a regular basis (19.3% vs. 37.5%, χ^2=7.53, *p*=.006). The prevalence of alcohol abuse and willingness to seek social support were relatively low for both Black and White men.

Multivariate Analyses

In the main effects models, religious and spiritual coping was the only coping strategy associated with physiological distress. In the interaction models, three coping strategies met the criteria for additional analyses: religious and spiritual coping, drug use, and being physically active. All other coping strategies were unrelated to physiological distress in the main effect and interaction models (findings summarized in the right side of Table 3.2).

Religious and spiritual coping. Race marginally moderated the relationship between physiological distress and religious and spiritual coping (*b*=.008, *SE*=.005, *p*=.074; Table 3.3, Model 2). Figure 3.2 depicts the interactive relationship between religious and spiritual coping and race on physiological distress. Simple slopes analyses indicated that religious and spiritual coping accounted for variation in physiological distress among for White men (*b*= -.004, *t*(688)= -3.28, *p*=.001) but not among Black men (*b*=.004, *t*(688)=.91, *p*=.363). Higher levels of reported religious and spiritual coping were associated with less physiological distress among White men. Although Figure 3.2 depicts the opposite relationship for Black men, religious and spiritual coping did not predict variations in physiological distress among Black men. Race-stratified models (Table 3.4) confirmed the protective nature of religious and spiritual coping for White men's physiological distress but absence of influence, good or bad, on Black men's physiological distress.

Drug use. Race moderated the relationship between physiological distress and drug use (*b*= -.113, *SE*=.036, *p*=.002; Table 3.5, Model 2). Figure 3.3 depicts the interactive relationship between drug use and race on physiological distress. Simple slopes analyses indicated that Black men who reported having used drug within the past 12 months had less physiological distress than Black men who abstained (*b*= -.095, *t*(692)= -2.87, *p*=.004). Among White men, physiological distress levels appeared unaffected by whether they had used drugs or not. Findings from race-stratified models, however, did not confirm these findings (Table 3.6): drug use was unrelated to physiological distress for both Black and White men.

Physically active. In the interaction model, race marginally moderated the relationship between physiological distress and being physically active (*b*=.070, *SE*=.039, *p*=.073; Table 3.7, Model 2). Additional analyses (i.e., simple slopes, race-stratified, and more parsimonious analyses) indicated that whether or not men were physically active did not predict physiological distress among either Black or White men.

Sensitivity analyses. Additional analyses of the smoking variable indicated that smoking

was unrelated to Black and White men's physiological distress. Although smoking was correlated with several coping strategies, removing the smoking control variable did not meaningfully alter model results. We repeated all analyses with the subsample of 669 men who had complete data on all measures, which included 54 Black men and 615 White men; results were consistent. We presented the analyses based on the maximum sample sizes available to preserve power. All parsimonious models were consistent with the findings presented below.

Discussion

Findings from this study provide insight into the role of different coping strategies in predicting racial disparities in physiological distress among midlife and older Black and White men. Black and White men reported comparable use of most of the coping strategies examined in this study, though Black men reported more use of positive reinterpretation, denial, and drugs and were less likely to be physically activity than White men. Ten out of the 12 coping strategies examined did not predict physiological distress among either Black or White men, indicating that the coping strategies included in this study may not be important determinants of physiological distress among men in the latter half of the life course. Despite academic and popular categorization of some coping strategies as good (adaptive) and others as bad (maladaptive), our evidence does not support this simplistic classification. It also is not consistent with more nuanced frameworks that informed our hypotheses about how the effectiveness of different coping strategies may differ for marginalized racial groups, such as the Environmental Affordances Framework (Jackson et al., 2010; Mezuk et al., 2013) and John Henryism (Bennett et al., 2004; James et al., 1983; 1987; 1992). Two coping strategies did predict physiological distress, but only for some men. We identified racial differences in the protective nature of religious and spiritual coping for White men. This finding was unanticipated, as it runs counter to the wealth of literature on the importance of religion, spirituality, and religious institutions for the lives and wellbeing of Black Americans (Taylor & Chatters, 2010). We also found that drug use was associated with less physiological distress among Black men. This was also unexpected, as it contradicts commonly held beliefs about the health dangers of drug use (Fraser & Moore, 2011).

The absence of relationships between the majority of coping strategies examined and physiological distress among our sample of midlife and older men is inconsistent with the wealth of theoretical and empirical literature positing coping as an important component of stress and

coping mechanisms affecting health (Folkman, 2011; Penley et al., 2002). Rather, our findings raise the question of whether coping is relevant to the physiological distress levels of midlife and older men. Researchers have identified over 400 coping strategies (Skinner et al., 2003). We only examined a small, yet diverse, selection of these, several of which qualitative studies with midlife and older men have identified as commonly relied upon by men in this age range (Ellis et al., 2015). A limitation of these coping measures, however, was that they are based on self-report. Therefore, they can be biased by social desirability, in this case related to "good"/"bad" coping strategies and traditional gender norms surrounding acceptable coping strategies. Further, researchers have documented discrepancies in men's and women's reports of the coping strategies men used (Ellis et al., 2015). Additionally, these measures may not capture subtle race-based differences in men's interpretation and enactment of certain coping strategies. For example, although the Black and White men reported similar levels of venting, the nature of venting may differ by race because emotional expression of this type has more negative ramifications for Black men than White men (Kaiser & Miller, 2001; Smith et al., 2007). More nuanced coping measures that integrate different perspectives on men's coping may provide further insight into how men cope and race-based differences in coping. Questions remain about whether different measures would detect more relationships between coping and physiological distress among Black and White men than were identified in the current study.

Another factor to consider in interpreting our findings is the sample's midlife and older age range. Theoretical and empirical research suggests that chronic exposure to stressors "weathers" the body in a cumulative manner over the life course (Geronimus, 1992; Geronimus et al., 2001; 2006; 2007; McEwen & Gianaros, 2010). Perhaps by the latter half of the lifespan, some men's HPA axis stress responses were damaged and dysregulated to the point where physiological distress was unresponsive to coping, either positively or negatively. This explanation could account for why coping was generally not associated with physiological distress among Black men, who demonstrated higher levels of physiological distress (Chapter 2). If this were the case, we would also anticipate finding more relationships between coping strategies and physiological distress among White men, who demonstrated relatively healthier stress responses; we did not find this, though. Although replicating this study with a younger age cohort of men may provide additional insight into the importance of coping, or lack thereof, for men's physiological distress, weathering among our midlife and older participants does not

account for our unanticipated findings.

The absence of relationships between most coping strategies examined and physiological distress provides important insight to inform efforts to improve health outcomes and reduce racial health disparities associated with men's physiological distress. Interventions prioritizing enhancing midlife and older men's coping skills and access to coping resources may have small or no effects on their physiological health. Instead, interventions need to focus on evidence-based predictors of men's physiological distress, such as chronic exposure to stressors rooted in social inequities (e.g., racism, Paradies, 2006; poverty, Evans & Kim, 2013) and number of common health problems (Chapter 2).

In regards to effective coping strategies, White men who reported high levels of religious and spiritual coping had less physiological distress than those who did not, but religious and spiritual coping was unrelated to Black men's physiological distress. This unanticipated finding runs counter to a rich literature on the importance of religion, spirituality, and religious institutions for Black Americans' health and wellbeing (Taylor & Chatters, 2010). Black Americans and women of both races (Black and White) tend to report higher levels of religious participation, religious coping, and spirituality than White Americans and men of both races, respectively (Krause & Chatters, 2005; Taylor & Chatters, 2010; Taylor, Chatters, & Jackson, 2007). In previous studies, religious involvement and coping have generally demonstrated moderately strong, positive relationships with physical health outcomes (Chatters, 2000; Powell, Shahabi, & Thorensen, 2003).

Scant research, however, has examined measures of religiosity and their relationships to health outcomes at the intersections of race and male gender. In this study, both Black and White men reported religious and spiritual coping at comparable levels and identified it as a coping strategy they tended to rely on more often. Basic comparisons by race on many religion and spirituality measures detected few differences. Black men did, however, seem to integrate religion and spirituality into their daily activities more than White men did, which suggests there may be qualitative differences in Black and White men's religiosity (Krause & Chatters, 2005). This topic would benefit from greater exploration, but was outside the scope of the current study. Although we argue above that how men cope may have little influence on their physiological distress, religious and spiritual coping was one exception. Perhaps our findings reflect the different types of stressors White and Black men face. White men tend to experience stressors

that are more transient and resolvable in nature, and so religious and spiritual coping may effectively buffer them from the negative effects of those stressors on their physical health. In contrast, Black men experience many chronic, structurally-embedded stressors, such as racism (Griffith et al., 2013). Religious and spiritual coping may be insufficient for reducing the negative physiological impact of these types of stressors. Alternatively, perhaps religious and spiritual coping is more effective than the other coping strategies tested, but the stress responses of midlife and older Black men are already dysregulated to the point that they are unresponsive to spiritual and religious coping. Additionally, although the current study explored relationships between men's physiological distress levels and their report of recent religious and spiritual coping, more research is needed on the long-term influence of religious and spiritual coping for men's physical health outcomes.

Drug use is generally regarded as injurious for the body and often framed as a maladaptive coping strategy. Nonetheless, it was associated with less physiological distress among the midlife and older Black men who participated in this study. This is inconsistent with The Environmental Affordance Framework (Jackson et al., 2010; Mezuk et al., 2013), which suggests that drug use may be protective for Black men's mental health, while endangering their physical health. Empirical findings have found some support for the hypothesized protective nature of drug use for mental health outcomes among Blacks (Mezuk et al., 2010; 2013). Our findings suggest that drug use may be linked to better physical health outcomes for Black men as well. Additional research with more nuanced drug use measures is needed before our findings can be translated into recommendations. In the meantime, healthcare providers should adopt a harm reduction approach to drug use, rather than insisting on abstinence and rehabilitation, since our findings indicate that the effects of drug use on Black men's physical health may be more complex and poorly understood than has previously been recognized.

For example, questions remain regarding whether the use of less physically damaging drugs, such as marijuana, is driving the relationship between drug use and lower levels of Black men's physiological distress. Marijuana was the most common drug reported by the Black males in our study and was more prevalent among Black men than White men. Marijuana use causes less physical harm than many other commonly used recreational drugs as well as tobacco and alcohol (van Amsterdam, Opperhuizen, Koeter, & van den Brink, 2010). Historic and contemporary social constructions of marijuana in the U.S. also differ from those surrounding

the misuse of prescriptions and other recreational drugs. This is especially relevant given its growing acceptance and legalization for medical and recreational uses (Hudak, 2016). As such, marijuana use may capture a confounding variable that is not included in our analyses—something about the lifestyles or personalities of men who use marijuana that differentiates them from other men—that is related to physiological distress or Black men's physiological distress in particular.

Although findings regarding being physically active were null, they suggest that this topic may benefit from further research. Being physicially active may have had a very small effect size for Black men that we lacked power to detect using a $p \leq .05$ benchmark. Using a different measure, such as a continuous measure of amount of regular physical activity, may provide additional insight since a robust literature demonstrates a dose-response relationship between physical activity and physical health outcomes (Warburton, Charlesworth, Ivey, Nettlefold, & Bredin, 2010). It may also be helpful to determine if there are specific subgroups of Black men who would especially benefit from being active. For Black men as a whole, however, our data suggests that even if being active is linked to physiological distress, the effect is small. Thus, intervention efforts should emphasize factors with greater potential to impact Black men's physiological distress.

Limitations

This study provided insight into racial differences in coping strategies and their relationships to physiological distress among Black and White men. These findings should be interpreted in light of acknowledged limitations. First, given the variety of sampling strategies used in MIDUS II and NSDE II, findings were not weighted to be nationally representative. Second, sample size constrained our analyses in several ways. We were unable to include comparisons to men of other races/ethnicities because their numbers were insufficient for generating robust findings in comparative analyses. The small subsample of Black men limited the number of variables we could control for while still possessing sufficient power and prevented us from conducting more complex age-group specific analyses. Therefore, we did not examine indicators of socioeconomic status other than educational attainment. Racial health disparities generally persist after controlling for socioeconomic status, which often interacts with race in complex ways (Farmer & Ferraro, 2005; Williams, Mohammed, Leavell, & Collins, 2010). Examining the moderating role of socioeconomic status on the relationship between race

and physiological distress, however, was outside the scope of the current study. Third, coping measure responses may have been biased by social desirability or discordance between how men believed they coped versus how they actually coped. More nuanced measurement of the coping strategies that we captured using dichotomous measures may also have provided more insight (e.g., being able to distinguish regular drug users from occasional users). Fourth, although diurnal cortisol slopes are one of the best measures for capturing chronic physiological distress currently available, they can be biased by lifestyle and measurement factors and demonstrate only moderate stability (Ross, Murphy, Adam, Chen, & Miller, 2014). To mitigate these shortcomings, we controlled for several biomarker cofounding factors, averaged slopes over four days, and conducted a series of sensitivity analyses. Some of these methods diverged from practices adopted by other cortisol researchers (e.g., controlling for confounders such as atypical sleep schedule rather than dropping those cases from the sample, not presenting multilevel model analyses); however, the objectives of this study and comparative analyses involving the relatively small subsample of Black men required a different approach. Finally, it is unknown how the time gap between when participants completed coping measures in MIDUS II and the physiological distress outcome measure in NSDE II may have influenced the findings. Although measures were selected to capture constructs that were fairly stable over time, the physiological distress data could reflect individual changes in coping strategies that occurred after data on those measures were collected.

Conclusions

The purpose of this study was to explore racial differences in the relationships between coping strategies and physiological distress among midlife and older Black and White men. Our findings enrich the literature on how variations in coping contribute to racial disparities in physiological distress among men in the second half of the life course. Most coping strategies tested were unrelated to physiological distress. Contrary to expectations, religious and spiritual coping was associated with less physiological distress among White men and drug use was associated with less physiological distress among Black men. Our findings: 1) provide direction for relevant factors to prioritize in intervention efforts aiming to reduce physiological distress disparities among midlife and older men; and 2) raise important questions as to the influence of broader social and structural factors for understanding the nature and effectiveness of diverse coping strategies among Black and White men.

Table 3.1. Participant sociodemographic characteristics and physiological distress, by race

Characteristic	Black Men		White Men		$p^{\dagger}$
	%	*M* (*SD*)	%	*M* (*SD*)	
Sociodemographic					
Age, in years		54.3 (9.94)		57.2 (12.1)	**.040**
Married/cohabitating	63.3		82.9		**.001**
Had children	86.7		84.0		.712
Educational attainment					
No HS degree/GED	13.3		4.8		**.013**
HS degree/GED	66.7		47.0		**.004**
BA/BS degree	10.0		30.5		**<.001**
Graduate/professional degree	10.0		17.6		.152
Employed	58.3		68.4		.115
Supervisory role, current/last job	32.8		51.6		**.006**
Decision autonomy, current/last job[a]		19.5 (6.24)		23.0 (4.88)	**.001**
Annual household income, median		$38,875		$65,250	**<.001**
Physiological distress & biomarker control variables					
Physiological distress		-.15 (.15)		-.21 (.11)	**.004**
Smoker	31.7		15.3		**.003**
Used medication affecting cortisol	11.7		27.9		**.006**
Atypical sleep schedule	28.3		8.7		**<.001**
Lunch protocol non-adherent	6.7		4.8		.530
Total *N*	60 (8.5%)		642 (91.5%)		

† two-tailed *t*, χ^2, and Mann-Whitney tests comparing Black and White men. Bold text indicates $p \leq .05$.
[a] Decision Authority Subcale (Karasek & Theorell, 1990); scores range from 5 (none) to 30 (a great deal).

Table 3.2. Racial differences in men's coping strategies and their relationships with physiological distress

Coping Strategy	*n*	Frequencies					Relationship with Physiological Distress	
		Black Men		White Men		$p^{\dagger}$	Main effects $p \leq .05^{\ddagger}$	Interaction $p \leq .10^{\ddagger}$
		%	*M* (*SD*)	%	*M* (*SD*)			
Positive reinterpretation	692		12.98 (2.07)		12.13 (2.37)	**.007**	No	No
Active coping	691		12.53 (2.05)		12.57 (2.13)	.911	No	No
Planning	692		13.32 (2.27)		13.05 (2.32)	.398	No	No
Venting of emotions	691		8.72 (2.78)		8.43 (2.56)	.411	No	No
Denial	691		6.75 (2.26)		5.75 (1.89)	**.001**	No	No
Behavioral disengagement	691		6.64 (2.48)		6.55 (2.17)	.761	No	No
Stress eating	691		6.87 (3.09)		6.46 (3.07)	.328	No	No
Religious & spiritual coping	694		11.24 (3.37)		10.49 (3.65)	.128	**Yes**	**Yes**
Willingness to seek social support	694		7.93 (4.13)		7.81 (3.77)	.812	No	No
Alcohol abuse	693	5.1		5.2		1.000	No	No
Drug use	698	26.7		11.4		**.002**	No	**Yes**
Physically active	695	19.3		37.5		**.006**	No	**Yes**

† two-tailed *t* and χ^2 tests comparing Black and White men. Bold text indicates $p \leq .05$.

‡ Controlling for age, educational attainment, race, smoker, medications, atypical sleep schedule, and lunch protocol non-adherent.

Table 3.3. Religious and spiritual coping and men's physiological distress, full sample (*N*=694)

Variables	Model 1			Model 2		
	b	*SE*	*p*†	*b*	*SE*	*p*†
Coping Strategy						
Religious and spiritual coping	-.003	.001	**.012**	-.004	.001	**.004**
Sociodemographic						
Age, in years	.000	<.001	.922	.000	<.001	.951
Educational attainment	-.009	.005	.101	-.009	.005	**.077**
Race indicator (Black)	.053	.016	**.001**	-.038	.053	.478
Biomarker Control						
Smoker	.010	.012	.409	.010	.012	.394
Medications	.009	.010	.335	.010	.010	.318
Atypical sleep schedule	.010	.014	.481	.010	.014	.496
Lunch protocol non-adherent	.154	.020	**<.001**	.153	.020	**<.001**
Interaction						
Religious/spiritual coping * race				.008	.005	**.074**
Intercept	-.165	.030	**<.001**	-.158	.030	**<.001**
R^2	.120			.124		
$F\ \Delta R^2$ (p)	11.66 (**<.001**)			3.21 (**.074**)		

† Bold text indicates $p \leq .10$.

Table 3.4. Religious and spiritual coping and men's physiological distress, by race

Variables	Black Men *n*=58			White Men *n*=636			$p^{\ddagger}$
	b	*SE*	$p^{\dagger}$	*b*	*SE*	$p^{\dagger}$	
Coping Strategy							
Religious and spiritual coping	.002	.006	.714	-.004	.001	**.003**	.995
Sociodemographic							
Age, in years	.001	.002	.728	.000	<.001	.898	1.000
Educational attainment	.019	.028	.492	-.011	.005	**.033**	.966
Biomarker Controls							
Smoker	-.031	.046	.504	.018	.012	.152	.952
Medications	.040	.063	.523	.008	.010	.403	.973
Atypical sleep schedule	.040	.046	.391	.004	.015	.779	.974
Lunch protocol non-adherent	.176	.083	**.040**	.148	.020	**<.001**	.887
Intercept	-.275	.161	.095	-.152	.030	**<.001**	.690
R^2	.149			.109			
F (*p*)	1.255 (.292)			10.963 (**<.001**)			

† Bold text indicates $p \leq .05$

‡ Two-tailed *z*-test comparing coefficients for Black and White men. Bold text indicates $p \leq .05$

Table 3.5. Drug use and men's physiological distress, full sample (*N*=698)

Variables	Model 1			Model 2		
	b	*SE*	*p*†	*b*	*SE*	*p*†
Coping Strategy						
Drug use	.001	.013	.954	.018	.014	.210
Sociodemographic						
Age, in years	.000	<.001	.919	.000	<.001	.932
Educational attainment	-.010	.005	**.061**	-.010	.005	**.060**
Race (Black)	.050	.016	**.002**	.078	.018	**<.001**
Biomarker Control						
Smoker	.012	.012	.324	.016	.012	.173
Medications	.010	.010	.305	.010	.010	.311
Atypical sleep schedule	.009	.014	.549	.007	.014	.603
Lunch protocol non-adherent	.160	.020	**<.001**	.157	.020	**<.001**
Interaction						
Drug use * race				-.113	.036	**.002**
Intercept	-.194	.028	**<.001**	-.196	.028	**<.001**
R^2	.118			.131		
$F\ \Delta R^2$ (p)	11.54 (**<.001**)			9.97 (.002)		

† Bold text indicates $p \leq .10$.

