EXPLORING THE INFLUENCE OF GENDERED RACISM ON SALIVARY ALPHA AMYLASE ACTIVITY AMONG BLACK WOMEN

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DEDICATION

This dissertation is dedicated to my mother, Bettie Jean Peppers, and my grandmother, Lizzie Mae Watkins; two mighty women of valor called to rest within less than one year of the completion of this project. Although you were both called to rest from your labors, you are blessed because your works do follow you (Revelation 14:13). I watched you both stand tall and know your worth as you resisted systemic oppression. Because of the lives you both lived I feel an enormous responsibility to continue this work through giving voice to the unique experiences of Black women. I am committed to continue this path in honor of the ways in which I watched you both live out your own liberation. The example you have set for me has given me courage and has taken me places where my voice can be heard. I will continue to honor your legacy by amplifying the voices of Black women. It is my hope that this work continues in its efforts to bring healing and to dismantle interlocking systems of oppression that have been in place for centuries leading to health inequities evident across multiple disadvantaged groups.

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ABSTRACT

This study tests Lewis and colleagues' (2017) biopsychosocial model of gendered racism, which extends the biopsychosocial model of perceived racism (Clark et al., 1999) to gendered racism by investigating the role of gendered racial microaggressions (e.g., subtle gendered racism) in autonomic nervous system (ANS) dysregulation among Black women. Specifically, the association between the stress and frequency of gendered racial microaggressions and sAA activity, including total sAA output, diurnal slope, and waking sAA as indicators of ANS dysregulation were examined among Black women (N = 90, M_{age} = 19 years, *SD* = 5.02). Four types of gendered racial microaggressions unique to Black women were explored: Assumptions of Beauty and Sexual Objectification, Silenced and Marginalized, Strong Black Woman Stereotype, and Angry Black Woman Stereotype. Findings suggest that the stress of gendered racial microaggressions was associated with ANS dysregulation. Specifically, greater stress of Silenced and Marginalized microaggressions significantly predicted low total sAA output, which is an indicator of ANS dysregulation. The current study has implications for increasing understanding of the ways in which gendered racism is related to biomarkers of chronic stress among Black women.

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CHAPTER ONE: INTRODUCTION

A large body of empirical research has found that Black women are disproportionately affected by chronic diseases and are at higher risk for heart disease, cancer, obesity, adverse birth outcomes, poor maternal morbidity, and maternal mortality rates (Asiedu et al., 2018; CDC, 2015; Chae et al., 2018; Creanga et al., 2017; DuMonthier, Childers, C., & Mili, 2017; Louis, Menard, & Gee, 2015; Shahul et al., 2015; Tucker, Berg, Callaghan, & Hsia, 2007; van den Oord & Rowe, 2000). For example, more than 177 in 100,000, Black women die annually of heart disease, which remains the highest heart disease mortality rate when compared to other racial and ethnic groups of U.S. women (DuMonthier et al., 2017). Black women are also three times more likely to experience life-threatening pregnancy complications (e.g., pre-eclampsia) and are nearly four times more likely to experience preventable pregnancy related deaths compared to women of other racial and ethnic groups (Creanga, Syverson, Seek, & Callaghan, 2017; Shahul et al., 2015; Tucker et al., 2007). Research has indicated that poor health outcomes, maternal morbidity, and mortality inequities are related to chronic stress and systemic racism experienced throughout the lives of Black women in society (Giscombé & Lobel, 2005; Krieger, 1990; Krieger & Sidney, 1996).

Mortality and morbidity resulting from inequities in health and other stress-related illnesses pose an alarming threat to the health and well-being of Black women. While there are multiple factors that contribute to the existence of racial health inequities, the wear and tear of racial stress on the bodies of Black people across the lifespan has been implicated in a number of chronic health outcomes (Clark et al., 1999; Goosby, Cheadle, & Mitchell, 2018; Geronimus, 1992). The racism and stress literature has shed light on the role of racism as a source of chronic stress and its deleterious effects on health (Clark et al., 1999; Goosby et al., 2018; Pascoe &

Smart Richman, 2009). Emerging literature within the past decade is beginning to highlight the impact of racism-related stress on physiological activity and health (Allen et al., 2019; Beckie, 2012; Busse et al., 2017; Chyu & Upchurch, 2011; Fuller-Rowell, Doan, & Eccles, 2012; Korous, Causadias, & Caspers, 2017; Lee et al., 2018). However, absent from this literature is a focus on the unique experience of discrimination at the intersection of race and gender (e.g., gendered racism) and its impact on the physiological health of Black women (Perry, Harp, & Oser, 2013). This study tests Lewis and colleagues' (2017) biopsychosocial model of gendered racism, which extends the biopsychosocial model of perceived racism (Clark et al., 1999) to gendered racism by investigating the role of gendered racism in autonomic nervous system (ANS) functioning. This paper will first provide a review of the theoretical literature on racism as a chronic stressor, followed by empirical research on racism and health. Then, I will highlight the importance of using an intersectionality framework to investigate the disproportionate burden of stress experienced by Black women. I will review the extant theoretical and empirical research on gendered racism and health, with particular attention to the chronic activation and subsequent dysregulation of the body's stress response system.

Racism as a Chronic Stressor

Experiences of racism persist in the lives of many Black Americans, despite perceived progress across racial/ethnic groups within recent decades (Utsey & Ponterotto, 1996). Scholars have developed theoretical models to investigate the link between racism as a chronic stressor and health. Early racism-related stress and health scholars such as Utsey and Ponterotto (1996) suggested that both acute and chronic encounters with racism result in frequent stress exposure that threatens well-being. The Biopsychosocial Model of Perceived Racism (Clark et al., 1999) further clarified the ways in which experiences of racist stimuli from the environment activate an

exaggerated stress response in the body. In their model, Clark and colleagues (1999) postulated that frequent and prolonged activation of the body's stress response via multiple racist stimuli is associated with an increased risk for negative health outcomes over time (Clark et al., 1999). Harrell's (2000) Multidimensional Model of Racism-Related Stress has contributed to a deeper understanding of racism as a chronic stressor and highlights the dynamic ways in which larger social, historical, and culture-based variables interact with racism to influence health. Harrell's model outlines ways in which sociodemographic variables (e.g., race, gender, socioeconomic status), family dynamics and socialization (e.g., racial socialization), sources of stress (race-related stress, daily hassles), internal and external mediators (e.g., self-esteem, worldview), and outcomes (e.g., physical and mental health outcomes) work together to determine how one interprets, responds, and is impacted by racism. Meyer's (2003) Minority Stress Framework is also critical to understanding racism and discrimination as a chronic stressor. Of note, key elements of Meyer's (2003) Minority Stress Framework highlight the complexity of minority stress processes, which include both strengths and vulnerabilities at the intrapersonal and interpersonal level. While there are multidimensional ways in which racism impacts health, there are also elements of the stress process that are unique to the deleterious effects of minority stressors, which contribute to the negative impact of racism on health. For example, minority stress is experienced in excess to typical stress and is to be differentiated from stress as a result of discrimination and prejudice (Meyer, 2003). The Minority Stress Model (Meyer, 2003) provides grounding to further conceptualize the intricate way in which discrimination at the intersection of multiple marginalized identities can lead to experiences of stress that exceed typical daily stressors. The common thread among these racism and minority stress theories is that the cumulative and systemic experience of discrimination places excessive strain on the

psychological and physical well-being of Black individuals and other marginalized groups. These theoretical frameworks have provided the groundwork for empirical research on the biopsychosocial effects of racism.

Empirical evidence has supported the premise that chronic racism-related stress leads to disproportionate strain on the body's stress response system, resulting in poor mental health and physical health outcomes (Paradies, 2006; Paradies et al., 2015; Pascoe & Smart Richman, 2009; Torres-Harding, Torres, & Yeo, 2020; Williams and Mohammed, 2009). However, there have been mixed findings regarding the strength of the association between racism and specific health outcomes. Racism has been more strongly associated with negative mental health outcomes than negative physical health outcomes (Paradies, 2006). Furthermore, Pascoe and Smart Richman (2009) explored experiences of discrimination and found stronger differences in overall effects of discrimination on mental health compared to physical health. In contrast, Paradies and colleagues (2015) were the first to complete a systematic review and meta-analysis that highlighted evidence for racism as a determinant of health. The authors examined 333 articles published between 1983 and 2013 across a range of populations and health outcomes (Paradies et al., 2015). In their meta-analysis, racism was found to be consistently associated with poorer mental health, poorer general health, and poorer physical health (Paradies et al., 2015). Although strong evidence exists in support of the long-term negative impact of racism on health, the aforementioned discrepant findings indicate the need for more research that investigates differential associations between experiences of racism-related stress and the impact on various health outcomes (Paradies et al., 2015). The racism and health literature has expanded to investigate racial microaggressions as a form of racism-related stress that negatively impacts

health and has also been found to predict specific types of health outcomes (Nadal et al., 2016; Torres, Driscoll, & Burrow, 2010; Torres-Harding et al., 2020).

Pierce and colleagues (1978) first coined the term *racial microaggressions* to capture the "subtle, stunning, often automatic" (p. 66) yet harmful everyday experiences of racism in contemporary America. Over the last 15 years, there has been a proliferation of research on racial microaggressions, which have also been conceptualized as racism-related stressors (Sue et al., 2007; Sue, 2010; Wong et al., 2014). It is now well documented that the stress and frequency of racial microaggressions is negatively associated with various mental health and physical health outcomes (Nadal et al., 2014a; Nadal et al., 2014b; Nadal et al., 2016; Torres, Driscoll, & Burrow, 2010; Torres-Harding et al., 2020). For example, in a longitudinal study conducted by Torres, Driscoll, and Burrow (2010), racial microaggressions experienced by Black doctoral students included social isolation, abilities being questioned, criminalization, marginalization, and being singled out. These specific types of racial microaggressions were linked to greater stress and symptoms of distress when tested one year later (Torres et al., 2010). Nadal and colleagues (2017) provided further empirical evidence in an exploratory study among 277 racial ethnic minority individuals that microaggressions within school or workplace settings significantly predicted nearly all self-reported physical health outcomes measured. In their study, racial microaggressions in school and workplace settings significantly predicted role limitations due to physical health, role limitations due to emotional problems, emotional well-being, and social functioning (Nadal et al., 2016). Recently, Torres-Harding, Torres, and Yeo (2020) examined the relationship between experiences of racial microaggressions and health among a sample of 467 racially/ethnically diverse college students. Their results revealed racial microaggression type (Criminality, Foreigner, Sexualization, Low-Achieving, Invisibility, and

Environmental) was differentially associated with physical health outcomes (Torres-Harding et al., 2020). Findings suggested that different types of racial microaggressions influence health via differing aspects of cognitive and emotional responses, which illuminates the need to examine the specific types of racial microaggressions that negatively influence health outcomes (Torres-Harding et al., 2020).

