

## ABSTRACT

Title of Dissertation: EXAMINING RACISM AS A RISK FACTOR  
FOR UTERINE FIBROIDS AMONG  
AFRICAN AMERICAN WOMEN

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Uterine fibroids are a common gynecological condition among women. African American women, however, are particularly susceptible to developing fibroids; in fact, approximately 80-90% of African American women are diagnosed with the condition by age 50. Left untreated, these benign tumors can reduce fertility and increase the risk of pregnancy complications. Despite the high prevalence of uterine fibroids among African American women and the detrimental effects they may have on reproductive health, little is known about the risk factors associated with fibroid development among this demographic.

To address this gap in the literature, the proposed study used data collected from 699 African American women in the southern region of the United States. This study was guided by an adapted racism and health framework as well as an expanded

ABC-X model that includes elements of the mundane extreme environmental stress theory. Structural equation modeling was used to examine the relationship between perceived and internalized racism, the interaction between the two racism variables, and uterine fibroid diagnosis among African American women. The study also investigated depressive symptomology and body mass index as mediators of the proposed relationships. Results revealed a direct effect between perceived racism and the likelihood of a uterine fibroid diagnosis ( $\beta = .172$ ,  $SE = .05$ ,  $p \leq .001$ ,  $OR = 1.19$  [95%  $CI = 1.08, 1.31$ ]). There was not a direct effect, however, between internalized racism and fibroid diagnosis, or the racism interaction variable and fibroid diagnosis. Perceived racism ( $\beta = .214$ ,  $SE = .03$ ,  $p < .001$ ), internalized racism ( $\beta = .108$ ,  $SE = .04$ ,  $p < .01$ ), and the racism interaction term ( $\beta = .067$ ,  $SE = .03$ ,  $p < .05$ ) were positively and significantly associated with depressive symptomology. There was no evidence of full or partial mediation through the proposed mediators. The present study is among the first to examine two forms of racism as critical psychosocial risk factors for an adverse reproductive health outcome that differentially impacts African American women. The findings have important implications for clinical practice and policy that may aid in the effort to address racial disparities related to uterine fibroid development.

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AMONG AFRICAN AMERICAN WOMEN

by

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## Dedication

This dissertation is dedicated to all African American women who have struggled with infertility, uterine fibroids, and/or any of the myriad gynecological conditions by which we are disproportionately affected.

You matter.

## Acknowledgements

This journey would not have been possible without the love and support of innumerable people over the years. I am so very thankful for each and every one of you who have played a role and will express explicit gratitude for a select few.

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## CHAPTER 1: INTRODUCTION

### Statement of the Problem

Reproductive health is a central component and important indicator of overall health and wellness for women and men. Pregnancy, including its antecedents and aftereffects, has, in recent decades, been a key reproductive health research topic. Issues that are critical to pregnancy include infertility and gynecologic conditions that impact fertility. *Infertility* is defined as “the inability of a sexually active, non-contracepting couple to achieve pregnancy in one year” (World Health Organization [WHO], 2019a). Couples who have a difficult time getting or remaining pregnant but have been trying for less than a year are diagnosed with *impaired fecundity* (U.S. Department of Health and Human Services, 2013). Approximately 6.7% and 12.1% of women aged 15 – 44 in the United States (U.S.) have been diagnosed with infertility and impaired fecundity, respectively (CDC, 2016).

Researchers and clinicians further delineate infertility into two categories. A woman is classified as having *primary infertility* if she is unable to ever become pregnant or carry a pregnancy to a live birth (WHO, 2019a). This includes women who experience spontaneous miscarriages and whose pregnancies result in a stillborn child. Conversely, women who have previously had one or more live births but are subsequently unable to become pregnant or carry a pregnancy to a live birth are classified as having *secondary infertility* (Mayo Clinic, 2017b).

African American women are disproportionately impacted by infertility (Chandra & Stephen, 2013, 2014; Jacobson et al., 2018; Sharara & McClamrock, 2000; Wellons et al., 2008). Analyses of recent waves of the National Survey of

Family Growth (2002 – 2013) indicate that they have a 43% higher adjusted odds of infertility compared to White women (Peck et al., 2016). It is important to note that racial disparities in the incidence of infertility are influenced by measures used to assess the condition, leading some studies to show a greater racial disparity in infertility than others (Gurunath, Pandian, Anderson, & Bhattacharya, 2011; Thoma, 2015; Zegers-Hochschild et al., 2017). Nevertheless, studies of racial/ethnic disparities regarding infertility have found that African American women are less likely than White women to seek care and are underrepresented in infertility clinic populations, despite their overrepresentation among all infertile women (Chandra & Stephen, 2014; Feinberg et al., 2006; Jain, 2006; Jain & Hornstein, 2005).

Primary and secondary infertility share many of the same causes, one of the most common of which is age and its impact on the quality and quantity of available eggs (UCLA Health, 2019). Other causes of female infertility include reproductive gynecologic disorders, including uterine fibroids (Mayo Clinic, 2017a). While many risk factors for infertility are biologically-based, there is an emerging body of literature which implicates psychosocial causes (e.g., stress, psychological trauma) as other potential mechanisms by which infertility may occur (Fidler & Bernstein, 1999; Huddleston et al., 2010; Prather et al., 2016).

Uterine fibroids, also known as leiomyomas or myomas, are benign tumors that occur when a single muscle cell in the uterine cavity grows either in or on the uterus and forms a noncancerous mass. Majority of women in the U.S. will develop them at some point in their lives; in fact, by age 50, approximately 70% of White women and 80% of African American women will be diagnosed with fibroids

(National Institutes of Health, 2018). Although their mere presence does not indicate infertility, the size, location, and quantity of fibroids are critical factors in determining the impact on conception attempts. Left untreated, they are a key risk factor for infertility since they can impair the ability of the uterine lining and the embryo to interact, thus lowering the likelihood of successful implantation and pregnancy (UCLA Health, 2019). African American women are more likely to experience conception and pregnancy complications as a result of fibroids than their White counterparts (Anachebe & Sutton, 2003; Eltoukhi et al., 2014; National Institutes of Health, 2018). Since African American women are also most likely to experience infertility and impaired fecundity, the presence of uterine fibroids significantly compounds the risk of reproductive challenges (Chandra & Stephen, 2013; Sharara & McClamrock, 2000; Wellons et al., 2008).

As mentioned above, a small number of researchers have begun to investigate the influence of psychosocial factors on infertility. To date, one study has identified traumatic childhood events as predictors of later life fertility issues and menstrual cycle dysregulation (Jacobs et al., 2015). The study results indicated that as the number of traumatic incidents in participants' lives increased, the likelihood of fertility difficulties, irregular menstruation, and reduced fecundability also increased (Jacobs et al., 2015). While this is the only study that has identified such a clear link, others have indicated that psychological support during infertility treatment is associated with significant increases in pregnancy rates, thus suggesting that stress reduction is associated with improved fertility outcomes (Domar et al., 2000; Rooney

& Domar, 2018). It follows, then, that high levels of stress might be associated with a greater likelihood of infertility issues.

Although there is a growing literature base for factors that contribute to infertility, most empirical articles are limited in their sample demographics and attention to contextual variables. More specifically, the population of interest in most empirical articles is White women. Thus, minimal consideration is granted for the unique needs and experiences of racial/ethnic minority women, specifically African American women, despite the increased likelihood of both uterine fibroids and infertility within this demographic (Anachebe & Sutton, 2003; J. W. Collins & David, 2009; Lu & Halfon, 2003). To date, very little is known and understood about why women of African ancestry are at heightened risk of developing uterine fibroids. Such conceptual gaps highlight an urgent need to understand issues related to infertility, including gynecologic conditions that affect infertility, among racial/ethnic minorities. A select number of researchers have begun to explore whether poor health issues among racial/ethnic minorities may be a function of the lived experience as a person of color in the U.S. (Chae et al., 2010; Lu & Halfon, 2003; D.R. Williams & Mohammed, 2013). Building on such inquiries, this dissertation aims to address this gap by investigating the relationship between both race-based discrimination and internalized racism and the development of uterine fibroids among African American women.

### **Racial Discrimination and Reproductive Health**

Racial/ethnic minorities in the U.S. experience a disproportionate degree of oppression and report many adverse health outcomes (Ahmed et al., 2007; Lu &

Halfon, 2003). This is particularly true for African American women, who must contend with both gender- and race-based discrimination. One of the arenas in which adverse consequences of racism and oppression manifest most clearly for African American women is reproductive health. They consistently fail to receive timely, routine, or adequate health care services in all areas of reproductive health, ranging from early screening and treatment for sexually transmitted infections to prenatal care and folic acid supplementation during pregnancy (which serves the critical function of reducing neural tube defects) (Anachebe & Sutton, 2003). They are also more likely to deliver low birth weight and premature infants than White women; in fact, African American women who report high levels of racial discrimination are three times as likely to deliver prematurely and five times more likely to deliver a low-birth-weight baby than their White counterparts (Black Women's Health Imperative, 2017b; J. W. Collins, David, Handler, Wall, & Andes, 2004; Copper et al., 1996; Hogue & Bremner, 2005; Jasienska, 2009; Rosenthal & Lobel, 2011). Further, counter to cultural stereotypes which purport that all African American women have several children early in life and with relative ease, research evidence indicates that they have the highest rates of infertility compared to all other racial/ethnic groups (Huddleston et al., 2010; Seifer et al., 2008). They also have a longer duration of infertility than White women, which points to issues around access to—and affordability of—appropriate reproductive health care (Huddleston et al., 2010).