Table 3.6. Drug use and men's physiological distress, by race

Variables	Black Men *n*=59			White Men *n*=639			$p^{\ddagger}$
	b	*SE*	$p^{\dagger}$	*b*	*SE*	$p^{\dagger}$	
Coping Strategy							
Drug use	-.077	.048	.120	.017	.014	.200	.060
Sociodemographic							
Age, in years	.000	.002	.929	.000	<.001	.954	.992
Educational attainment	.014	.026	.587	-.012	.005	**.026**	.326
Biomarker Controls							
Smoker	-.010	.047	.833	.020	.012	.109	.536
Medications	.042	.060	.487	.008	.010	.392	.576
Atypical sleep schedule	.038	.044	.396	.001	.015	.930	.426
Lunch protocol non-adherent	.162	.081	.051	.156	.020	**<.001**	.943
Intercept	-.193	.150	.203	-.191	.028	**<.001**	.990
R^2	.187			.107			
F (*p*)	1.680 (.135)			10.783 (**<.001**)			

† Bold text indicates $p \leq .05$

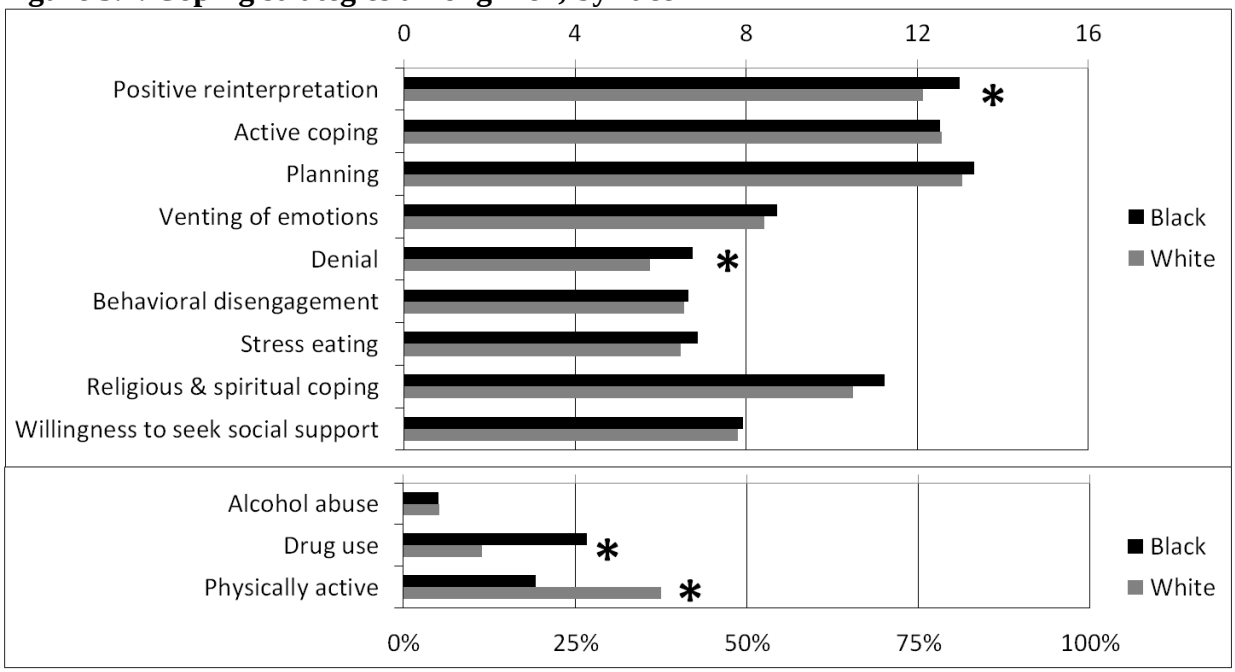
‡ Two-tailed *z*-test comparing coefficients for Black and White men. Bold text indicates $p \leq .05$

Table 3.7. Physical activity and men's physiological distress, full sample (*N*=695)

Variables	Model 1			Model 2		
	b	*SE*	*p*†	*b*	*SE*	*p*†
Coping Strategy						
Physically active	.007	.009	.432	.003	.009	.727
Sociodemographic						
Age, in years	.000	<.001	.796	.000	<.001	.795
Educational attainment	-.009	.005	**.096**	-.009	.005	.105
Race (Black)	.051	.016	**.002**	.036	.018	**.045**
Biomarker Control						
Smoker	.014	.012	.238	.015	.012	.210
Medications	.010	.010	.310	.009	.010	.344
Atypical sleep schedule	.007	.014	.633	.007	.014	.613
Lunch protocol non-adherent	.160	.020	**<.001**	.159	.020	**<.001**
Interaction						
Physically active * race				.070	.039	**.073**
Intercept	-.207	.028	**<.001**	-.206	.027	**<.001**
R^2	.117			.121		
$F\ \Delta R^2$ (p)	11.38 (**<.001**)			3.21 (**.073**)		

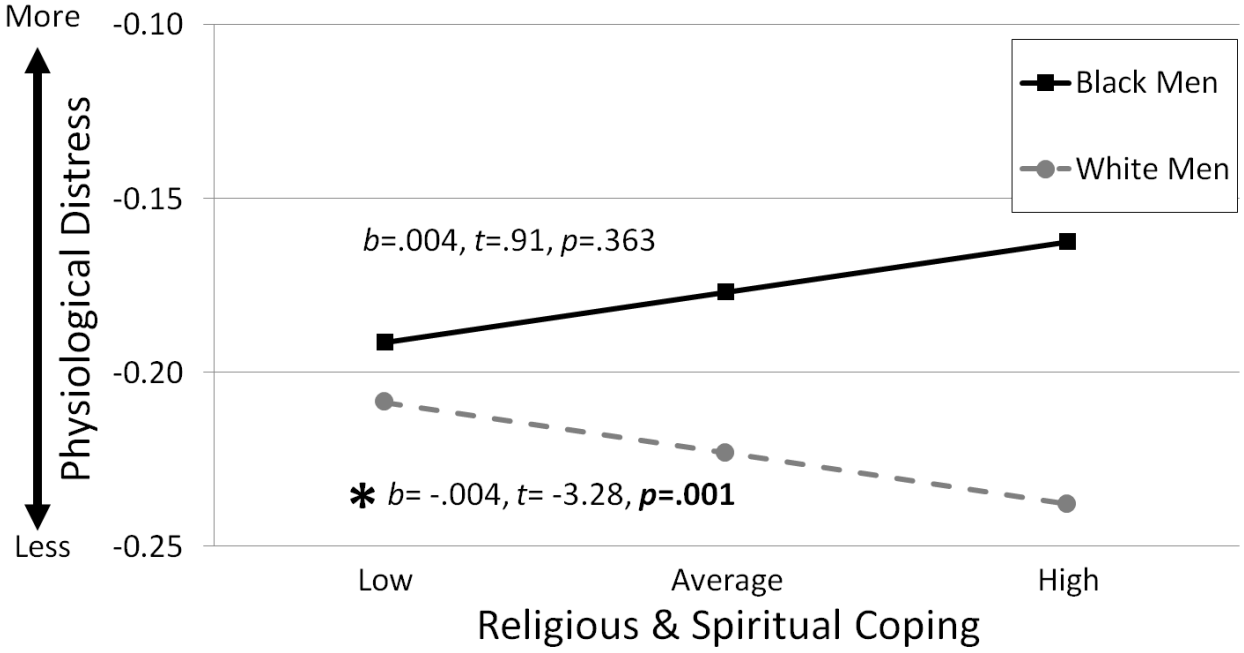
† Bold text indicates $p \leq .10$.

Figure 3.1. Coping strategies among men, by race



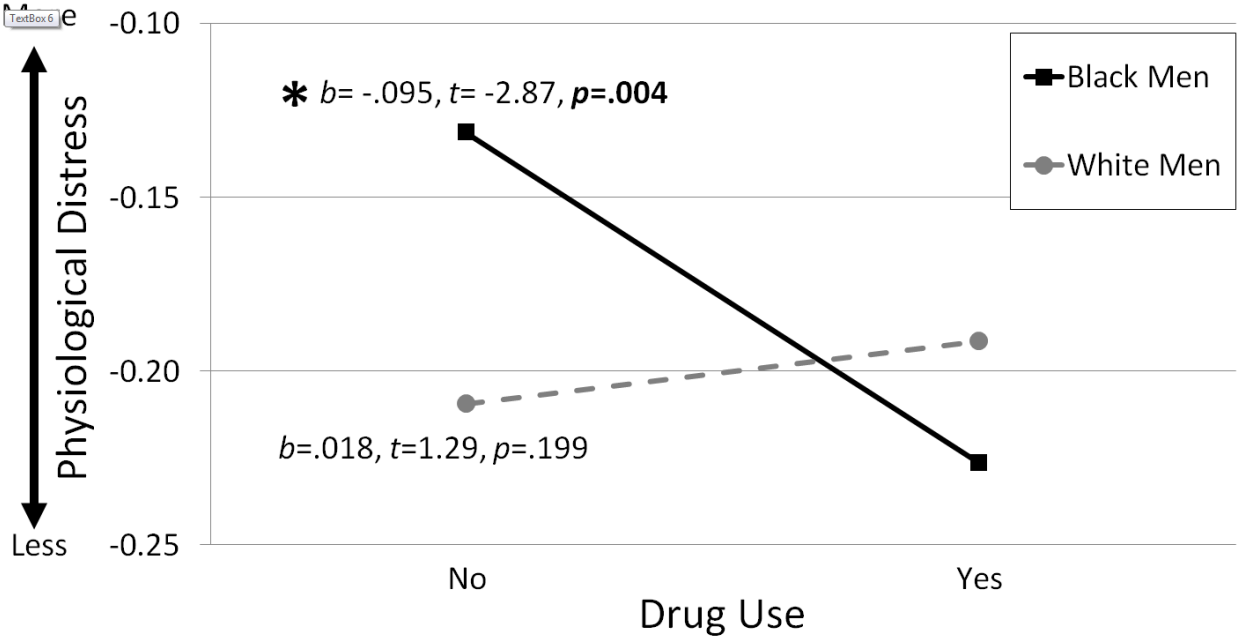
* $p \leq .05$

Figure 3.2. Relationships between physiological distress and religious and spiritual coping for Black and White men



Based on average values for all demographic and biomarker control variables

Figure 3.3. Relationships between physiological distress and drug use for Black and White men



Based on average values for all demographic and biomarker control variables

References

Adam, E.K., Heissel, J.A., Zeiders, K.H., Richeson, J.A., Ross, E.C., Ehrlich, K.B., ... & Peck, S.C. (2015). Developmental histories of perceived racial discrimination and diurnal cortisol profiles in adulthood: A 20-year prospective study. *Psychoneuroendocrinology, 62*, 279-91.

Adam, E.K., & Kumari, M. (2009). Assessing salivary cortisol in large-scale, epidemiological research, *Psychoneuroendocrinology, 34*, 1423-36.

Adam, E.K., Quinn, M.E., Tavernier, R., McQuillan, M.T., Dahlke, K.A., & Gilbert, K.E. (2017). Diurnal cortisol slopes and mental and physical health outcomes: A systematic review and meta-analysis. *Psychoneuroendocrinology, 83, 25-41*.

Aiken, L.S., West, S.G., & Reno, R.R. (1991). *Multiple Regression: Testing and Interpreting Interactions*. Thousand Oaks, CA: Sage.

Almeida, D. M. (2005). Resilience and vulnerability to daily stressors assessed via diary methods. *Current Directions in Psychological Science, 14*, 64–8.

Almeida, D.M., McGonagle, K.A., & King, H. (2009). Assessing daily stress processes in social surveys by combining stressor exposure and salivary control. *Biodemography and Social Biology, 55*, 220–38.

Badrick, E., Kirschbaum, C., & Kumari, M. (2007). The relationship between smoking status and cortisol secretion. *The Journal of Clinical Endocrinology & Metabolism, 92*(3), 819-24.

Bennett, G.G., Merritt, M.M., Sollers III, J.J., Edwards, C.L., Whitfield, K.E., Brandon, D.T., & Tucker, R.D. (2004). Stress, coping, and health outcomes among African-Americans: A review of the John Henryism hypothesis. *Psychology & Health, 19*(3), 369-83.

Bowman, P.J. (1989). Research perspectives on Black men: Role strain and adaptation across the adult life cycle. In R. L. Jones (Ed.), *Black Adult Development and Aging* (pp. 117-150). Berkeley, CA: Cobb & Henry Publishers.

Bowman, P.J. (2006). Role Strain and adaptation issues in the strength-based model: diversity, multilevel, and life-span considerations. *Counseling Psychologist, 34*(1), 118-133.

Braveman, P., Egerter, S., & Williams, D.R. (2011). The social determinants of health: Coming of age. *Annual Review of Public Health, 32*, 381-98.

Carver, C. S. (1997). You want to measure coping but your protocol's too long: Consider the Brief COPE. *International Journal of Behavioral Medicine, 4*, 92-100.

Carver, C.S., Scheier, M.F., & Weintraub, J.K. (1989). Assessing coping strategies: A theoretically based approach. *Journal of Personality and Social Psychology*, 56, 267-83.

Chae, D.H., Nuru-Jeter, A.M., Adler, N.E., Brody, G.H., Lin, J., Blackburn, E.H., & Epel, E.S. (2014). Discrimination, racial bias, and telomere length in African-American men. *American Journal of Preventive Medicine, 46*(2), 103-11.

Chatters, L.M. (2000). Religion and health: Public health research and practice. *Annual Review of Public Health, 21*(1), 335-67.

Cheatham, C.T., Barksdale, D.J., & Rodgers, S.G. (2008). Barriers to health care and health-seeking behaviors faced by black men. *Journal of the American Association of Nurse Practitioners, 20*(11), 555-62.

Cheema, J.R. (2014). Some general guidelines for choosing missing data handling methods in educational research. *Journal of Modern and Applied Statistical Methods, 13*(2), 53-75.

Clogg, C.C., Petkova, E., & Haritou, A. (1995). Statistical methods for comparing regression coefficients between models. *American Journal of Sociology, 100*(5), 1261-93.

Cohen, J., Cohen, P., West, S.G., Aiken, L.S. (2003). *Applied Multiple Regression/Correlation*

Analysis for the Behavioral Sciences, 3rd edition. NY: Routledge.
Cohen, S., Schwartz, J.E., Epel, E., Kirschbaum, C., Sidney, S., & Seeman, T. (2006). Socioeconomic status, race, and diurnal cortisol decline in the Coronary Artery Risk Development in Young Adults (CARDIA) Study. *Psychosomatic Medicine, 68*, 41–50.
Courtenay, W.H. (2000). Constructions of masculinity and their influence on men's well-being: A theory of gender and health. *Social Science & Medicine, 10,* 1385–1401.
Das, A. (2013). How does race get "under the skin"?: Inflammation, weathering, and metabolic problems in late life. *Social Science and Medicine, 77*, 75-83.
Davis, M.C., Matthews, K.A., & Twamley, E.W. (1999). "Is life more difficult on Mars or Venus? A meta-analytic review of sex differences in major and minor life events. *Annals of Behavioral Medicine, 21*(1): 83–97. doi: 10.1007/BF02895038.
Dmitrieva, N.O., Almedia, D.M., Dmitrieva, J., Loken, E., & Pieper, C.F. (2013). A day-centered approach to modeling cortisol: Diurnal cortisol profiles and their associations among U.S. adults. *Psychoneuroendocrinology, 38,* 1254-65.
Doane, L.D., Chen, F.R., Sladek, M.R., Van Lenten, S.A., & Granger, D.A. (2015). Latent trait cortisol (LTC) levels: Reliability, validity, and stability. *Psychoneuroendocrinology, 55*, 21-35.
Ellis, K.R., Griffith, D.M., Allen, J.O., Thorpe, R.J. Jr., & Bruce, M.A. (2015). "If you do nothing about stress, the next thing you know, you're shattered": Perspectives on African American men's stress, coping and health from African American men and key women in their lives. *Social Science & Medicine, 139*, 107-14.
Evans, J., Frank, B., Offile, J.L., & Gregory, D. (2011). Health, Illness, Men and Masculinities (HIMM): A theoretical framework for understanding men and their health. *Journal of Men's Health, 8*(1), 7-15.
Evans, G.W., & Kim, P. (2013), Childhood poverty, chronic stress, self-regulation, and coping. *Child Development Perspectives, 7*(1), 43-8. doi: 10.1111/cdep.12013.
Federenko, I., Wust, S., Hellhammer, D.H., Dechoux, R., Kumsta, R., & Kirschbaum, C. (2004). Free cortisol awakening responses are influenced by awakening time. *Psychoneuroendocrinology 29*, 174-84.
Fetzer Institute/National Institute on Aging Working Group. (1999). *Multidimensional Measurement of Religiousness/Spirituality for Use in Health Research: A Report of the Fetzer Institute/National Institute on Aging Working Group*. Kalamazoo, MI: Fetzer Institute.
Flaskerud, J.H. (2012). Coping and health status: John Henryism. *Issues in Mental Health Nursing, 33*(10), 712-5.
Folkman, S. (1997). Positive psychological states and coping with severe stress. *Social Science and Medicine, 45*, 1207-21.
Folkman, S. (Ed.). (2011). *The Oxford Handbook of Stress, Health, and Coping*. NY: Oxford University Press.
Folkman, S., & Moskowitz, J.T. (2000). Positive affect and the other side of coping, *American Psychologist, 55*, 647-54.
Fraser, S., & Moore, D. (Eds.). (2011). *The Drug Effect: Health, Crime and Society*. NY: Cambridge University Press.
Geronimus, A.T. (1992). The weathering hypothesis and the health of African-American women and infants: Evidence and speculations. *Ethnicity and Disease, 2*, 207–21.
Geronimus, A.T., Bound, J., Waidmann, T.A., Colen, C.G., & Steffick, D. (2001). Inequality in

life expectancy, functional status, and active life expectancy across selected Black and White populations in the U.S. *Demography, 38*, 227-51.
Geronimus, A.T., Hicken, M., Keene, D., & Bound, J. (2006). "Weathering" and age patterns of allostatic load scores among Blacks and Whites in the United States. *American Journal of Public Health, 96*(5), 826-33.
Geronimus, A.T., Keene, D., Hicken, M., & Bound, J. (2007). Black-White differences in age trajectories of hypertension prevalence among adult women and men, 1999-2002. *Ethnicity and Disease, 17*(1), 40-8.
Geronimus, A.T., & Thompson, J.P. (2004). To denigrate, ignore, or disrupt: Racial inequality in health and the impact of a policy-induced breakdown of African American communities. *Due Bois Review, 1*(2), 247-79.
Gilbert, K.L., Ray, R., Siddiqi, A., Shetty, S., Baker, E.A., Elder, K., & Griffith, D.M. (2016). Visible and invisible trends in Black men's health: Pitfalls and promises for addressing racial, ethnic, and gender inequities in health. *Annual Reviw of Public Health, 37*, 295-311.
Goffman, A. (2014). *On the Run: Fugitive Life in an American City*. Chicago, IL: University of Chicago Press.
Good, G.E., Robertson, J.M., Fitzgerald, L.F., Stevens, M., & Bartels, K.M. (1996). The relation between masculine role conflict and psychological distress in male university counseling clients. *Journal of Counseling & Development, 76*, 44-9.
Granger, D.A., Hibel, L.C., Fortunato, C.K., & Kapelewski, C.H., 2009. Medication effects on salivary cortisol: Tactics and strategy to minimize impact in behavioral and developmental science. *Psychoneuroendocrinology 34*, 1437-48.
Griffith, D.M., Ellis, K.R., & Allen, J.O. (2012). How does health information influence African American men's health behavior? *American Journal of Men's Health, 6*(2), 156-63.
Griffith, D.M., Ellis, K.R., & Allen, J.O. (2013). An intersectional approach to social determinants of stress and African American men's health: Men's and women's perspectives. *American Journal of Men's Health, 7(Suppl. 4), S19-30*.
Griffith, D.M., Gunter, K., & Allen, J.O. (2011). Male gender role strain as a barrier to African American men's physical activity. *Health Education and Behaviors, 38*(5), 482-91.
Grzywacz, J.G., & Marks, N.F. (1999). Family solidarity and health behaviors: Evidence from the National Survey of Midlife Development in the United States. *Journal of Family Issues, 20*(2), 243-268.
Hawthorne, G., & Elliott, P. (2005). Imputing cross-sectional missing data: Comparison of common techniques. *Australian and New Zealand Journal of Psychiatry, 39*(7), 583-90.
Heffernan, K.S., Jae, S.Y., Wilund, K.R., Woods, J.A, & Fernhall, B. (2008). Racial differences in central blood pressure and vascular function in young men. *American Journal of Physiology-Heart Circulatory Physiology, 295*, H2380–7.
Hudak, J. (2016). *Marijuana: A Short History*. Washington, DC: Brookings Institution Press.
Ice, G.H. (2005). Factors influencing cortisol level and slope among community dwelling older adults in Minnesota. *Journal of Cross-Cultural Gerontology, 20*(2), 91-108.
Idler, E.L., Musick, M.A., Ellison, C.G., George, L.K., Krause, N., Ory, M.G., … & Williams, D.R. (2003). Measuring multiple dimensions of religion and spirituality for health research: conceptual background and findings from the 1998 General Social Survey. *Research on Aging, 25*, 327-65.
Jaccard, J. (2001). *Interaction Effects in Logistic Regression*. Thousand Oaks, CA: Sage.

Jackson, J.S., Knight, K.M., & Rafferty, J.A. (2010). Race and unhealthy behaviors: Chronic stress, the HPA axis, and physical and mental health disparities over the life course. *American Journal of Public Health, 100,* 933-939.
James, S.A., Hartnett, S.A., & Kalsbeek, W.D. (1983). John Henryism and blood pressure differences among black men. *Journal of Behavioral Medicine, 6,* 259-78.
James, S.A., Keenan, N.L., Strogatz, D.S., Browning, S.R., & Garrett, J.M. (1992). Socioeconomic status, John Henryism, and blood pressure in black adults: The Pitt County Study. *American Journal of Epidemiology, 135*(1), 59-67.
James, S.A., Strogatz, D.S., Wing, S.B., & Ramsey, D.L. (1987). Socioeconomic status, John Henryism, and hypertension in Blacks and Whites. *American Journal of Epidemiology, 126*(4), 664-73.
Jones, C.P. (2000). Levels of racism: A theoretical framework and a gardener's tale. *American Journal of Public Health, 90,* 1212-5.
Juster, R-P., McEwen, B.S., & Lupien ,S.J. (2010). Allostatic load biomarkers of chronic stress and impact on health and cognition. *Neuroscience & Biobehavioral Reviews, 35*(1), 2-16.
Kaiser, C.R., & Miller, C.T. (2001). Stop complaining! The social costs of making attributions to discrimination. *Personality and Social Psychology Bulletin, 27*(2), 254-63.
Karasek, R.A., & Theorell, T. (1990). *Healthy Work: Stress, Productivity, and the Reconstruction of Working Life.* New York: Basic Books.
Keyes, C.L. (2009). The Black–White paradox in health: Flourishing in the face of social inequality and discrimination. *Journal of Personality, 77*(6), 1677-706.
Keyes, K.M., Barnes, D.M., & Bates, L.M. (2011). Stress, coping, and depression: Testing a new hypothesis in a prospectively studied general population sample of U.S.-born Whites and Blacks. *Social Science & Medicine, 72,* 650-9.
Krause, N., & Chatters, L.M. (2005). Exploring race differences in a multidimensional battery of prayer measures among older adults. *Sociology of Religion, 66*(1), 23-43.
Kudielka, B.M., & Kirschbaum, C. (2005). Sex differences in HPA axis responses to stress: A review. *Biological Psychology, 69*(1), 113-132.
Lazarus, R.S. (1991). *Emotion and Adaptation*. NY: Oxford University Press.
Lazarus, R.S., & Folkman, S. (1984). *Stress, Appraisal, and Coping*. NY: Springer.
Lichter, D.T., Parisi, D., & Taquino, M.C. (2012). The geography of exclusion: Race, segregation, and concentrated poverty. *Social Problems, 59*(3), 364-88.
Masharani, U., Shiboski, S., Eisner, M.D., Katz, P.P., Janson, S.L., Grainger, D.A., & Blanc, P.D. (2005). Impact of exogenous glucocorticoid use on salivary cortisol measurements among adults with asthma and rhinitis. *Psychoneuroendocrinology, 30,* 744-52.
Mauer, M. (2011). Addressing racial disparities in incarceration. *The Prison Journal, 91*(3), 87S-101S.
McDonough, P., & Walters, V. (2001). Gender and health: Reassessing patterns and explanations. *Social Science & Medicine, 52*(4), 547-59.
McEwen, B.S., & Gianaros, P.J. (2010). Central role of the brain in stress and adaptation: Links to socioeconomic status, health, and disease. *Annals of the New York Academy of Sciences, 1186,* 190-222.
Mezuk, B., Abdou, C.M., Hudson, D., Kershaw, K.N., Rafferty, J.A., Lee, H., & Jackson, J.S. (2013). "White box" epidemiology and the social neuroscience of health behaviors: The Environmental Affordances Model. *Society and Mental Health,* 3, 79-95.
Mezuk, B., Rafferty, J.A., Kershaw, K.N., Hudson, D., Abdou, C.M., Lee, H., ... & Jackson, J.S.