While the negative association between racial microaggressions and health is well documented in the literature, there is a dearth of research on the role of both racism and sexism as chronic stressors that may influence physiological biomarkers of stress among Black women. Torres-Harding, Torres, and Yeo (2020) call for the use of an intersectional lens to adequately examine the context and type of racial microaggressions in association with negative health consequences. The present study applies an intersectionality lens to extend the research on racial microaggressions by exploring the link between gendered racial microaggressions unique to Black women and physiological dysregulation.

Intersectionality and Gendered Racism

The term intersectionality was first used to capture the unique experience of Black women at the intersection of racial and gender discrimination by critical legal scholar, Kimberlé Williams Crenshaw (1989). Crenshaw drew attention to critical gaps in protection that occur when treating racism and sexism as separate forms of discrimination in U.S. Law. The subsequent emergence of intersectionality theory facilitated a more nuanced approach to explore the impact of intersecting forms of oppression, often working together to create multiple layers of injustice. As a result, there are several ways that intersectionality theory has been applied to research in the field of psychology and across the social sciences (Grzanka, Santos, & Moradi, 2017; Moradi & Grzanka, 2017; Perry, Harp, & Oser, 2013). However, scholars have noted that

the use of an intersectionality framework has not yet achieved its full potential as a methodological approach and critique of the inequality resulting from intersecting forms of systemic oppression (Grzanka, Santos, & Moradi, 2017; Moradi & Grzanka, 2017; Perry, Harp, & Oser, 2013). One way in which intersectionality theorists have described Black women's lived experiences is by using a single axis approach, in which one form of oppression (e.g., racism) is experienced while another axis is held constant (e.g., sexism) (Crenshaw, 1989). It has also been theorized that Black women experience a double jeopardy of racism and sexism, in which experiences of racism and sexism are additive and each have an equal effect (Crenshaw, 1989; Thomas, Witherspoon, & Speight, 2008). A third theoretical perspective at the intersection of race and gender suggests that Black women experience an interaction of race and gender oppression that can be captured in a statistical analysis that explores race and gender separately and together (Moradi & Subich, 2003). Finally, an intersectional approach accounts for the unique way in which Black women experience oppression as interlocking systems of oppression with simultaneous impact on the individual that cannot be teased apart (Cole, 2009; Lewis & Grzanka, 2016).

Although there is now a greater awareness that racism and sexism operate interdependently to impact the lives of Black women, there have been several methodological challenges associated with conducting intersectionality research. Bowleg (2008) brought attention to the attempt of early intersectionality researchers to study multiple marginalized identities using an additive approach where social inequality increases with each additional stigmatized identity (e.g., the addition of race/ethnicity and sex/gender). However, an additive approach is problematic in that it conceptualizes experiences of individuals who are multiply disadvantaged as separate, independent, and summative (Bowleg, 2008). This approach implies

that discrimination is based on identities that can be ranked in order, for example, from most harmful to least harmful (Bowleg, 2008). In response to methodological limitations to the additive approach, scholars have also attempted to quantify intersectional data by analyzing each structural inequality separately and simultaneously using main and interaction effects (Bowleg, 2008; Purdie-Vaugns & Eicbach, 2008). These approaches assume that discrimination at the intersection of multiple disadvantaged identities interacts synergistically (Purdie-Vaugns & Eicbach, 2008). However, the interactive approach is limited because it still does not capture interlocking forms of discrimination that cannot be measured separately.

More recently, intersectionality scholars in the field of psychology have argued that it is important to use quantitative instruments that can accurately measure the simultaneous experience of racism and sexism to better assess the influence of intersectional discrimination, such as gendered racism, on health outcomes (Bowleg, 2008; Lewis & Grzanka, 2016; Lewis & Neville, 2015; Moradi & Grzanka, 2017). Given what is known about the ways that interlocking racism and sexism operate in the lives of Black women, an intersectional approach to understand the impact of racism and sexism on health should capture experiences of discrimination without separating race and gender.

Gendered racism refers to a unique form of discrimination that captures the simultaneous experience of racism and sexism (Essed, 1991) and has been identified in previous empirical research as a chronic stressor (Fuller-Rowell, Doan, & Eccles, 2012; Krieger & Sidney, 1996; Lewis, Aiello, Leurgans, Kelly, Barnes, & 2010). Sociologist Philomena Essed (1991) laid the groundwork for understanding of gendered racism as a significant stressor that leads to experiences of intersecting forms of oppression with both additive and multiplicative effects. To understand gendered racism as a chronic stressor and its negative impact on health, it is

important to accurately attend to the disproportionate exposure to stress experienced. Intersectionality scholars have documented the stress of gendered racism as a direct result of multiple interlocking systems of oppression at work in the lives of women of color (Collins, 2000; Crenshaw, 1991; Jones & Shorter-Gooden, 2003; Thomas, Witherspoon, & Speight, 2008).

An increasing number of scholars have provided empirical evidence for the impact of gendered racism on both the psychological and physical health of Black women (Lewis & Neville, 2015; Perry, Pullen, & Oser, 2012; Rosenthal & Lobel, 2018; Szymanski & Lewis, 2016; Thomas et al., 2008). However, the subtle nature in which this contemporary form of racism is experienced has not proven to be amenable to traditional methodological approaches. For example, Szymanski and Stewart (2010) tested an additive and interactive relationship between racism, sexism, and psychological distress. Results indicated that greater experiences of sexism were a positive predictor of psychological distress, but racism was not a significant predictor (Szymanski & Stewart, 2010). Moradi and Subich (2003) found that racist and sexist events were positively correlated with psychological distress, but the interaction of racist and sexist events did not significantly predict psychological distress. Klonoff and Landrine (1995) found that lifetime sexist events were related to somatic symptoms with an effect that was above and beyond daily hassles and other stressful life events. Taken together, these studies demonstrate how the use of additive and interactional methodological approaches which separate and tease apart experiences of racism and sexism, fail to provide consistent evidence that accurately captures the way in which gendered racism is experienced by Black women.

Gendered Racial Microaggressions

Intersectionality theory has been applied to extend the work of early microaggressions scholars, expanding awareness regarding the specific way in which discrimination is experienced by Black women (Lewis et al., 2013; Lewis & Neville, 2015, Sue et al., 2007). Black women are subjected to discrimination based on negative gendered racial stereotypes (e.g., hypersexual, lower class) and socially constructed controlling images of Black womanhood that have historically been used to perpetuate oppression in the form of gendered racial microaggressions (Collins, 1991; Lewis, Mendenhall, Harwood, & Browne Huntt, 2016). Lewis and colleagues (2013) defined *gendered racial microaggressions* as subtle and everyday interpersonal and environmental forms of discrimination experienced at the intersection of race and gender. Lewis, Mendenhall, Harwood, and Browne Huntt (2016) later developed a taxonomy that served to clarify the subtle yet harmful forms of racism and sexism that occur in the daily lives of Black women. Four types of gendered racial microaggressions unique to Black women are identified as follows: Assumptions of Beauty and Sexual Objectification, Silenced and Marginalized, Strong Black Woman Stereotype, and Angry Black Woman Stereotype (Lewis & Neville, 2015; Lewis et al., 2013; Lewis et al., 2016). *Assumptions of Beauty and Sexual Objectification* gendered racial microaggressions include Black women being objectified and reduced to their communication style, physical appearance, and body type (Lewis et al., 2013; Lewis et al., 2016). *Silenced and Marginalized* gendered racial microaggressions include ways in which Black women are silenced and marginalized and often involve both invisibility and a struggle for respect in school settings, workplace, and professional settings (Lewis et al., 2013; Lewis et al., 2016). The *Strong Black Woman Stereotype* includes prejudices rooted in the generalization that Black women are strong enough to endure an inhumane amount of stress (Lewis et al., 2013;

Lewis et al., 2016). Finally, the *Angry Black* Woman *Stereotype* includes an expectation that Black women will embody the stereotype of an angry Black woman, is related to assumptions of criminality, and often involves stigmatization for standing up for oneself in the face of harm (Lewis et al., 2013; Lewis et al., 2016). Empirical findings from several qualitative and quantitative studies on racial microaggressions, specifically in the workplace and in higher education settings, are consistent with research on gendered racial microaggression and include experiences of environmental microaggressions, Black women stereotypes, invisibility, inferiority, and exclusion (Harwood et al., 2012; Holder, Jackson, & Ponterotto, 2015; Lewis et al., 2013; Nadal et al., 2016; Solórzano, Ceja, & Yosso, 2000; Torres-Harding, Torres, & Yeo, 2020). Burgeoning scholarship has emerged within the past decade specifically exploring the lived experiences of Black women and the impact of gendered racial microaggressions on health and well-being.

The Gendered Racial Microaggressions Scale (Lewis & Neville, 2015) was developed as the first intersectional measure of gendered racial microaggressions and has been used to provide empirical support for a more nuanced understanding of the harmful impact of the frequency and stress of gendered racial microaggressions. For example, Lewis, Williams, Peppers, Gadson (2017) extended Clark et al.'s (1999) biopsychosocial model of racism to examine the relation between experiences of gendered racial microaggressions and health among Black women. In their study of 231 Black women, a greater frequency of gendered racial microaggressions significantly predicted negative mental and physical health (Lewis et al., 2017). In addition, they found variables such as coping strategies and gendered racial identity that mediated and moderated the link between gendered racial microaggressions and health (Lewis et al., 2017). Additionally, research has indicated that Black women who experience a greater frequency of

gendered racism also report greater psychological distress, depressive symptoms, and traumatic stress (Lewis & Neville, 2015; Moody & Lewis, 2019; Williams & Lewis, 2019). Taken together, these studies highlight the importance of using an intersectional measure that captures the simultaneous impact of discrimination at the intersection of racism and sexism in the lives of Black women. Furthermore, while the deleterious effects of racism on health is well documented in the literature, empirical support has emerged for the underlying physiological processes at work that influence long-term negative health consequences (Busse, Yim, Campos, & Marshburn, 2017; Harrell, Hall, Taliaferro, 2003; Korous, Causadias, & Casper, 2017; Lee et al., 2018). Yet, missing from the literature is the examination of the link between the stress and frequency of gendered racial microaggressions and physiological responses to stress. Thus, it is important to investigate biomarkers of chronic stress experienced by Black women.

Although there has been significant proliferation in knowledge production about racial microaggressions, much of the current empirical research on gendered racism and health has focused on self-reported measures of health, which limits a deeper understanding of the influence of gendered racism on physiological biomarkers of chronic stress (Wong et al., 2014). It is important to build on the important work of scholars in the racism and health literature in the investigation of the complex relationship that exists between racism and physiological biomarkers of stress unique to Black women. There has also been a recent increase in research exploring physiological indicators of stress that inform a dysregulated adaptation of the body to racism-related stress (Busse et al., 2017; Harrell et al., 2003; Korous et al., 2017; Lee et al., 2018). For example, cortisol has been well documented in the literature as a biomarker of racism-related stress and health in response to acute experiences of racism (Busse et al., 2017; Korous et al., 2017; Lee et al., 2018). Given what is known about the role of chronic stress as an

established risk factor for chronic illnesses and its association with health disparities, it is important to examine objective biomarkers of chronic stress.