A number of researchers have begun to study racial discrimination as a key predictor of reproductive health disparities, particularly prenatal maternal stress among African American women (Lu & Halfon, 2003; Nabukera et al., 2009;



Rosenthal & Lobel, 2011b). The accumulation of race-related distress over a lifetime (i.e., allostatic load; McEwen, 1998) results in poorer psychological functioning and culminates in a variety of health issues (Ahmed et al., 2007; Mays et al., 2007; D.R. Williams & Mohammed, 2013). Several studies have found that experiences of racial discrimination—and its associated psychological distress—are associated with a higher likelihood of preterm birth, low birth weight, and greater maternal and infant mortality (Anachebe & Sutton, 2003; Copper et al., 1996; Dole et al., 2003; Lobel, Dunkel-Schetter, & Scrimshaw, 1992; Miniño, Arias, Kochanek, Murphy, & Smith, 2002; Nabukera et al., 2009; Rosenthal & Lobel, 2011). This is in line with the weathering hypothesis (Geronimus, 1992), which stipulates that African American women in their mid-20s and older are more likely to experience adverse birth outcomes. This is attributed to the fact that racism and cumulative socioeconomic disadvantage causes rapid health deterioration beginning in early adulthood (Geronimus, 1992). While there is a growing literature base for these topical areas, few empirical articles focus on the unique needs and experiences of racial/ethnic minority women, despite the increased likelihood of infertility and pregnancy complications among them (Anachebe & Sutton, 2003; J. W. Collins & David, 2009; Lu & Halfon, 2003).

### **Infertility and Racial/Ethnic Disparities in Reproductive Health: Gaps in the Literature**

There remains much to be learned about the causes and consequences of infertility, particularly among racial/ethnic minority women. The preponderance of empirical evidence makes clear that women of color, particularly African Americans,

are at significantly higher risk of reproductive morbidities, including infertility (Anachebe & Sutton, 2003; Lobel et al., 1992; Lu & Halfon, 2003; G. P. Parham & Hicks, 2005). More specifically, they are highly susceptible to uterine fibroids, which oftentimes alter the reproductive organs and present infertility challenges.

Although uterine fibroids have been linked to difficulties with conception and infertility (American Society for Reproductive Medicine, 2015; Centers for Disease Control and Prevention [CDC], 2016a; Mayo Clinic, 2018), very little is known about their antecedents (Crawford et al., 2017; National Institutes of Health, 2018; Office on Women's Health, 2018). Identifying such factors can play a pivotal role in reducing the incidence of fibroids, as well as impaired fecundity and infertility as a whole.

As stated earlier, several researchers have begun to establish the link between racism and adverse reproductive health outcomes (Dominguez, 2008; Dominguez, Dunkel-Schetter, Glynn, Hobel, & Sandman, 2008; Lu & Halfon, 2003). Some studies have investigated racial/ethnic disparities in reproductive health outcomes (Peck et al., 2016; Rosenthal & Lobel, 2011; Wellons et al., 2008; L. White, McQuillan, & Greil, 2006), while others have examined the role of racism in sexual and reproductive health outcomes more broadly (Anachebe & Sutton, 2003; Dominguez, 2008; Dominguez et al., 2008; Mays et al., 2007). To date, only one study has investigated the association between perceived racial discrimination, uterine fibroids, and subsequent infertility (Wise et al., 2007). The present study builds on the limited literature available by examining the effects of both perceived and internalized racism on uterine fibroid development among African American women.

This is critical since internalized racism has been identified as an important indicator of a number of poor health outcomes (Ahmed et al., 2007; Chambers et al., 2004; Kwate & Meyer, 2011; Szymanski & Gupta, 2009; D.R. Williams & Mohammed, 2009). By deepening our understanding of different domains of racism and their associations with uterine fibroid development, researchers can begin the work of generating interventions that will positively impact African American women's reproductive health and, more specifically, their child-bearing capabilities.

In addition to examining the impact of racial discrimination and internalized racism on uterine fibroid development, the current study also examined factors that might mediate and moderate the impact of race-based experiences. More specifically, the proposed mediators in this study are depressive symptomology and body mass index (BMI) and the hypothesized moderators are religiosity and social support. Depression is a significant mental health concern which has been proven to negatively impact most, if not all, areas of an individual's life (Gelenberg, 2010; Holden, 2000; Tse & Bond, 2004). Studies have indicated that both experiencing racial discrimination and internalizing negative stereotypes about one's race can adversely affect self-esteem and self-concept, which can subsequently lead to depression (Carr, Szymanski, Taha, West, & Kaslow, 2014; Hughes, Kiecolt, Keith, & Demo, 2015; Molina & James, 2016; J. Taylor, Henderson, & Jackson, 1991a). Depression has also been associated with BMI. A number of researchers have identified a causal relationship between depression and higher BMI due to changes in eating patterns—including increased consumption of calorie-dense foods—and reduced physical activity that is oftentimes associated with depressive symptomology

(Baumeister & Härter, 2007; E. S. Becker et al., 2001; Faith et al., 2002; Luppino et al., 2010; Richardson et al., 2006; Stunkard et al., 2003).

Both of the proposed mediators in the study, namely depressive symptomology and BMI, have been causally linked to adverse reproductive health outcomes in the literature. Clinical levels of depression and depressive symptomology have been found to be associated with pregnancy complications, poor maternal infant bonding, low maternal functioning, poor infant and child health and development, and increased risk of unintended pregnancy due to user-related contraceptive failures or unprotected sex (O'Hara, 2009; Yonkers et al., 2009). High BMI has been linked to a number of female-specific reproductive health issues, including infertility (Fedorcsák et al., 2004; Maheshwari et al., 2007; Practice Committee of American Society for Reproductive Medicine, 2008; X. Wang et al., 2003), miscarriage (Maheshwari et al., 2007; Metwally et al., 2008), stillbirth (Chu et al., 2007), birth defects (Stothard et al., 2009), caesarean section (Poobalan et al., 2009), breast cancer (Eliassen et al., 2006), and endometrial cancer (Modesitt & van Nagell, 2005). Moreover, high maternal weight during pregnancy has long-term implications for their offspring (e.g., increased lifetime risk of hyperglycemia, hyperlipidemia, and obesity) (Cardozo et al., 2013; M. Li et al., 2011; J. Smith et al., 2009; Whitaker, 2004). In the present study, it is hypothesized that the pathway between negative race-based experiences and uterine fibroid diagnosis will be mediated by depressive symptomology and BMI.

Religiosity may serve a critical role in determining the severity of the effect of racism in participants' lives. Historically, African American women have relied on their spiritual beliefs and the church community to persevere through impossibly

difficult life circumstances. In studies that explore African American women's responses to both race-based and reproductive health challenges, reliance on their religion as a source of support is a consistent theme (G. W. Brown, 2003; Ceballo et al., 2015; Lewis-Coles & Constantine, 2006; Szymanski & Obiri, 2011b). Thus, for the participants in the current study sample, religiosity may have a buffering effect on the relationship between perceived and internalized racism and the development of uterine fibroids.

Finally, social support may prove to be a moderator of the proposed association between racism and uterine fibroid diagnosis. In this study, social support refers to the extent to which an individual believes that she has people in her community, other than her spouse, on whom she can rely to meet both practical and emotional needs. Social support has been identified as a key indicator of resilience for African American women in a number of studies, with the vast majority of women stating that their interpersonal network served a pivotal role in helping them meet their psychological, emotional, and physical needs (Fleury & Lee, 2006; Giurgescu et al., 2015; Griffin, 2012; Joseph, Ainsworth, Mathis, Hooker, & Keller, 2017; Schulz et al., 2006; Shorter-Gooden, 2004; Warren, 1997). Thus, a strong support network may buffer the negative impact of racism for women in the current study sample.

### **Proposed Study**

This dissertation used data from a longitudinal project funded by the National Institute of Child Health and Human Development (NICHD) titled, the Helping to Examine African American Relationship Traits (HEART) Project. Dr. Chalandra Bryant, the principal investigator, and her research team collected data on African

American newlywed couples in the southern region of the U.S. over a period of five years. This study is cross-sectional in nature and examined perceived and internalized racism as predictors of fibroid development and diagnosis among African American women in the sample. It also tested depressive symptomatology and body mass index as mediators and religious coping and social support as moderators of the association between racism and uterine fibroids.

### **Theoretical Framework**

The environment is a key factor in the perpetuation of racial/ethnic health disparities. For African Americans, in particular, the surrounding environment—ranging from local to societal—is the arena in which racism may be most starkly experienced. Dr. Chester Pierce described the African American social environment as one in which racism and oppression are constant, ubiquitous, continuing, and mundane (Carroll, 1998; Pierce, 1970, 1974). It is this conceptualization of African American individuals' lived experiences that inspired the development of the mundane extreme environmental stress (MEES) theory (Carroll, 1998). The choice of those four descriptors to convey the race-related stress was very intentional and can be explained as follows: *mundane* since race-based stress in the form of discrimination, oppression, and intimidation is so commonplace and pervasive that African Americans almost take it for granted; *extreme* because of the harsh effect that racism has on the psyche and internal schemas (e.g., self-esteem, self-concept) of African Americans; *environmental* because it is borne out of and fostered by the environment; and *stress* because the ultimate impact on African American individuals and families is immensely stressful, debilitating, and energy-consuming (Carroll,

1998). This omnipresent oppression rooted in racial discrimination has been associated with adverse mental and physical health outcomes among African Americans.