(2010). Reconsidering the role of social disadvantage in physical and mental health: Stressful life events, health behaviors, race, and depression. *American Journal of Epidemiology, 172*(11), 1238-49.
Mezuk, B., Ratliff, S., Concha, J.B., Abdou, C.M., Rafferty, J., Lee, H., & Jackson, J.S. (2017). Stress, self-regulation, and context: Evidence from the health and retirement survey. *SSM-Population Health, 3*, 455-63.
Miller, G.E., Chen, E., & Zhou, E.S. (2007). If it goes up, must it come down? Chronic stress and the hypothalamic-pituitary-adrenocortical axis in humans. *Psychological Bulletin, 133*(1), 25-45.
Miniño, A.M. (2013). *Death in the United States, 2011*. NCHS data brief, no 115. Hyattsville, MD: National Center for Health Statistics.
Nolen-Hoeksema, S. (2012). Emotional regulation and psychopathology: The role of gender. *Annual Review of Clinical Psychology, 8*, 161-87.
Olives, C., Myerson, R., Mokdad, A.H., Murray, C.J.L., & Lim, S.S. (2013). Prevalence, awareness, treatment, and control of hypertension in U.S. counties, 2001–2009. *PLoS ONE, 8*(4): e60308.
Paradies, Y. (2006) A review of psychosocial stress and chronic disease for 4th world indigenous people and African Americans. *Ethnicity & Disease, 16*, 195-308.
Paradies, Y., Ben, J., Denson, N., Elias, A., Priest, N., Pieterse, A., ... & Gee, G. (2015). Racism as a determinant of health: A systematic review and meta-analysis. *PloS one, 10*(9), e0138511.
Paris, J.J., Franco, C., Sodano, R., Freidenberg, B., Gordis, E., Anderson, D.A., … & Frye, C.A. (2010). Sex differences in salivary cortisol in response to acute stressors among healthy participants, in recreational or pathological gamblers, and in those with posttraumatic stress disorder. *Hormones and Behavior, 57*(1), 35-45.
Park, C.L., & Iacocca, M.O. (2014). A stress and coping perspective on health behaviors: Theoretical and methodological considerations. *Anxiety, Stress, & Coping, 27*(2), 123-37.
Penley, J.A., Tomaka, J., & Wiebe, J.S. (2002). The association of coping to physical and psychological health outcomes: A meta-analytic review. *Journal of Behavioral Medicine, 25*(6), 551-603.
Piazza, J.R., Almeida, D.M., Dmitrieva, N.O., & Klein, L.C. (2010). Frontiers in the use of biomarkers of health in research on stress and aging. *Journal of Gerontology: Psychological Science, 65B*(5), 513-25.
Powell, L.H., Shahabi, L., & Thoresen, C.E. (2003). Religion and spirituality: Linkages to physical health. *American Psychologist, 58*(1), 36-52.
Radler, B.T., & Ryff, C.D. (2010). Who participates? Accounting for longitudinal retention in the MIDUS National Study of Health and Well-Being. *Journal of Aging Health, 22*, 307-31.
Ross, K.M., Murphy, M.L.M., Adam, E.K., Chen, E., & Miller, G.E. (2014). How stable are diurnal cortisol activity indices in healthy individuals/ Evidence from three multi-wave studies. *Psychoneuroendocrinology, 39*, 184-93.
Ryff, C., Almeida, D.M., Ayanian, J.S., Carr, D.S, Cleary, P.D., Coe, C., …Williams, D. (2010). *Midlife in the United States (MIDUS), 2004–2006*. ICPSR04652-v6. Ann Arbor, MI: Inter-university Consortium for Political and Social Research [distributor], 2012-04-18. https://doi.org/10.3886/ICPSR04652.v6
Ryff, C., Almeida, D.M., Ayanian, J.S., Carr, D.S, Cleary, P.D., Coe, C., …Williams, D. (2006).

Midlife Development in the United States (MIDUS II), 2004–2006: Documentation of Psychosocial Constructs and Composite Variables in MIDUS II Project 1. ICPSR04652. Ann Arbor, MI: Inter-university Consortium for Political and Social Research [distributor].

Ryff, C., Almeida, D., Ayanian, J.S., Carr, D.S, Cleary, P.D., Coe, C., …Williams, D. (2012). *Midlife Development in the United States (MIDUS II): Milwaukee African American Sample, 2005-2006* (ICPSR 22840). ICPSR22840-v2. Ann Arbor, MI: Inter-university Consortium for Political and Social Research [distributor], 2012-05-21. https://doi.org/10.3886/ICPSR22840.v2

Scherer, K.R. (2001). Appraisal considered as a process of multilevel sequential checking. In K.R. Scherer, A. Schorr, & T. Johnstone (Eds.), *Appraisal Processes in Emotion: Theory, Methods, Research* (pp. 92-120). Oxford, Englad: Oxford University Press.

Schneiderman, N., Ironson, G., & Siegel, S.D. (2005). Stress and health: psychological, behavioral, and biological determinants. *Annual Review of Clinical Psychology, 1,* 607-28.

Selzer, M.L. (1971). The Michigan Alcohol Screening Test: The quest for a new diagnostic instrument. *American Journal of Psychiatry, 127*, 89-94.

Skinner, E.A., Edge, K., Altman, J., & Sherwood, H. (2003). Searching for the structure of coping: A review and critique of category systems for classifying ways of coping. *Psychological bulletin, 129*(2), 216-69.

Smith, W.A., Allen, W.A., & Danley, L.L. (2007). "Assume the position…you fit the description": Psychosocial experiences and racial battle fatigue among African American male college students. *American Behavioral Scientist, 51*(4), 551-78.

Stawski, R.S., Cichy, K.E., Piazza, J.R., & Almeida, D.M. (2013). Associations among daily stressors and salivary cortisol: Findings from the national study of daily experiences. *Psychoneuroendocrinology, 38*, 2654–65.

Steele, C.M. (2010). *Whistling Vivaldi: How Stereotypes Affect Us and What We Can* Do. NY: W.W. Norton & Co.

Taylor, R.J., & Chatters, L.M. (2010). Importance of religion and spirituality in the lives of African Americans, Caribbean Blacks and non-Hispanic Whites. *The Journal of Negro Education*, 280-94.

Taylor, R.J., Chatters, L.M., & Jackson, J.S. (2007). Religious and spiritual involvement among older African Americans, Caribbean blacks, and non-Hispanic whites: Findings from the National Survey of American Life. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences, 62*(4), S238-50.

U.S. Department of Health and Human Services (USDHHS), Office of Disease Prevention and Health Promotion. (2001). *Healthy People 2000 Final Review*. Hyattsville, MD: Public Health Service.

U.S. Department of Health and Human Services (USDHHS). (2009). Code of Federal Regulations, Title 45: Public welfare, Part 46: Protection of Human Subjects. Accessed 10/20/2017 from www.hhs.gov. www.hhs.gov/ohrp/regulations-and-policy/regulations/45-cfr-46/index.html#46.101

van Amsterdam, J., Opperhuizen, A., Koeter, M. & van den Brink, W. (2010). Ranking the harm of alcohol, tobacco and illicit drugs for the individual and the population. *European Addiction Research. 16*, 202–7.

Wang, X., Sánchez, B.N., Golden, S.H., Shrager, S., Kirschbaum, C., Karlamangla, A.S., … &

Roux, A.V.D. (2014). Stability and predictors of change in salivary cortisol measures over six years: MESA. *Psychoneuroendocrinology*, *49*, 310-320.
Warburton, D.E., Charlesworth, S., Ivey, A., Nettlefold, L., & Bredin, S.S. (2010). A systematic review of the evidence for Canada's Physical Activity Guidelines for Adults. *International Journal of Behavioral Nutrition and Physical Activity, 7*(1), 39.
Warner, D.F., & Hayward, M.D. (2007). Early-life origins of the race gap in men's mortality. *Journal of Health and Social Behavior, 47*(3), 209-26.
Williams, D.R. (2003). The health of men: Structured inequalities and opportunities. *American Journal of Public Health, 93*(5), 724-731.
Williams, D.R., & Mohammed, S.A. (2009). Discrimination and racial disparities in health: Evidence and needed research. *Journal of Behavioral Medicine*, *32*(1), 20-47.
Williams, D.R., & Mohammed, S.A. (2013). Racism and health I: Pathways and scientific evidence. *American Behavioral Scientist*, *57*(8), 1152-73.

CHAPTER 4

Coping with Physiological and Psychological Distress among Midlife and Older Black and White Men

Abstract

National surveys document a paradox in which Black men experience racial disparities in physical health outcomes but better mental health than their White counterparts. We know less, however, about what factors contribute to this paradox and how they might be leveraged to reduce the burden of poor physical health and premature death among Black men. Distress is increasingly investigated as a key predictor and precursor of several health outcomes. Emergent research on racial differences in physiological and psychological distress is consistent with the Black-White health paradox. Nonetheless, the relationship between physiological and psychological distress and how they are influenced by antecedent stress and coping processes is not well understood. This study explored racial differences in the relationships between coping strategies and physiological and psychological distress among midlife and older Black and White men in the National Survey of Midlife Development in the United States (MIDUS) II. None of the 12 coping strategies examined demonstrated similar relationships with both physiological and psychological distress. Most coping strategies predicted psychological distress but not physiological distress. Coping strategies predicted psychological distress in ways that were generally consistent with common categorizations of harmful and protective strategies. Key findings include: 1) coping affects men's physiological and psychological distress differently; 2) coping strategies used by midlife and older men may be important for their psychological health but have little impact on their physiological distress levels; and 3) among men, the Black-White health paradox is unrelated to racial differences in coping strategies used or racial differences in the effects of coping on health.

Introduction

Black[4] men have poorer physical health status and shorter average lifespans than other race and gender groups in the U.S. population (Miniño, 2013; USDHHS, 2001; Warner & Hayward, 2006). This is a result, in large part, of disparities in chronic physical health conditions such as hypertension, heart disease and stroke, cancers, and diabetes (Arias, Heron, & Tejada-Vera, 2013; CDC, 2014; Warner & Hayward, 2006). Further, Black men develop physical health problems at a younger age than other sociodemographic subgroups, and their conditions tend to be more poorly controlled, more severe, and accompanied by more serious complications and greater disability (Geronimus, Keene, Hicken, & Bound, 2007; Heffernan, Jae, Wilund, Woods, & Fernhall, 2008; Olives, Myerson, Mokdad, Murray, & Lim, 2013; Williams, 2003). A robust and well-established literature links racial health disparities to political, economic, historic, and social inequities in the U.S. (Braveman, Egerter, & Williams, 2011; Geronimus & Thompson, 2004;Gilbert et al., 2016; Warner & Hayward, 2006; Williams & Mohammed, 2013). Given the social and structural disadvantages associated with living in the racially-stratified U.S., we might anticipate that Black men would also have high rates of mental health disorders associated with exposure to stressors. National surveys, however, have consistently documented a paradox such that, when compared to Whites, Blacks experience a disproportionate burden of morbidity and mortality associated with physical health outcomes but lower rates of common mental health conditions; this paradox is evident for both males and females (Breslau et al. 2006; Mezuk et al., 2010; Miniño, 2013; USDHHS, 2001). The Black-White health paradox is not merely a reflection of issues with measurement, sampling, or differential rates of formal diagnosis (Mezuk et al., 2013). Less is known, however, about the factors contributing to this paradox, and how they might be leveraged to reduce the burden of poor physical health and premature death among Black men (Mezuk et al., 2013).

Chronic distress is increasingly examined as a key predictor and precursor of several health outcomes (Das, 2013; Dressler, Bindon, & Neggers, 1998; Geronimus, 1992; Geronimus, 2013; Geronimus, Bound, Waidmann, Colen, & Steffick, 2001; Juster, McEwen, & Lupien, 2010; Paradies, 2006; Russ et al., 2012; Schneiderman, Ironson, & Siegel, 2005; Sparrenberger

[4] We consider "Black" and "White" to be complex, socially-constructed racial categories that reflect an array of historic, geographic, cultural, political, and economic factors that coalesce to shape individuals' lived experiences and, ultimately, health. We use these broad terms that reference skin color and appearance, rather than self-identification with a particular ethnic group, because external perceptions and categorizations of people's race influence exposure to stressors and access to opportunities in the U.S. (Jones, 2000). Blacks continue to experience interpersonal and institutional racism and social marginalization, while Whites benefit from the privileges associated with affiliation with the dominant White racial group in the U.S. that, collectively, possesses the bulk of political, economic, and social power.

et al., 2009; Torres & Nowson, 2007). The focus on distress is due, in part, to the acknowledged role of chronic distress as a proximal outcome in stress and coping processes theorized to contribute to overall health and health disparities (Braveman et al., 2011; Das, 2013; Geronimus, 1992; Geronimus, 2013; Geronimus, Hicken, Keene, & Bound, 2006; Juster et al., 2010; Paradies, 2006; Schneiderman et al., 2005; Warner & Hayward, 2007). Chronic distress represents a damaging and ongoing state of imbalance that occurs when coping and adaptation processes are insufficient for mitigating the negative effects of stressors (Selye, 1975). Although distress appears to have distinct physiological and psychological dimensions, the relationship between these two forms of distress is not well understood (Chida & Hamer, 2008; Chida & Steptoe, 2009; Russell, Koren, Rieder, & Van Uum, 2012; Stalder & Kirschbaum, 2012; Staufenbiel, Penninx, Spijker, Elzinga, & van Rossum, 2013). In fact, much of theoretical literature does not clearly distinguish between these two forms of distress or identify them as fulfilling distinct roles in stress and coping processes related to health.

Emergent research on racial differences in physiological and psychological distress among men is largely consistent with the Black-White health paradox. Black men demonstrate more physiological distress than their White counterparts (Chapter 2). Although research findings comparing Black and White men's levels of self-reported psychological distress are mixed, Black men tend to report low levels of self-reported psychological distress (Breslau et al., 2006; Lincoln, Taylor, Watkins, & Chatters, 2011; Riolo, Nguyen, Gredlen, & King, 2005). Understanding similarities and differences between physiological and psychological distress and their relationships to antecedent stress and coping processes can provide important information about the mechanisms responsible for generating and reproducing the burden of physical health disparities among Black men. Additionally, this knowledge may provide insight on ways in which race-based differences in coping may account for the Black-White health paradox (Jackson, Knight, & Rafferty, 2010; Keyes, 2009; Keyes, Barnes, & Bates, 2011; Mezuk et al., 2013). The current study addressed some of these questions by exploring racial differences in the relationships between specific coping strategies and men's physiological and psychological distress.

Stress and Coping Processes and Men's Health

When faced with a stressor—a source of stress that is a threat to one's homeostasis and well-being—men experience a combination of interdependent physiological, psychological, and

behavioral responses. The nervous system activates the hypothalamic-pituitary-adrenocorticoid (HPA) axis, which releases a flood of stress hormones, including cortisol. This allows the body to react in a fight or flight manner, as needed, causing acute physiological distress. Cognitive processes may involve appraising the stressor to assess the level of threat and available coping options. Men may experience short-term psychological distress, which is a generalized, subjective sense of discomfort and strain due to unpredictable, uncontrollable, or overwhelming demands. They may alter their emotional responses and/or behavior by adopting one or more coping strategies. Effective coping can mitigate physiological and psychological distress, enabling a return to a normal state. This pattern of responses to a stressor is adaptive and an essential part of healthy human functioning.

When, however, men face stressors over a prolonged period and their coping efforts are insufficient, their nervous systems' stress responses become dysregulated. In response to stressors, the HPA axis does not generate a surge in stress hormones when necessary or as a part of natural occurring daily fluctuations (Miller, Chen, & Zhou, 2007), a condition termed chronic physiological distress. Other systems in the body are affected in this process and deteriorate over time (McEwen & Gianaros, 2010). Over the life course, chronic physiological distress leads to the development of disability, chronic diseases, and premature mortality (Juster et al., 2010). In contrast, chronic psychological distress has been consistently linked to adverse mental and emotional health such as increased risk for anxiety and mood disorders (Andrews & Slade, 2001), substance abuse (Andrews & Slade, 2001), and suicide (Beghi, Rosenbaum, Cerri, & Cornaggia, 2013).

Coping is considered a key process that mediates exposure to stressors and their effects on health and wellbeing (Folkman, 1997; Folkman & Moskowitz, 2000; Lazarus, 1991; Lazarus & Folkman, 1984). Although effective coping can reduce the negative consequences of stressors on people's lives, coping efforts can also be ineffectual, harmful, or have mixed results that improve some health outcomes while exacerbating others. Factors affecting coping responses and their effectiveness include interactions involving individual (personality traits, preferred coping approaches), contextual (types and chronicity of stressors, access to coping resources), and societal (masculine and racial ideologies, roles, and expectations) influences. We conceptualized coping strategies as including both general orientations, as well as behaviors that men may or may not consciously employ in response to stressors. Some researchers do not

consider unconscious strategies to reflect coping; however, individuals do not always recognize stressors and may unconsciously enact coping efforts through innate (sensory-motor) and learned (scheme-based) processes (Scherer, 2001). Further, men often have unconscious responses to stressors and may be aware of how stressors influence their lives and behavior even if they do not consider these responses as being reflective of coping (Ellis, Griffith, Allen, Thorpe, & Bruce, 2015).

Coping is generally recognized as having several dimensions, although there is little consensus in the field about what these are. The Transactional Model of Stress and Coping (Folkman, 1997; Folkman & Moskowitz, 2000; Lazarus, 1991; Lazarus & Folkman, 1984) categorizes coping strategies as either problem-focused (i.e., individuals seek to directly address stressors) or involving emotional regulation (i.e., individuals try to change their emotional response to stressors). Although widely used, this categorization overlooks coping strategies that reduce physiological responses to stressors. For example, individuals may use deep breathing exercises to slow a heart rate that became elevated following exposure to a stressor. Other common approaches to categorizing coping strategies consider whether strategies are: 1) cognitive or behavioral; 2) characterized by engagement or disengagement; or 3) adaptive (i.e., "good") or maladaptive (i.e., "bad") (Skinner, Edge, Altman, & Sherwood, 2003). Coping strategies commonly categorized as adaptive include positive reinterpretation, active problem solving, seeking social support, religious and spiritual coping, and being physically active. Coping strategies commonly considered maladaptive include denial, behavioral disengagement, social isolation, and avoidance or self-medication with overconsumption of comfort foods, drug use, or alcohol abuse. Overall, categorizing coping strategies is problematic conceptually and in application (Mezuk et al., 2017; Skinner et al., 2003). This practice risks masking the different effects a single coping strategy may have for different health outcomes. Further, relationships between coping strategies and health outcomes may vary according to individuals' sociodemographic characteristics (e.g., gender, race) or over different time spans (i.e., short- versus long-term effects).

Previous research documents sex and gender differences in stressors, coping strategies used, and associated health outcomes, including physiological and psychological distress (Bowman, 1989; 2006; Courtenay, 2000; Davis, Matthews, & Twamley, 1999; Evans, Frank, Offile, & Gregory, 2011; Kudielka & Kirschbaum, 2005; McDonough & Walters, 2001; Paris et

al., 2010). Men, as compared to women, tend to employ more problem-focused strategies and less emotion-focused strategies (Courtenay, 2000; Nolen-Hoeksema, 2012). Men may also engage in other gendered strategies to cope with stressors such as denial, social isolation, and drug and alcohol use (Courtenay, 2000; Evans et al., 2011). Objective biomarkers may be especially valuable in men's health disparities research, as men tend to misattribute and minimize stressors and resultant psychological distress, especially when associated with discrimination (Good, Robertson, Fitzgerald, Stevens, & Bartels, 1996; Kaiser & Miller, 2001). Stress and coping processes and their influences on health reflect the interplay of biological, social, and contextual factors. We do not know, however, to what extent sex-based differences in the relationships between coping and health are due to biological sex differences or the influences of gender ideologies, roles, and expectations. Given this, sex- and gender-specific research is critical to better understand and address stress and coping mechanisms and their effects on physiological and psychological distress.

Stress Processes, Coping, and Health Disparities

Although everyone experiences stressors, socially and structurally marginalized populations experience more stressors overall, more chronic stressors, and have fewer mitigating resources (Geronimus, 1992). The Weathering Hypothesis describes a general pathway linking social inequities, stress processes, and health disparities (Geronimus et al., 2006). Social inequities are social and contextual conditions that promote marginalization of certain sociodemographic groups (e.g., Blacks, women, poor) while privileging others (e.g., Whites, men, wealthy) through differential access to political, economic, and social power. The Weathering Hypothesis posits that exposure to objective and subjective stressors and high-effort coping get "under the skin" by causing chronic distress and subsequent physical deterioration and negative health outcomes. Biomarkers of physiological distress provide a means for examining the cumulative health impact of stressors, including stressors that can be difficult to measure such those rooted in institutional racism. These types of stressors, while eluding detection and self-report, are still relevant for and can affect coping, distress, and associated health outcomes (Ellis et al., 2015; Paradies, 2006; Scherer, 2001; Williams & Mohammed, 2009). A growing body of research provides empirical support for the Weathering Hypothesis and its theorized contribution to racial/ethnic disparities in chronic health conditions, mortality, and other health outcomes (Das, 2013; Geronimus, 1992; Geronimus et al., 2001; 2006; Juster et

al., 2010; Paradies, 2006; Schneiderman et al., 2005). Cortisol has been the most widely used physiological distress biomarker in research examining stress processes and population-level health outcomes.

The Environmental Affordances Model (Jackson et al., 2010; Mezuk et al., 2013) provides a framework linking coping strategies to the Black-White health paradox. It posits that the coping strategies people adopt may reflect the economic, social, and geographic contexts in which they live. Black men may habitually employ coping strategies that reflect the limited opportunities and resources available in the disadvantaged communities where Blacks are more likely to live. These coping strategies may include using tobacco, alcohol, and drugs; physical inactivity; and the overconsumption of unhealthy comfort foods (Mezuk et al., 2013). Jackson, Mezuk, and colleagues (Jackson et al., 2010; Mezuk et al., 2013) argue that these coping strategies may protect Black men's mental health while increasing their risk of developing chronic diseases and early mortality. Research testing the hypothesizing link between "bad" coping behaviors (e.g., smoking, alcohol abuse, drug use, stress eating, physical inactivity) and improved mental health among Blacks has produced mixed results (Jackson et al., 2010; Keyes, 2009; Keyes et al., 2011; Mezuk et al., 2010). Mezuk and colleagues (2017) found that these coping behaviors were more closely associated with the amount of stressors individuals were exposed to, rather than race or economic disadvantage. Further, women reported more unhealthy coping strategies than men, underscoring the importance of considering sex/gender differences in mechanisms underlying the Black-White health paradox. Our review of the literature indicated that the Environmental Affordances Model has not yet been tested with an exclusively male sample or for its theorized race-based differences in the relationships between coping strategies and mental and physical health outcomes.

Race frequently has a moderating role in population-level social and health sciences research. The Diminishing Returns Hypothesis is consistent with this relationship and suggests that, compared to more privileged groups, marginalized groups experience barriers that limit their ability to take advantage of resources (Farmer & Ferraro, 2005). Consequently, marginalized groups accrue fewer health benefits from resources and assets at their disposal (i.e., race moderates the relationship between protective factors and health). Extrapolating from this premise, Blacks may reap fewer health benefits from protective coping strategies than Whites do. This concept has been confirmed in studies examining a variety of physical health outcomes and

their relationships to resources and assets such as education, family socioeconomic status, employment, neighborhood safety, and social support (Assari, 2017). More research is needed to ascertain whether diminishing returns only occur with physical health indicators.