Chronic Stress and Physiological Dysregulation

Experiences of stress can impact a number of physiological systems in the body including, but not limited to, the hypothalamic-pituitary-adrenal axis (HPA Axis) as well as the sympathetic branch of the autonomic nervous system (ANS) (Kemeny, 2003). For example, stimulation of the HPA axis leads to the release of cortisol in response to stress (Steptoe, 2006). Stimulation of the sympathetic branch of the autonomic nervous system leads to increases in blood pressure and heart rate in conjunction with a number of stress-related hormones (Steptoe, 2006). Dysregulation in these stress response systems, which closely interact with the immune system, have been implicated in a wide range of stress-related illnesses and negative health outcomes (Ali & Nater, 2020; Steptoe, 2006). While physiological responses to stress serve an immediate adaptive function, chronic activation of the body's stress response system can result in negative psychological and physical health outcomes (Ali & Nater, 2020; Kemeny, 2003; Steptoe, 2006). Thus, the deleterious effects of chronic stress has been a target of inquiry in the stress and health literature (Ali & Nater, 2020). Wear and tear on the body from chronic stress is often quantified by indicators that reflect biological dysregulation, such as HPA axis activity and ANS activity.

Activation of the HPA axis and release of its downstream hormone, cortisol, have evolved as a widely accepted biomarker when investigating the influence of stress on various health outcomes, given its reliability and accessibility to be measured in the saliva (Adam et al., 2017; Ali & Nater, 2020; Busse et al., 2017; Huynh, Huynh, & Stein, 2017 Korous et al., 2017). There is strong empirical evidence that cortisol has a significant role in many stress-related

health outcomes (Adam et al., 2017; Ali & Nater, 2020; Busse et al., 2017; Huynh et al., 2017; Korous et al., 2017). Dysregulated cortisol activity is a well-documented indicator of acute racism-related stress; however, it has been limited in its measurement of chronic stress when tested alongside other physiological indicators (Wolf et al., 2008; Yang et al., 2107; Giesbrecht et al., 2013). Much of the research on the effects of racism-related stress on negative physical health outcomes has focused on the role of the HPA axis and cortisol. However, various aspects of the autonomic nervous system (ANS) have also been implicated in our understanding of physiological processes that occur in response to stress and its relationship to negative stress-related health outcomes (Ali & Nater, 2020). Of note, the utility of which aspect of the ANS is studied is largely limited in accessibility, reliability, and sensitivity (Ali & Nater, 2020; Nater & Rohleder, 2009; Rohleder & Nater, 2009). Chronic exposure to racism, for example, culminates in over activation of the body's stress response, which places Black people at greater risk for a more rapid deterioration in health, a concept known as weathering (Geronimus et al., 2006). Gendered racism is a unique form of discrimination experienced by Black women and has also been identified in previous empirical research as a chronic stressor (Fuller-Rowell, Doan, & Eccles, 2012; Krieger and Sidney, 1996; Lewis, Aiello, Leurgans, Kelly, Barnes, 2010). However, the role of gendered racism in autonomic nervous system (ANS) dysregulation has not yet been investigated.

Autonomic Nervous System Dysregulation

The sympathetic branch of the autonomic nervous system (ANS) prepares the body to deal with stressful demands from the environment, particularly when stress is chronic (Goosby et al., 2018). Experiences of discrimination have also been associated with activation of the sympathetic branch of the ANS (Goosby et al., 2018). Emerging evidence suggests the

autonomically driven protein enzyme salivary alpha amylase (sAA) is a specific measure of autonomic nervous system functioning and can be used to measure the stress response (Nater, 2009). Although cortisol is a well-established measure of chronic stress, in the past 15 years the protein enzyme sAA has emerged as a valid, reliable, sensitive, and non-invasive biomarker of stress-related body changes in response to psychosocial stress (Ali & Nater, 2020; Goosby et al., 2018; Nater & Rohleder, 2009; Rohleder & Nater, 2009; Skoluda et al., 2017). The protein enzyme sAA has recently become preferred over cortisol because it is released into the saliva at a faster rate than cortisol; it is secreted within seconds to prepare the body to utilize and break down simple sugars for fight or flight, while cortisol and other salivary markers of stress may take longer to peak (Nater, 2009). Thus, it is an important biomarker to consider in extending the racism-related stress and health literature.

Salivary alpha amylase (sAA) activity is well documented as an indicator of psychosocial stress in which greater experiences of discrimination and other forms of chronic stress, have led to blunted (less of a decline) or attenuated sAA output (Austin et al., 2018; deVente et al., 2015; Liu et al., 2017; Nater & Ali, 2020; Granger et al., 2007). Thus, it is plausible that stressful and frequent experiences of gendered racial microaggressions could lead to ANS dysregulation as evidenced by less than optimal sAA output (Steptoe, 2006). The primary ways in which sAA activity has been examined as an indicator of ANS dysregulation has been investigating total sAA output, diurnal slope, and waking sAA (Nater & Ali, 2020; Nater & Rohleder, 2009). Total sAA output has been measured using area under the curve (AUCg) using the trapezoid formula, to incorporate the repeated measures of sAA levels (Fekedulegn et al., 2007; Liu et al., 2017; Pruessner, Kirschbaum, Meinlschmid, & Hellhammer, 2003). The normal diurnal pattern of sAA is characterized by a pronounced decrease within 60 minutes of waking, followed by a steady

increase of activity throughout the day (Ali & Nater, 2020; Nater et al., 2007; Skoluda et al., 2017). A number of studies have assessed sAA activity triggered by acute stress (Nater & Rohleder, 2009). Recent research suggests that the diurnal profile of sAA can also be used as a non-invasive biomarker to measure chronic stress responses (Nater, 2009; Nater et al., 2007), although findings have been mixed. For example, Nater and colleagues (2007) were among the first to examine use of the sAA diurnal profile as a physiological indicator of chronic stress. In their study of 76 healthy individuals, they found that chronic stress was associated with higher sAA levels when compared to individuals reporting low chronic stress. With respect to waking sAA as an indicator of chronic stress, research has shown that individuals who have been exposed to chronic stress have significantly blunted sAA at awakening (Ali & Nater, 2020).

There is no study to date that has examined the association between racism and dysregulated sAA activity, although, there are two studies to date that have investigated the relation between minority stress and sAA dysregulation. Fischer et al. (2017) investigated the negative impact of acute ethnic discrimination on both cortisol and sAA activity among male Turkish immigrants. Their study found face to face exposure to derogatory comments to immigrant participants from a confederate physician expressing negative stereotypes resulted in lower cortisol concentration and increased sAA concentration when compared to the nonimmigrant condition (Fischer et al., 2017). However, this study was limited by an all-male sample experiencing overt discrimination in a laboratory (Fischer et al., 2017). Beyond limitations in generalizability, this study also did not capture subtle forms of ethnic discrimination experienced by individuals on a daily basis and suggested the importance of incorporating an indicator of more long-term dysregulation as a result of ethnic discrimination that is experienced as a chronic stressor. In another study, Austin et al. (2018) sought to examine

waking sAA and diurnal sAA profiles among sexual minority individuals exposed to chronic levels of stress. Their study found significantly blunted sAA at awakening and elevated sAA levels diurnally among lesbian and bisexual women when compared to heterosexual women (Austin et al., 2018). Importantly, the authors found that this pattern was not present in gay or bisexual men, suggesting differential sensitivities of the ANS between men and women exposed to chronic sexual minority stress (Austin et al., 2018). Thus, this highlights the importance of exploring gender specific patterns of sAA dysregulation.

Emerging evidence further suggests gender-specific patterns of sAA dysregulation. For example, among women nurses at high risk for burnout, women showed more pronounced increases in sAA throughout the day when compared to men nurses (Wingenfeld et al., 2010). These data indicate differential sensitivity of the ANS among women and men exposed to chronic levels of occupational stress (Wingenfeld et al., 2010). Furthermore, the influence of psychosocial factors associated with chronic stress have been shown to have important effects on sAA functioning as evidenced by lower levels of sAA at awakening and higher sAA values in the afternoon and at bedtime (Marchand et al., 2016; Landolt et al., 2019). Taken together, these findings suggest gender specific sensitivity to sAA dysregulation and a need to investigate within group differences in sAA dysregulation among women separately. Overall, these data suggest a plausible association between experiences of gendered racial microaggressions and attenuated sAA patterns among Black women. Thus, it is important to clarify the nature of dysregulated sAA activity as a result of the stress and frequency of experiences of gendered racial microaggressions and its long-term impact on the physical health of Black women.

The Present Study

This study tests Lewis and colleagues' (2017) biopsychosocial model of gendered racism, which extends the biopsychosocial model of perceived racism (Clark et al., 1999) to gendered racism by investigating the role of gendered racism in autonomic nervous system (ANS) functioning, specifically, the release of salivary alpha amylase (sAA). Given what is known about the response of the body's stress response system to psychosocial stressors, it is plausible that greater experiences of gendered racism are associated with ANS dysregulation. The purpose of this study is to apply an intersectional lens to investigate the association between gendered racial microaggressions (e.g., subtle gendered racism) and ANS dysregulation among Black women. Specifically, this study seeks to investigate the association between the frequency and stress of gendered racial microaggressions and sAA activity, including total sAA output, diurnal slope, and waking sAA as indicators of ANS dysregulation. The current study will test the following research hypotheses:

Hypothesis 1: Greater stress appraisal of gendered racial microaggressions will be associated with sAA dysregulation, including: (1a) blunted total sAA output, (1b) flattened sAA diurnal slopes, and (1c) blunted waking sAA output. Specifically, higher stress appraisal of gendered racial microaggressions will be associated with lower total sAA output, flattened sAA diurnal slopes (sAA levels are hypothesized to increase slower in the morning upon awakening, and to decrease less prominently throughout the day), and lower waking sAA.

Hypothesis 2: Greater frequency of gendered racial microaggressions will be associated with sAA dysregulation, including: (2a) blunted total sAA output, (2b) flattened sAA diurnal slopes, and (2c) blunted waking sAA output. Specifically, higher frequency of gendered racial microaggressions will be associated with lower total sAA output, flattened sAA diurnal slopes

(sAA levels are hypothesized to increase slower in the morning upon awakening, and to decrease less prominently throughout the day), and lower waking sAA.

CHAPTER TWO: METHOD

Participants

Participants for this study were recruited as a part of a larger study on the daily gendered racism experiences of Black women. During the screening process, participants were included in the study if they met the following inclusion criteria: self-identification as a Black woman, 18 years of age or older, lived and/or worked in Knoxville, Tennessee. Any prospective participant who did not meet the aforementioned criteria was excluded. A total of 97 Black women students (96%) and community members (4%) completed the survey and saliva sample protocol. Two participants were omitted from the analyses due to missing items on the gendered racism measure. Five participants were omitted from the analyses due to unsubmitted or missing saliva samples for one or both days. The final sample was 90 Black women. Of the participants, a majority identified as Black or African American (85%) and 94% were born in the United States; the remainder of participants identified as biracial/multiracial (13%) or an African ethnic background (2%; e.g., Egyptian, Ethiopian). Among the current sample 90% self-identified as heterosexual and 10% self-identified as bisexual; 84% reported a marital status of single/never married, 11% reported being in a long term committed relationship, and 5% did not report marital status. Participants ranged in age from 18 to 59 years, with a mean age of 19 (SD = 5.02).