This is not to say, however, that African Americans are helpless in the face of constant and ubiquitous racial discrimination. In fact, family and extended friendship networks have proven critical in providing the space to vent about and resolve tensions and frustrations that arise as part of the lived experience of being African American in the U.S. (D. L. Brown, 2008; Kane, 2000; McGoldrick et al., 2005). Oftentimes, family members provide a safe haven that can facilitate the development of strategies for survival, provide mutually reciprocal friend and/or kin support, and foster emotional wellbeing (Goosby et al., 2012; Staples, 1976).

Taking into account the role of coping resources in contending with stress, Peters and Massey (1983) have postulated that the MEES theory can be used to augment the ABC-X model of family stress and crisis developed by Reuben Hill (1949). By combining the two, the ultimate result is a theory that is culturally informed and adequately captures the ways in which African American families may respond to the unique stressors with which they must contend on a daily basis. Hill's (1949) theory was originally developed to describe the ultimate impact of societal level stressors (e.g., war, the Great Depression) on families. To do so, he created a model that consisted of four parts: A, B, C, and X. The "A" factor refers to a stressor event that provokes a variable degree of change in the family system (Bush et al., 2016). The stressor can be anything that changes some aspect of the system (e.g., roles, boundaries, processes, values) and can be either positive or negative in nature.

The “B” factor in Hill’s (1949) model refers to the resources that the family has at its disposal that may moderate the impact of the stressor event on the family’s ultimate level of stress. According to McCubbin and Patterson (1985), resources can be defined as traits, characteristics, or abilities of individual family members and/or the family system to meet the demands of the stressor event. Examples of resources include financial stability, physical and emotional wellbeing, access to information, problem-solving skills, and psychological resources (e.g., self-esteem, sense of mastery). The “C” in Hill’s (1949) model refers to the perception or definition of the stressor event that might moderate the impact of the stressor on ultimate stress levels. This factor highlights that the subjective appraisal of the stressor significantly influences the response to it. Assessment of the event can range from positive (i.e., viewing the stressor as an opportunity for growth) to negative (i.e., viewing the stressor as too difficult or unconquerable) (Bush et al., 2016; McCubbin & Patterson, 1985). Some researchers posit that the subjective perception of the stressor event may be the most important factor in determining an individual’s or family’s response to it (Boss et al., 2016; Hennon et al., 2009). Finally, the “X” factor refers to the ultimate stress or crisis that the family experiences in response to the stressor event. This factor is divided into two subsections: “stress” and “crisis.” Whereas stress is a continuous variable and can be conceptualized as high or low, crisis is dichotomous; in other words, families either enter into crisis mode or they do not. When families are in crisis, they are immobilized and the members do not function adequately. In the cases of both stress and crisis, families ultimately work to reestablish equilibrium, even if this means adapting to a new normal. It is important to note that the degree of



stress or the crisis that the family experiences is dependent upon the family's resources to meet the demands of the change ("B" factor) as well as the family's appraisal of the stressor event ("C" factor).

In their work, Peters and Massey (1983) expanded the ABC-X model to accommodate elements of the MEES theory and ultimately create a family stress theory that is directly applicable to African American families. In the augmented model, "A" is the stressor event, "B" is the resources available to the family, "C" is the definition of the event, and "X" is the stress or crisis that the family experiences. However, the model includes new factors referred to as A<sub>1</sub>, D, and Y. "A<sub>1</sub>" represents chronic, unpredictable acts of racial discrimination experienced by African Americans in society. "D," refers to mundane, extreme environmental stress experienced by African Americans and can be conceptualized as anticipated, ongoing, and pervasive. In contrast to A<sub>1</sub>, which refers to specific acts, the D component represents race-related stress that is omnipresent, ubiquitous, continuous, contextual, and occurs in every facet of life for African Americans; thus, it is built into the fabric of daily life experiences for members of this minority group (Murry et al., 2001; Peters & Massey, 1983). Finally, "Y," refers to the ways in which African American families who are experiencing MEES cope with the stress- or crisis-inducing event.

In their conceptualization of the model, Peters and Massey (1983) also provide examples of factors that may influence a family's available resources ("B") and perception ("C") of the event. Crisis-meeting resources might include a family support system, past experience with a similar stressor event, and flexibility of family roles (Peters & Massey, 1983). Several factors might influence African American

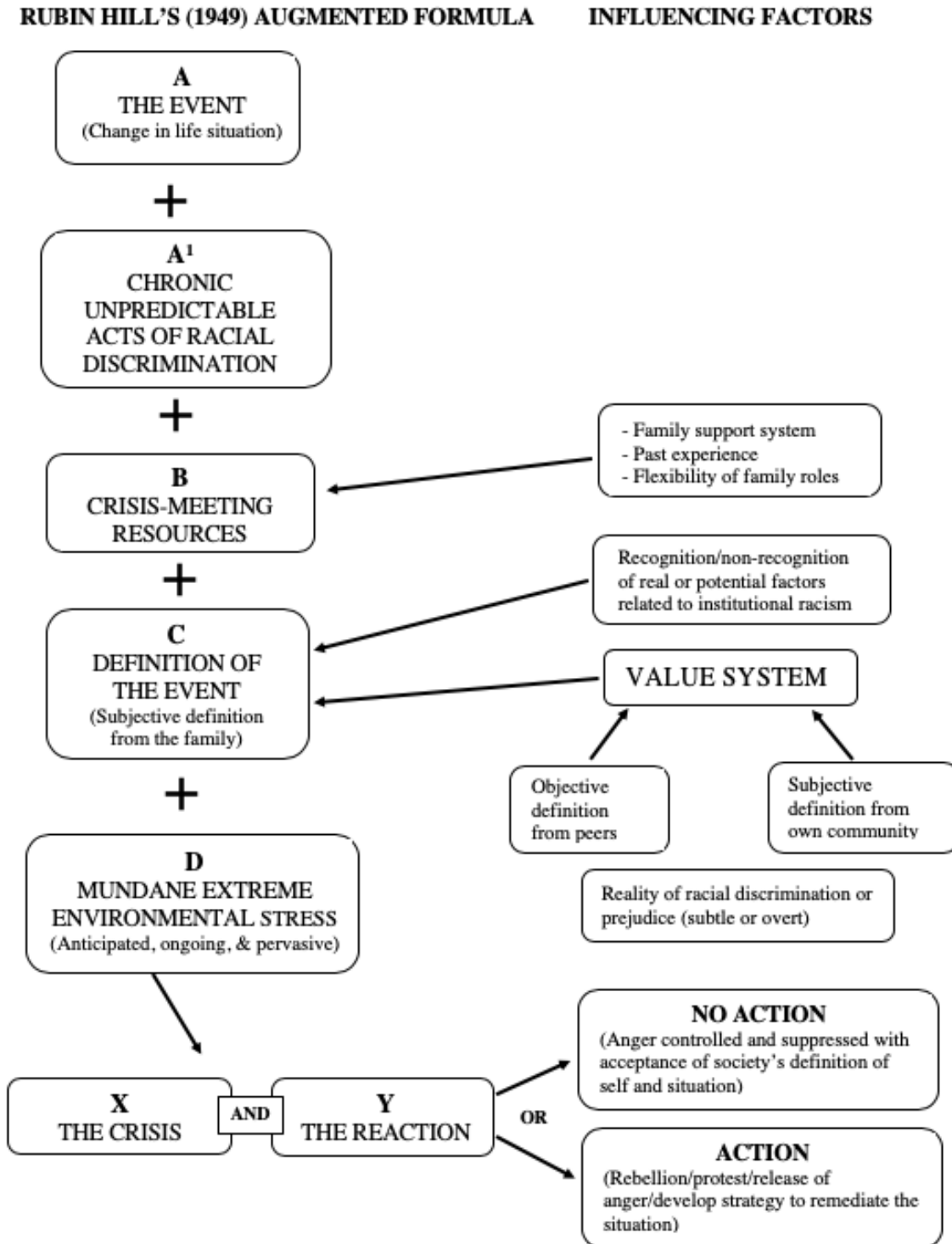
family members' perception of the event, including their value system and whether or not they recognize the event as associated with institutionalized racism. The "D" factor refers to the mundane, extreme, environmental race-related stress that is ever-present and courses through every facet of their lives. Finally, "Y" can take the form of action or no action. Examples of taking action include rebelling, protesting, releasing anger, and/or developing strategies to alleviate the stressor. When families do not take action, they refrain from engaging in any active coping strategies and instead control and/or suppress their anger and accept society's definition of themselves and the situation (Peters & Massey, 1983). The augmented model is shown in Figure 1.

The combined ABC-X/MEES model is appropriate for the study of the association between racism and uterine fibroid development as it directly accounts for the stressor event, resources, and buffering factors that might influence the ultimate levels of stress or crisis experienced by African American women. In the present study, the stressor event is racism, which encapsulates both "A" and "A<sub>1</sub>" in the augmented model. Crisis-meeting resources ("B") might involve friends, family members, and romantic partners who provide critical sources of social support. Church involvement or religiosity also exists within this factor and may have a buffering effect for racial discrimination or the level of internalized racism. Religious beliefs might also impact African American women's perception of the racism that they experience, with some viewing it as a challenge put forth by a higher power to make them stronger. Consistent with Peters and Massey's (1983) augmented model, African American women's value systems also impact the ways in which they

conceptualize the racism that they experience. For instance, some may view racism as a necessary evil in the world and not something to be alarmed or stressed by, while others may feel personally affronted by racist encounters and perceive themselves as inferior or incompetent as a result. The “D” factor refers to mundane, extreme environmental stress that is anticipated, ongoing, and pervasive. Thus, it represents the stress generated by socially sanctioned racism and oppression (either subtle or overt) that all African Americans experience. Finally, “X” signifies the stressful or crisis situation that might ensue, which often takes the form of adverse mental, physical, or reproductive issues (e.g., development of uterine fibroids). The subsequent reaction (“Y”) may be actively choosing to seek medical treatment or taking no action at all and succumbing to the effects of an adverse reproductive health outcome.