Study Purpose

The purpose of this study was to explore how the coping strategies Black and White men reported predicted their physiological and psychological distress. Our aims were twofold. First, we examined the relationships (strength and direction) each coping strategy demonstrated with two dimensions of distress, physiological distress and psychological distress. We hypothesized that coping behaviors that affect the body through direct pathways (e.g., stress eating, alcohol use, drug use, physical activity) would be associated with physiological distress, while cognitively-oriented coping strategies (e.g., positive reinterpretation, planning, venting, denial) would be associated with psychological distress. Next, we tested whether race moderated any of these relationships. We hypothesized that for physiological distress, Black men would show evidence of diminished return (less benefit) from protective coping strategies and greater vulnerability to the negative effects of harmful coping strategies than their White counterparts would. For psychological distress, we anticipated that Black men would benefit equally or more from protective strategies and be negatively affected by harmful coping strategies at levels comparable to or less than White men.

Methods

Data Source

This study used linked data from participants in the second waves of the National Survey of Midlife in the United States (MIDUS II) and the National Study of Daily Experiences (NSDE II), which included a random subsample of MIDUS II participants (Almeida, 2005; Almeida, McGonagle, & King, 2009). MIDUS II consisted of an interview and self-administered questionnaire that assessed: sociodemographic, family, and lifestyle characteristics; psychological constructs; health behaviors; and health outcomes. NSDE II was an in-depth study of daily stressors, physiological distress biomarkers (i.e., cortisol), and health indicators in which participants completed telephone interviews for eight consecutive days and provided cortisol samples on half of those days (Almeida, 2005; Almeida et al., 2009). Physiological distress and associated control variables (i.e., smoker-NSDE, lunch protocol non-adherent) used in the current study were collected in NSDE II between 2004 and 2009, after participants provided data

for all other measures in MIDUS II, which was collected between 2004 and 2006. The present study was exempt from Internal Review Board evaluation because it involved secondary analysis of a publically available deidentified dataset (45 CFR 46; USDHHS, 2009).

Sample. The MIDUS sample was identified using a stratified probability sampling design. MIDUS II included 5,555 English-speaking, community-residing adults who were in midlife or older (35-85 years of age) and resided in the contiguous United States (Radler & Ryff, 2010; Ryff et al., 2006; 2012). A total of 2,022 MIDUS II participants provided data for NSDE II (78% response rate), and 1,735 (85.8%) of these provided saliva samples. For the current study, we limited the analytic sample to the 59 Black and 637 White men who completed the MIDUS II interview and self-administered questionnaire and provided sufficient data for calculating the two distress outcome measures.

Physiological distress data collection. Cortisol, a biomarker of physiological distress, was collected from saliva. Participants used Salivette kits (Sarstedt, Rommelsdorft, Germany) to collect four saliva samples each day for four consecutive days, for a total of 16 samples per person. Participants collected samples upon waking (T1), 30 minutes after waking (T2), before lunch (T3), and at bedtime (T4). Salivary cortisol samples were collected using standard procedures and protocols used in large-scale epidemiological research (Adam & Kumari, 2009); details are described elsewhere (Almeida et al., 2009; Stawski, Cichy, Piazza, & Almeida, 2013). Participants indicated the times they collected samples with a paper-pencil log and during nightly telephone interviews; correlations were above .90 (Almeida et al., 2009). Participants mailed their samples to a lab where raw salivary cortisol concentrations were measured with luminescence immunoassays; intra- and inter-assay coefficients were below 5%.

Measures

Outcome measures. ***Physiological distress*** was operationalized as diurnal cortisol slopes from 30 minutes after waking (T2), which is when they typically peak, to before lunch (T3), averaged over four days. Cortisol slopes for this portion of the day are declining, so slope values are negative (e.g., -.20). More blunted (i.e., horizontal, closer to 0) diurnal cortisol slopes represent more physiological distress, because they are indicative of reduced cortisol reactivity and disrupted physiological stress response (Adam et al., 2017; Adam & Kumari, 2009). We used diurnal cortisol slopes from this portion of the day because analyses indicated notable racial differences in diurnal cortisol slopes, especially between T3 and T2, which would increase statistical

power to detect significant race differences, should they exist (Chapter 2). Research on the properties and best practices for using different cortisol measures as indicators of physiological distress is still emerging. Diurnal cortisol slopes have demonstrated good predictive validity for a broad range of mental and physical health outcomes (Adam et al., 2017). Although cortisol levels and patterns are known to fluctuate daily, diurnal cortisol slopes have better reliability than other commonly use cortisol measures, especially when data from several days are averaged to increase stability (Doane, Chen, Sladek, Van Lenten, & Granger, 2015; Wang et al., 2014). Diurnal cortisol slopes were calculated for each day for each individual by dividing the difference in the times of T2 and T3 cortisol collection by the difference in the natural logs of the T2 and T3 cortisol values. Raw cortisol values were natural log transformed to adjust for skew, consistent with previous cortisol research (Adam & Kumari, 2009). Diurnal cortisol slopes were calculated for the four cortisol collection days and then averaged to obtain the physiological distress measure used in this study.

Psychological distress was measured with the fourteen-item Negative Affect Scale created for the MIDUS study, which captures non-specific psychological distress (Almeida et al., 2007; Piazza, Charles, Stawski, & Almeida, 2013). The Negative Affect Scale includes a broad range of mood states including moods theorized to capture expressions of distress specifically among men (Addis, 2008; Leimkűhler, Heller, & Paulus, 2007). Participants were asked, "In the past 30 days, how much of the time did you feel: nervous, restless or fidgety, hopeless, that everything was an effort, worthless, so sad nothing could cheer you up, afraid, jittery, irritable, ashamed, upset, lonely, angry, and upset?" Participants responded using a five-point scale ranging from All the Time (1) to None of the Time (5). Responses were reverse coded and averaged, so higher scores indicated more psychological distress. The Negative Affect Scale has demonstrated good internal validity and reliability in other studies, though its psychometric properties have only previously been examined with mixed race and mixed gender samples (Piazza et al., 2013). The scale demonstrated good reliability for the Black and White men in this sample (Cronbach's alphas .954 and .914, respectively).

Coping strategies. We examined 12 general approaches to coping that individuals tend to employ on a regular basis when dealing with stressors. Some measures asked participants to report their use of a particular strategy explicitly for coping with stressors; others captured behaviors identified in the coping research literature as strategies men may consciously or unconsciously adopt to cope with stressors (e.g., social support seeking, alcohol abuse, drug use,

physical activity; Ellis et al., 2015; Park & Iacocca, 2013). Continuous measures were calculated so that higher scores indicated greater reliance on that coping strategy and all measures had the same range of possible scores (4-16) for ease of comparison across strategies. We calculated scales with missing item values by imputing missing values based on individual men's mean scores for other scale items (i.e., person mean substitution), a method recommended in the MIDUS protocols (Ryff et al., 2010) and suitable for our data (Hawthorne & Elliott, 2005).

Positive reinterpretation, active coping, planning, venting, denial, and ***behavioral disengagement*** were measured using subscales from the original COPE Inventory (Carver, 1997; Carver, Scheier, & Weintraub, 1989). Participants were asked to evaluate how often they tended to respond to difficult or stressful events in their lives in specific ways. Response options ranged from Not At All (4) to A Lot (1). Each subscale was calculated by summing the reverse-coded values of the four items in each subscale. The COPE Inventory has been previously used with diverse populations. Cronbach's alphas for this sample were: positive reinterpretation α=.803, active coping α=.728, planning α=.833, venting α=.800, denial α=.701, and behavioral disengagement α=.747.

Stress eating was assessed by two items that asked participants to indicate how often they responded to difficult or stressful events in their lives in the following ways: "I eat more than I usually do," and "I eat more of my favorite foods to make myself feel better." Response options ranged from Not At All (4) to A Lot (1). The measure was calculated by summing the reverse-coded responses to the two items and then multiplying by 2 to fit the desired scale range. Cronbach's α=.834 and Standardized Cronbach's α=.701.

Religious and spiritual coping was assessed with six items that asked participants to report how often they turned to their religious or spiritual practices and beliefs to help understand and deal with major problems in their lives using a four-point scale ranging from Never (4) to A Great Deal (1) (Fetzer Institute/NIA Working Group, 1999; Idler et al., 2003). Items were: "I seek comfort through religious or spiritual means such as praying, meditating, attending services, or talking to a religious or spiritual advisor," "I ask what my religious or spiritual beliefs suggest I should do," "I try to make sense of the situation and decide what to do without relying on God (reverse coded)," "I look to God for strength, support, and guidance," "I work together with God as partners," and "I think about how my life is part of a larger spiritual force." Responses were summed and multiplied by ⅔ to fit the desired scale range. Cronbach's α=.897.

Willingness to seek social support was assessed with two items that asked participants to report how well the following statements described their attitudes about seeking social support: "I don't like to ask others for help unless I have to" and "Asking others for help comes naturally for me." The four-point response options ranged from Not At All (4) to A Lot (1). The second item was reverse coded. The scale score was calculated by taking the sum of the two items and multiplying by 2 to fit the desired scale range. Cronbach's α=.655 and Standardized Cronbach's α=.492.

Alcohol abuse was assessed with a four-item modified version of the Michigan Alcohol Screening Test (MAST; Selzer, 1971). These items asked participants to report whether they had experienced various problems while drinking or because of alcohol in the past 12 months. Example items were: "Did you have such as strong desire or urge to use alcohol that you could not resist it or could not think of anything else?," and "Did you have a period of a month or more when you spent a great deal of time using alcohol or getting over its effects?" Alcohol abuse was treated as a dichotomous variable in which one or more affirmative response was categorized as indicative of alcohol abuse problems, with no reported alcohol problems as the reference group. Previous research (Grzywacz & Marks, 1999) indicated that this operationalization was valid and sensitive to population-level variation.

Drug use was a dichotomous variable indicating whether participants reported using any of the following within the past 12 months: 1) illegal drugs; 2) prescription medications without a prescription; or 3) prescription medications used in a manner that was inconsistent with the instructions. Drugs queried included: sedatives, tranquilizers, stimulants, painkillers, antidepressants, inhalants, marijuana, cocaine/crack, LSD/hallucinogens, and heroin. No reported drug use was the reference group.

Physically active was a dichotomous variable indicating whether participants regularly engaged in vigorous or moderate physical activity several times a week. Participants were asked to report how frequently they engaged in moderate and vigorous leisure time physical activity (assessed separately) during the summer and during the winter (four questions total). Participants who reported being physically active at least several times a week for two or more questions were considered active; participants who did not meet this criterion were the inactive reference group.

Control variables. We controlled for sociodemographic and confounding variables

consistently associated with physiological and psychological distress in previous research and that preliminary analyses indicated meaningfully contributed to our models. These included age (Byrd, 2012; Ice, 2005), educational attainment (Byrd, 2012; Cohen et al., 2006), smoking (Badrick, Kirschbaum, & Kumari, 2007; Orlando, Ellickson, & Kimberly, 2001), and not adhering to cortisol collection protocols (only relevant to physiological distress; Adam & Kumari, 2009). There were no missing data on control variables. ***Age*** represented participants' age, rounded to the nearest year at the time of MIDUS II data collection. ***Educational attainment*** was measured using four ordinal categories based on participant report of their highest level of schooling completed: no high school degree and no GED (1); high school graduate or obtained a GED (2), bachelor's degree (3), and advanced graduate or professional degree (4). ***Smoker-NSDE*** and ***Smoker-MIDUS*** were two variables indicating whether participants were cigarette smoker at the time of physiological (NSDE II) and psychological (MIDUS II) distress data collection, respectively. The smoker-NSDE variable was used in models with physiological distress as the outcome variable, and smoker-MIDUS was used in models with psychological distress. Nonsmoker was the reference group for both. ***Lunch protocol non-adherent*** indicated whether participants appeared to have diverged from the T3 collection protocol, which directed them to collect the T3 saliva sample prior to eating lunch. Evidence of a T3 cortisol surge, when T3 is more than 10 nmol/L higher than T2, indicated that the participant probably ate before providing the T3 sample. Men whose cortisol data showed evidence of a T3 surge on cortisol sample collection days were coded as non-adherent. Adherent was the reference group. ***Race*** was self-reported.

Data Analysis

We conducted exploratory data analyses with all study variables to identify potential confounding variables for inclusion as control variables, examine missing data, explore variable distributions and conduct appropriate transformations, and assess internal reliability and conduct data reduction (e.g., Cronbach's alpha and factor analysis) of scaled measures to ensure that we were using the most psychometrically sound scales. We determined that multiple imputation was not necessary due the exceedingly small amount of missing data and other data and analytic considerations (Cheema, 2014). We calculated basic descriptive statistics, including comparisons by race using two-tailed t, χ^2, and Mann-Whitney tests. Raw cortisol levels and patterns by race were reported in Chapter 2 in our examination of proximal health predictors of Black and White

men's physiological distress. All statistical analyses were conducted in SPSS version 24 (IBM Corp., Armonk, NY).

We conducted a series of analyses to identify: 1) the nature of the relationships between a diverse group of coping strategies and physiological distress among Black and White men (details reported in Chapter 3): and 2) the nature of the relationships between the identical coping strategies and psychological distress among Black and White men. The samples for all analyses varied slightly based on the number of men for whom a specific coping strategy measure could be calculated. First, we using ordinary least squares linear regression to regress physiological distress on each coping strategy, in turn, accounting for select control variables (age, educational attainment, race-indicator, smoker-NSDE, and lunch protocol non-adherent).

Next, we explored similarities and differences in the relationships between specific coping strategies and physiological distress for Black men and White men by adding interaction terms for the race indicator variable and appropriate coping strategy variable to the main effect models. We identified coping strategies potentially moderated by race that warranted additional analyses using a significance level of $p<.1$ for the interaction partial regression coefficient. We used $p<.1$ because we had limited power for identifying relationships that existed for Black men but not White men. This was due to the imbalanced racial distribution and relatively small number of Black men in the sample. We then graphed the interactions, holding all other variables at their average values to illustrate the interaction for the average participant (Jaccard, 2001). Given the differing profiles of Black and White men in the sample (Table 4.1), this was a conservative depiction of race-based differences. For continuous coping measures, we graphed the conditional effect of race at three coping values: the average for the sample and one standard deviation above and below. For dichotomous variables, we graphed race for participants who did and did not use that coping strategy. We then conducted simple slopes analyses to ascertain which coping strategy partial regression coefficients differed from 0, thereby indicating a significant effect. To do this, we conducted *t*-tests of the slopes divided by their standard errors (Aiken, West, & Reno, 1991).

We repeated the steps above with psychological distress as the outcome variable, controlling for age, educational attainment, and smoker-MIDUS.

We examined indicators and the potential biasing influences of misspecification, multicollinearity, heteroskedasticity, and outliers. We repeated all analyses with the subsample of

participants who had complete data on all measures to determine if results differed from those presented, based on the maximum sample sizes available for inclusion in each coping strategy model.

Results

Descriptive Analyses

Sample characteristics. Table 4.1 describes the sociodemographic characteristics and physiological distress data for participants by race. The total sample included 696 men, 8.5% of whom were Black (*n*=59) and 91.5% of whom were White (*n*=637). Participants ranged from 34 to 83 years old and were, on average, in their mid-50s. Black participants were slightly younger than White participants (*M*=54.3, *SD*=10.0 vs. *M*=57.1, *SD*=12.1, *t*(694)=2.10, *p*=.040) and were less likely to be married or cohabitating with a romantic partner at the time of data collection (62.7% vs. 83.0%, χ^2=14.70, *p*<.001); the majority of both Black and White men were parents. Overall, Black men reported lower socioeconomic status than White men: Black men had less education; and were less likely to have supervisory responsibilities (31.6% vs. 51.9%, χ^2=8.63, *p*=.004) and decision autonomy at work (*M*=19.4, *SD*=6.27 vs. *M*=23.0, *SD*=4.86, *t*(509)=3.70, *p*=.001). Black men had median annual household incomes that were more than 40% lower than the White men's ($39,000 vs. $65,250, *p*<.001). Comparable proportions of Black and White men were employed (57.6% and 68.4%, respectively). Black men had more physiological distress than White men, as indicated by more blunted (closer to 0) diurnal cortisol slopes (*M*= -.15, *SD*=.15 vs. *M*= -.21, *SD*=.11, *t*(694)= -2.97, *p*=.004). Black men also reported more psychological distress (*M*=1.73, *SD*=.81 vs. *M*=1.51, *SD*=.44, *t*(694)= -2.11, *p*=.039), although average scores for both groups reflected infrequent psychological distress (i.e., between None and A Little response options). Black men were more likely than White men to smoke at both time periods during which outcome variables were collected (32.2% vs. 15.4%, χ^2=10.92, *p*=.003 and 25.4% vs. 11.8%, χ^2=8.94, *p*=.007 at the time of physiological distress and psychological distress data collection, respectively). Data suggested that Black and White men were non-adherent to the lunch cortisol collection protocol at comparable rates (6.8% and 4.9%).

Men's coping strategies, by race. The coping strategies reported by Black and White men are illustrated in Figure 4.1 and Table 4.2. Men were asked to report how often they employed eight strategies explicitly to cope with difficult or stressful events in their lives: positive reinterpretation, active coping, planning, venting, denial, behavioral disengagement, stress eating, and religious and spiritual coping. Men reported responding with planning, positive

reinterpretation, active coping, and religious and spiritual coping the most often; and stress eating, denial, and behavioral disengagement were reported the least often. For these more explicit coping strategies, Black men were more likely than White men to report relying with positive reinterpretation (*M*=13.01, *SD*=2.07 vs. *M*=12.13, *SD*=2.38, *t*(686)= -2.75, *p*=.006) and denial (*M*=6.69, *SD*=2.24 vs. *M*=5.73, *SD*=1.87, *t*(685)= -3.23, *p*=.002). Men were also asked about their overall attitudes and/or participation in four strategies that men may not consciously adopt to cope with stressors: willingness to seek social support, alcohol abuse, drug use, and being physically active. For these strategies, Black men were more likely than White men to report drug use in the last 12 months (27.1% vs. 11.0%, χ^2=12.88, *p*=.001) and were less likely to be physically active on a regular basis (19.6% vs. 37.6%, χ^2=7.18, *p*=.008). The prevalence of alcohol abuse was relatively low for both Black and White men.

Multivariate Analyses

We conducted all analyses in a two-step process: first, with the maximum sample sizes available for each coping strategy model (sample sizes reported in Table 4.2); and second with the subsample of 666 men who had complete data on all measures, which included 54 Black men and 612 White men. Results were generally consistent, so we presented the analyses conducted with the maximum sample sizes available to preserve power.

Physiological distress. Table 4.3 summarizes the results from the models testing main and interactive effects. Religious and spiritual coping was the only strategy that demonstrated main effects. Three coping strategies warranted additional analyses to determine if they differed for Black and White men, as indicated by interaction term partial regression coefficients with *p*<.1. These were religious and spiritual coping (*b*=.008, *SE*=.005, *p*=.083), drug use (*b*= -.113, *SE*=.036, *p*=.002), and being physically active *b*=.070, *SE*=.039, *p*=.070).

Figure 4.2 depicts the interactive relationship between each of these coping strategies and race on physiological distress. In Figure 4.2.A. we graphed the relationships between religious and spiritual coping on physiological distress for Black and White men. Simple slopes analyses indicated that higher levels of religious and spiritual coping were associated with less physiological distress among White men (*b*= -.003, *t*(686)= -2.45, *p*=.015) but unrelated to Black men's physiological distress levels (*b*=.005, *t*(686)=1.14, *p*=.256). Figure 4.2.B. depicts the interactive relationship between drug use and race on physiological distress. Black men who reported having used drugs within the past 12 months had less physiological distress than Black

men who abstained (*b*= -.096, *t*(690)= -2.91, *p*=.004); White men's physiological distress levels appeared unaffected by whether they had used drugs or not (*b*=.017, *t*(690)=1.20, *p*=.232). In Figure 4.2.C., whether or not men were physically active did not significantly predict physiological distress among either Black or White men.

In summary, Figure 4.3 illustrates the effect sizes and 95% confidence intervals of the 12 coping strategies tested in predicting physiological distress. Ten of these strategies (including being physically active) did not account for variation in physiological distress, as indicated by the inclusion of zero in their confidence intervals. Religious and spiritual coping was protective for White men, but unrelated to Black men's physiological distress. Drug use was associated with less physiological distress for Black men, but unrelated to White men's physiological distress.

Psychological distress. Table 4.3 summarizes the results from the models testing main and interactive effects. Ten coping strategies were associated with psychological distress: positive reinterpretation, active coping, planning, venting, denial, behavioral disengagement, stress eating, willingness to seek social support, alcohol abuse, and drug use; religious and spiritual coping and being physically active were unrelated to psychological distress. Five coping strategies warranted additional analyses to determine if they differed for Black and White men: active coping (*b*=.057, *SE*=.030, *p*=.058), venting (*b*=.128, *SE*=.021, *p*<.001), willingness to seek social support (*b*= -.032, *SE*=.015, *p*=.036), alcohol abuse (*b*= -.648, *SE*=.289, *p*=.025), and drug use (*b*=.439, *SE*=.146, *p*=.003).

Figure 4.4 depicts the interactive relationships between each of these coping strategies and race on psychological distress. Figure 4.4.A. depicts the relationships between active coping and psychological distress for Black and White men. Simple slopes analyses indicated that greater reported use of active coping was associated with less psychological distress among White men (*b*= -.043, *t*(684)= -5.03, *p*<.001) but unrelated to Black men's psychological distress levels (*b*=.014, *t*(684)=.48, *p*=.629). Figure 4.4.B illustrates that greater levels of venting was associated with more psychological distress among both Black and White men, but venting was more harmful for Black men than White men at high levels (*b*=.053, *t*(684)=7.99, *p*<.001 and *b*=.181, *t*(684)=9.01, *p*<.001, respectively). In contrast, Figure 4.4.C shows that greater willingness to seek social support was protective for both Black and White, and especially beneficial for Black men's psychological distress (*b*= -.047, *t*(687)= -3.23, *p*=.001) compared to

that of their White counterparts (*b*= -.015, *t*(687)= -3.06, *p*=.002). Figure 4.4.D. depicts the relationship between alcohol abuse and Black and White men's psychological distress. White men who abused alcohol had more psychological distress than those who did not (*b*=.303, *t*(686)=3.57, *p*<.001); Black men's psychological distress levels appeared unaffected by whether they abused alcohol (*b*= -.345, *t*(686)= -1.24, *p*=.215). Figure 4.4.E. demonstrates that reported drug use was associated with more psychological distress for both Black and White men, though it was associated with far worse psychological distress for Black men (*b*=.636, *t*(691)=4.71, *p*<.001) than for White men (*b*=.197, *t*(691)=3.38, *p*=.001).