Procedure

Approval was sought through the university's Institutional Review Board (IRB). Prior to study enrollment, research staff informed participants of confidentiality and participant rights using an IRB approved consent form. Participants were assured that they can withdraw from the study at any time. Participants were asked to read and sign the informed consent that outlined all aspects of the study. Participants were recruited through a variety of methods: recruitment

through the Psychology Department's research subject pool, Black student email listservs, flyers posted on campus, and throughout the local community (e.g., hair salons, community centers). All study recruitment materials outlined the study's purpose, described the research design, and included contact information so that potential participants could contact study personnel and express interest in the study. Once eligibility was established by confirmation that each participant was over the age of 18 and self-identified as a Black woman, dates and times were determined to complete study requirements within an allotted one-week timeframe. Data used for this project were collected on Study Day 0 (survey at study enrollment) through Study Day 1 and Study Day 2 (for in home saliva sample collection). Given the challenges in recruiting Black women in a predominantly White city, accommodations were made to reduce barriers in access to the research lab and to facilitate completion of all study procedures as outlined below.

Participation in this research study involved the following: (1) Participants were asked to complete a brief survey of approximately 30 minutes in duration. All participants completed their survey in person in the Gendered Racism and Health Disparities Lab located in the Austin Peay Building at the University of Tennessee in the Department of Psychology. (2) Participants also received a saliva self-collection kit and detailed instructions provided by Salimetrics, Inc. This kit was used to provide a small saliva sample in the privacy of the participants' home, three times a day, at four-hour intervals beginning on Study Day 1 through Study Day 2. (3) Participants were asked to return a total of 6 frozen samples to the research staff one week later when they returned to complete their post survey. Community participants were permitted to meet research staff off campus to submit saliva samples, which was transported by research staff and maintained frozen during transport using a cooler.

Community participants received a total of $25 for completion of all study activities. Undergraduate general psychology students received course credit for completion of all study activities. Research staff debriefed participants at the completion of all study activities to answer questions regarding the study's purpose that may have been prohibited at study enrollment to avoid biased data. A detailed handout describing campus and community resources was provided in the event that participants experienced psychological distress as it related to study procedures.

Measures

Gendered racial microaggressions. The Gendered Racial Microaggressions Scale (GRMS; Lewis & Neville, 2015) consists of 26 items. It is used to assess the frequency and stress appraisal of nonverbal, verbal, and behavioral negative racial and gender slights experienced by Black women. This instrument was selected because it is the only measure of gendered racism for use with Black women, specifically. In addition, this instrument has prior support for construct validity between the GRMS and racial and ethnic microaggressions, experiences of sexist events, and psychological distress (Lewis & Neville, 2015). Participants in this study were asked to report the frequency of experiences of gendered racial microaggressions on a 6-point Likert-type response format ranging 0 (*never*) to 5 (*once a week or more*). Higher scores indicated a greater frequency of gendered racial microaggressions (Lewis & Neville, 2015). Participants were also asked to report how stressful (e.g., upset, bothered, offended, or annoyed) experiences of gendered racial microaggressions have been on a 6-point Likert-type response format ranging 0 (*this has never happened to me*) to 5 (*extremely stressful*). Higher scores indicated a greater stress appraisal of gendered racial microaggressions (Lewis & Neville, 2015).

For the purpose of the current study, the GRMS-Stress and GRMS-Frequency subscales (Assumptions of Beauty and Sexual Objectification, Silenced and Marginalized, Strong Black Woman Stereotype, and Angry Black Woman Stereotype) were used to explore which type of gendered racial microaggressions predicted study outcomes. A sample GRMS item includes, "Someone assumed that I did not have much to contribute to the conversation." Previous research reported reliability coefficients for GRMS-Stress subscales as follows: Assumptions of Beauty and Sexual Objectification (α = .87), Silenced and Marginalized (α = .88), Strong Black Woman (α = .74), and Angry Black Woman (α = .75; Lewis & Neville, 2015). Reliability coefficients for GRMS-Frequency subscales have been reported in prior research as follows: Assumptions of Beauty and Sexual Objectification (α = .85), Silenced and Marginalized (α = .88), Strong Black Woman (α = .74), and Angry Black Woman (α = .79; Lewis & Neville, 2015). In the initial validation of the GRMS, Lewis and Neville (2015) used an independent sample of 210 Black women to conduct a confirmatory factor analyses which suggested that the multidimensional 4-factor model of the aforementioned subscales was a good fit of the data for both the frequency and stress appraisal scales. In the current study, the Cronbach's alpha reliability coefficients for GRMS-Stress subscales were as follows: Assumptions of Beauty and Sexual Objectification (α = .87), Silenced and Marginalized (α = .88), Strong Black Woman (α = .74), and Angry Black Woman (α = .79). Reliability coefficients for GRMS-Frequency subscales have been reported in prior research as follows: Assumptions of Beauty and Sexual Objectification (α = .86), Silenced and Marginalized (α = .90), Strong Black Woman (α = .74), and Angry Black Woman (α = .79).

Saliva Sample Collection. Saliva collection methods used were comparable to methods documented in previous studies (Klein et al., 2016; Liu et al., 2017). Participants were provided

with SalivaBio oral swab (SOS) and swab storage tubes, supplied by Salimetrics, LLC, to collect saliva sample in the privacy of their own homes. Each tube was pre-affixed with labels so that participants can document the date and time of their saliva sample collection. Instructions for saliva sample collection were given as follows: (1) Remove swab that corresponds to the correct study day (i.e., Day 1 Waking) from outer packaging and place into proper mouth location. (2) Keep swab in place for 1 -2 minutes to ensure that it is saturated. (3) Please be careful that the swab does not move around in the mouth during this time period. (4) Place SOS into the swab storage basket insert (upper portion of the tube). (5) Replace cap and snap securely onto tube. (6) Place sample into freezer until you return to the lab at the end of the study for submission to research staff. Participants provided saliva samples at three times per day, once every four hours, over two consecutive days. Participants were given an instruction sheet on how to use the saliva swabs, avoiding eating, drinking, brushing teeth, or using tobacco or caffeinated products within 30 minutes of taking samples. Participants were also given a notes calendar to record medications taken over the past 48 hours of saliva sample collection, tobacco smoking status, and information on hormone status (e.g., menstrual cycle, hormone therapy use). At the end of the saliva collection period, saliva samples were returned to research staff and sent to Salimetrics, LLC to be analyzed. Per assay protocol, sAA activity was tested for each sample in duplicate (assay sensitivity: 0.4 U/mL; range: 2-400 U/mL).

Demographics. Participants completed a demographic questionnaire developed as a part of the larger study that assessed the following: Age, race, ethnicity, gender, sexual orientation, marital status, country of birth, and number of years lived in the United States. Participants were given the following prompt: Please tell us about yourself by filling in or circling the following information as completely as possible.

Data Analytic Plan

All data analyses were performed using SPSS Version 26 (IBM Corp, 2019). Prior to primary analyses, descriptive statistics were calculated, including the mean, standard deviation, and bivariate correlations among study variables (see Table 1 and Table 2). Age and sexual orientation were not associated with dependent variables of interest in this study. Thus, these variables were not included as covariates. Multicollinearity testing indicated that tolerance (>.20) and VIF (<10) values were within acceptable range (see Table 6 through Table 8; Hair, Black, Babin, & Anderson, 2010). A Little's Missing Completely at Random (MCAR) test was conducted with the final study sample to assess for missingness and missing data were subsequently imputed. The G-power analysis program (G*Power 3.1); (Faul, Erdfelder, Buchner, & Lang, 2009) was used to determine, a priori, the appropriate sample size for a regression analysis. Assuming a medium effect size of 0.15 (Cohen, 1988), an alpha (α) of 0.05, and beta of (1-β) of 0.80, results of the power analysis indicated a sample size of 80 participants was needed to ensure sufficient power; thus, the sample size of 90 participants was sufficient to detect medium effect sizes. The skewness of sAA samples was determined based on established criteria documented in prior research in order to determine if transformation of data was necessary (Clark et al., 2016; Kobayashi, Park and Miyazaki, 2012). Typical sAA levels follow a known diurnal pattern, such that sAA levels decrease initially after morning waking, reach a nadir within approximately 30 minutes, then rise gradually throughout the course of a day (Miller et al., 2015; Nater et al., 2007). The present study used composite sAA values (AUCg, diurnal slope, and sAA waking) as outcomes and the stress and frequency of gendered racial microaggressions as predictor variables (Miller et al., 2015).

The first hypothesis was tested using three separate simultaneous multiple regression analyses since it was predicted that the stress of gendered racial microaggressions would be associated with sAA dysregulation, as defined by blunted total sAA output, flattened sAA diurnal slopes, and blunted waking sAA output. Although this study included both a within person and between person design, we focused on the between person analyses, similar to prior studies examining the association between racial microaggressions and neuroendocrine responses (Zeiders et al., 2018). To explore gendered racial microaggression type as a predictor of each of the three outcomes, all GRMS-Stress subscales (Assumptions of Beauty and Sexual Objectification, Silenced and Marginalized, Strong Black Woman Stereotype, and Angry Black Woman Stereotype) were entered as predictors of blunted total sAA output, flattened diurnal slopes, and blunted waking sAA output, respectively. The second hypothesis was tested using three separate simultaneous multiple regression analyses. In the remaining three analysis, all GRMS-Frequency subscales (Assumptions of Beauty and Sexual Objectification, Silenced and Marginalized, Strong Black Woman Stereotype, and Angry Black Woman Stereotype) were entered as predictors of blunted total sAA output, flattened diurnal slopes, and blunted waking sAA output, respectively.

CHAPTER THREE: RESULTS

Data Screening and Preliminary Analysis. A total of 97 African American women students and community members completed the study protocol. Two participants were omitted from the analyses due to missing items on the gendered racial microaggressions measure. Five participants were omitted from the analyses due to unsubmitted or missing saliva samples for one or both days. A small amount of missing data remained of the final sample of 90 participants included in the analysis. Thus, a Little's Missing Completely at Random (MCAR) test was completed for GRMS-Stress, $\chi 2$ (100) = 110.57, p = .221; GRMS-Frequency, $\chi 2$ (100) = 121.23, p = .073; Day 1 sAA values, $\chi 2$ (5) = 5.41, p = .368; and Day 2 sAA values, $\chi 2$ (4) = 4.13, p = .389, which indicated the data were missing completely at random (Little, 1988). A maximum likelihood technique was used to estimate missing GRMS-Stress (3.8% missing) and GRMS-Frequency (3.8% missing) via the Expectation Maximization (EM) imputation method (Little & Rubin, 2002). In addition, analysis of the patterns of missing data for saliva collection time recorded by participants indicated that there was approximately 4% of missing sAA data. Given the small amount of missing data for saliva collection time, mean substitution was used to impute missing values, which has been shown to produce similar results to multiple imputation methods (Parent, 2013). Additionally, due to individual differences in sAA activity (Ali & Nater, 2020), mean substitution was used in order to impute missing values closest to a participant's individual sAA pattern.