**Figure 1**

*Expanded ABC-X Model that Accommodates the Mundane Extreme Environmental Stress Theory*



This dissertation proposes that both perceived racial discrimination and internalized racism are stressors in the daily lives of many African Americans. Both of these forms of racism may subsequently prompt psychological distress (i.e., depressive symptoms) and physiological changes that lead to adverse reproductive health outcomes, namely, uterine fibroid development. The current study also proposes that social support and religiosity, which can be conceptualized as resources and can also alter perceptions of the event, may buffer the negative effects of racism among African American women.

In their empirical review of the pathways by which racial discrimination impacts health, Ahmed et al. (2007) propose a framework that aptly encapsulates the mechanisms by which perceived racial discrimination, a chronic psychosocial stressor that leads to changes in neuroendocrine, autonomic, and immune systems, may consequently lead to changes in both physiology and behavior that ultimately result in differential health outcomes. This dissertation proposes an adapted version of the proposed pathway to represent the means by which both perceived and internalized racism may directly and indirectly influence poor reproductive health outcomes, specifically the development of uterine fibroids among African American women.

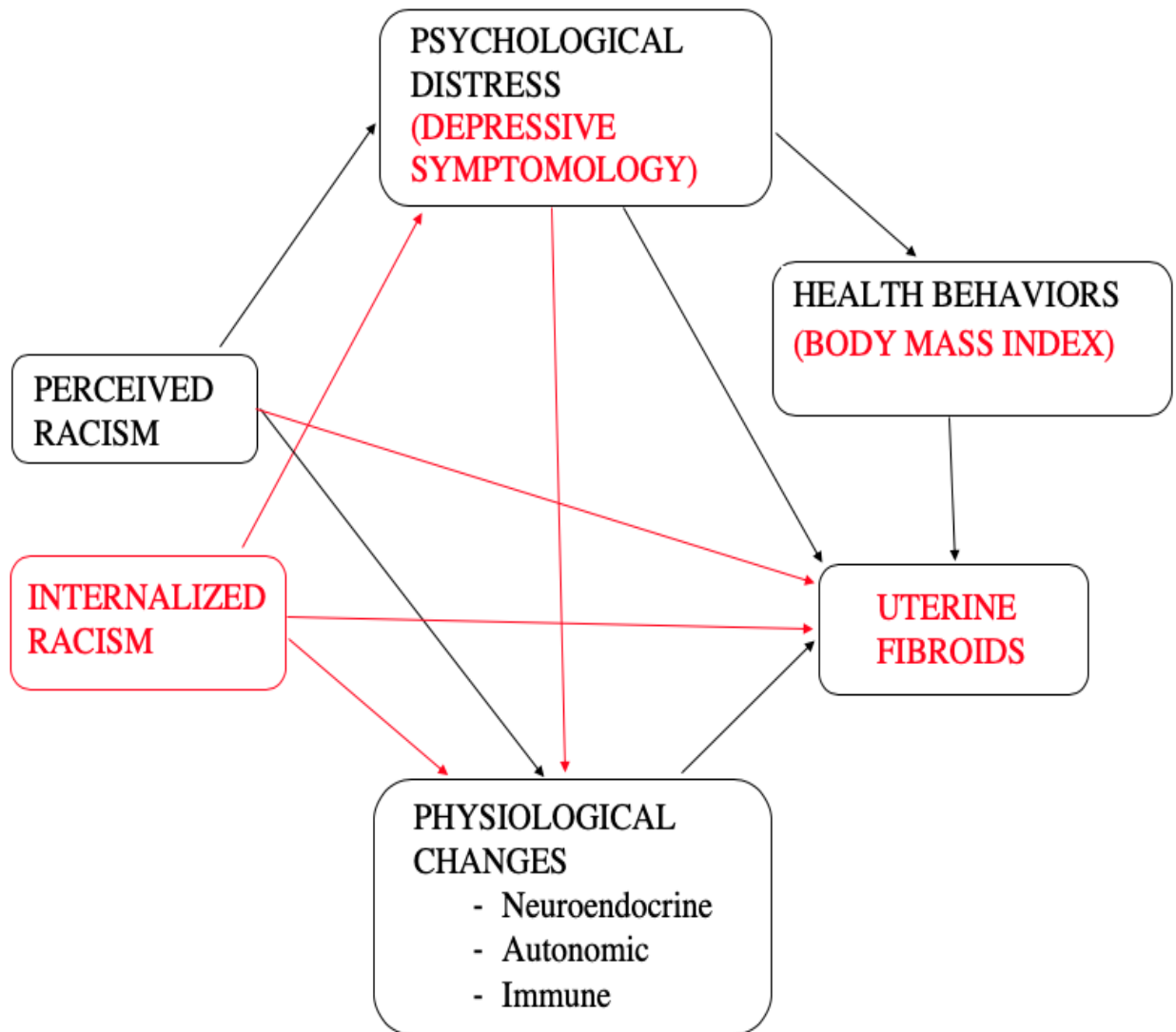
The framework shown in Figure 2 represents an adapted version of the Ahmed et al. (2007) pathway. Lines and variables in red represent the new constructs and pathways added for this dissertation. Although stress is in Ahmed et al.'s (2007) framework, it is not included in the adapted figure because it cannot be operationalized using the available data. However, both perceived and internalized racism have been well-documented in the literature as significant stressors (Carr et

al., 2014; Franklin-Jackson & Carter, 2007; Harrell, Hall, & Taliaferro, 2003; Hertzman, 1999; Molina & James, 2016; Outten, Schmitt, Garcia, & Branscombe, 2009; Pager & Shepherd, 2008) and thus serve as appropriate proxies for a stress variable. Finally, rather than examining physical health as the outcome, this dissertation extends the Ahmed et al. (2007) framework to one that assesses a key reproductive health outcome, namely uterine fibroids.

Thus, the Figure 2 framework describes a pathway wherein perceived and internalized racism simultaneously lead to psychological distress in the form of depressive symptomatology as well as physiological changes in the body. Depressive symptomatology is expected to subsequently contribute to poor health behaviors (manifest as overweight or obesity) and the development of uterine fibroids. Physiological changes that occur in the body (not measured in this dissertation) in response to the stress of racism are also conceptualized as leading to uterine fibroids among African American women.

**Figure 2**

*Adapted Racial Discrimination Framework Representing the Mechanisms Through Which Perceived and Internalized Racism May Influence Uterine Fibroid Development among African American Women*



The augmented ABC-X/MEES model developed Peters and Massey (1983), combined with an adapted version of Ahmed et al.'s (2007) racial discrimination and health framework will guide the aims of this dissertation. The current study seeks to

determine the nature of the association between perceived and internalized racism on the development of uterine fibroids among African American women. This study will also explore the mediating role of depressive symptomatology and BMI along the pathway, as well as the potential moderating effects of both religiosity and social support.



## **CHAPTER 2: LITERATURE REVIEW**

### **Overview of Infertility**

Reproductive health refers to the reproductive system's function and processes throughout the life span (WHO, 2019b). Operationalized, this entails the ability to have a safe and satisfying sex life, the capacity and freedom to reproduce if and when desired, adequate information about and access to affordable, effective, and safe family planning methods, and the right to appropriate healthcare services to support pregnancy and childbirth (BioMed Central, 2019). These factors are critical for women, men, and couples throughout the life course.

Infertility, defined as the inability to conceive after one year of trying, is one of the most distressing reproductive health issues among women and men who desire to have children (WHO, 2019a). Additionally, many women have difficulty getting pregnant or carrying a pregnancy to term and are thus diagnosed with impaired fecundity (CDC, 2016a). There are a number of risk factors associated with infertility and impaired fecundity among women. One of the most common causes of infertility among women is age since egg numbers decrease rapidly as women grow older. Beginning at age 35, the quality and quantity of available eggs deteriorate at an accelerated rate (UCLA Health, 2019). For this reason, couples are encouraged to seek treatment after only six months of trying if the woman is 35 years of age or older. Lifestyle habits (e.g., maintaining healthy weight, exercise, cigarette smoking, alcohol and caffeine consumption, nutrition) have also been identified as key predictors of fertility and infertility (Hassan & Killick, 2004; Sharma et al., 2013).

Other causes of infertility among women include ovulation disorders, of which polycystic ovarian syndrome (PCOS) is the most common, occurring in 10% of reproductive-aged women (Mayo Clinic, 2017a). Uterine fibroids, tubal occlusion, endometriosis, endometrial polyps, pelvic adhesions, and female reproductive cancers are other common causes. Of those, uterine fibroids are diagnosed in African American women at disproportionately high rates compared to women of other racial/ethnic groups (American Society for Reproductive Medicine, 2015; Black Women's Health Imperative, 2017a; Eltoukhi et al., 2014; National Institutes of Health, 2018). Thus, fibroids are a central focus of the present study.