In summary, Figure 4.5 illustrates the effect sizes and 95% confidence intervals of the 12 coping strategies tested in predicting psychological distress. Seven coping strategies did not demonstrate race-based differences in their relationships with psychological distress: positive reinterpretation and planning were associated with less psychological distress; denial, behavioral disengagement, and stress eating were associated with more psychological distress; and neither religious and spiritual coping nor being physically active were associated with psychological distress at all. Five coping strategies differed in the relationships with psychological distress when comparing Black and White men: active coping was only protective for White men; both venting and drug use were associated with more psychological distress for both Black and White men, but were more harmful for Black men; willingness to seek social support was protective for both Black and White men, but more beneficial for Black men; and alcohol abuse was only harmful for White men's psychological distress.

Discussion

Findings from this study provide insight into the role of different coping strategies in predicting physiological and psychological distress among midlife and older Black and White men. Black and White men reported comparable use of most of the coping strategies examined in this study, though Black men reported more use of positive reinterpretation, denial, and drugs and were less likely to be physically active than White men. Physiological distress was not predicted by ten of the 12 coping strategies examined for either Black or White men. Religious and spiritual coping was protective only for White men's physiological distress, and drug use was associated with less physiological distress only among Black men. Overall, men's reported coping strategies were more closely related to their levels of psychological distress. Psychological distress was predicted by five coping strategies that did not demonstrate race-

based differences, and five coping strategies that were moderated by race. These relationships were generally consistent with conventional conceptualizations about harmful and protective strategies, though some strategies were unrelated to psychological distress (i.e., religious and spiritual coping and being physically active for Black and White men; active coping and alcohol abuse for Black men).

None of the coping strategies examined demonstrated similar relationships with men's physiological distress and psychological distress. This provides substantial evidence that these two dimensions of distress are distinct. Given this, references to distress, especially in the theoretical literature, need to be specific about the dimension(s) of distress are being discussed. In Chapter 2, we found men's physiological and psychological distress to be unrelated after controlling for sociodemographic characteristics and other health factors. Although physiological and psychological distress differed markedly in their relationships with the coping strategies included in the current study, more research is needed to ascertain if the same patterns would be found among women. Women may be more aware of and accurately report their psychological distress than men because of differing gender norms regarding attention to health considerations and awareness of and willingness to share one's emotions and vulnerabilities (Allen, Griffith, and Gaines, 2013; Courtenay, 2000; Martin, Neighbors, & Griffith, 2013). Given this, it is conceivable that physiological and psychological dimensions of distress may be more similar for women than for men.

Our findings did not provide support for the Environmental Affordance Model (Jackson et al., 2010; Mezuk et al., 2013). Rather, the relationships tested between "bad" coping strategies (i.e., stress eating, drug use, alcohol abuse, physical inactivity) and men's physical and mental health were either null or the opposite of what Jackson and colleagues (2010) hypothesized. These "bad" coping strategies were not associated with less psychological distress among Black men, though alcohol abuse trended in that direction. Furthermore, "bad" coping strategies were unrelated to Black men's physical health, or, in the case of drug use, associated with better outcomes. Our findings regarding drug use complicate our attempts to understand the role of coping in the Black-White health paradox. Drug use was: 1) more common among Black men than White men; 2) linked to lower physiological distress for Black men's, but not for White men; and 3) more harmful for Black men's psychological distress than White men's. Taken together and controlling for all other factors, drug use would appear to be linked to better

physical health but worse mental health for Black men when compared to White men.

Our findings provided some support for the Diminishing Returns Hypothesis (Assari, 2017; Farmer & Ferraro, 2005), though it was inconsistent. Black men benefited less from some positive assets (i.e., religious and spiritual coping on physiological distress, active coping on psychological distress) but more from others (i.e., willingness to seek social support on psychological distress). We also anticipated that the converse may be true and that Black men would be more vulnerable to the negative influences of maladaptive coping strategies on their physiological and psychological distress. Again, our findings were mixed. Black men were more harmed than White men by some coping strategies (i.e., venting and drug use on psychological distress) but less by others (i.e., alcohol abuse on psychological distress).

One factor to consider in interpreting our findings is the sample's midlife and older age range. Theoretical and empirical research suggests that chronic exposure to stressors weathers the body in a cumulative manner over the life course (Geronimus, 1992; Geronimus et al., 2001; 2006; 2007; McEwen & Gianaros, 2010). Perhaps by the latter half of the lifespan, men's HPA axis stress responses were damaged and dysregulated to the point where physiological distress was unresponsive to coping, either positively or negatively. With the exception of these two coping strategies, our findings on the lack of relationships between coping and physiological indicate that the coping strategies included in this study may not be important determinants of physiological distress among men in the latter half of the life course. Religious and spiritual coping and drug use may be exceptions, because they have more powerful influences on physiological distress among men in this age range than other coping strategies. White men, however, appeared to have benefited more from religious and spiritual coping than Black men. Perhaps this form of coping was more effective at mitigating physiological distress resulting from the types of stressors White men experienced, which may have been more transient and resolvable than the stressors Black men faced (Griffith, Ellis, & Allen, 2013). Alternatively, perhaps midlife and older Black men's stress responses were already dysregulated to the point that they were no longer responsive to the positive benefits of religious and spiritual coping. Replicating this study with a younger age cohort of men may provide additional insight into the importance of coping, or lack thereof, for men's physiological distress.

Our findings inform future efforts to improve men's health and reduce health disparities. Interventions prioritizing enhancing midlife and older men's coping skills and access to coping

resources may have small or no effects on their physiological health. Instead, interventions need to focus on evidence-based predictors of men's physiological distress, such as chronic exposure to stressors rooted in social inequities (e.g., racism, Paradies, 2006; poverty, Evans & Kim, 2013) and the impact of common health problems on Black men's lives (Chapter 2). Men's psychological health, on the other hand, appears far more influenced by the coping strategies men employ. Although enhancing men's coping skills may be ineffective for reducing physiological distress and associated poor physical health outcomes among men, it shows promise for interventions seeking to reduce men's psychological distress and improve their mental health. Our findings indicate the building men's capacity for positive reinterpretation and social support seeking and developing alternatives to venting, denial, behavioral disengagement, and alcohol abuse may be especially effective approaches. More research is needed, however, before our findings on the relationships between drug use and men's physiological and psychological distress, particularly among Black men, can be translated into recommendations. More focused research on this particular coping behavior, using more nuanced measures, and its impact on men's physiological and psychological distress is needed.

Limitations

This study provided insight into racial differences in coping strategies and their relationships to physiological and psychological distress among Black and White men. These findings should be interpreted in light of acknowledged limitations. First, given the variety of sampling strategies used in MIDUS II and NSDE II, findings were not weighted to be nationally representative. Second, sample size constrained our analyses in several ways. We were unable to include comparisons to men of other races or ethnicities because their numbers were insufficient for generating robust findings in comparative analyses. The relatively small subsample of Black men limited the number of variables we could control for while still possessing sufficient power and prevented us from conducting more complex age-group specific analyses. Therefore, we did not examine indicators of socioeconomic status other than educational attainment. Racial health disparities generally persist after controlling for socioeconomic status, which often interacts with race in complex ways (Farmer & Ferraro, 2005; Williams, Mohammed, Leavell, & Collins, 2010). Examining the moderating role of socioeconomic status on the relationship between race and physiological distress, however, was outside the scope of the current study. Third, coping measure responses may have been biased by social desirability or discordance between how men

believed they coped versus how they actually coped. More nuanced measurement of the coping strategies captured with dichotomous measures may also have provided more insight (e.g., being able to distinguish regular drug users from occasional users). Although smoking is a known coping strategy and one specifically discussed in the Environmental Affordances Model, we controlled for smoking rather than examining it as a coping behavior because smoking biases cortisol levels and patterns (Badrick et al., 2007). Fourth, although diurnal cortisol slopes are one of the best measures for capturing chronic physiological distress currently available, they can be biased by lifestyle and measurement factors and demonstrate only moderate stability (Ross, Murphy, Adam, Chen, & Miller, 2014). To mitigate these shortcomings, we controlled for several cofounding factors, averaged slopes over four days, and conducted a series of sensitivity analyses. Some of these methods diverged from practices adopted by other cortisol researchers (e.g., controlling for confounders such as atypical sleep schedule rather than dropping those cases from the sample, not presenting multilevel model analyses); however, the objectives of this study and comparative analyses involving the relatively small subsample of Black men required a different approach. Finally, it is unknown how the time gap between when participants completed coping measures in MIDUS II and the physiological distress outcome measure in NSDE II may have influenced the findings. Although measures were selected to capture constructs that were fairly stable over time, the physiological distress data could reflect individual changes in coping strategies that occurred after data on those measures were collected.

Conclusions

The purpose of this study was to explore racial differences in the relationships between 12 different coping strategies and physiological and psychological distress among midlife and older Black and White men. None of the coping strategies demonstrated similar relationships for both physiological and psychological distress, providing further evidence that these two dimensions of distress are distinct. Most of the coping strategies included in this study predicted psychological distress but not physiological distress, suggesting that the coping strategies used by men in the latter half of the life course may be important for their mental health but have little impact to their physical health. The relationships between coping strategies and psychological distress were generally consistent with common conceptualizations about harmful and protective strategies, though some showed no effect. Overall, our findings were inconsistent with the Environmental Affordances Model and instead suggested that the Black-White health paradox, at

least among men, is due to factors other than differences in men's coping strategies.

Table 4.1. Participant sociodemographic and health characteristics, by race

Characteristic	Black Men		White Men		$p^{\dagger}$
	%	*M* (*SD*)	%	*M* (*SD*)	
Sociodemographic					
Age, in years		54.3 (10.0)		57.1 (12.1)	**.040**
Married/cohabitating	62.7		83.0		**<.001**
Had children	86.4		84.0		.712
Educational attainment					
No HS degree/GED	13.6		4.7		**.011**
HS degree/GED	66.1		46.9		**.006**
BA/BS degree	10.2		30.6		**<.001**
Graduate/professional degree	10.2		17.7		.152
Employed	57.6		68.4		.109
Supervisory role, current/last job	31.6		51.9		**.004**
Decision autonomy, current/last job[a]		19.4 (6.27)		23.0 (4.86)	**.001**
Annual household income, median		$39,000		$65,250	**<.001**
Health					
Physiological distress		-.15 (.15)		-.21 (.11)	**.004**
Psychological distress		1.73 (.81)		1.51 (.44)	**.039**
Smoker-NSDE	32.2		15.4		**.003**
Smoker-MIDUS	25.4		11.8		**.007**
Lunch protocol non-adherent	6.8		4.9		.528
Total *N*	59 (8.5%)		637 (91.5%)		

† two-tailed *t*, χ^2, and Mann-Whitney tests comparing Black and White men. Bold text indicates $p \leq .05$.
[a] Decision Authority Subcale (Karasek & Theorell, 1990); scores range from 5 (none) to 30 (a great deal).

Table 4.2. Racial differences in men's coping strategies

Coping Strategy	Frequencies				$p^{\dagger}$
	Black Men		White Men		
	%	*M* (*SD*)	%	*M* (*SD*)	
Positive reinterpretation		13.01 (2.07)		12.13 (2.38)	**.006**
Active coping		12.53 (2.06)		12.58 (2.14)	.860
Planning		13.34 (2.29)		13.06 (2.33)	.378
Venting of emotions		8.64 (2.75)		8.42 (2.56)	.531
Denial		6.69 (2.24)		5.73 (1.87)	**.002**
Behavioral disengagement		6.59 (2.46)		6.54 (2.16)	.871
Stress eating		6.92 (3.09)		6.43 (3.04)	.239
Religious & spiritual coping		11.19 (3.38)		10.49 (3.64)	.162
Willingness to seek social support		7.93 (4.17)		7.78 (3.77)	.775
Alcohol abuse	5.2		5.1		1.000
Drug use	27.1		11.0		**.001**
Physically active	19.6		37.6		**.008**

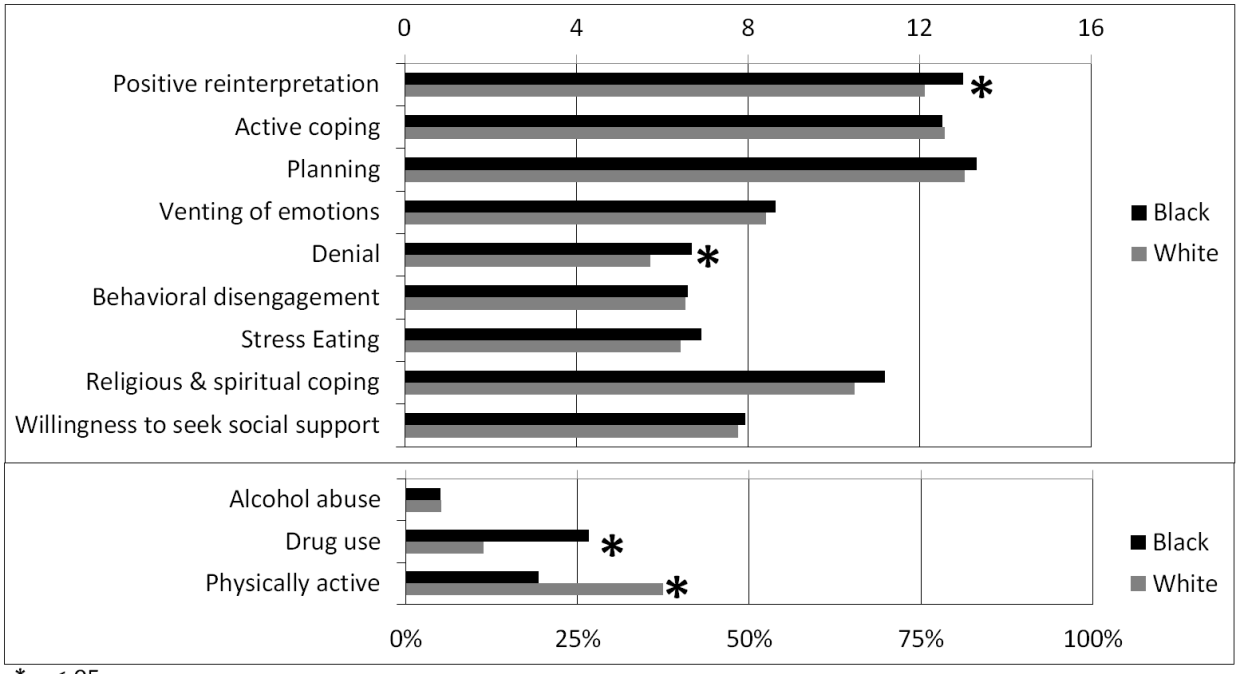
† two-tailed *t* and χ^2 tests comparing Black and White men. Bold text indicates $p \leq .05$.

Table 4.3. Relationships between coping strategies and men's physiological and psychological distress

Coping Strategy	*n*	Physiological Distress†			Psychological Distress‡		
		Main effects	Interaction with Race	Summary	Main effects	Interaction with Race	Summary
Positive reinterpretation	688	No	No	No relationship	Yes	No	Protective, no race-based differences
Active coping	687	No	No	No relationship	Yes	Maybe	White men: Protective Black men: No relationship
Planning	688	No	No	No relationship	Yes	No	Protective, no race-based differences
Venting of emotions	687	No	No	No relationship	Yes	Yes	White men: Harmful Black men: Harmful
Denial	687	No	No	No relationship	Yes	No	Harmful, no race-based differences
Behavioral disengagement	687	No	No	No relationship	Yes	No	Harmful, no race-based differences
Stress eating	687	No	No	No relationship	Yes	No	Harmful, no race-based differences
Religious & spiritual coping	690	Yes	Maybe	White men: Protective Black men: No relationship	No	No	No relationship
Willingness to seek social support	690	No	No	No relationship	Yes	Yes	White men: Protective Black men: Protective
Alcohol abuse	689	No	No	No relationship	Yes	Yes	White men: Harmful Black men: No relationship
Drug use	694	No	Yes	White men: No relationship Black men: Protective	Yes	Yes	White men: Harmful Black men: Harmful
Physically active	692	No	Maybe	White men: No relationship Black men: No relationship	No	No	No relationship

† Controlling for age, educational attainment, race, smoker-NSDE, and lunch protocol non-adherent. "Yes" indicates $p \leq .05$, "Maybe" $p \leq .1$, "No" $p > .1$.
‡ Controlling for age, educational attainment, race, and smoker-MIDUS. "Yes" $p \leq .05$, "Maybe" $p \leq .1$, "No" $p > .1$.

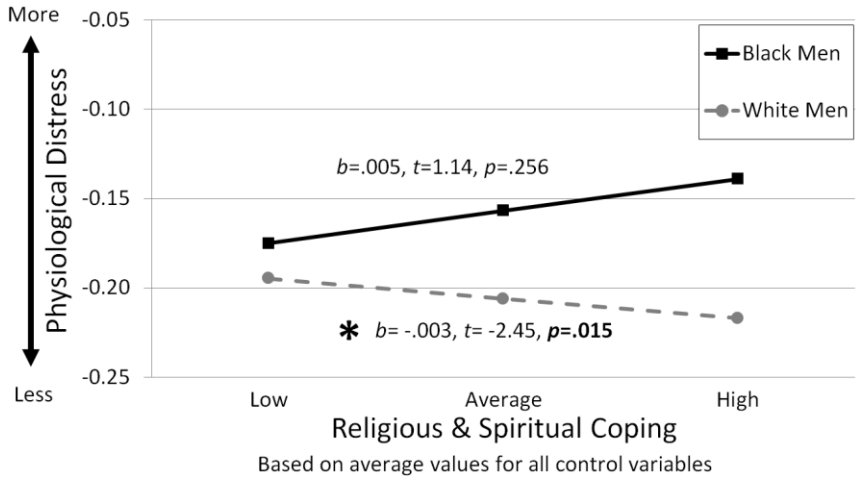
Figure 4.1 Racial differences in men's coping strategies



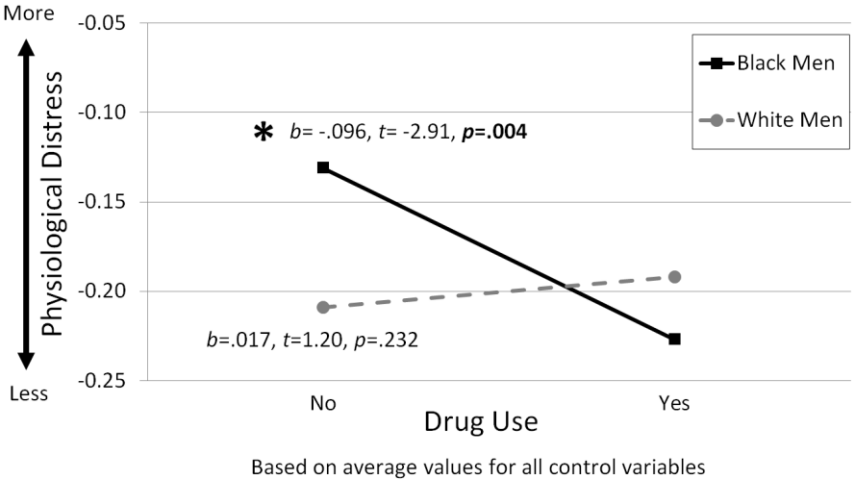
* $p \leq .05$

Figure 4.2. Men's physiological distress and coping strategies moderated by race

4.2.A. Religious and spiritual coping



4.2.B. Drug use



4.2.C. Being physically active

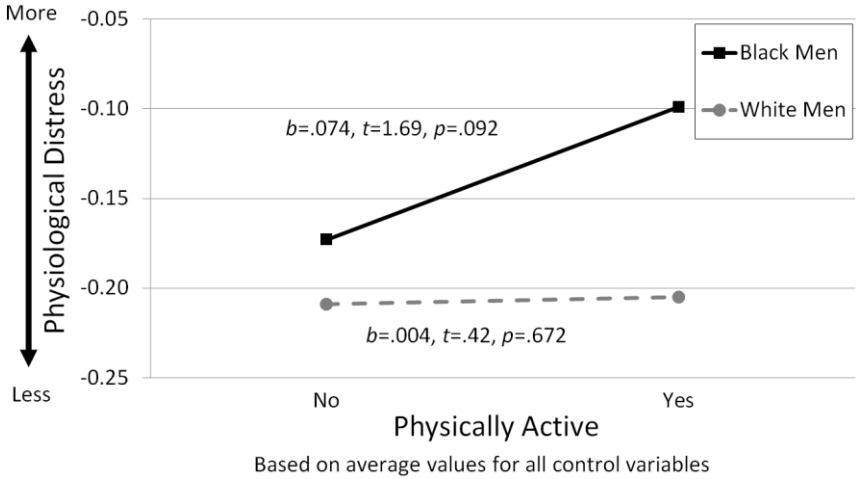
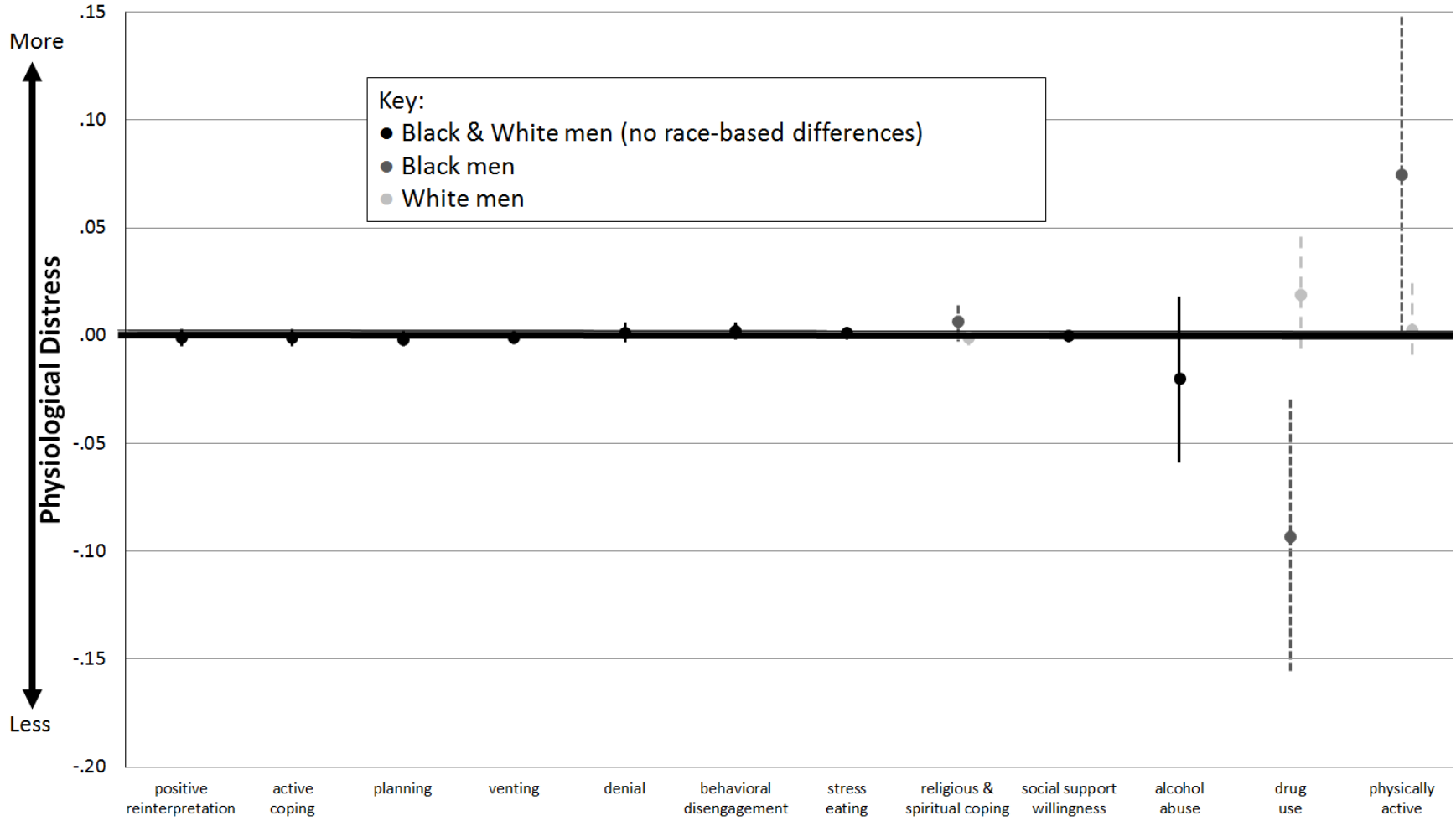