To examine associations between GRMS-Stress, GRMS-Frequency, and sAA activity, sAA means were calculated by taking the average sAA across Study Day 1 and Study Day 2 at waking (Time 1), 4 hours post waking (Time 2), and 8 hours post waking (Time 3) (Roe, Thompson, Roe, Aspinall, Brewer, Duff, Miller, Mitchell, & Clow, 2013). To measure *total sAA*

output, the area under the curve with respect to ground (AUCg) was calculated, using the trapezoid formula, to incorporate the repeated measures of sAA levels (Pruessner et al., 2003). AUCg represents a continuous single summary measure from multiple saliva sample collection time points throughout the day (Fekedulegn et al., 2007). Diurnal slope was calculated using the difference between waking sAA concentration and sAA concentration at eight hours post waking, divided by the total number of minutes elapsed between the two samples (Roe et al., 2013; DeSantis et al., 2015). Skewness and kurtosis were also examined among study variables. As suggested by prior neuroendocrine research, the AUCg composite variable should have a skewness less than the absolute value of 2 and kurtosis less than the absolute value of 2. The AUCg composite variable was out of range for both skewness (2.45) and kurtosis (10.10), as suggested by prior neuroendocrine research (Clark et al., 2016; Kobayashi, Park and Miyazaki, 2012). In order to correct for skewness (-0.12) and kurtosis (-0.04), the AUCg composite variable underwent a log transformation. After transformation of the AUCg variable, both skewness and kurtosis values fell within acceptable range (Clark et al., 2016; Kobayashi, Park and Miyazaki, 2012).

Primary Analysis. The first research hypothesis tested whether greater stress appraisal of gendered racial microaggressions will be significantly associated with dysregulated ANS activity, (1a) blunted total sAA output (AUCg Mean), (1b) flattened sAA diurnal slopes, and (1c) low waking sAA output. To test this hypothesis, three separate multiple regression analyses were conducted testing the GRMS-Stress subscales (Assumptions of Beauty and Sexual Objectification, Silenced and Marginalized, Strong Black Woman Stereotype, and Angry Black Woman Stereotype) predicting total sAA output, diurnal slopes, and waking sAA. The results indicated that the overall model predicting AUCg was statistically significant, $t(89) = -3.26$, $p <$

.05; $F(4, 89) = 2.82$, $p = 0.03$. In addition, the Silenced and Marginalized subscale explained a significant proportion of the variance in AUCg, $\beta = -0.55$, ($R^2 = 0.12$), $F(4, 85) = 2.82$, $p = 0.03$ (see Table 3). There was no evidence that the overall model for GRMS-Stress subscales significantly predicted diurnal slope, $F(4, 89) = 2.82$; $F(4, 89) = 1.54$, $p = 0.20$ (see Table 4) nor waking sAA output $F(4, 89) = 1.70$, $p = 0.16$ (see Table 5).

The second research hypothesis tested whether greater frequency of gendered racial microaggressions will be significantly associated with dysregulated ANS activity, (2a) blunted total sAA output (AUCg), (2b) flattened sAA diurnal slopes, and (2c) low waking sAA output. To test this hypothesis, three separate multiple regression analyses were conducted testing the GRMS-Frequency subscales (Assumptions of Beauty and Sexual Objectification, Silenced and Marginalized, Strong Black Woman Stereotype, and Angry Black Woman Stereotype) predicting total sAA output, diurnal slopes, and waking sAA, respectively.

There was no evidence that overall models for GRMS-Frequency subscales significantly predicted AUCg; $F(4, 89) = 1.78$, $p = 0.14$ (see Table 3), diurnal slope; $F(4, 89) = 2.08$, $p = 0.09$ (see Table 4), nor waking sAA output; $F(4, 89) = 0.37$, $p = 0.83$ (see Table 5).

CHAPTER FOUR: DISCUSSION

This study tested Lewis and colleagues' (2017) biopsychosocial model of gendered racism to investigate the relations between gendered racial microaggressions (e.g., subtle gendered racism) and ANS dysregulation among Black women. Specifically, this study investigated the association between the stress and frequency of gendered racial microaggressions and sAA activity, including total sAA output, diurnal slope, and waking sAA.

The first research hypothesis stated that GRMS-Stress will significantly predict dysregulated ANS activity. Specifically, it was hypothesized that greater stress appraisal of gendered racial microaggressions would be associated with lower total sAA output, flattened sAA diurnal slopes, and lower waking sAA output. This hypothesis was partially supported. The stress of gendered racial microaggressions significantly predicted lower total sAA output, as indicated by lower AUCg. Overall, a higher stress appraisal of gendered racial microaggressions (Assumptions of Beauty and Sexual Objectification, Silenced and Marginalized, Strong Black Woman Stereotype, and Angry Black Woman Stereotype) significantly predicted lower total sAA output, which is an indicator of blunted total sAA output. Specifically, *Silenced and Marginalized* microaggressions significantly contributed the most to the variance in lower total sAA output. These microaggressions refer to the ways that Black women experience being silenced and marginalized in work, school, and other professional settings (Lewis et al., 2013; Lewis & Neville, 2015; Lewis et al., 2016). For Black women, these microaggressions include feeling invisible, unheard, comments being ignored, and assumptions that Black women do not have much to contribute to conversations.

One possible explanation as to why *Silenced and Marginalized* gendered racial microaggressions emerged as a significant contributor to lower total sAA output could be

associated with the context and developmental stage of a majority of participants in this study. Participants in this study were primarily emerging adult Black women college students at a Predominantly White Institution (PWI) in the Southeastern United States. Most participants in this study represented a numerical racial/ethnic minority group in classroom settings and outside of the university. Challenges experienced by students of color at PWIs are well documented in the literature (Harwood et al., 2012; Lewis et al., 2013; Lewis et al., 2016; Solórzano, Ceja, & Yosso, 2000; Yosso et al., 2009). Prior work has also shown that being silenced, marginalized, and invisible is a particularly salient aspect of the experiences of Black women in predominantly White college settings (Lewis et al., 2013; Lewis et al., 2016; Torres-Harding et al., 2020). Results from the current study are consistent with previous research that has found racial microaggressions in higher education and in workplace settings to be hostile and lead to high distress and low self-esteem (Cheng & Mallinckrodt, 2015; Franklin, Boyd-Franklin, & Kelly, 2006; Lewis et al., 2013; Lewis et al., 2016; Nadal et al., 2014; Solórzano, Ceja, & Yosso, 2000; Torres, Driscoll, & Burrow, 2010; Torres-Harding, Torres, & Yeo, 2020). The results reported in the current study also support microaggression scholarship that has consistently documented negative self-reported physical health outcomes in association with feelings of invisibility, hypervisibility, and assumptions of intellectual inferiority; common types of micro-invalidations unique to Black people in higher education and in workplace settings (Constantine et al., 2008; Franklin et al., 2006; Nadal et al., 2016; Sue et al., 2008; Torres-Harding and Turner, 2015).

Dysregulated ANS activity, as evidenced in the current study by blunted sAA output, in response to experiences of *Silenced and Marginalized* gendered racial microaggressions is consistent with previous research. Stress and health scholars have documented an increased wear and tear on the body's stress response systems over time leads to a reduced ability of the body to

adapt to stress, leading to a decrease in reactivity to mental stressors and subsequent failure of the body to produce physiological responses within optimal range (Goosby, Cheadle, & Mitchell, 2018; Steptoe, 2006). Chronic exposure to stress and subsequent sAA dysregulation has been associated with a variety of chronic and negative health consequences for which Black women who are already at highest risk including hypertension, cardiovascular disease, immune system dysregulation, affective disorders, fatigue, and frequency of illness (Granger et al., 2007; Goosby, Cheadle, & Mitchell, 2018; Liu et al., 2017; Long et al., 2004). The present study is the only study to date to test the relations between experiences of gendered racism and blunted sAA activity, and the current findings are consistent with burgeoning research that has found correlations among sAA and chronic stress (Gordis et al., 2006; Keller and El-Sheikh, 2009; Liu et al., 2017; Nater et al., 2007; Rohleder et al., 2008; Vigil et al., 2010; Wolf et al., 2008).

The results of the current study also provide preliminary evidence in support of Utsey's theoretical model of race-related stress (Utsey & Ponterotto, 1996). Furthermore, results provide support that extends the Biopsychosocial Model of Perceived Racism (Clark et al., 1999) and highlights the ways in which experiences of gendered racial microaggressions from the environment activate an exaggerated stress response in the body of Black women. Consistent with the model, prolonged activation of the body's stress response to experiences of silenced and marginalized gendered racial microaggressions are postulated to be associated with an increased risk for negative health outcomes over time (Clark et al., 1999), which in this case is likely dysregulated ANS activity. Finally, Meyer's (2003) Minority Stress Framework also provides a framework to conceptualize experiences of gendered racism and discrimination as a chronic stressor. Meyer's model provides context for the multidimensional ways in which gendered racism may impact health, especially given the number of ways in which gendered racial

microaggressions are experienced (e.g., Silenced and Marginalized microaggressions). The current study provides support for the differential elements of the stress process that are unique to the deleterious effects of minority stressors (Meyers, 2003), as evidenced by the influence of the stress from Silenced and Marginalized microaggressions on dysregulated sAA activity and not the other types of gendered racial microaggressions. In this case, stress associated with feeling silenced and marginalized is experienced by the current sample in excess (Meyer, 2003). The Minority Stress Model (Meyer, 2003) provides grounding to further conceptualize the intricate way in which discrimination at the intersection of race and gender among Black women can lead to experiences of stress that exceed typical daily stressors. Thus, the current study contributes important preliminary evidence to clarify the role of the stress of *Silenced and Marginalized* gendered racial microaggressions on dysregulated sAA activity and the potential long-term impact on the physical health of Black women.

It was unexpected that Assumptions of Beauty and Sexual Objectification, Strong Black Woman Stereotype, and Angry Black Woman Stereotype gendered racial microaggressions did not significantly contribute to the variance in total sAA output. It was particularly surprising that Beauty and Sexual Objectification microaggressions were not linked to blunted sAA output given prior research that has linked Sexualization racial microaggressions directly to negative physical health and somatic symptoms (Torres-Harding et al., 2020). It was also unexpected that the stress associated with experiences of the Strong Black Woman Stereotype was less associated with sAA output given prior research that documents the stress associated with this type of gendered racial microaggression among Black women (Lewis et al., 2013; Lewis et al., 2016; Watson-Singleton, 2017). One possible explanation for this finding is supported by prior research that has documented experiences of the Angry Black Woman stereotype as less stressful

than the Strong Black Woman stereotype due to adopting a "Superwoman" schema, often characterized by self-reliance and internalized during the process of gendered racial socialization (Harris-Perry, 2011; Lewis et al., 2013; Woods-Giscombé, 2010). In addition, the GRMS-Stress *Silenced and Marginalized* gendered racial microaggressions subscale mean of the current sample was highest compared to the other subscales (see Table 1). Thus, the Assumptions of Beauty and Sexual Objectification, Strong Black Woman Stereotype, and Angry Black Woman Stereotype gendered racial microaggressions were appraised as less stressful in the current sample, which might have influenced the findings.