### **Racial and Ethnic Disparities in Infertility**

In virtually all areas of reproductive health, racial/ethnic minority women are most at risk of adverse health outcomes and are least likely to seek interventions for reproductive and gynecologic care (Black Women's Health Imperative, 2017a; Chandra & Stephen, 2013, 2014; J. Thompson, 2018). In the 2006 - 2010 National Survey of Family Growth, results indicated that among women aged 22 – 44, African American women were nearly twice as likely to experience infertility compared to White or Latina women (Chandra & Stephen, 2013). In the same study, approximately equal percentages of White, Latina, and African American women (10 – 12%) reported impaired fecundity (Chandra & Stephen, 2013). Interestingly, impaired fecundity varied as a function of educational attainment in the sample. More specifically, African American and White women with an undergraduate degree or higher were less likely to be diagnosed with impaired fecundity than women with lower educational attainment (Chandra & Stephen, 2013). Such findings have been

corroborated elsewhere (Mathews & Hamilton, 2009) and are largely attributable to the fact that women who are highly educated are also more likely to delay childbearing until older ages when fertility and fecundity have already begun to decline (Amin & Behrman, 2014; G. Livingston, 2015; Neels et al., 2017; Tavares, 2010).

There is a persistent and widespread belief in American society that African American women do not contend with infertility when, in fact, they are most likely to struggle with it and do so for longer periods of time (Chandra & Stephen, 2013, 2014; Sharara & McClamrock, 2000; Wellons et al., 2008). They are also more likely to confront the issue alone since African American women are more than twice as likely to report feeling uncomfortable talking about fertility issues with friends, family, a partner, doctors, or a support group compared to White women (J. Thompson, 2018). Dr. Rosario Ceballo interviewed African American women in a variety of professions about their experiences with infertility. She eventually coined the term *Black-fertility mandate* to underscore the reality that the ability to become a mother is closely tied to African American women's identity (Ceballo et al., 2015; J. Thompson, 2018). This creates a vicious catch-22 cycle in which African American women who struggle with infertility feel isolated and unable to talk about their difficulties with conception.

### ***Uterine Fibroids and Associated Reproductive Health Outcomes***

Uterine fibroids, particularly submucosal fibroids, which are a special class of fibroids that project into the uterine cavity, adversely affect both fertility and pregnancy in a number of ways (Black Women's Health Imperative, 2017a; Pritts et al., 2009). The benign tumors may impact fertility and reduce the likelihood of

conception by: changing the shape of the cervix, thereby limiting the number of sperm that can successfully enter the uterus; changing the shape of the uterus, which may interfere with the movement of the sperm, embryo, or both; blocking one or both fallopian tubes; changing the size of the uterine lining cavity; or decreasing the blood flow to the uterine cavity, which may impinge upon the ability of an embryo to successfully implant to the uterine wall and develop (American Society for Reproductive Medicine, 2015). Fibroids may also cause irregular bleeding between cycles, which can adversely affect fertility. Because of their potential impact on infertility, women of any age who have uterine fibroids are encouraged to seek fertility evaluation and treatment if they have been trying to conceive for six months or longer.

If a woman is successfully able to conceive, fibroids increase the probability of both pregnancy loss and pregnancy complications. Spontaneous abortions during the first trimester are twice as common in women with fibroids compared to those without the condition (Benson et al., 2001; Casini et al., 2006; Metwally et al., 2012; Saravelos et al., 2011; Sheiner et al., 2004). In their systematic literature review of uterine fibroids' impact on reproductive outcomes, Klatsky and colleagues (2008) found that women undergoing in vitro fertilization with submucosal fibroids had twice the miscarriage rate (15.3%) compared to those without fibroids (7.7%) (Casini et al., 2006; Eldar-Geva et al., 1998; Farhi et al., 1995). Thus, their removal is often central to bringing a pregnancy to term.

With fibroids intact, a common adverse pregnancy complication is the caesarean section (C-section) delivery. Largely because of poor fetal positioning and

placental issues associated with fibroids, 48.8% of women with fibroids have a C-section delivery compared to only 13.3% of women without them (Cook et al., 2010; Eltoukhi et al., 2014; Vergani et al., 1994, 2007) Other potential adverse outcomes associated with fibroids include having a placental abruption, in which the placenta detaches from the uterine wall, thereby preventing the fetus from obtaining an appropriate amount of oxygen; breech positioning, where the fetus is positioned feet-first rather than head-first, necessitating a C-section; preterm delivery, operationalized as delivery before 37 weeks gestation for singletons; and postpartum hemorrhage (American Society for Reproductive Medicine, 2015; Black Women's Health Imperative, 2017a).

### ***Physiological Processes of Uterine Fibroids***

There remains much to be understood about the risk factors for uterine fibroids. What is clear, however, is that hormones, namely estrogen and progesterone, serve critical functions in fibroid development (Office on Women's Health, 2016). Estrogen plays a significant role in the development of secondary sex characteristics in women (e.g., breasts, wider hips, pubic hair) and also helps regulate a woman's menstrual cycle (Bradford, 2017); similarly, progesterone regulates the menstrual cycle and supports pregnancy (Seladi-Schulman, 2019). These hormones are produced by the ovaries and allow the uterine lining to regenerate during each menstrual cycle. In the process, they may also stimulate the growth of fibroids (Macon & Yu, 2018).

Higher levels of estrogen ( $>200$  pg/mL) and progesterone ( $>20$  ng/mL) are associated with more rapid fibroid growth (Holland & Cruickshank, 2018; Holm,

2016). Since the female body produces increased levels of progesterone and estrogen during pregnancy, fibroids can grow large when women are pregnant. Conversely, fibroids can stop growing and even begin to shrink when women are in menopause since reproductive hormone levels are low during this time (Office on Women's Health, 2016). Estrogen and progesterone work in tandem with one another, with both "feeding" fibroids and promoting their growth, especially when they exist at high levels (Borahay et al., 2017; Moravek & Bulun, 2015; Moro et al., 2019).

While progesterone is most likely to proliferate during pregnancy (Seladi-Schulman, 2019), high estrogen levels are typically the result of hormone imbalances that may be caused by medications and lifestyle factors such as obesity (Leonard, 2018). Weight and estrogen are closely linked since estrogen is produced by both fat cells and the adrenal gland (Bradford, 2017). More specifically, studies have indicated that high levels of estrogen are associated with extra body fat and higher weight (Bezemer et al., 2005; Borahay et al., 2017; Leonard, 2018; Lukanova et al., 2004). Thus, higher weight may lead to higher levels of estrogen, which subsequently leads to the development and proliferation of uterine fibroids in women.

### **The Disparate Impact of Uterine Fibroids on African American Women**

Incidence rates of uterine fibroid diagnosis vary by case definition, ranging from 12.8 per 1,000 person-years for all diagnoses via pelvic exam, ultrasound, or hysterectomy to approximately 2.0 per 1,000 person-years for cases that were confirmed by hysterectomy (Wise & Laughlin-Tommaso, 2016). After adjusting for age and other risk factors, the incidence and relative risk of fibroids is three times higher in African American women compared to their White counterparts; this pattern

holds true across nearly all ages (American Society for Reproductive Medicine, 2015; Black Women's Health Imperative, 2017a; Eltoukhi et al., 2014).

Although African American women are most susceptible to developing fibroids, many of the risk factors remain unclear. Baird and colleagues (2003) conducted the first study to confirm racial/ethnic disparities in fibroid development. Through random selection, they garnered a cross-sectional sample of 1,364 women between ages 35 – 49 and screened for fibroid tumors to determine the age-specific proportions of African American and White women who develop fibroids. Results indicated that by age 50, more than 80% of African American women were diagnosed with fibroids compared to less than 70% of White women. Moreover, there was a highly significant difference in the age-specific cumulative incidence curves for African American and White women, suggesting that African American women are more susceptible to developing uterine fibroid tumors at earlier ages.

As evidenced in the study conducted by Baird et al. (2003), in addition to their higher susceptibility to fibroid development, African American women experience an earlier age of onset and are more symptomatic than other racial groups. The age of onset is approximately 10 years younger, oftentimes beginning at age 25 and rapidly increasing for African American women compared to age 35 for White women (Laughlin et al., 2009). In their longitudinal study of age and race differences in uterine fibroid incidence, Marshall and colleagues (1997) followed 95,061 asymptomatic, premenopausal women ages 18 – 30 for four years. Each of the women had an intact uterus and no history of uterine fibroids. During the study period, 4,181 new cases of fibroid tumors were reported with incidence rates

increasing by age and race (8.9 per 1000 woman-years for White women compared to 30.6 per 1000 woman-years for African American women). After adjusting for a number of known risk factors, including marital status, BMI, age at first birth, years since last birth, history of infertility, age at first oral contraceptive use, and current alcohol consumption, rates among African American women remained significantly higher than those of their White counterparts (Marshall et al., 1997). Such findings indicate that the significant disparity in uterine fibroids among premenopausal African American women is not explained by conventional risk factors for fibroids, thus underscoring the need for further investigation of other causal variables.

The burden of fibroids is compounded for African American women since, in addition to developing them at earlier ages and being more symptomatic than their racial/ethnic peers, they are also more likely to differentially respond to medical treatment for the condition (Jacoby et al., 2010). Fibroids are typically asymptomatic; however, African American women are two-to-three times more likely than other women to experience symptoms, which may include heavy bleeding during menstrual cycles, pelvic pain or cramping during cycles, bleeding between cycles, pressure or fullness in the lower abdominal area, pain during sex, and bloating (Black Women's Health Imperative, 2017a). Because of such symptoms, in addition to the fact that their fibroids tend to grow at a more rapid rate and to a bigger size, African American women are more likely to undergo surgical intervention. In their lifetimes, African American women have a seven-fold increase relative risk for myomectomy surgery (fibroid removal procedure) compared to White women (Flynn et al., 2006; Wechter et al., 2011). They are also two-to-three times more likely than women in other



racial/ethnic groups to undergo hysterectomy surgery, which entails full or partial removal of the uterus and completely eliminates the ability to have children in the future (Wechter et al., 2011; Wilcox et al., 1994). In total, African American women report higher rates of hospitalizations, myomectomies, and hysterectomies to treat fibroids compared to White women (Eltoukhi et al., 2014; Laughlin & Stewart, 2011; Wechter et al., 2011; Wu et al., 2007). Much more research is needed to better understand the reasons why African Americans experience fibroids more often, at younger ages, and more severely than White women and other women of color. This is a particularly high priority public health concern since fibroids exacerbate African American women's already-higher likelihood of infertility issues.