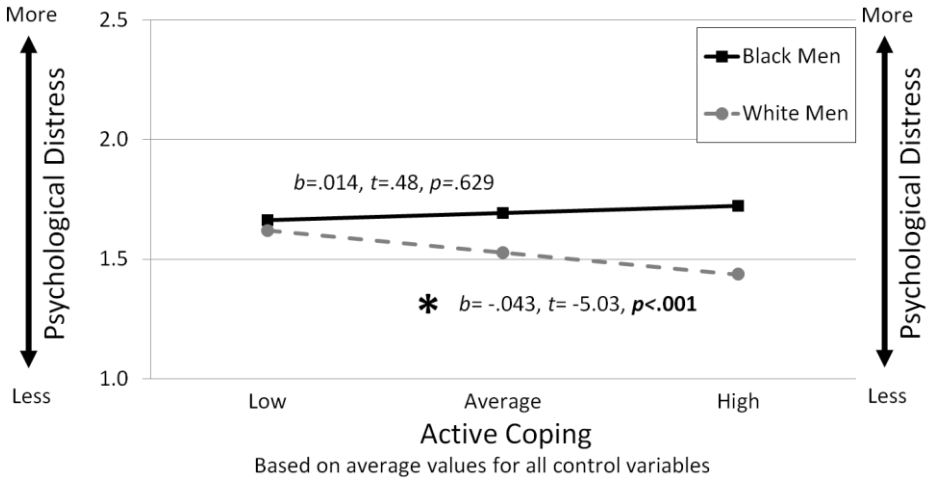
Figure 4.3: Relationships between men's physiological distress and coping strategies, effect sizes and 95% confidence intervals†



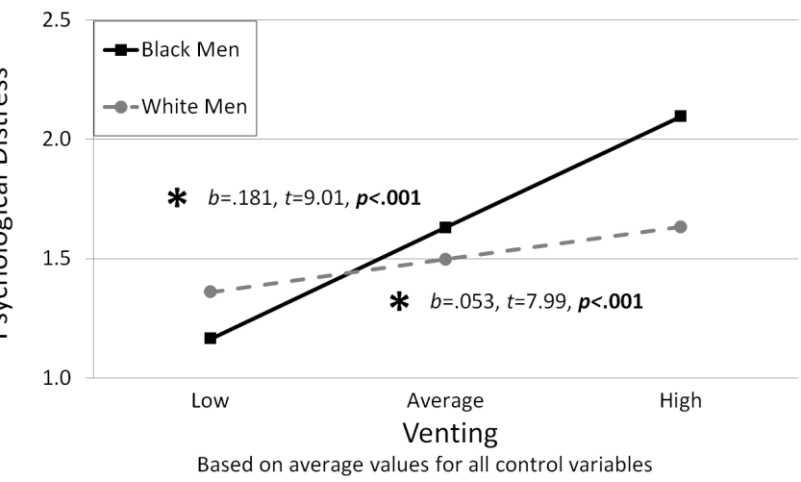
† Controlling for age, educational attainment, smoker-NSDE, and lunch protocol non-adherent.

Figure 4.4. Men's psychological distress and coping strategies moderated by race

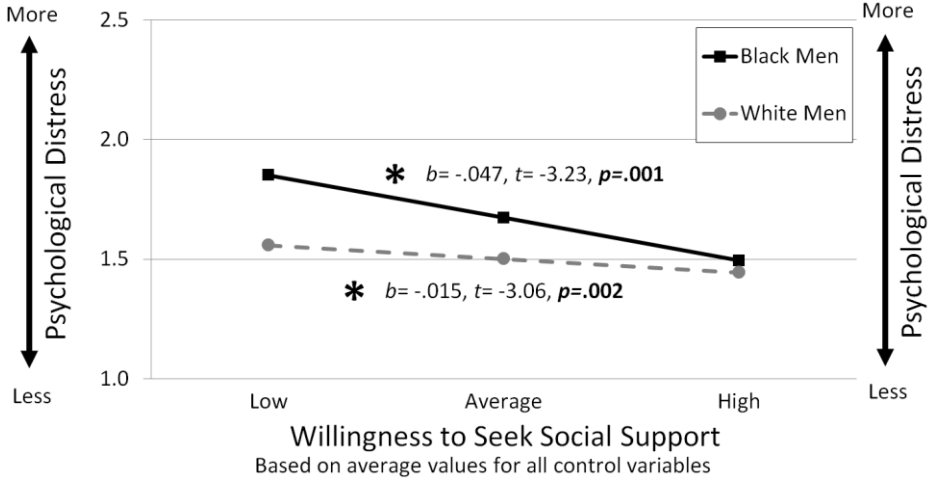
4.4.A. Active coping



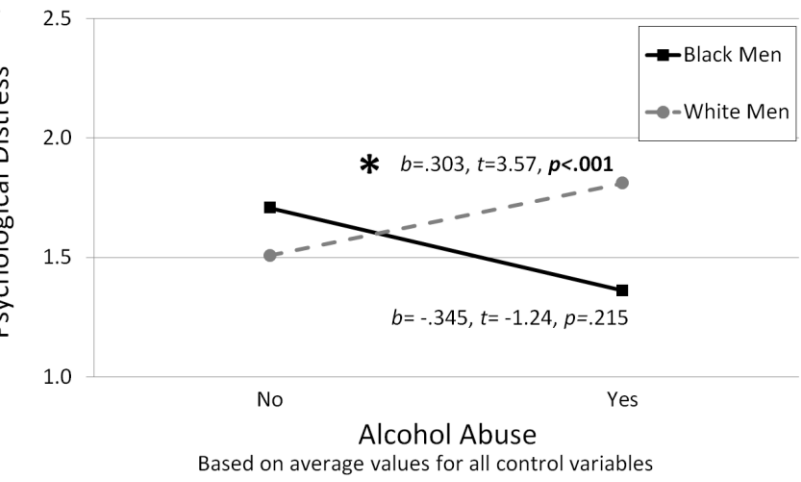
4.4.B. Venting



4.4.C. Willingness to seek social support



4.4.D. Alcohol abuse



4.4.E. Drug use

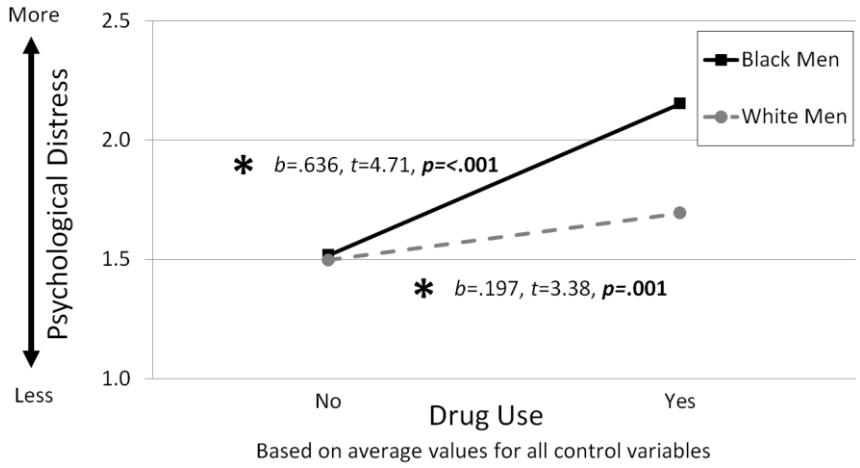
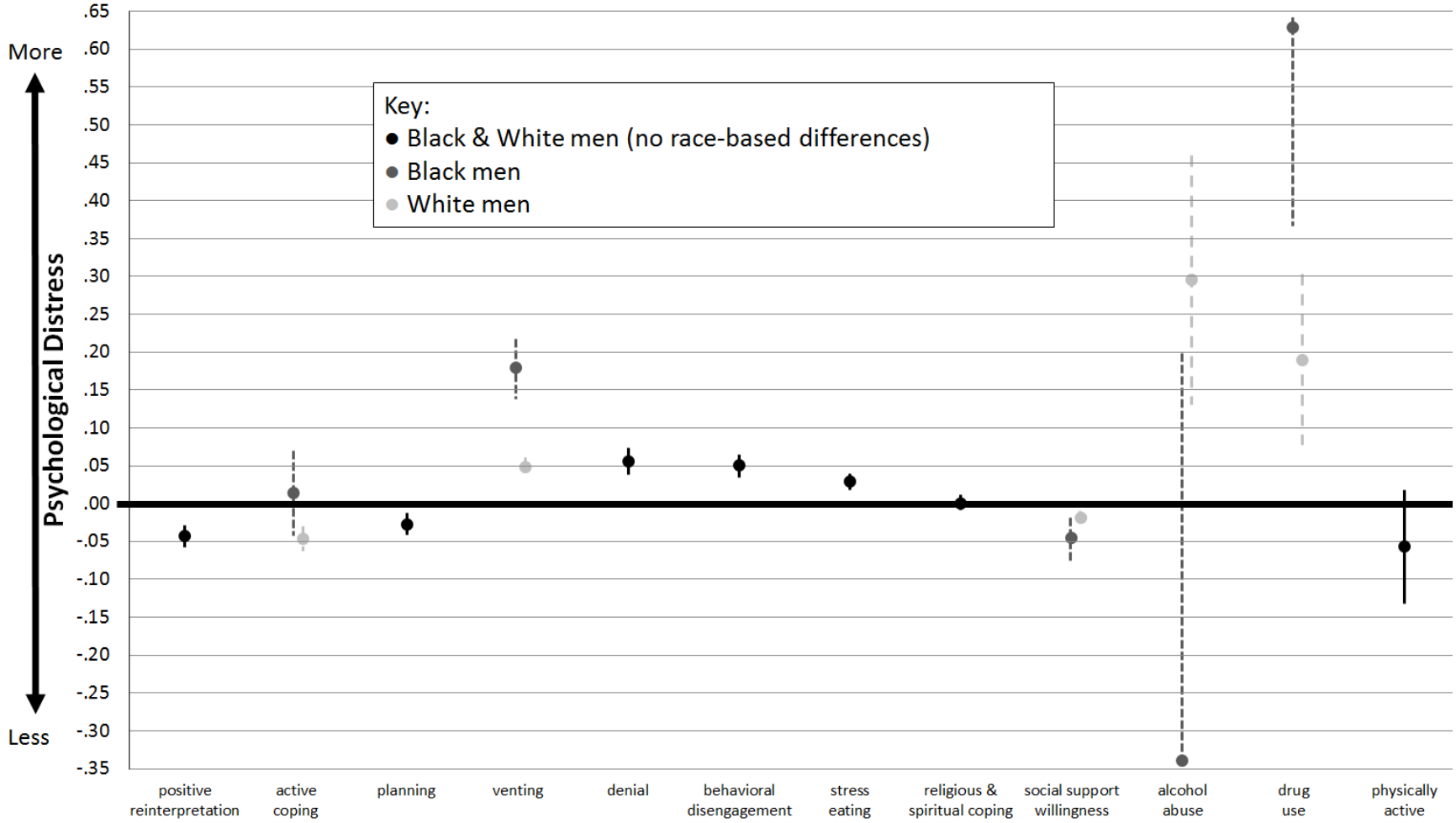

More
Less
Psychological Distress
2.5
2.0
1.5
1.0
Black Men
White Men
* b=.636, t=4.71, p=<.001
* b=.197, t=3.38, p=.001
No
Yes
Drug Use
Based on average values for all control variables

Figure 4.5: Relationships between men's psychological distress and coping strategies, effect sizes and 95% confidence intervals[†]



† Controlling for age, educational attainment, and smoker-MIDUS.

References

Adam, E.K., & Kumari, M. (2009). Assessing salivary cortisol in large-scale, epidemiological research, *Psychoneuroendocrinology, 34*, 1423-36.

Adam, E.K., Quinn, M.E., Tavernier, R., McQuillan, M.T., Dahlke, K.A., & Gilbert, K.E. (2017). Diurnal cortisol slopes and mental and physical health outcomes: A systematic review and meta-analysis. *Psychoneuroendocrinology, 83, 25-41*.

Addis, M.E. (2008). Gender and depression in men. *Clinical Psychology; Science and Practice, 15*(3), 153-68.

Aiken, L.S., West, S.G., & Reno, R.R. (1991). *Multiple Regression: Testing and Interpreting Interactions*. Thousand Oaks, CA: Sage.

Allen, J.O., Griffith, D.M., & Gaines, H.C. (2013). "She looks out for the meals, period": African American men's perceptions of how their wives influence their eating behavior and dietary health. *Health Psychology, 32*(4), 447-55.

Almeida, D. M. (2005). Resilience and vulnerability to daily stressors assessed via diary methods. *Current Directions in Psychological Science*, *14*, 64–8.

Almeida, D.M., Ayanian, J.S., Carr, D.S., Cleary, P.D., Coe, C., Davidson, R., … & Williams, D. (2007). Documentation of scales in Milwaukee Survey. *Midlife Development in the United States (MIDUS II): Milwaukee African American Sample, 2005-2006*. Madison, WI: Institute on Aging, University of Wisconsin.

Almeida, D.M., McGonagle, K.A., & King, H. (2009). Assessing daily stress processes in social surveys by combining stressor exposure and salivary control. *Biodemography and Social Biology*, *55*, 220–38.

Andrews, G., & Slade, T. (2001). Interpreting scores on the Kessler psychological distress scale (K10). *Australian and New Zealand Journal of Public Health*, *25*(6), 494-7.

Arias, E., Heron, M., & Tejada-Vera, B. (2013). U.S. life tables eliminating certain causes of death, 1999-2001. *National Vital Statistics Report, 61*(9). Hyattsville, MD: National Center for Health Statistics.

Assari, S. (2017). Unequal gain of equal resources across racial groups. *International Journal of Health Policy and Management*. Advance online publication. doi: 10.15171/ijhpm.2017.90.

Badrick, E., Kirschbaum, C., & Kumari, M. (2007). The relationship between smoking status and cortisol secretion. *The Journal of Clinical Endocrinology & Metabolism*, *92*(3), 819-24.

Beghi, M., Rosenbaum, J.F., Cerri, C., & Cornaggia, C.M. (2013). Risk factors for fatal and nonfatal repetition of suicide attempts: A literature review. *Neuropsychiatric Disease and Treatment*, *9*, 1725.

Bowman, P.J. (1989). Research perspectives on Black men: Role strain and adaptation across the adult life cycle. In R. L. Jones (Ed.), *Black Adult Development and Aging* (pp. 117-150). Berkeley, CA: Cobb & Henry Publishers.

Bowman, P.J. (2006). Role Strain and adaptation issues in the strength-based model: diversity, multilevel, and life-span considerations. *Counseling Psychologist, 34*(1), 118-133.

Braveman, P., Egerter, S., & Williams, D.R. (2011). The social determinants of health: Coming of age. *Annual Review of Public Health, 32*, 381-98.

Breslau, J., Aguilar-Gaxiola, S., Kendler, K.S., Su, M., Williams, D., & Kessler, R.C. (2006). Specifying race-ethnic differences in risk for psychiatric disorder in a USA national sample. P*sychological Medicine, 36*, 57–68.

Byrd, D.R. (2012). Race/ethnicity and self-reported levels of discrimination and psychological

distress, California, 2005. Preventing Chronic Disease, 9, 120042. DOI: http://dx.doi.org/10.5888/pcd9.120042
Carver, C. S. (1997). You want to measure coping but your protocol's too long: Consider the Brief COPE. *International Journal of Behavioral Medicine, 4*, 92-100.
Carver, C.S., Scheier, M.F., & Weintraub, J.K. (1989). Assessing coping strategies: A theoretically based approach. *Journal of Personality and Social Psychology*, 56, 267-83.
Centers for Disease Control and Prevention (CDC). (2014). *Leading Causes of Death in Males by Race and Age Group-United States, 2014*. Atlanta, GA: Division of Vital Statistics, National Center for Health Statistics, CDC.
Cheema, J.R. (2014). Some general guidelines for choosing missing data handling methods in educational research. *Journal of Modern and Applied Statistical Methods, 13*(2), 53-75.
Chida, Y., & Hamer, M. (2008). Chronic psychosocial factors and acute physiological responses to laboratory-induced stress in healthy populations: A quantitative review of 30 years of investigations. *Psychological Bulletin, 134*(6), 829-85.
Chida, Y., & Steptoe, A. (2009). Cortisol awakening response and psychosocial factors: A systematic review and meta-analysis. *Biological psychology, 80*(3), 265-78.
Cohen, S., Schwartz, J.E., Epel, E., Kirschbaum, C., Sidney, S., & Seeman, T. (2006). Socioeconomic status, race, and diurnal cortisol decline in the Coronary Artery Risk Development in Young Adults (CARDIA) Study. *Psychosomatic Medicine, 68*, 41–50.
Courtenay, W.H. (2000). Constructions of masculinity and their influence on men's well-being: A theory of gender and health. *Social Science & Medicine, 10*, 1385–1401.
Das, A. (2013). How does race get "under the skin"?: Inflammation, weathering, and metabolic problems in late life. *Social Science & Medicine, 77*, 75-83.
Davis, M.C., Matthews, K.A., & Twamley, E.W. (1999). "Is life more difficult on Mars or Venus? A meta-analytic review of sex differences in major and minor life events. *Annals of Behavioral Medicine, 21*(1): 83–97. doi: 10.1007/BF02895038.
Doane, L.D., Chen, F.R., Sladek, M.R., Van Lenten, S.A., & Granger, D.A. (2015). Latent trait cortisol (LTC) levels: Reliability, validity, and stability. *Psychoneuroendocrinology*, *55*, 21-35.
Dressler, W.W., Bindon, J.R., & Neggers, Y.H. (1998). John Henryism, gender, and arterial blood pressure in an African American community. *Psychosomatic Medicine, 60*(5), 620-4.
Ellis, K.R., Griffith, D.M., Allen, J.O., Thorpe, R.J. Jr., & Bruce, M.A. (2015). "If you do nothing about stress, the next thing you know, you're shattered": Perspectives on African American men's stress, coping and health from African American men and key women in their lives. *Social Science & Medicine, 139*, 107-14.
Evans, J., Frank, B., Offile, J.L., & Gregory, D. (2011). Health, Illness, Men and Masculinities (HIMM): A theoretical framework for understanding men and their health. *Journal of Men's Health, 8*(1), 7-15.
Evans, G.W., & Kim, P. (2013), Childhood poverty, chronic stress, self-regulation, and coping. *Child Development Perspectives, 7*(1), 43-8. doi: 10.1111/cdep.12013.
Farmer, M.M., & Ferraro, K.F. (2005). Are racial disparities in health conditional on socioeconomic status? *Social Science & Medicine, 60*(1), 191-204. doi: 10.1016/j.socscimed.2004.04.026.
Fetzer Institute/National Institute on Aging Working Group. (1999). *Multidimensional Measurement of Religiousness/Spirituality for Use in Health Research: A Report of the*