The first hypothesis also stated that greater stress appraisal of gendered racial microaggressions would also significantly predict two other indicators of ANS dysregulation, flattened diurnal sAA slopes and low waking sAA. However, contrary to expectation, there was no evidence in the present study that the stress of gendered racial microaggressions predicted flattened diurnal sAA slopes nor waking sAA output. It is possible that the stress appraisal of gendered racial microaggressions may be associated with other indicators of health that were not measured in the present study. This pattern of results was also observed in other studies that suspected within-person differences influenced study outcomes (Liu et al., 2017; Torres-Harding et al., 2020).

The second research hypothesis examined whether a greater frequency of gendered racial microaggressions was associated with lower total sAA output, flattened sAA diurnal slopes, and lower waking sAA output. This hypothesis was not supported in the present study. Higher frequency of gendered racial microaggressions did not predict significant dysregulation in sAA total output, sAA diurnal slope, nor waking sAA output. One possible explanation for these findings is that the stress appraisal of gendered racial microaggressions might be more strongly

associated with negative health outcomes compared to the frequency of gendered racial microaggressions. A second possible interpretation for these findings could also be attributable to participants' limited awareness of gendered racial microaggressions. While the frequency of gendered racial microaggressions did not significantly predict dysregulated sAA activity, participants' physiological patterns suggested that they were affected by experiences of being silenced and marginalized, as this subscale significantly contributed the most to the variance across all models. This is an important contribution to the literature in that it provides evidence for a discrepancy between perceived frequency of gendered racial microaggressions and dysregulated sAA activity. These findings support the theoretical notion (Lewis & Neville, 2015) that the stress of discrimination or microaggressions are more important to measure than merely the frequency of microaggression experiences.

Limitations

Although the present study is the first investigation of the link between gendered racial microaggressions and sAA activity among Black women, several limitations are important to note when interpreting the findings. The present study used a repeated-measures approach to data collection to compare participants' sAA levels at three different time points across two days in association with reported experiences of gendered racial microaggressions. The study was limited in interpretation of well-known physiological markers of stress such as the awakening response, which includes an sAA measurement at 30 minutes post waking. Given that the sAA awakening response was not measured in this study, data time points were limited. Thus, data could not be subjected to multilevel modeling, which may have yielded greater statistical significance. Future research should include a minimum of four time points, including 30 minutes post waking, across a minimum of three days for greater accuracy and more robust

findings. Additional time points would also allow for the use of multilevel modeling (e.g., hierarchical linear modeling), which would reduce the limitations inherent in multiple regression analyses by accounting for repeated measures and time-varying factors in sAA activity that may change from day-to-day within individuals.

Another noteworthy limitation is the restricted age range as a result of recruiting participants who were primarily college students. This limits the generalizability of the study's findings to a larger more diverse group of Black women. Community members and students may have unique experiences. The ability to detect differences in the small percentage of community members in the current study may be influenced by combining the sample. Future samples should include, in addition to college students, extensive community-based recruitment from a broad range of Black women in age, SES, and education status. It is also possible that having a relatively healthy sample of young adult Black women, this study may have been limited in its ability to capture cumulative damage to the body's stress response system as a result of gendered racism. Future studies should incorporate a longitudinal study design to follow-up on disease development and to accurately determine associations with health indicators from early adulthood and as gendered racial identity continues to develop over time. Another possible explanation for the non-significant findings in this study could be related to inconsistent wake up time and time collection documented among a sample of primarily college students, which could have a significant impact on sAA measurements. An examination of the composite variables across days revealed significant skewness and kurtosis that required a log transformation procedure to bring the AUCg variable within normal range. While positively skewed sAA distributions are often expected (Granger, et al., 2007), future research would benefit from

alternative data collection protocols that enhance participant compliance such as the use of time stamp devices.

The present study was also limited by its sample size. The a priori power analysis conducted indicated that the findings in the present study had sufficient power to detect medium effect sizes. However, it is possible that an increased sample size would yield different findings. Although, it should be noted that data collection stopped at 97 participants due to the emergence of the COVID-19 pandemic in the United States for the safety of participants and research staff. As a result, community recruitment was halted and resulted in a greater number of emerging adults in the sample. Future studies may want to increase the sample size and include a more diverse sample of Black women in age, SES, and education status in order to make comparisons within-subjects, between-subjects, and to potentially explore mediating variables that could help to contextualize the findings.

Future Research

The findings in the present study indicated that physiological reactivity to gendered racial microaggressions is associated with decreased sAA output, an indicator of dysregulated ANS activity. Salivary bioscience research has provided a deeper understanding of the complex mechanisms by which racism-related stress can negatively impact health. The body's stress response system is complex and sAA is only one component of the ANS system. Non-invasive biomarkers of stress and health have emerged in the literature in recent decades as assessment tools to more readily capture complex physiological processes that underlie chronic health conditions experienced by racial/ethnic minority individuals. While sAA has received increasing support as a reliable and sensitive biomarker of chronic stress, future research should examine the multidimensional aspects of the stress response system (e.g., allostatic load, blood pressure,

interactions between cortisol and sAA) to better understand the impact of gendered racism on the health of Black women. Given that a greater frequency and stress of gendered racial microaggressions has predicted greater anxious arousal (Wright & Lewis, 2020), and given the support from preliminary findings that have suggested the use of sAA as a biomarker of anxiety (Nater & Rohleder, 2009), future research could explore dysregulated sAA activity as a biomarker of anxious functioning resulting from experiences of gendered racial microaggressions. Furthermore, given the accessibility and non-invasive nature of sAA as a biomarker of stress, future research should also extend prior work to test the effectiveness of culturally-adapted interventions (e.g., mindfulness, mediation, prayer) that can mitigate the negative impact of the stress of gendered racial microaggressions on sAA activity (Ali & Nater, 2020). For example, the development of interventions and evidence-based treatment for Black women that incorporate protective factors, such as spirituality, culturally-specific coping, cultural resources, and social resources (Lewis-Coles & Constantine, 2006; Meyers, 2003; Utsey, Giesbrecht, Hook & Stanard, 2008) warrant further empirical support.

Given that gendered racism is often experienced on a chronic and recurrent basis, emerging conceptual models may be considered to appropriately capture the unique experiences of gendered racial microaggressions among Black women. For example, race-based traumatic stress has been postulated to account for the trauma-like symptoms that may develop as a result of the emotional toll of racism and may account for the psychological, emotional, social, behavioral and cognitive changes associated with discrimination (Carter, 2007; Cheng & Mallinckrodt, 2015; Loo et al., 2001). Future research is needed to validate this theoretical construct among a diverse range of Black women in age, SES, and education status, in order to assess the impact on psychological and physiological functioning and health outcomes. Building

on these findings as it relates to the unique experiences of Black women are important because they suggest that the stress of gendered racism and trauma interferes with emotional health and cognitive functioning, which can challenge academic, social, and psychological adjustment across the lifespan. Thus, further inquiry into the relationship between the stress of gendered racism and cognitive functioning is warranted.

Future research could benefit from exploring these differences across a larger sample size of a more diverse group of Black women in age, education level, and SES. Future research could also be strengthened by the use of a mixed methods study design in which qualitative and quantitative data may be used to better clarify the complex relationship between the frequency and stress appraisal of gendered racial microaggressions. Future research could also benefit from isolating factors that contribute to certain types of gendered racial microaggressions among Black women across the lifespan (e.g., coping strategies) to better examine the relationship between gendered racial microaggressions as a chronic stressor, flattened diurnal slopes, and low waking sAA levels.

A critical aspect of the current study is that results highlight the importance that even subtle experiences of racism, such as microaggressions, can cause harmful long-lasting effects. This study highlights the negative consequences of gendered racial microaggressions that include being silenced and marginalized in workplace, school, or other professional settings. For example, negative consequences of blunted sAA activity among women has been associated with dysregulated hormonal secretion, maternal health, and pregnancy related complications (Giesbrecht et al., 2013). Given the pervasive inequities in pregnancy-related complications and birth outcomes among Black women, more research is needed to investigate the link between chronic gendered racism, dysregulated sAA, and other chronic diseases such as heart disease and

high blood pressure among Black women. Findings from the current study provide evidence for the importance of applying an intersectional analysis in continued research that centers the health needs of Black women. More support is needed to push forward legislation such as senate bill S.3424, the Black Maternal Health Momnibus Act of 2020, introduced by Senator Kamala D. Harris of California in March 2020. This act calls for national attention to the maternal health care crisis among Black women in the United States and for the support of federal health agencies to address health inequities (Congress.gov, 2020). Thus, the need is great for greater federal support to study the unique gendered racial health inequities among Black women.

Implications for Counseling Psychologists

The deleterious effect of the stress of everyday racism on the psychological and physical health of Black women is significant and should be addressed by counseling psychologists and other mental health practitioners. The stress of gendered racial microaggressions has been found to negatively influence health including depressive symptoms (Williams & Lewis, 2019), traumatic stress (Moody & Lewis, 2019), negative self-reported physical health (Lewis et al., 2017), anxious arousal (Wright & Lewis, 2020), and lower waking cortisol levels (Peppers, 2018) among Black women. When providing psychological services to Black women, data from the current study support the importance of psychologists including an assessment of the extent to which gendered racism might be related to or exacerbating presenting problems or in some way interfering with daily functioning. Furthermore, the need remains for the development of clinical assessment tools such as semi-structured clinical interview protocols that can be used qualitatively by counseling psychologists in serving Black women. Data highlighting the role of Silenced and Marginalized gendered racial microaggressions on dysregulated stress responses among Black women in this study point to the need for a sense of urgency among counseling

psychologists in taking concerns of gendered racial microaggressions seriously in therapy. Ultimately, results from this study inform a need to improve mental health services provided in ways that validate and support the unique lived experiences of Black women.

Implications for Healthcare Professionals

Findings from the current study highlight the importance of interdisciplinary collaboration among psychologists, physicians, public health professionals, and health equity advocates to increase awareness regarding the link between gendered racism and health among Black women. It is imperative that clinicians and public health professionals continue to promote education and prevention programming for Black women whose unique lived experiences are often overlooked in the development and standardization of evidenced based treatment. This is of particular importance given the findings in the present study coupled with trends in the literature that Black women are often under diagnosed, underutilize services, or attain services that do not meet their needs and are not culturally relevant.