### ***Risk Factors Associated with Uterine Fibroids Among African American Women***

To date, there are significant gaps in the understanding of risk factors associated with developing uterine fibroids. In population-level epidemiological studies, researchers have identified a number of modifiable and non-modifiable risk factors associated with fibroids, including older age, African American race, family history of uterine fibroids, high blood pressure, obesity, vitamin D deficiency, consumption of food additives, and nulliparity (Bradford, 2017; D. D. Baird et al., 2003, 2013; Office on Women's Health, 2016). In contrast, factors associated with a lower likelihood of fibroid development include pregnancies (the risk decreases with each successive pregnancy) and long-term use of oral or injectable contraceptives (Pavone et al., 2018; Stewart, 2015; Stewart et al., 2017).

There is a small body of literature on potential biologic causes for the higher incidence of fibroids among African American women. Large-scale studies that have

examined differences between African American and White women found that the disparity could not be accounted for by risk factors that traditionally vary by race (e.g., marital status, BMI, age at first birth) (Eltoukhi et al., 2014; Jacoby et al., 2010; Marshall et al., 1997). However, one recent study identified an association between vitamin D insufficiency and increased fibroid risk among African American women (D. D. Baird et al., 2013). Baird and colleagues (2013) examined data provided by the National Institute of Environmental Health Sciences Uterine Fibroid Study to examine the association between vitamin D and fibroid status. The sample consisted of 620 African American and 416 White women between ages 35 - 49, all of whom were premenopausal. Results indicated that only 10% of African Americans and 50% of Whites had sufficient vitamin D levels. Moreover, African American and White women who had sufficient vitamin D had 32% reduced odds of developing fibroids compared to those with a vitamin D deficiency. Although other studies should be conducted to corroborate the link, this study offers a plausible biologic mechanism, since darker skin inhibits production of vitamin D (Eltoukhi et al., 2014). If successfully replicated, such findings could offer insight about a potential prevention tactic for uterine fibroids, namely vitamin D supplementation for African American women.

At present, little is known about the psychosocial risk factors associated with uterine fibroids, particularly among African American women. Of key interest is the impact of racism, which is a critical stressor that manifests in daily life experiences for many African Americans, either in the form of overt racial discrimination, internalized racism, or both. Many studies have documented the negative impact of

both forms of racism on psychological, emotional, and physical health (Ahmed et al., 2007; Chae et al., 2010; Chambers et al., 2004; Giscombé & Lobel, 2005; Krieger & Sidney, 1996; Kwate & Meyer, 2011; Molina & James, 2016). Only one, to date, has more closely examined the association between perceived racial discrimination and uterine fibroid development among African American women (Wise et al., 2007). Results from this study revealed a positive and statistically significant association between discrimination and fibroids. The present study aims to add to the literature about risk factors for uterine fibroids among African American women by examining the causal effects of both perceived and internalized racism.

### **Racial Discrimination and Health**

Racial discrimination remains common in the U.S. despite numerous attempts at eradication over the past several decades. Racism can be described as “an organized system premised on the categorization and ranking of social groups into races and devalues, disempowers, and differentially allocates desirable societal opportunities and resources to racial groups regarded as inferior” (D.R. Williams & Mohammed, 2013, p. 1153), thereby also encompassing both prejudice and stereotypes toward—and about—said inferior minority groups (Bonilla-Silva, 1997; D.R. Williams, 2004). Perhaps most common today, particularly in diverse areas, is aversive racism, in which a person does not explicitly display or endorse racial prejudice, but maintains implicit biases that favor Whites over African Americans (Dovidio & Gaertner, 2004; D.R. Williams & Mohammed, 2013).

With its implicit and insidious nature, racism can affect health via a number of pathways. Racism can be enacted at both the institutional and cultural levels.

Institutional racism has historically been most evident in residential segregation, unequal workplace hiring and opportunities, and incarceration. Cultural racism refers to the deeply ingrained institutional and interpersonal discrimination embedded within American society. This includes ideas about African American inferiority and White superiority, anti-African American ideology and representation in the media, and pervasively negative racial stereotypes (D.R. Williams & Mohammed, 2013).

### ***Perceived Racism***

While discrimination is engrained at both the institutional and cultural levels in America, a key factor in determining the impact of racial discrimination on an individual is elucidating the racial minority member's perception of race-based encounters. *Perceived discrimination* refers to the subjective experience of feeling discriminated against and its associated psychosocial stress (Ahmed et al., 2007). It has been consistently linked to adverse health behaviors and outcomes and poor health status and may, in and of itself, have a deleterious impact on an individual's health above and beyond the effects of experiencing differential access to services, goods, and environmental exposures (Ahmed et al., 2007). Discriminatory acts can be conceptualized as existing on a spectrum. On one end are daily hassles or slights, also known as *microaggressions* (e.g., being told they are the "exception" to the race or that they speak like a White person), while at the other end are severe and violent manifestations of racism (e.g., lynching, torture, violation of medical rights).

African Americans consistently report frequent experiences of racial discrimination. Results from a nationally representative survey conducted by National Public Radio, the Robert Wood Johnson Foundation, and the Harvard T.H. Chan

School of Public Health (2017) indicated that 92% of African Americans believe that racial discrimination against African Americans still exists. Of those, 49% say that the biggest problem is the prejudice of individual people, compared to 25% who say the biggest issue is discrimination embedded in laws and policies and another 25% who say that both issues are equal in their significance and severity (National Public Radio et al., 2017). Institutional racism was experienced and reported by majority of African Americans in the survey, with half or more saying they had been personally discriminated against because of their race during interactions with the police (50%), searching for jobs (56%), and being paid equally or being considered for a promotion at their current place of employment (57%). A plurality endorsed the belief that African Americans in their neighborhoods have fewer employment opportunities because of their race (71%), that their children do not have the same educational opportunities and quality as White children (64%), and that they are paid less than White people for equal work (61%).

Many African Americans reported that others in their immediate circle had experienced discrimination as well, with 60% saying that they or a family member had been unfairly stopped by the police because they were African American; interestingly, this maltreatment was more common among African Americans who lived in suburban, rather than urban, areas. Almost half (45%) said that they had been unfairly treated by the court system because of their race. Individual discrimination was reported in the form of racial slurs (51%), people making insensitive or offensive comments about their race or condoning negative stereotypes (52%), and experiencing racial violence (42%). Moreover, four in 10 African Americans report

people acting afraid of them based on the color of their skin. These experiences were mostly endorsed by higher-income African Americans (National Public Radio et al., 2017). More than two-thirds of the sample (61%) believed that police officers were more likely to use unnecessary force on an African American person than a White person in the same situation. Finally, African Americans living in majority-African American neighborhoods were significantly more likely to report perceived discrimination in, and negatively evaluate, their neighborhood and local community compared to African Americans living in more diverse areas (National Public Radio et al., 2017).

There are a number of pathways by which perceived racial discrimination may impact health. Chronic and persistent psychosocial stress changes the neuroendocrine, autonomic, and immune systems (Tsigos & Chrousos, 2002). Such changes then impact both physiology and behavior, thereby influencing various health outcomes. These disruptions in bodily systems necessarily impact an individual's allostatic load, which refers to the cumulative wear and tear on the body's regulatory systems as a result of constant efforts to maintain homeostasis and adapt to stressful events (McEwen, 2006). Repeated and chronic stress is damaging to the body and often results in high allostatic load, which is associated with mortality, cardiovascular disease, declines in cognitive and physical function (Chrousos, 2000), and early, swift, and severe chronic pain syndromes (Nash & Theberge, 2006). Perceived discrimination, specifically, has been associated with psychological distress, depression, anxiety, symptoms of obsessive-compulsive disorder, psychosis, negative affect, and low satisfaction with—and quality of—life (Franklin-Jackson & Carter,

2007; Paradies, 2006; Sellers et al., 2003; V. L. Thompson, 1996). It has also been associated with health-damaging behaviors, including smoking (Landrine & Klonoff, 2000) and alcohol use disorders (Paradies, 2006), as well as health conditions such as hypertension (Brondolo et al., 2003; Chae et al., 2010; Harrell et al., 2003). Such findings make evident that perceived racial discrimination is hugely impactful physically, psychologically, and emotionally for African Americans.

### ***Internalized Racism***

In response to ubiquitous typecasts and discrimination, stigmatized racial/ethnic minorities may learn to accept as true the dominant party's beliefs about their biological and cultural inferiority. The self-imposition and acceptance of such messages is what characterizes *internalized racism*. This self-stereotyping can adversely affect health in a number of ways, including by fostering anxieties, expectations, and reactions that oftentimes negatively affect both social and psychological functioning (Ahmed et al., 2007). The effects often entail lowered self-esteem and psychological well-being and decreased motivation for socioeconomic mobility, thereby leading to poor health and health behaviors as well as low levels of economic attainment across the life course (Kwate & Meyer, 2011). In their comprehensive review of manuscripts about racial discrimination and health disparities that were published between 2005 and 2007, Williams and Mohammed (2009) noted that internalized racism has been linked to increased alcohol consumption, psychological distress, blood pressure, abdominal obesity, fasting glucose, and being overweight. Other studies have found positive associations between internalized racism and cardiovascular disease risk (Chae et al., 2010;

Chambers et al., 2004) as well as violent and delinquent behaviors in a sample of adolescents (Bryant, 2011). Other studies have corroborated that internalized racism is linked to greater depressive symptoms and psychological distress (H. L. Jones et al., 2007; Szymanski & Gupta, 2009).