Fetzer Institute/National Institute on Aging Working Group. Kalamazoo, MI: Fetzer Institute.
Folkman, S. (1997). Positive psychological states and coping with severe stress. *Social Science & Medicine, 45*, 1207-21.
Folkman, S., & Moskowitz, J.T. (2000). Positive affect and the other side of coping, *American Psychologist, 55*, 647-54.
Geronimus, A.T. (1992). The weathering hypothesis and the health of African-American women and infants: Evidence and speculations. *Ethnicity and Disease, 2*, 207–21.
Geronimus, A.T. (2013). Jedi Public Health: Leveraging contingencies of social identity to grasp and eliminate racial health inequality. In L. Gomez & N. Lopez (eds), *Mapping 'Race' and Inequality: A Critical Reader on Health Disparities Research* . New Brunswick, NJ: Rutgers University Press.
Geronimus, A.T., Bound, J., Waidmann, T.A., Colen, C.G., & Steffick, D. (2001). Inequality in life expectancy, functional status, and active life expectancy across selected Black and White populations in the U.S. *Demography, 38*, 227-51.
Geronimus, A.T., Hicken, M., Keene, D., & Bound, J. (2006). "Weathering" and age patterns of allostatic load scores among Blacks and Whites in the United States. *American Journal of Public Health, 96*(5), 826-33.
Geronimus, A.T., Keene, D., Hicken, M., & Bound, J. (2007). Black-White differences in age trajectories of hypertension prevalence among adult women and men, 1999-2002. *Ethnicity and Disease, 17*(1), 40-8.
Geronimus, A.T., & Thompson, J.P. (2004). To denigrate, ignore, or disrupt: Racial inequality in health and the impact of a policy-induced breakdown of African American communities. *Due Bois Review, 1*(2), 247-79.
Gilbert, K.L., Ray, R., Siddiqi, A., Shetty, S., Baker, E.A., Elder, K., & Griffith, D.M. (2016). Visible and invisible trends in Black men's health: Pitfalls and promises for addressing racial, ethnic, and gender inequities in health. *Annual Reviw of Public Health, 37*, 295-311.
Good, G.E., Robertson, J.M., Fitzgerald, L.F., Stevens, M., & Bartels, K.M. (1996). The relation between masculine role conflict and psychological distress in male university counseling clients. *Journal of Counseling & Development, 76*, 44-9.
Griffith, D.M., Ellis, K.R., & Allen, J.O. (2013). An intersectional approach to social determinants of stress and African American men's health: Men's and women's perspectives. *American Journal of Men's Health, 7(Suppl. 4), S19-30*.
Grzywacz, J.G., & Marks, N.F. (1999). Family solidarity and health behaviors: Evidence from the National Survey of Midlife Development in the United States. *Journal of Family Issues, 20*(2), 243-268.
Hawthorne, G., & Elliott, P. (2005). Imputing cross-sectional missing data: Comparison of common techniques. *Australian and New Zealand Journal of Psychiatry*, *39*(7), 583-90.
Heffernan, K.S., Jae, S.Y., Wilund, K.R., Woods, J.A, & Fernhall, B. (2008). Racial differences in central blood pressure and vascular function in young men. *American Journal of Physiology-Heart Circulatory Physiology*, *295*, H2380–7.
Ice, G.H. (2005). Factors influencing cortisol level and slope among community dwelling older adults in Minnesota. *Journal of Cross-Cultural Gerontology*, *20*(2), 91-108.
Idler, E.L., Musick, M.A., Ellison, C.G., George, L.K., Krause, N., Ory, M.G., … & Williams, D.R. (2003). Measuring multiple dimensions of religion and spirituality for health

research: conceptual background and findings from the 1998 General Social Survey. *Research on Aging, 25*, 327-65.
Jaccard, J. (2001). *Interaction Effects in Logistic Regression*. Thousand Oaks, CA: Sage.
Jackson, J.S., Knight, K.M., & Rafferty, J.A. (2010). Race and unhealthy behaviors: Chronic stress, the HPA axis, and physical and mental health disparities over the life course. *American Journal of Public Health, 100*, 933-939.
Jones, C.P. (2000). Levels of racism: A theoretical framework and a gardener's tale. *American Journal of Public Health, 90*, 1212-5.
Juster, R-P., McEwen, B.S., & Lupien ,S.J. (2010). Allostatic load biomarkers of chronic stress and impact on health and cognition. *Neuroscience & Biobehavioral Reviews, 35*(1), 2-16.
Kaiser, C.R., & Miller, C.T. (2001). Stop complaining! The social costs of making attributions to discrimination. *Personality and Social Psychology Bulletin, 27*(2), 254-63.
Karasek, R.A., & Theorell, T. (1990). *Healthy Work: Stress, Productivity, and the Reconstruction of Working Life*. New York: Basic Books.
Keyes, C.L. (2009). The Black–White paradox in health: Flourishing in the face of social inequality and discrimination. *Journal of Personality, 77*(6), 1677-706.
Keyes, K.M., Barnes, D.M., & Bates, L.M. (2011). Stress, coping, and depression: Testing a new hypothesis in a prospectively studied general population sample of U.S.-born Whites and Blacks. *Social Science & Medicine, 72*, 650-9.
Kudielka, B.M., & Kirschbaum, C. (2005). Sex differences in HPA axis responses to stress: A review. *Biological Psychology, 69*(1), 113-132.
Lazarus, R.S. (1991). *Emotion and Adaptation*. NY: Oxford University Press.
Lazarus, R.S., & Folkman, S. (1984). *Stress, Appraisal, and Coping*. NY: Springer.
Leimkűhler, A.M.M., Heller, J., & Paulus, N.-C. (2007). Subjective well-being and 'male depression' in male adolescents. *Journal of Affective Disorders, 98*(1-2), 65-72.
Lincoln, K.D., Taylor, R.J., Watkins, D.C., & Chatters, L.M. (2011). Correlates of psychological distress and major depressive disorder among African American men. *Research on Social Work Practice, 21*(3), 278-88.
Martin, L.A., Neighbors, H.W., & Griffith, D.M. (2013). The experience of symptoms of depression in men vs women: Analysis of the National Comorbidity Survey Replication. *JAMA Psychiatry, 70*(10), 1100-6.
McDonough, P., & Walters, V. (2001). Gender and health: Reassessing patterns and explanations. *Social Science & Medicine, 52*(4), 547-59.
McEwen, B.S., & Gianaros, P.J. (2010). Central role of the brain in stress and adaptation: Links to socioeconomic status, health, and disease. *Annals of the New York Academy of Sciences, 1186*, 190-222.
Mezuk, B., Abdou, C.M., Hudson, D., Kershaw, K.N., Rafferty, J.A., Lee, H., & Jackson, J.S. (2013). "White box" epidemiology and the social neuroscience of health behaviors: The Environmental Affordances Model. *Society and Mental Health*, 3, 79-95.
Mezuk, B., Rafferty, J.A., Kershaw, K.N., Hudson, D., Abdou, C.M., Lee, H., ... & Jackson, J.S. (2010). Reconsidering the role of social disadvantage in physical and mental health: Stressful life events, health behaviors, race, and depression. *American Journal of Epidemiology, 172*(11), 1238-49.
Mezuk, B., Ratliff, S., Concha, J.B., Abdou, C.M., Rafferty, J., Lee, H., & Jackson, J.S. (2017). Stress, self-regulation, and context: Evidence from the health and retirement survey. *SSM-Population Health, 3*, 455-63.

Miller, G.E., Chen, E., & Zhou, E.S. (2007). If it goes up, must it come down? Chronic stress and the hypothalamic-pituitary-adrenocortical axis in humans. *Psychological Bulletin, 133*(1), 25-45.

Miniño, A.M. (2013). *Death in the United States, 2011*. NCHS data brief, no 115. Hyattsville, MD: National Center for Health Statistics.

Nolen-Hoeksema, S. (2012). Emotional regulation and psychopathology: The role of gender. *Annual Review of Clinical Psychology, 8*, 161-87.

Olives, C., Myerson, R., Mokdad, A.H., Murray, C.J.L., & Lim, S.S. (2013). Prevalence, awareness, treatment, and control of hypertension in U.S. counties, 2001–2009. *PLoS ONE, 8*(4): e60308.

Orlando, M., Ellickson, P.L., & Jinnett, K. (2001). The temporal relationship between emotional distress and cigarette smoking during adolescence and young adulthood. *Journal of Consulting and Clinical Psychology, 69*(6), 959-70.

Paradies, Y. (2006) A review of psychosocial stress and chronic disease for 4th world indigenous people and African Americans. *Ethnicity & Disease, 16*, 195-308.

Paris, J.J., Franco, C., Sodano, R., Freidenberg, B., Gordis, E., Anderson, D.A., … & Frye, C.A. (2010). Sex differences in salivary cortisol in response to acute stressors among healthy participants, in recreational or pathological gamblers, and in those with posttraumatic stress disorder. *Hormones and Behavior, 57*(1), 35-45.

Park, C.L., & Iacocca, M.O. (2014). A stress and coping perspective on health behaviors: Theoretical and methodological considerations. *Anxiety, Stress, & Coping, 27*(2), 123-37.

Piazza, J.R., Charles, S.T., Stawski, R.S., & Almeida, D.M. (2013). Age and the association between negative affective states and diurnal cortisol. *Psychology and Aging, 28*(1), 47-56.

Radler, B.T., & Ryff, C.D. (2010). Who participates? Accounting for longitudinal retention in the MIDUS National Study of Health and Well-Being. *Journal of Aging Health, 22*, 307-31.

Riolo, S.A., Nguyen, T.A., Greden, J.F., & King, C. A. (2005). Prevalence of depression by race/ethnicity: Findings from the National Health and Nutrition Examination Survey III. *American Journal of Public Health, 95*, 998-1000.

Ross, K.M., Murphy, M.L.M., Adam, E.K., Chen, E., & Miller, G.E. (2014). How stable are diurnal cortisol activity indices in healthy individuals/ Evidence from three multi-wave studies. *Psychoneuroendocrinology, 39*, 184-93.

Russ, T.C., Stamatakis, E., Hamer, M., Starr, J.M., Kivimaki, M., & Batty, G.D. (2012). Association between psychological distress and mortality: Individual participant pooled analysis of 10 prospective cohort studies. *British Medical Journal, 345*, e4933.

Russell, E., Koren, G., Rieder, M., & Van Uum, S. (2012). Hair cortisol as a biological marker of chronic stress: Current status, future directions and unanswered questions. *Psychoneuroendocrinology, 37*, 589—601.

Ryff, C., Almeida, D.M., Ayanian, J.S., Carr, D.S, Cleary, P.D., Coe, C., …Williams, D. (2010). *Midlife in the United States (MIDUS), 2004–2006*. ICPSR04652-v6. Ann Arbor, MI: Inter-university Consortium for Political and Social Research [distributor], 2012-04-18. https://doi.org/10.3886/ICPSR04652.v6

Ryff, C., Almeida, D.M., Ayanian, J.S., Carr, D.S, Cleary, P.D., Coe, C., …Williams, D. (2006). *Midlife Development in the United States (MIDUS II), 2004–2006: Documentation of Psychosocial Constructs and Composite Variables in MIDUS II Project 1*. ICPSR04652.

Ann Arbor, MI: Inter-university Consortium for Political and Social Research [distributor].
Ryff, C., Almeida, D., Ayanian, J.S., Carr, D.S, Cleary, P.D., Coe, C., …Williams, D. (2012). *Midlife Development in the United States (MIDUS II): Milwaukee African American Sample, 2005-2006* (ICPSR 22840). ICPSR22840-v2. Ann Arbor, MI: Inter-university Consortium for Political and Social Research [distributor], 2012-05-21. https://doi.org/10.3886/ICPSR22840.v2
Scherer, K.R. (2001). Appraisal considered as a process of multilevel sequential checking. In K.R. Scherer, A. Schorr, & T. Johnstone (Eds.), *Appraisal Processes in Emotion: Theory, Methods, Research* (pp. 92-120). Oxford, Englad: Oxford University Press.
Schneiderman, N., Ironson, G., & Siegel, S.D. (2005). Stress and health: psychological, behavioral, and biological determinants. *Annual Review of Clinical Psychology, 1*, 607-28.
Selzer, M.L. (1971). The Michigan Alcohol Screening Test: The quest for a new diagnostic instrument. *American Journal of Psychiatry, 127*, 89-94.
Selye, H. (1975). Confusion and controversy in the stress field. *Journal of Human Stress, 1*, 37-44.
Skinner, E.A., Edge, K., Altman, J., & Sherwood, H. (2003). Searching for the structure of coping: A review and critique of category systems for classifying ways of coping. *Psychological bulletin, 129*(2), 216-69.
Sparrenberger, F., Cichelero, F.T., Ascoli, A.M., Fonseca, F.P., Weiss, G., Berwanger, O., …& Fuchs, F.D. (2009). Does psychosocial stress cause hypertension? A systematic review of observational studies. *Journal of Human Hypertension, 23*, 12–9.
Stalder, T., & Kirschbaum, C. (2012). Analysis of cortisol in hair-Sate of the art and future directions. *Brain, Behavior, and Immunity, 26*, 1019-29.
Staufenbiel, S.M., Penninx, B.W.J.H., Spijker, A.T., Elzinga, B.M., & van Rossum, E.F.C. (2013). Hair cortisol, stress exposure, and mental health in humans: A systematic review. *Psychoneuroendocrinology, 38*, 1220-35.
Stawski, R.S., Cichy, K.E., Piazza, J.R., & Almeida, D.M. (2013). Associations among daily stressors and salivary cortisol: Findings from the national study of daily experiences. *Psychoneuroendocrinology, 38*, 2654–65.
Torres, S.J., & Nowson, C.A. (2007). Relationship between stress, eating behavior, and obesity. *Nutrition, 23*(11–12), 887–94.
U.S. Department of Health and Human Services (USDHHS), Office of Disease Prevention and Health Promotion. (2001). *Healthy People 2000 Final Review*. Hyattsville, MD: Public Health Service.
U.S. Department of Health and Human Services (USDHHS). (2009). Code of Federal Regulations, Title 45: Public welfare, Part 46: Protection of Human Subjects. Accessed 10/20/2017 from www.hhs.gov. www.hhs.gov/ohrp/regulations-and-policy/regulations/45-cfr-46/index.html#46.101
Wang, X., Sánchez, B.N., Golden, S.H., Shrager, S., Kirschbaum, C., Karlamangla, A.S., … & Roux, A.V.D. (2014). Stability and predictors of change in salivary cortisol measures over six years: MESA. *Psychoneuroendocrinology, 49*, 310-320.
Warner, D.F., & Hayward, M.D. (2007). Early-life origins of the race gap in men's mortality. *Journal of Health and Social Behavior, 47*(3), 209-26.
Williams, D.R. (2003). The health of men: Structured inequalities and opportunities. *American*

Journal of Public Health, 93(5), 724-731.
Williams, D.R., & Mohammed, S.A. (2009). Discrimination and racial disparities in health: Evidence and needed research. *Journal of Behavioral Medicine, 32*(1), 20-47.
Williams, D.R., & Mohammed, S.A. (2013). Racism and health I: Pathways and scientific evidence. *American Behavioral Scientist, 57*(8), 1152-73.
Williams, D.R., Mohammed, S.A., Leavell, J., & Collins, C. (2010). Race, socioeconomic status, and health: Complexities, ongoing challenges, and research opportunities. *Annals of the New York Academy of Sciences, 1186*(1), 69-101. doi: 10.1111/j.1749-6632.2009.05339.x.

CHAPTER 5

Key Findings and Implications for Men's Health Theory, Research, and Intervention

Despite multi-sectoral attention, commitment, and resources aimed at eliminating health disparities in the United States during the past two decades, racial disparities in aging-related physical health outcomes among men persist and, in some cases, have widened (Griffith, Moy, Reischl, & Dayton, 2006). A robust and well-established literature links political, economic, historic, and social inequities in the U.S. to these racial health disparities (Braveman, Egerter, & Williams, 2011; Geronimus & Thompson, 2004; Gilbert et al., 2016; Warner & Hayward, 2006; Williams & Mohammed, 2013). These social and structural determinants of health are deeply entrenched in our society and altering them is a challenging and protracted process. Understanding mediating processes between these social and structural factors and men's health outcomes provides the opportunity to develop more immediate interventions strategies to complement long-term strategies to address fundamental factors underlying racial health disparities among men (Link & Phelan, 1995). Mechanisms associated with chronic distress represent a promising field of research for: 1) understanding how broad social and structural factors get "under the skin" to affect health; and 2) informing the development of effective, multilevel intervention strategies to reduce racial health disparities among men. Emergent research on stress biomarkers, such as cortisol, provides direction for measuring physiological distress so that we can examine its role in linking social inequities to racial health disparities.

Although a wealth of literature links stressors rooted in social inequities to racial health disparities among men (Adam et al., 2015; Chae et al., 2014; Cohen et al., 2006; Ellis, Griffith, Allen, Thorpe, & Bruce, 2015; Gee, 2002; Paradies, 2006; Warner & Hayward, 2006; Williams & Mohammed, 2013), many questions remain about the mediating processes and factors that generate and reproduce these disparities. Several theories and frameworks offer hypotheses regarding the mechanisms underlying health disparities (i.e., the Weathering Hypothesis, the Environmental Affordances Model, John Henryism, the Diminishing Returns Hypothesis). Empirical tests of some of these premises have generated mixed findings, and many have not

been tested for their applicability to specific sociodemographic subgroups, including midlife and older Black men (Assari, 2017; Bennett et al., 2004; Dressler, Bindon, & Neggers, 1998; Farmer & Ferraro, 2005; Geronimus, 1992; Geronimus, Hicken, Keene, & Bound, 2006; Geronimus et al., 2015; Jackson, Knight, & Rafferty, 2010; James, Hartnett, & Kalsbeek, 1983; James, Keenan, Strogatz, Browning, & Garrett, 1992; James, Strogatz, Wing, & Ramsey, 1987; McEwn & Gianaros, 2010; Mezuk et al., 2010; 2013; 2017). A lack of distinction between different dimensions of distress (e.g., physiological distress versus psychological distress) and consensus on best practices in using physiological distress biomarkers (Adam & Kumari, 2009; Hansen, Garden, & Persson, 2008) further complicate interpretation, comparison, and integration of the empirical and theoretical literature. Furthermore, although we might anticipate that Black men would also have high rates of mental health disorders associated with chronic exposure to stressors associated with social inequities, national surveys have consistently documented a paradox such that Black men experience more physical health problems but better mental health than White men (Breslau et al. 2006; Mezuk et al., 2010; Miniño, 2013; USDHHS, 2001). This adds another level of complexity, because it demonstrates differences in how broad social and structural factors affect different types of health outcomes. Finally, inadequate attention has been paid to the roles of gender and sex in this area of research. Given that stress and coping processes involve interactions of both biological (e.g., physiological stress responses involving sex hormones) and social factors (e.g., gender ideologies), sex- and gender-specific research is critical.

This dissertation was intended to fill gaps in the literature by: 1) documenting racial differences in men's physiological distress levels; 2) identifying racial differences in the relationships between physiological distress and proximal health factors and coping strategies; and 3) testing prominent theories linking stress and coping processes to racial health disparities and differences among men. We completed three empirical studies using linked data from approximately 700 midlife and older Black and White men who participated in the second waves of the National Survey of Midlife Development in the United States (MIDUS II) and the National Study of Daily Experiences (NSDE II). These studies were informed by our theoretical framework and tested portions of our conceptual model (Figure 1.1), both of which were described in Chapter 1. In this final chapter, we summarize key findings from our studies and discuss their implications for theories related to men's health and health disparities, research

methods and measurement, and interventions to improve health and reduce racial health disparities among aging men.

Key Findings and Implications

Theories Related to Men's Health and Health Disparities

Consistent with the core premise of **the Weathering Hypothesis**, we documented more physiological distress among Black men than White men. This filled a critical gap in the literature, since we are not aware of any published studies that examined race-based differences in physiological distress in exclusively male samples. We also found that physiological distress levels were higher with each successive age group of Black men, whereas physiological distress levels among White men of different age groups were comparable. This provides further evidence that the physiological stress responses of socially marginalized groups "weather" at a faster rate over life course than the physiological stress responses of individuals affiliated with dominant sociodemographic groups (Geronimus, 1992; Geronimus et al., 2006; Geronimus, Bound, Waidmann, Colen, & Steffick, 2001; Geronimus, Keene, Hicken, & Bound, 2007; McEwen & Gianaros, 2010). This is consistent with the patterning of stressors rooted in social and structural inequities linked to race within the contemporary U.S. (Geronimus & Thompson, 2004). Longitudinal studies carried out over long periods of time are needed to establish whether these age- and race-linked patterns reflect racial differences in men's physiological distress trajectories over the life course (i.e., within-person change). Replicating our research with a younger cohort of men could indicate whether our hypothesis is plausible that the HPA axis stress responses of men in the latter half of the lifespan may be too damaged and dysregulated to be affected by coping or changes in other proximal factors.

Our findings did not corroborate several frameworks linking coping strategies to racial health disparities. Our findings were inconsistent with the **Environmental Affordances Model** (Jackson et al., 2010; Mezuk et al., 2013). Most of the "bad" coping strategies that we examined were associated with poor psychological health and unrelated to physiological health for both Black and White men; drug use (a "bad" coping strategy) was one of the few coping strategies that did predict physiological distress, and it was associated with less physiological distress among Black men. Taken together, these findings are the opposite of what Jackson and colleagues (2010) postulated when attempting to account for the documented health paradox in which Blacks experience better mental health outcomes but poorer physical health when

compared to Whites.

Although we did not test nuances of **John Henryism** (James et al., 1983; 1987; 1992) related to socioeconomic status, our findings were not consistent with its more basic assumption that active coping benefits White men, while being more harmful than beneficial to Black men's physical health (Flaskerud, 2012). In contrast, we found that active coping was unrelated to both Black and White men's physiological distress levels. Although John Henryism is typically linked to physical health outcomes, our findings trend in the anticipated directions when we examined psychological health as our outcome. Active coping was associated with less psychological distress for White men but was neither beneficial nor harmful for Black men. In research on John Henryism and other topics, socioeconomic status interacts with race to affect health in complex ways. Exploring the moderating role of race and socioeconomic status (three-way interaction) on the relationships between stress and coping processes and men's physiological distress was outside the scope of the current study. This approach has, however, the potential to more accurately capture the lived experiences of Blacks in the U.S., because the "Black" racial category is inextricably interlinked with historic and contemporary social and economic marginalization (Geronimus & Thompson, 2004; Williams, Mohammed, Leavell, & Collins, 2010).

Our research provided some, albeit inconsistent, support for the **Diminishing Returns Hypothesis** (Assari, 2017; Farmer & Ferraro, 2005). What we cannot discern, however, is whether our mixed findings reflect shortcomings of this hypothesis, or the ways in which our application of the hypothesis diverged from the original concept. Previous research has primarily focused on diminishing returns from resources and assets in application to physical health outcomes (Assari, 2017). We examined diminishing returns for Black men relative to White men on both physical and psychological health outcomes and found diminished returns with similar frequency for both outcomes. We also extrapolated that although coping strategies differ from resources and assets, the Diminishing Returns Hypothesis may still be valid because Black men encounter more barriers that constrain their selection of copying strategies (Jackson et al., 2010) and limit the extent to which they can benefit from protective strategies. In relation to the Diminishing Returns Hypothesis, our research generated more questions than answers. More focused research is needed to determine if the Diminishing Returns Hypothesis is applicable with coping and on mental health outcomes among midlife and older men.

Finally, the absence of relationships detected between coping strategies and physiological distress generates doubts about the importance of coping for the physical health, at least for men in the latter half of the life course. Although coping is regarded as a core component of the **Transactional Model of Stress and Coping (**Folkman, 1997; Folkman & Moskowitz, 2000; Lazarus, 1991; Lazarus & Folkman, 1984), perhaps the relevance of this construct varies by health outcome of interest and for different sociodemographic subgroups. We acknowledge that the coping strategies we tested were not exhaustive; however, they did represent a diverse selection of commonly reported strategies that were distributed across multiple dimensions of coping (e.g., problem focused and emotional regulation, cognitive and behavioral, engaged and disengaged, adaptive and maladaptive, explicitly used for coping and potentially unconscious; Griffith, Ellis, & Allen, 2013; Skinner, Edge, Altman, & Sherwood, 2003).

Research Methods and Measurement

In this dissertation, we demonstrated that men experience measurable physiological distress, as indicated by blunted diurnal cortisol slopes. We also showed that their levels of physiological distress varied in a manner consistent with membership in a marginalized racial group, which suggests the utility of these measures in racial health disparities research. We provided several arguments for why objective biomarkers may be especially valuable in men's health research. Given the multiple potential sources of bias in self-report distress measures, objective measures of physiological distress may be superior for understanding and examining the effects of chronic stressors on men's bodies and health. Expansion of biomarker collection in large-scale survey research and ongoing refinement of biomarker protocols, measures, and analytic approaches is needed to continue advancing the use of this emerging area of research to understand the distribution and mechanism of health.

Physiological and psychological distress are assumed to be correlated and are often conflated in the theoretical literature on stress processes. Our research, however, indicated that these two dimensions of distress represented distinct constructs. We found that: 1) physiological distress and self-reported psychological distress were unrelated after accounting for select sociodemographic, health, and confounding variables; and 2) none of the coping strategies tested demonstrated similar relationships to both physiological and psychological distress. Therefore, references to distress in the literature need to be specific about the dimension(s) of distress that are being discussed. Further, it is important to explore how physiological and psychological

distress may be differentially affected by stressors and stress and coping mechanisms and have different long-term health consequences. For example, additional research in on these two dimensions of distress could identify factors contributing to the Black-White health paradox. These could then be leveraged to improve the health of both Black and White men and reduce racial health disparities.