The findings in the present study of the chronic stress of gendered racism in association with dysregulated physiological patterns is a novel contribution to the stress and health literature and can be used to inform the development of evidenced-based mental health treatment. Findings from this study can be used to inform strategies that are collaborative and emphasize psychologists working alongside teams of health professionals, community advocates, and Black women. It is important that mental health providers actively discuss and address experiences of discrimination in therapy, assessment, and data gathering to inform treatment planning and interventions. Specifically, results from this study highlight the importance of exploring both the frequency and stress of gendered racism in order to better understand the unique lived

experiences of Black women clients that may contribute to psychological distress and poor health.

Conclusion

The results of this study found an association between gendered racial microaggressions experienced by Black women and total sAA output. Specifically, Black women in this study experienced greater stress from gendered racial microaggressions that tend to include feeling silenced and marginalized. A discrepancy was found between the stress and frequency of gendered racial microaggressions and its impact on the body's physiological stress response, which is an important contribution of the present study. Future research should examine awareness of gendered racial microaggressions and include an assessment of gendered racial identity among a diverse group of Black women in age, SES, and educational background. Findings from this study provide a more nuanced understanding of the ways in which gendered racism is experienced as a chronic stressor, as evidenced by ANS dysregulation. Future research is warranted to clarify the role of gendered racial microaggressions in the pervasive health inequities among Black women.

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APPENDICES

Table 1

Intercorrelations Between GRMS-Stress Subscales and All Study Variables

Variables	1	2	3	4	5	*6*	*7*	*M*	*SD*	α
1. GRMS-Beauty	---	**0.73****	**0.68****	**0.53****	-0.05	0.04	0.05	2.66	1.11	.87
2. GRMS-Silent		---	**0.69****	**0.63****	**-0.21***	-0.14	-0.09	2.91	1.25	.88
3. GRMS-Strong			---	**0.63****	-0.02	-0.06	0.10	1.68	0.98	.74
4. GRMS-Angry				---	-0.05	-0.01	0.06	2.56	1.25	.79
5. AUCg Mean					---	**0.34****	**0.78****	8.47×10^4	6.17×10^4	
6. Diurnal Slope Mean						---	-0.13	0.11	0.20	
7. Waking sAA Mean							---	102.62	74.33	

Note. GRMS-Stress = Gendered Racial Microaggressions Scale-Stress Appraisal;

GRMS-Beauty = Assumptions of Beauty and Sexual Objectification

GRMS-Silent = Silenced and Marginalized

GRMS-Strong = Strong Black Woman Stereotype

GRMS-Angry = Angry Black Woman Stereotype

** $p < .01$

Table 2

Intercorrelations Between GRMS-Frequency Subscales and All Study Variables

Variables	1	2	3	4	5	6	7	M	SD	α
1. GRMS-Beauty	---	**0.71****	**0.55****	**0.57****	-0.02	-0.01	0.06	2.40	1.08	.86
2. GRMS-Silent		---	**0.59****	**0.62****	-0.14	-0.16	-0.03	2.54	1.28	.90
3. GRMS-Strong			---	**0.64****	0.01	0.02	-0.01	2.47	1.38	.74
4. GRMS-Angry				---	-0.10	0.09	-0.04	2.69	1.32	.79
5. AUCg Mean					---	**-0.34****	**0.78****	8.47×10^4	6.17×10^4	
6. Diurnal Slope Mean						---	-0.13	0.11	0.20	
7. Waking sAA Mean							---	102.62	74.33	

Note. GRMS-Frequency = Gendered Racial Microaggressions Scale-Frequency

GRMS-Beauty = Assumptions of Beauty and Sexual Objectification

GRMS-Silent = Silenced and Marginalized

GRMS-Strong = Strong Black Woman Stereotype

GRMS-Angry = Angry Black Woman Stereotype

** $p < .01$

Table 3

Simultaneous Multiple Regression Predicting AUCg from GRMS Stress Appraisal and Frequency Subscales

	Coefficient					Collinearity Statistics	
Predictor Variables	*B*	SE_B	*t*	95% CI	□R^2	Tolerance	VIF
Stress Appraisal					0.12		
GRMS-Beauty	0.28	0.04	1.76	[-0.01, 0.16]		0.41	2.45
GRMS-Silent	-0.55	0.04	**-3.26***	[-0.21, -0.05]		0.36	2.79
GRMS-Strong	0.21	0.05	1.29	[-0.03, 0.16]		0.41	2.46
GRMS-Angry	0.05	0.03	0.38	[-0.05, 0.08]		0.53	1.90
Frequency					0.08		
GRMF-Beauty	0.24	0.04	1.57	[-0.02, 0.15]		0.46	2.17
GRMF-Silent	-0.38	0.04	**-2.33***	[-0.16, -0.01]		0.41	2.41
GRMF-Strong	0.21	0.03	1.46	[-0.02, 0.11]		0.52	1.93
GRMF-Angry	-0.07	0.03	-0.47	[-0.08, 0.05]		0.50	2.02

Note. CI = confidence interval; VIF = variance inflation factor;

**p* <.05

Table 4

Simultaneous Multiple Regression Predicting Diurnal Slope from GRMS Stress Appraisal and Frequency Subscales

	Coefficient					Collinearity Statistics	
Predictor Variables	*B*	SE_B	*t*	95% CI	□R^2	Tolerance	VIF
Stress Appraisal					0.07		
GRMS-Beauty	0.30	0.03	1.85	[-4.0×10^{-3}, 0.11]		0.41	2.45
GRMS-Silent	-0.39	0.03	**-2.22***	[-0.12, 0.01]		0.36	2.79
GRMS-Strong	-0.07	0.03	-0.42	[-0.08, 0.05]		0.41	2.46
GRMS-Angry	0.12	0.02	0.83	[-0.03, 0.06]		0.53	1.90
Frequency					0.09		
GRMS-Beauty	0.12	0.03	0.77	[-0.03, 0.08]		0.46	2.17
GRMS-Silent	-0.43	0.02	**-2.64***	[-0.11, -0.02]		0.41	2.41
GRMS-Strong	0.05	0.02	0.32	[-0.03, 0.05]		0.52	1.93
GRMS-Angry	0.25	0.02	1.71	[-0.01, 0.08]		0.50	2.02

Note. CI = confidence interval; VIF = variance inflation factor;

*p <.05

Table 5

Simultaneous Multiple Regression Predicting sAA Waking from GRMS Stress Appraisal and Frequency Subscales

	Coefficient					Collinearity Statistics	
Predictor Variables	*B*	SE_B	*t*	95% CI	□R^2	Tolerance	VIF
Stress Appraisal					0.07		
GRMS-Beauty	0.15	10.92	0.94	[-11.46, 31.96]		0.41	2.46
GRMS-Silent	-0.42	10.41	**-2.42***	[-45.82, -4.44]		0.36	2.79
GRMS-Strong	0.22	12.49	1.32	[-8.34, 41.32]		0.41	2.46
GRMS-Angry	0.11	8.53	0.76	[-10.48, 23.43]		0.53	1.90
Frequency					0.02		
GRMS-Beauty	0.18	10.96	1.12	[-9.55, 34.04]		0.46	2.17
GRMS-Silent	-0.11	9.67	-0.67	[-25.69, 12.77]		0.41	2.41
GRMS-Strong	0.02	8.08	0.10	[-15.27, 16.84]		0.52	1.93
GRMS-Angry	-0.08	8.63	-0.55	[-21.91, 12.40]		0.50	2.02

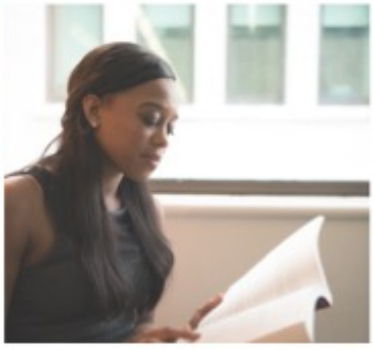
Note. CI = confidence interval; VIF = variance inflation factor;

*p <.05

Gendered Racial Experiences and Health

Participants wanted for a study exploring the life experiences and well-being of Black women





Who: **Black women who are at least 18 years of age.**

What: **Participation in this study involves four parts: (1) You will complete a brief survey in person in the department of Psychology at the University of Tennessee, (2) You will receive a saliva self-collection kit and detailed instructions to provide small saliva samples for two days in the privacy of your own home, (3) All participants will complete a daily brief survey to record gendered racial experiences over the course of seven days, (4) You will complete a brief survey in person when you return a total of 6 saliva samples back to the research staff at the end of the study.**

When:

Where: **Dr. Jioni Lewis's Research Lab**

Why: **Your participation will help us investigate the unique gendered racial experiences that may impact the overall health and well-being of Black women. Receiving your feedback is very important to us!**

How: **Email or call Erica Peppers, Graduate Research Assistant, Gendered Racial Experiences Study**

As a token of our appreciation, you will receive $25 at the completion of the study.

Consent Form

Introduction/Purpose:
You are invited to participate in a research study entitled, "Effects of Gendered Racial Experiences on Health" directed by Dr. Jioni A. Lewis of the Department of Psychology at the University of Tennessee. The purpose of this research study is to examine the associations between everyday discrimination and health among Black women.

Procedures:
Participation in this research study involves the following: (1) You will complete a brief survey that should take about 30 minutes to complete. You will complete this survey in person at the University of Tennessee in the department of Psychology on Day 0 and on Day 8 of the research study. This survey is completely voluntary and you can stop participating at any time. (2) Your blood pressure will be measured on Study Day 0 and on Study Day 8. Total time investment on Study Day 0 is one hour. Total time investment on Study Day 8 is thirty minutes. (3) All participants will complete a daily diary to record experiences with everyday discrimination over the course of seven days. You will receive an email reminder with a personalized link to complete electronic entries on Day 1 through Day 7. To protect your privacy, upon receipt, all daily diary entries will be assigned a numerical code. Your email address will not be associated with your entries. Time investment for daily diary entries is no more than 10 minutes per day. (4) You will receive a saliva self-collection kit and detailed instructions provided by Salimetrics, Inc. You will use this kit in order to provide a small saliva sample in the privacy of your own home, four times per day, at four hour intervals beginning on Study Day 1 through Study Day 2. Providing a saliva sample should take no more than 10 minutes per day. You will return a total of 6 samples back to the research staff on day 8 of the research study. Completion of all research study procedures includes a total time investment of 4 hours and 10 minutes.

Risks
Participation is not expected to cause any harm outside of what is normally encountered in daily life. In the rare event that you become upset or offended by a question, you may choose to skip the question. In addition, if you experience any psychological distress during or after this research study, you can contact the National Help Line at 1-800-662-HELP (4357) for additional support. If you are a student at the University of Tennessee, you may contact the Student Counseling Center at (865) 974-2251. Additionally, you may contact Cherokee Health Systems at (865) 544-0406 or your local mental health agency if you live outside the Knoxville area.

Benefits:
A potential benefit of your participation is that you may learn more about issues specific to Black women. In addition, a larger societal benefit is that your participation in this research study will help us identify unique concerns that may impact the overall health and well-being of Black women. We hope that the knowledge gained from this research study will help us to better understand and address mental and physical health issues of Black women.