In their study, Taylor, Henderson, and Jackson (1991a) examined a number of risk factors that might predict depressive symptoms among African American women. Their predictor variables of interest included internalized racism, social support, life events, religious orientation, marital status, development stage (e.g., chronological age), and socioeconomic status. The sample consisted of 289 African American women who were a subset of participants in a longitudinal study of inner-city women between 25 – 75 years of age. The researchers utilized structural equation modeling methodology to examine the associations of interest. Results indicated support for nearly all of the proposed hypotheses. Of particular interest is that internalized racism was positively, significantly, and directly associated with depressive symptoms among women in the sample (J. Taylor et al., 1991b).

In addition to mental health associations, internalized racism has been linked to adverse behavioral and physical health outcomes as well. In a separate study that utilized the same sample described above, Taylor and Jackson (1990) explored risk factors for excessive alcohol consumption among African American women. Findings indicated a direct association between internalized racism and alcohol consumption within this demographic. In another study, Tull et al. (1999) examined the association between internalized racism and abdominal obesity and elevated blood pressure among 133 Afro-Caribbean women aged 20 – 55 years. The participants were



randomly selected from Barbados and completed a battery of assessments that measured blood pressure, anxiety, depression, and internalized racism. Results indicated that anxiety, depression, and internalized racism were each positively and significantly correlated with waist circumference (Tull et al., 1999). Moreover, even after adjusting for a number of variables, including age, education, depression, and anxiety, internalized racism remained significantly correlated with waist circumference. Participants with high internalized racism also had a higher likelihood of developing abdominal obesity even after adjusting for age, education, and BMI. Although blood pressure was not independently associated with internalized racism, the findings of this study are striking since they underscore the physiological processes and physical manifestations associated with this chronic psychosocial stressor.

Perhaps unsurprisingly, studies have indicated that when African Americans have positive views about their racial identity, they tend to have better mental health outcomes (Haslam et al., 2009; Outten et al., 2009; Stets & Burke, 2000; D.R. Williams & Mohammed, 2013). Hughes et al. (2015) evaluated the associations between group identity and well-being among 3,570 African Americans using data available in the National Survey of American Life. Findings revealed that in-group identification among African Americans was significantly associated with positive evaluations of African Americans as a whole, higher self-esteem and mastery, and lower depressive symptomatology (Hughes et al., 2015). Majority of African Americans in this sample closely identified with—and had positive views of—their racial group, which was beneficial to their mental health.

In summary, studies have shown that internalized racism is predictive of adverse health outcomes, including excessive alcohol consumption, low self-esteem, depression, being overweight, and high blood pressure (Kwate & Meyer, 2011; Szymanski & Gupta, 2009; J. Taylor, 1990; D.R. Williams & Mohammed, 2013). Conversely, in-group identification (i.e., low levels of internalized racism) is predictive of higher self-esteem and mental well-being (Hughes et al., 2015). Internalized racism is only one piece of the puzzle, however. It is important to note that racial/ethnic minorities who deny experiences of racial discrimination while harboring negative racial group attitudes toward their same-race peers are most at risk of poor health. Researchers have found that when high internalization of negative racial group attitudes is combined with self-report of no perceived racial discrimination (i.e., denial of systematic oppression and discriminatory experiences) African Americans experience exacerbated adverse health outcomes (Chae et al., 2010; Krieger & Sidney, 1996). By exploring the differential impacts of both perceived and internalized racism, this dissertation contributes uniquely to the literature base and offers a nuanced understanding of the effects of racism on a key reproductive health outcome of interest, namely uterine fibroids.

### **Additional Considerations: Intersection of Race and Gender**

Of utmost importance is the reality that in addition to race-based stress, African American women must also contend with gender-based discrimination and stress. The confluence of racism and sexism in the lives of African American women, referred to as “gendered racism” (Essed, 1991), contributes to uniquely high levels of stress and psychiatric symptoms in this group (Klonoff et al., 1999; Klonoff &

Landrine, 1995). Although this intersection has historically been understudied (Charisse Jones & Shorter-Gooden, 2003; Woods-Giscombé & Lobel, 2008), some researchers have demonstrated that race-based, gender-based, and generic stress equally contribute to African American women's global stress levels, thereby predicting emotional and psychological distress symptoms (Jackson et al., 2001; Thomas et al., 2008b; Woods-Giscombé & Lobel, 2008).

While this dissertation assessed the influence of perceived and internalized racism on uterine fibroid development in a sample comprised solely of African American women, it did not explicitly measure perceptions of gender-based racism among participants. Nevertheless, the phenomenon of gendered racism is supported by the literature and described as one that is both significant and impactful to women of color. Thus, even though it was not measured in the present study, it remains a critical factor that is highly relevant to the sample demographic.

### **Racial Discrimination and Reproductive Health**

Perhaps one of the biggest paradoxes in reproductive health exists among African American women (J. W. Collins & David, 2009; Lu & Halfon, 2003; Mays et al., 2007). They consistently exhibit the highest rates of preterm birth and low birth rates compared to American women of other racial/ethnic groups (Anachebe & Sutton, 2003; CDC, 1999a, 2002; Dole et al., 2004). African American women are three times as likely to have very-low-birth-weight infants (J. W. Collins et al., 2000, 2004; Jasienska, 2009). Infant mortality also remains consistently higher among them, with African American infants dying at four times the rate of White infants (Riddell et al., 2017). Approximately two-thirds of the disparity is attributed to higher

rates of both preterm and low-birth-weight babies delivered to African American women (CDC, 2000). Maternal mortality is also much higher among African American women, who are three to four times as likely to die from pregnancy and/or childbirth complications than White women (E. A. Howell, 2018). In fact, the risk of death for African American women is significantly higher for all pregnancy-related issues, including pulmonary embolism, pregnancy-induced hypertension, and hemorrhaging (CDC, 1999b).

These statistics hold true regardless of socioeconomic status and college education, both of which typically serve as protective factors for all other racial groups. In fact, college-educated African American women are more likely to deliver low-birth-weight infants compared to their White, college-educated counterparts (Black Women's Health Imperative, 2017b; Kuhlmann & Annandale, 2012; Schoendorf et al., 1992). Moreover, second-generation high socioeconomic status African American women remain at elevated risk of low-birth-weight and preterm deliveries (Foster et al., 2000; Lu & Halfon, 2003). These results are influenced by the lived experience of being an African American woman in the U.S. This is corroborated by the fact that African American women born in the U.S. have a higher likelihood of developing low-birth-weight babies than Caribbean-born women in the U.S. who might also have darker skin and similar phenotypic markers as their African American counterparts (Cabral et al., 1990; Hummer et al., 1999; Pallotto et al., 2000).

A few researchers have sought to determine the extent to which perceived racial discrimination impacts adverse reproductive health outcomes (Giscombé &

Lobel, 2005; Hogue & Bremner, 2005; Kramer & Hogue, 2009; Rosenthal & Lobel, 2011; Wise et al., 2007)). For example, researchers have found that mothers who report high levels of racial discrimination experiences are at higher risk of delivering infants who are preterm or have low birth weight (Giscombé & Lobel, 2005). These findings hold true for mothers who experienced ongoing discrimination throughout their lives and those who first perceived it during their pregnancies.

To further corroborate the link between racism and adverse birth outcomes, Ellen (2000) examined birth and death certificates in 1990, restricting her sample to singleton births and mothers in metropolitan areas. The total sample consisted of three million births that occurred in 261 metropolitan areas around the country. Results indicated that African American mothers who reported high scores on a perceived racial discrimination scale were twice as likely to deliver low-birth-weight babies and that racial segregation contributed to adverse health outcomes (Ellen, 2000). In another study, researchers investigated the impact of chronic psychological stress on preterm delivery rates using data from a prenatal cohort of 6,000 women in the Boston area which were collected as part of a longitudinal project funded by the National Institutes of Health (J. Rich-Edwards et al., 2001). They specifically examined the effect of corticotrophin, a hormone associated with long-term stress (Pike, 2005), on adverse birth outcomes. Results indicated a positive and significant association between high placental levels of corticotrophin and preterm birth (J. Rich-Edwards et al., 2001).

In their study of 124 African American and White pregnant women, Dominguez and colleagues (2008) investigated perceived racial discrimination at ages

16 and younger and during adulthood in a variety of domains, including educational, employment, personal, and housing. They found that perceived racism across the life course was predictive of low-birth-weight children for African American, but not White, women, even when controlling for potential confounders such as parent education levels, medical risk, and gestational age (Dominguez et al., 2008). In a study of psychosocial risk factors associated with preterm birth, researchers asked approximately 2,000 African American and White pregnant women to indicate the degree to which they perceived racial discrimination and gender discrimination, with options including “no discrimination,” “some discrimination,” and “higher discrimination” (Dole et al., 2003). African American women who reported higher levels of racial discrimination were more likely to deliver preterm, with those who experienced the most racial discrimination 1.4 times more likely to deliver before the fetus reached full term (Dole et al., 2003).