One challenge to cortisol research in large-scale community surveys is that cortisol-based physiological distress measures are sensitive to a variety of factors that can bias readings and are difficult to control or track outside of the laboratory setting. Some factors are typically statistically controlled for, while others are used to justify removing participants from analyses. Key correlates of cortisol levels and patterns identified in previous studies with female and mixed gender samples include smoking (Badrick, Kirschbaum, & Kumari, 2007), taking medications known to affect cortisol (Masharani et al., 2005), atypical sleep schedule (Federenko et al., 2004), and not adhering to cortisol collection protocols (Adam & Kumari, 2009). In our series of studies with an exclusively male sample, however, the first three of these variables were unrelated to physiological distress. Additional research confirming that these variables are not linked to men's physiological distress levels would justify their elimination from future research with all-male samples.

Diverging from standard practices in population-level research with cortisol-based physiological distress measures (Adam & Kumari, 2009), we decided to statistically control for key correlates of cortisol rather having them serve as exclusion criteria. Our primary rationale for this was to maximize our sample size and capacity to examine race-based differences involving a relatively small subsample of Black men. Extensive sensitivity analyses indicated that this methodological approach did not bias our findings. Rather, it provided additional power to detect relationships, especially those moderated by race. An added benefit of this approach was that it avoided excluding participants whose cortisol levels and patterns may be affected by these types of lifestyle factors. This could result in bias the findings because the study sample was healthier than the population as a whole.

One strength of these dissertation studies is that they represent some of the few studies that examine physiological distress in an exclusively male sample. Although this dissertation did not compare males and females, we argue that sex- and gender-specific research is critical to better understand and address stress and coping mechanisms, their effects on physiological

distress, and resultant health outcomes. Sex differences in biology and hormone production linked to cortisol production are well known, even if sex differences in cortisol-based physiological distress are less clear (Kudielka & Kirschbaum, 2005; Paris et al., 2010). Furthermore, stress and coping processes and their influences on health reflect the interplay of biological, social, and contextual factors. We do not know, for example, to what extent sex-based differences in the relationships between coping and health are due to biological sex difference or the influences of gender ideologies, roles, and expectations. Therefore, physiological distress measures and associated processes may not be comparable across gender.

There were both strengths and limitations to the coping measures examined in Chapters 3 and 4. Strengths included the inclusion of: 1) strategies reflecting a variety of coping dimensions, examined individually (Skinner et al., 2003); 2) strategies men explicitly reported employing in response to stressors as well as strategies men may not have consciously identified as occurring in response to a stressor or as reflective of coping (Ellis et al., 2015; Park & Iacocca, 2013); and 3) strategies featured prominently in the men's coping literature (Courtenay, 2000; Ellis et al., 2015; Evans, Frank, Offile, & Gregory, 2011). A limitation of these coping measures, however, was that they are based on self-report. Therefore, they can be biased by social desirability, in this case related to "good"/"bad" coping strategies and traditional gender norms surrounding acceptable coping strategies. Further, researchers have documented discrepancies between the coping strategies men reported that they used and the strategies that women in men's lives reported that men used (Ellis et al., 2015). Related to this, men have described women, particularly their spouses, as more aware of men's health and health behaviors than the men are, themselves (Allen, Griffith, & Gaines, 2013). Additionally, although statistical tests (i.e., factor analysis, Cronbach's alphas) indicated that our coping measures functioned similarly for Black and White men, these measures may not capture subtle differences in the interpretation and enactment of certain coping strategies. For example, although the Black and White men reported similar levels of venting, the nature of venting may differ by race because emotional expression of this type has more negative ramifications for Black men than White men due to stereotypes of Black men as threatening and dangerous (Kaiser & Miller, 2001; Smith, Allen, & Danley, 2007). More nuanced coping measures that integrate different perspectives on men's coping have the potential to provide further insight into how men cope, race-based differences in coping, and how coping may relate to racial health disparities among men.

Interventions to Improve Health and Reduce Racial Health Disparities among Men

The absence of relationships between physiological distress and many of the proximal health factors and coping strategies examined in this dissertation provides important direction for intervention efforts to reduce physiological distress and racial health disparities among midlife and older men. For example, our findings suggest that psychological distress, functional limitations, and smoking do not warrant attention in interventions to reduce physiological distress among aging men, because their effects are unjustifiably small or they are not relevant for men (Kudielka & Kirschbaum, 2005). Interventions designed to enhance coping skills and access to supportive resources may be completely ineffective for reducing physiological distress among midlife and older men. Furthermore, social and internalized pressure to avoid coping strategies popularly categorized as "bad" and engage in coping strategies considered to be "good" may serve as added stressors in men's lives, while behaving in accordance with this simplistic classification may not benefit men's physical health.

Three factors examined in this dissertation were associated with physiological distress among some men; therefore, these factors merit additional consideration for inclusion in efforts to reduce physiological distress and racial health disparities among men. Having a greater number of common medical conditions, such as those examined in this study, predicted more physiological distress among Black men but was unrelated to White men's physiological distress levels. This suggests that common medical conditions may have inherently different and more harmful effects on the lives and health of Black men than their White counterparts. Reducing the harmful effects of common medical conditions on Black men's lives is likely to be an effective intervention strategy. Therefore, Black men would benefit from integrated, multidisciplinary approaches to healthcare provision that recognize the complexities of treating and managing co-occuring medical conditions. Further, patient-centered approaches that adopt a more holistic perspective on Black men's health may be more effective at identifying effective strategies for reducing the negative ramifications of common medical conditions on Black men's lives (Sturmberg, Bennett, Martin, & Picard, 2017). This likely necessitates improvements in patient-provider communication and trust, consideration of the factors that inhibit Black men from seeking healthcare or implementing provider recommendations, and strengthening alternative sources of health information and care in Black men's lives, such as family members, religious institutions, and barbershops (Allen, Zebrack, Wittmann, Hammelef, & Morris, 2014; Griffith,

Allen, & Gunter, 2011).

Our finding that Black men who used drugs had less physiological distress than those who abstained was unanticipated. Additional research with more nuanced drug use measures is needed to better understand these findings before they can be translated into recommendations. In the meantime, healthcare professionals who work with Black men with co-morbid physical health and drug use issues should prioritize addressing men's common health conditions, a known factor associated with poor physical health outcomes. We also recommend that providers adopt a harm reduction approach to drug use, rather than insisting on abstinence and rehabilitation, since our findings indicate that the effects of drug use on Black men's physical health may be more complex and poorly understood than was previously recognized. Given the reciprocal interactions between physical health conditions and substance use and abuse, it is likely that reducing the negative effects of either condition on men's lives will be associated with lower physiological distress and associated morbidity and mortality.

Religious and spiritual coping was protective for White men's physiological distress, but not Black men's. Although we provided several possible explanations for this finding, this topic would benefit from more in-depth exploration. Regardless, supporting interested men of both races in religious and spiritual coping is unlikely to be harmful and may benefit men in ways beyond those examined in Chapters 3 and 4 (Chatters, 2000; Powell, Shahabi, & Thorensen, 2003).

Although interventions that enhance midlife and older men's coping skills and access to supportive resources may be ineffective for reducing physiological distress and associated poor physical health outcomes among men, this approach shows promise for reducing men's psychological distress and improving their mental health. Men's psychological health was more closely linked to the coping strategies men reported than their physiological health. Our findings indicate that building men's capacity for positive reinterpretation and social support seeking and developing alternatives to venting, denial, behavioral disengagement, and alcohol abuse may be especially effective.

In summary, interventions to reduce physiological distress and physical health disparities among midlife and older men should prioritize evidence-based predictors of men's physiological distress. A wealth of literature suggests that eliminating social inequities would radically alter the distribution of health in the U.S., largely disentangling it from socially-constructed categories

that reflect historic, geographic, cultural, political, and economic factors that shape access to policical, economic, and social power (Braveman et al., 2011; Geronimus & Thompson, 2004; Gilbert et al., 2016; Link & Phelan, 1995; Warner & Hayward, 2006; Williams & Mohammed, 2013). These efforts should be complemented by interventions addressing more proximal factors linked to physiological distress for some sociodemographic subgroups of men (e.g., reducing the harmful effects of common medical conditions on Black men's lives, encouraging religious and spiritual coping with White men, and exploring the effects of drug use for Black men).

Conclusion

The original motivation for this dissertation research was to examine stress and coping processes as mediators of the linkage between exposure to chronic stressors and racial health disparities among men. Our hope was to identify factors that could be leveraged to improve Black men's health. Given that the majority of the psychosocial factors tested (i.e., psychological distress, functional limitations, smoking, atypical sleep schedules, use of medications that affect cortisol, alcohol abuse, being physically active, and numerous other coping strategies) did not predict physiological distress, our findings suggest that intervention efforts focused on more proximal factors such as these may have no effect on physical health outcomes or racial health disparities among midlife and older men. Therefore, changing fundamental determinants of health such as social inequities may be necessary to produce meaningful reductions in racial health disparities among men in this age group. Our findings did provide additional evidence in support of the Weathering Hypothesis and demonstrated the value using physiological distress measures in men's health research. Finally, our unanticipated findings regarding the protective effects of religious and spiritual coping for White men and drug use for Black men provide intriguing directions for future research.

References

Adam, E.K., Heissel, J.A., Zeiders, K.H., Richeson, J.A., Ross, E.C., Ehrlich, K.B., ... & Peck, S.C. (2015). Developmental histories of perceived racial discrimination and diurnal cortisol profiles in adulthood: A 20-year prospective study. *Psychoneuroendocrinology, 62*, 279-91.

Adam, E.K., & Kumari, M. (2009). Assessing salivary cortisol in large-scale, epidemiological research, *Psychoneuroendocrinology, 34*, 1423-36.

Allen, J.O., Griffith, D.M., & Gaines, H.C. (2013). "She looks out for the meals, period": African American men's perceptions of how their wives influence their eating behavior and dietary health. *Health Psychology, 32*(4), 447-55.

Allen, J.O., Zebrack, B., Wittmann, D., Hammelef, K., & Morris, A.M. (2014). Expanding the NCCN guidelines for distress management: A model of barriers to the use of coping resources. *The Journal of Community and Supportive Oncology, 12*(8), 271-7.

Assari, S. (2017). Unequal gain of equal resources across racial groups. *International Journal of Health Policy and Management*. Advance online publication. doi: 10.15171/ijhpm.2017.90.

Badrick, E., Kirschbaum, C., & Kumari, M. (2007). The relationship between smoking status and cortisol secretion. *The Journal of Clinical Endocrinology & Metabolism, 92*(3), 819-24.

Bennett, G.G., Merritt, M.M., Sollers III, J.J., Edwards, C.L., Whitfield, K.E., Brandon, D.T., & Tucker, R.D. (2004). Stress, coping, and health outcomes among African-Americans: A review of the John Henryism hypothesis. *Psychology & Health, 19*(3), 369-83.

Braveman, P., Egerter, S., & Williams, D.R. (2011). The social determinants of health: Coming of age. *Annual Review of Public Health, 32*, 381-98.

Breslau, J., Aguilar-Gaxiola, S., Kendler, K.S., Su, M., Williams, D., & Kessler, R.C. (2006). Specifying race-ethnic differences in risk for psychiatric disorder in a USA national sample. P*sychological Medicine, 36*, 57–68.

Chae, D.H., Nuru-Jeter, A.M., Adler, N.E., Brody, G.H., Lin, J., Blackburn, E.H., & Epel, E.S. (2014). Discrimination, racial bias, and telomere length in African-American men. *American Journal of Preventive Medicine, 46*(2), 103-11.

Chatters, L.M. (2000). Religion and health: Public health research and practice. *Annual Review of Public Health, 21*(1), 335-67.

Cohen, S., Schwartz, J.E., Epel, E., Kirschbaum, C., Sidney, S., & Seeman, T. (2006). Socioeconomic status, race, and diurnal cortisol decline in the Coronary Artery Risk Development in Young Adults (CARDIA) Study. *Psychosomatic Medicine, 68*, 41–50.

Courtenay, W.H. (2000). Constructions of masculinity and their influence on men's well-being: A theory of gender and health. *Social Science & Medicine, 10*, 1385–1401.

Dressler, W.W., Bindon, J.R., & Neggers, Y.H. (1998). John Henryism, gender, and arterial blood pressure in an African American community. *Psychosomatic Medicine, 60*(5), 620-4.

Ellis, K.R., Griffith, D.M., Allen, J.O., Thorpe, R.J. Jr., & Bruce, M.A. (2015). "If you do nothing about stress, the next thing you know, you're shattered": Perspectives on African American men's stress, coping and health from African American men and key women in their lives. *Social Science & Medicine, 139*, 107-14.

Evans, J., Frank, B., Offile, J.L., & Gregory, D. (2011). Health, Illness, Men and Masculinities (HIMM): A theoretical framework for understanding men and their health. *Journal of Men's Health, 8*(1), 7-15.

Farmer, M.M., & Ferraro, K.F. (2005). Are racial disparities in health conditional on socioeconomic status? *Social Science & Medicine, 60*(1), 191-204. doi: 10.1016/j.socscimed.2004.04.026.
Federenko, I., Wust, S., Hellhammer, D.H., Dechoux, R., Kumsta, R., & Kirschbaum, C. (2004). Free cortisol awakening responses are influenced by awakening time. *Psychoneuroendocrinology 29*, 174-84.
Flaskerud, J.H. (2012). Coping and health status: John Henryism. *Issues in Mental Health Nursing, 33*(10), 712-5.
Folkman, S. (1997). Positive psychological states and coping with severe stress. *Social Science and Medicine, 45*, 1207-21.
Folkman, S., & Moskowitz, J.T. (2000). Positive affect and the other side of coping, *American Psychologist, 55*, 647-54.
Gee, G.C. (2002). A multilevel analysis of the relationship between institutional and individual racial discrimination and health status. *American Journal of Public Health, 92*, 615-23.
Geronimus, A.T. (1992). The weathering hypothesis and the health of African-American women and infants: Evidence and speculations. *Ethnicity and Disease, 2*, 207–21.
Geronimus, A.T., Bound, J., Waidmann, T.A., Colen, C.G., & Steffick, D. (2001). Inequality in life expectancy, functional status, and active life expectancy across selected Black and White populations in the U.S. *Demography, 38*, 227-51.
Geronimus, A.T., Hicken, M., Keene, D., & Bound, J. (2006). "Weathering" and age patterns of allostatic load scores among Blacks and Whites in the United States. *American Journal of Public Health, 96*(5), 826-33.
Geronimus, A.T., Keene, D., Hicken, M., & Bound, J. (2007). Black-White differences in age trajectories of hypertension prevalence among adult women and men, 1999-2002. *Ethnicity and Disease, 17*(1), 40-8.
Geronimus, A.T., Pearson, J.A., Linnenbringer, E., Schulz, A.J., Reyes, A.G., Epel, E.S., ... & Blackburn, E.H. (2015). Race-ethnicity, poverty, urban stressors, and telomere length in a Detroit community-based sample. *Journal of Health and Social Behavior*, *56*(2), 199-224.
Geronimus, A.T., & Thompson, J.P. (2004). To denigrate, ignore, or disrupt: Racial inequality in health and the impact of a policy-induced breakdown of African American communities. *Due Bois Review, 1*(2), 247-79.
Gilbert, K.L., Ray, R., Siddiqi, A., Shetty, S., Baker, E.A., Elder, K., & Griffith, D.M. (2016). Visible and invisible trends in Black men's health: Pitfalls and promises for addressing racial, ethnic, and gender inequities in health. *Annual Reviw of Public Health, 37*, 295-311.
Griffith, D.M., Allen, J.O., & Gunter, K. (2011). Social and cultural factors influence African American men's medical help-seeking. *Research on Social Work Practice, 21*(3), 337-47.
Griffith, D.M., Ellis, K.R., & Allen, J.O. (2013). An intersectional approach to social determinants of stress and African American men's health: Men's and women's perspectives. *American Journal of Men's Health, 7(Suppl. 4), S19-30*.
Griffith, D.M., Moy, E., Reischl, T.M., & Dayton, E. (2006). National data for monitoring and evaluating racial and ethnic health inequities: Where do we go from here? *Health Education & Behavior, 33*(4), 470-87.
Hansen, A.M., Garden, A.H., & Persson, R. (2008). Sources of biological and methodological variation in salivary cortisol and their impact on measurement among health adults: A

review. *Scandinavian Journal of Clinical & Laboratory Investigation, 68*(6), 448-58.
Jackson, J.S., Knight, K.M., & Rafferty, J.A. (2010). Race and unhealthy behaviors: Chronic stress, the HPA axis, and physical and mental health disparities over the life course. *American Journal of Public Health, 100,* 933-9.
James, S.A., Hartnett, S.A., & Kalsbeek, W.D. (1983). John Henryism and blood pressure differences among black men. *Journal of Behavioral Medicine, 6*, 259-78.
James, S.A., Keenan, N.L., Strogatz, D.S., Browning, S.R., & Garrett, J.M. (1992). Socioeconomic status, John Henryism, and blood pressure in black adults: The Pitt County Study. *American Journal of Epidemiology*, *135*(1), 59-67.
James, S.A., Strogatz, D.S., Wing, S.B., & Ramsey, D.L. (1987). Socioeconomic status, John Henryism, and hypertension in Blacks and Whites. *American Journal of Epidemiology, 126*(4), 664-73.
Kaiser, C.R., Miller, C.T. (2001). Stop complaining! The social costs of making attributions to discrimination. *Personality and Social Psychology Bulletin*, *27*(2), 254-63.
Kudielka, B.M., & Kirschbaum, C. (2005). Sex differences in HPA axis responses to stress: A review. *Biological Psychology, 69*(1), 113-132.
Lazarus, R.S. (1991). *Emotion and Adaptation*. NY: Oxford University Press.
Lazarus, R.S., & Folkman, S. (1984). *Stress, Appraisal, and Coping*. NY: Springer.
Link, B.G., & Phelan, J. (1995). Social conditions as fundamental causes of disease. *Journal of Health and Social Behavior, 35*, 80-94.
Masharani, U., Shiboski, S., Eisner, M.D., Katz, P.P., Janson, S.L., Grainger, D.A., & Blanc, P.D., 2005. Impact of exogenous glucocorticoid use on salivary cortisol measurements among adults with asthma and rhinitis. *Psychoneuroendocrinology, 30*, 744-52.
McEwen, B.S., & Gianaros, P.J. (2010). Central role of the brain in stress and adaptation: Links to socioeconomic status, health, and disease. *Annals of the New York Academy of Sciences, 1186*, 190-222.
Mezuk, B., Rafferty, J.A., Kershaw, K.N., Hudson, D., Abdou, C.M., Lee, H., ... & Jackson, J.S. (2010). Reconsidering the role of social disadvantage in physical and mental health: Stressful life events, health behaviors, race, and depression. *American Journal of Epidemiology*, *172*(11), 1238-49.
Mezuk, B., Abdou, C.M., Hudson, D., Kershaw, K.N., Rafferty, J.A., Lee, H., & Jackson, J.S. (2013). "White box" epidemiology and the social neuroscience of health behaviors: The Environmental Affordances Model. *Society and Mental Health,* 3, 79-95.
Mezuk, B., Ratliff, S., Concha, J.B., Abdou, C.M., Rafferty, J., Lee, H., & Jackson, J.S. (2017). Stress, self-regulation, and context: Evidence from the health and retirement survey. *SSM-Population Health, 3*, 455-63.
Miniño, A.M. (2013). *Death in the United States, 2011*. NCHS data brief, no 115. Hyattsville, MD: National Center for Health Statistics.
Paradies, Y. (2006) A review of psychosocial stress and chronic disease for 4th world indigenous people and African Americans. *Ethnicity & Disease, 16*, 195-308.
Paris, J.J., Franco, C., Sodano, R., Freidenberg, B., Gordis, E., Anderson, D.A., … & Frye, C.A. (2010). Sex differences in salivary cortisol in response to acute stressors among healthy participants, in recreational or pathological gamblers, and in those with posttraumatic stress disorder. *Hormones and Behavior*, *57*(1), 35-45.
Park, C.L., & Iacocca, M.O. (2014). A stress and coping perspective on health behaviors: Theoretical and methodological considerations. *Anxiety, Stress, & Coping, 27*(2), 123-37.

Powell, L.H., Shahabi, L., & Thoresen, C.E. (2003). Religion and spirituality: Linkages to physical health. *American Psychologist, 58*(1), 36-52.

Skinner, E.A., Edge, K., Altman, J., & Sherwood, H. (2003). Searching for the structure of coping: A review and critique of category systems for classifying ways of coping. *Psychological bulletin, 129*(2), 216-69.

Smith, W.A., Allen, W.A., & Danley, L.L. (2007). "Assume the position…you fit the description": Psychosocial experiences and racial battle fatigue among African American male college students. *American Behavioral Scientist, 51*(4), 551-78.

Sturmberg, J.P., Bennett, J.M., Martin, C.M., & Picard, M. (2017). 'Multimorbidity' as the manifestation of network disturbances. *Journal of Evaluation in Clinical Practice, 23*(1), 199-208.

U.S. Department of Health and Human Services (USDHHS), Office of Disease Prevention and Health Promotion. (2001). *Healthy People 2000 Final Review*. Hyattsville, MD: Public Health Service.

Warner, D.F., & Hayward, M.D. (2007). Early-life origins of the race gap in men's mortality. *Journal of Health and Social Behavior, 47*(3), 209-26.

Williams, D.R., & Mohammed, S.A. (2013). Racism and health I: Pathways and scientific evidence. *American Behavioral Scientist, 57*(8), 1152-73.

Williams, D.R., Mohammed, S.A., Leavell, J., & Collins, C. (2010). Race, socioeconomic status, and health: Complexities, ongoing challenges, and research opportunities. *Annals of the New York Academy of Sciences, 1186*(1), 69-101. doi: 10.1111/j.1749-6632.2009.05339.x.

APPENDIX

Select COPE Inventory Subscales

Stem:

This set of questions is about how you respond when you are confronted with difficult or stressful events in your life. We are interested in what you generally do and feel when you experience stressful situations. Please circle the number that best describes how you usually experience a stressful event.

Response Options:

A lot (1), A medium amount (2), Only a little (3), Not at all (4)

Subscale Items:

Positive Reinterpretation and Growth
I try to grow as a person as a result of the experience.
I try to see it in a different light, to make it seem more positive.
I look for something good in what is happening.
I learn something from the experience.

Active Coping
I concentrate my efforts on doing something about it.
I take additional action to try to get rid of the problem.
I take direct action to get around the problem.
I do what has to be done, one step at a time.

Planning
I make a plan of action.
I try to come up with a strategy about what to do.
I think about how I might best handle the problem.
I think hard about what steps to take.

Focus on and Venting of Emotions
I get upset and let my emotions out.
I get upset, and am really aware of it.
I let my feelings out.

I feel a lot of emotional distress and find myself expressing those feelings a lot.

Denial
I say to myself "this isn't real".
I refuse to believe that it has happened.
I pretend that it hasn't really happened.
I act as though it hasn't even happened.

Behavioral Disengagement
I admit to myself that I can't deal with it, and quit trying.
I give up trying to reach my goal.
I give up the attempt to get what I want.
I reduce the amount of effort I'm putting into solving the problem.

Stress Eating
I eat more than I usually do.
I eat more of my favorite foods to make myself feel better.