Alternatives/Participant's Rights:
There will be no negative consequences if you decide not to participate. You have the right to discontinue your participation at any time without penalty. Should you decide not to participate, this will have no effect on your grades, status, or future relations with the University of Tennessee or its affiliates. Your participation is completely voluntary, and you can choose not to participate in this research study at any time. You can withdraw from the research study with no loss of benefits to which you are otherwise entitled.

Confidentiality:
Several safeguards will be taken to protect your identity. All of your answers to survey questions will be strictly confidential. Your name will not be connected to your responses to the survey. In addition, all of your identifying information will be removed from your saliva samples. Master files containing your demographic information (e.g., age, sex, name, and research study identification number) will be kept in a secure location at the University of Tennessee that is separate from your saliva samples. This master file containing your identifying information will be destroyed at the end of this research study. Only investigators involved in the research study and their research staff will have access to identifying information. The results from this research study may be published in a professional journal or government grant application, but you will not be identified as an individual. Instead, results will be reported as group averages.

Future Research:
Your materials, information, and biospecimens will not be used or shared with other researchers for future research, even if identifiers are removed.

Compensation
After you have completed all research study procedures on day 8, **you will receive 5 credits if you are a student in an eligible University of Tennessee undergraduate introductory psychology course and enroll in the research study through SONA**. If you are not in an eligible University of Tennessee undergraduate introductory psychology course, you will receive compensation ($5) for completing a 30 minute survey and blood pressure assessment in person during your first visit. After we receive your saliva samples and daily diary, you will be compensated an additional $20 at your day 8 visit. If you choose to withdraw from the research study prior to its completion, you will be eligible for compensation for all completed parts of the research study at the time of withdrawal. You will receive your compensation in the form of cash during your day 1 and day 8 visits.

Contact Information:
If you have any questions or concerns about participation in this research, you may contact **Erica Peppers** at or **Dr. Jioni A. Lewis** at . For additional information regarding the rights of human participants in research, you may contact the University of Tennessee IRB Compliance Officer at utkirb@utk.edu or (865) 974-7697.

Consent

I am at least 18 year of age and I have read the above information. The research study has been explained to me in full detail. I have been given the opportunity to ask questions and my questions have been answered to my satisfaction. If I have additional questions, I have been told who to contact. I agree to participate in the research study described above and I understand that I will receive a copy of this form.

Participant's Name (printed)_____

Participant's Signature _____Date _____

Before Saliva Collection

Good saliva collection requires documenting items which may affect results, as well as following procedures which avoid the possibility of contaminating saliva with substances that could interfere with the immunoassay. Before starting saliva collection, we recommend the following precautions:

1. Avoid foods with high sugar or acidity, or high caffeine content, immediately before sample collection, since they may compromise your sample.
2. Document consumption of alcohol, caffeine, nicotine, and prescription/over-the-counter medications within 12 hours of your sample collection.
3. Document vigorous physical activity and the presence of oral diseases or injury.
4. Do not eat a major meal within 60 minutes of sample collection.
5. Rinse mouth with water to remove food residue and **wait at least 10 minutes** after rinsing to avoid sample dilution before collecting saliva.



Instructions for Use

1. Remove swab that corresponds to the correct study day (i.e., Day 1 Waking) from outer packaging and place into proper mouth location.
2. Keep swab in place for 1 -2 minutes to ensure that it is saturated.
    - Please be careful that the swab *does not move around* in the mouth during this time period.
3. Place SOS into the swab storage upper portion of the tube.
4. Replace cap and snap securely onto tube.
5. Place sample into freezer until you return to the lab.
6. **Repeat steps 1-5** upon waking, and every four hours, until you have collected a total of 3 samples per day.
7. Return a total of 6 frozen samples to the research lab on Study Day 8.

Debriefing Form and Resource List

Thank you for your participation in this study. Information collected from this project will help us gain a better understanding of how subtle forms of racism and sexism that Black women experience on a day-to-day basis may relate to mental and physical health outcomes.

Some of the issues raised in this study may be difficult to deal with and may have stirred up some feelings for you. If you would like to talk to someone more about these issues, here are some suggested resources. Below is a list of mental health, wellness, and educational resources for you. Please feel free to print a copy of this resource list for future reference.

Local Mental Health Resources

- If you are a **University of Tennessee student**, you can contact the following resources:
  University of Tennessee Student Health Counseling Center

  (865) 974-2251

  http://web.utk.edu/~shs/clinics_mental.php

- If you are a **Knoxville resident**, you can contact the following resources:
  Knox County Health Department
  (865) 215-5400
  http://www.knoxcounty.org/health/adult_primary_care.php

- **Additional Resources:**

  http://tn.gov/mental/recovery/crisis_serv.shtml

National Mental Health Resources

- If you are a college student, you can contact your university Counseling Center or Student Health Center and ask to see a counselor.
- If you are a community resident outside of the Knoxville area, you can use the following online therapist directories to find a local mental health professional:
- **Psychology Today**:
  http://therapists.psychologytoday.com/ppc/prof_search.php?iorb=4764
  Detailed listings for psychologists, psychiatrists, therapists and counselors are available throughout the United States and Canada. Choose a state to begin your search.
- **Therapist Locator:** http://www.therapistlocator.net/
- This Directory will assist you in locating a marriage and family therapist in your area. The listed therapists are Clinical Members of the American Association for Marriage and Family Therapy.

Educational Resources

- Here are some educational resources that provide additional information about some of the topics covered in this research project:

- Collins, P. H. (1990). *Black Feminist Thought: Knowledge, Consciousness, and the Politics of Empowerment.* Cambridge, MA: Unwin Hyman, Inc.

- Harris-Perry, M. V. (2011). Sister Citizen: Shame, Stereotypes, and Black Women in America. New Haven, CT: Yale University Press.

- hooks, b. (1981). *Ain't I A Woman: Black Women and Feminism.* Cambridge, MA: South End Press.

- Jones, C. & Shorter-Gooden, K. (2003). Shifting: The Double Lives of Black Women in America. New York: HarperCollins Publishers, Inc.

- Sue, D. W. (2010). *Microaggressions in Everyday Life: Race, Gender, and Sexual Orientation.* John Wiley & Sons, Inc. New Jersey.

- Sue, D. W. (2010). *Microaggressions and Marginality: Manifestation, Dynamics, and Impact.* John Wiley & Sons, Inc. New Jersey.

Wellness Book List

The Value in the Valley: A Black Woman's Guide Through Life's Dilemmas by Iyanla Vanzant

- Provides descriptions of ten common life experiences that African American women face and advice on how to overcome difficulties associated with these experiences.

Sisters of the Yam: Black women and self-recovery by bell hooks

- Provides information on how African-American women can recover from systems of oppression such as racism, sexism, and consumer capitalism.

Rock my Soul: Black People and Self-Esteem by bell hooks

- hooks examines the political and social barriers that keep African-Americans from emotional well-being.

Souls of My Sisters by Dawn Marie Daniels and Candace Sandy

- Provides a series of essays describing the emotional trials of Black women and ways in which the women were able to triumph over their pain in order to appreciate the gifts life has to offer.

Souls Revealed: A Souls of My Sisters Book of Revelations and Tools for Healing Your Spirit, Soul and Life by Dawn Daniels and Candace Sandy

- Provides coping strategies for dealing with painful experiences that may cause disruption within your life.

Your Inner Eve: Discovering God's Woman Within by Reverend Dr. Susan Newman

- Provides guidance on how African American women can increase their psychological well-being from a spiritual point of view.

Black Pain: It Just Looks Like We're Not Hurting by Terri Williams

- Describes what depression looks like within the African-American community and dispels the myth of stoicism among African American men and women.

Internet Resources

- **Black Women's Health Imperative**
  - This is an online community that provides a wealth of online resources, support communities, and informative articles in order to promote physical, spiritual, and emotional health among African-American women.
    - http://www.blackwomenshealth.org/
- **California Black Women's Health Project**
  - Founded in 1994, the California Black Women's Health Project (CABWHP) focuses on empowering Black women to take personal responsibility for our own health and to advocate for changes in policies that adversely affect Black women's health status.
    - http://www.cabwhp.org/
- **Crunk Feminist Collective**
  - Online blog that discusses issues relevant to Black women from a feminist perspective that intersects issues of race and gender.
    - http://crunkfeministcollective.wordpress.com/
- **National Women's Health Information Center**
  - This website provides information on special topics like mental health, pregnancy, breastfeeding, body image, HIV/AIDS, girls' health, heart health, menopause and hormone therapy, quitting smoking, and violence against women.
    - http://www.womenshealth.gov/
- **Journey to Wellness**
  - This is an online health magazine for African-Americans that also provides audio links to its nationally syndicated radio show.
    - http://www.journeytowellness.com/

- **Websites on Racism Education and Anti-Racist Action**
  - Taking Action Against Racism (TAAR); website providing resources and activities designed to address issues related to racism. Organized by the American Psychological Association's Society of Counseling Psychology
    - http://div17.org/TAAR/
  - National Resource Center for the Healing of Racism; website providing resources in the form of structured sharing and personal experiences around issues related to racism.
    - http://www.nrchr.org/

VITA

Erica Peppers was born in Huntsville, Alabama. She attended the Academy for Academics and Arts for primary school and middle school, J.O. Johnson High School and North High School for secondary school. She pursued her degrees at the University of Alabama at Birmingham, and graduated with the B.A. in Spanish and a B.S. in Psychology in 2005. Upon graduation, she served the community of Birmingham through various roles in which her bilingual skills could be used. She then enrolled at the University of Alabama at Birmingham School of Public Health, in 2006, where she earned a Master's in Public Health from the department of Maternal and Child Health with a minor emphasis in International Health and Global Studies. Thereafter, she moved to the Texas-Mexico border where she studied health inequities affecting Latinx populations through a Center for Disease Control and Prevention sponsored program; Hispanic Serving Health Professions Schools (HSHPS). After completing two research fellowships through HSHPS, she moved the Houston, Texas where she served in the department of Health Disparities Research as Senior Research Coordinator. She transitioned to Baylor College of Medicine to serve as Senior Research Coordinator at the Dan L. Duncan Cancer Center to support the conduct of clinical trials in conjunction with Harris Health Systems. In 2015, Ms. Peppers was admitted to the Counseling Psychology Ph.D. program in the Psychology Department at the University of Tennessee. During this time, she was a graduate research assistant with the Gendered Racism and Health Disparities Lab, under the direction of Dr. Jioni A. Lewis. Throughout this time, she was granted research awards to support the conduct of research impacting the mental and physical health Black women. As part of this research lab, she has gained experience presenting her research at national conferences and she

has also made contributions on two publications. Erica has served the community of Knoxville, TN with her bilingual skills as a former volunteer at the immigration legal clinic at UT School of Law. She has also partnered with a local non-profit, Centro Hispano de East Tennessee to address barriers in access to education for Latinx youth and young adults and served as a member of the steering committee for the Latino Student Success Coalition. She is completing the final stages of her training as a psychology intern at the Washington D.C. VA Medical Center and aims to bring a unique lens to provide more culturally appropriate interventions and support to Black veterans.