As described above, there is a burgeoning area of research on the association between racial discrimination and adverse reproductive health outcomes (e.g., low-birth-weight infants, preterm deliveries, infant mortality) (J. W. Collins & David, 2009; Dominguez, 2008; Dominguez et al., 2008; Lu & Halfon, 2003). Study findings point to a potential pathway model that links racism, stress, and poor birth outcomes among African American women. However, there is little research on the association between racism and infertility or, relatedly, indicators of infertility (e.g., uterine fibroids). I found only one study on the association between perceived racial discrimination and uterine fibroids among African American women (Wise et al., 2007). The authors used data collected as part of the Black Women’s Health Study,

which is a prospective cohort study of African American women who were between the ages of 21 - 69 in 1995. They followed a total sample of 22,002 women from 1997 – 2003 and noted their reports of “everyday” and “lifetime” experiences of racism. Results revealed a positive and significant association between perceived racism and fibroids for native-born African American women (Wise et al., 2007). The association remained intact even after adjusting for a number of lifestyle and behavioral risk factors (e.g., BMI, cigarette smoking, marital status, etc.).

Wise et al.’s (2007) study makes an important contribution to the literature in that it establishes a causal link between perceived racial discrimination and uterine fibroid development among African American women. One of the limitations of the study, however, is that it did not assess experiences of internalized racism among the sample, despite well-documented evidence that internalized racism is linked to adverse health outcomes (Bryant, 2011; Chae et al., 2010; Chambers et al., 2004; H. L. Jones et al., 2007). Another limitation of the study is that the “everyday racism” questions were broadly stated and did not directly ask participants whether the differential treatment that they experienced was believed to be due to their race. This dissertation aims to address a critical gap in the literature and builds on the findings from the Wise et al. (2007) paper by incorporating internalized racism and also asking targeted questions about perceived racism in participants’ lives.

It is possible that a number of variables might influence the direct association between racism and fibroid development. Mental health is one such factor that serves a significant role in one’s overall wellbeing. Studies have confirmed that it is adversely affected by racism, whether rooted in internal or external forces (Mays,

Caldwell, & Jackson, 1996; Molina & James, 2016; Sellers et al., 2003; Smith-Bynum, Lambert, English, & Ialongo, 2014). As depression is one mental health outcome most commonly associated with racism, this study explores depressive symptomatology as a mediating variable along the pathway between racism and uterine fibroid diagnosis. Studies also indicate that poor physical health is associated with both racism and adverse reproductive health outcomes (Brondolo et al., 2003; Chae et al., 2010; Chrousos, 2000; Dole et al., 2003; Dominguez, 2008; Dominguez et al., 2008; Harrell et al., 2003; Lu & Halfon, 2003; McEwen, 2006; Nash & Thebarge, 2006; Tsigos & Chrousos, 2002). Thus, the present study investigates BMI as a mediator in the proposed pathway as well. Other influential variables may be external to the individual, but directly impact her health. For example, religiosity has been identified as a key function in the lives of many African Americans and may serve as an adaptive coping mechanism. Similarly, social support, which refers to the love, care, and concern received from others in the community, may also assist in coping with racism and thereby influence the proposed pathway. Taken together, depressive symptomatology, BMI, religiosity, and social support may significantly influence the nature of the association between racism (both perceived and internalized) and a uterine fibroid diagnosis; thus, each were examined in the proposed study.

### **Racism, Mental Health, and Reproductive Health**

Mental health and reproductive health are biological systems that are intricately linked. For African American women, race-related stress that is inherent to the lived experience as a person of color in America has a deleterious impact on



mental well-being and exacerbates reproductive health challenges. As a function of gendered racism (Essed, 1991), African American women contend with discrimination on the basis of both their race and their gender (Bowleg, 2008). Research has indicated that this oppression is associated with a slew of mental health issues, including major depressive disorder (Molina & James, 2016), general depressive symptoms (Landrine & Klonoff, 1996; Thomas et al., 2008), anxiety, interpersonal sensitivity, somatization, obsessions/compulsions, negative affect, and loss of behavioral/emotional control (Franklin-Jackson & Carter, 2007; Paradies, 2006; Szymanski & Stewart, 2010). In one study, researchers investigated the link between multiple forms of oppression and depression in a sample of 144 African American women ranging from 18 – 72 years old at a university-affiliated hospital in the southeastern region of the U.S. (Carr et al., 2014). Participants completed a number of measures which assessed various oppressive situations, including experiencing racial discrimination, sexual objectification, and gendered racism, as well as depressive symptomology. Results indicated that exposure to racist events remained a significant predictor of depressive symptoms above and beyond other forms of oppression, including sexism and gendered racism (Carr et al., 2014).

When African American women contend with reproductive health issues, particularly infertility, there is often a profound impact on their mental health. This is partly due to the *Black-fertility mandate* (Ceballo et al., 2015), which refers to the reality that motherhood is intricately linked to identity for many African American women. Thus, an inability to conceive (i.e., infertility) or carry a child to term (i.e., impaired fecundity) often negatively impacts these women at the intrapersonal,

interpersonal, community, and societal levels. And because of the expectation that African American women will easily and frequently bear children, many who struggle with infertility or impaired fecundity silence themselves and their issues, further retreating into both psychological and emotional distress.

In her exploration of African American women's coping and adjustment responses to primary infertility, Brown (2003) collected data from 106 African American women, 61 of whom were fertile, and 45 of whom were struggling with infertility. Chi-squared and multiple regression analyses indicated that the women who were infertile were more likely to be depressed and less likely to seek social support (G. W. Brown, 2003). Ticinelli (2013) also explored African American women's experiences with infertility by focusing on the psychosocial impact of the condition using grounded theory methodology. She conducted semi-structured interviews with 10 couples, all of whom had been diagnosed with infertility. Findings indicated that African American women experience a range of psychological consequences in response to infertility, including depression, sadness, shock about the diagnosis, fear that they would never experience motherhood, and concern about the implications for their womanhood (Ticinelli, 2013). Many of the women used problem-focused and emotion-focused coping strategies. Most of them also reported major strains in their couple relationship during the infertility diagnosis and treatment processes (Ticinelli, 2013). Other studies have corroborated depression as a significant correlate of infertility, as well as sexual dysfunction, low self-esteem, and anger (Nelson et al., 2008; Robinson & Stewart, 1996).

Much more research is needed to investigate the link between uterine fibroids (which are a key indicator of infertility, particularly among African American women) and mental health difficulties, namely depression. In their exploratory qualitative study of the mental health status of women with uterine fibroids, Nicholls, Glover, and Pistrang (2004) conducted semi-structured interviews with 18 women who had the gynecologic condition. Eight themes emerged, which were then collapsed into two higher-order themes referred to as “managing uncertainty” and “struggling between defeat and optimism.” Findings suggested that levels of depression varied as a function of how women conceptualized their fibroid diagnosis and its impact on their lives (Nicholls et al., 2004).

Another qualitative study assessed the burden of uterine fibroids on women’s mental and emotional wellbeing. Ghant et al. (2015) conducted semi-structured interviews and collected demographic data on 60 women ages 25 - 55 with symptomatic uterine fibroids. Participants were recruited from an urban academic medical center as well as community-based organizations. Majority of the participants (61.7%) were African American. The researchers used a grounded theory approach to analyze the data and found that nearly all (95%) women reported that their uterine fibroids caused significant psychological distress in their lives (Ghant et al., 2015). Primary emotions expressed included concern, worry, and fear rooted in not knowing or understanding the long-term implications of the fibroids. Many women also reported negative emotions toward their fibroids, which included frustration, hate, and anger. These emotions translated into behavioral changes for some participants, including canceling scheduled plans or avoiding plans altogether

because of the possibility of heavy bleeding occurring during the outing. Although the researchers did not use a clinically validated tool to confirm depression, many women in the interviews used terms such as “depressed” or “hopeless” to describe their emotional experience in relation to their fibroids. Such terms arose when participants shared stories about fibroids causing heavy bleeding in public places, leading to ruined clothing and furniture, as well as severe pain during sexual intercourse. Other themes that emerged included helplessness/hopelessness, negative body image and sexuality, and lack of social support. The findings from Ghant et al.’s (2015) study support the notion that fibroids may have a significant negative impact on women’s psychological and emotional health and may ultimately spur depressive symptoms.

In a quantitative exploration of the association between uterine fibroids and mental health, Soliman et al. (2017) conducted an online cross-sectional survey on uterine fibroid prevalence, symptoms, and health-related quality of life in a sample of 4,848 women ages 18 – 49. Findings revealed that mean quality of life was significantly worse for women who reported fibroid symptoms compared to those who did not. Among women who did report symptoms, those who rated their symptoms as severe had significantly worse quality of life scores than women with mild or moderate symptoms; moreover, quality of life scores worsened as the number and severity of symptoms increased (Soliman et al., 2017). Such results indicate the significant impact that uterine fibroids may have on women’s mental health status and overall wellbeing.

To date, qualitative research has laid much of the groundwork for establishing a link between uterine fibroids and depressive symptomology among women.

Findings from each of the studies indicate that women with the gynecologic condition experience poor mental health, particularly depression. The present quantitative study aims to expand the association by also examining racism, BMI, religiosity, and social support along the pathway.

### **Linkages Between Mental Health, Physical Health, and Uterine Fibroids**

Mental health, physical health, and adverse reproductive health outcomes are linked by psychological and physiological processes. More specifically, the literature reveals that among women, psychological distress spurs biological functions that impact their physical and reproductive health and well-being (Dunkel Schetter & Tanner, 2012; Gelenberg, 2010; Glover, 2014; Hemmert et al., 2018; G. D. Smith et al., 2005; Yonkers et al., 2009). While this holds true for all women, these associations are pronounced for women of color, particularly African Americans (Black et al., 2015; Copper et al., 1996; Dole et al., 2003; Dominguez, 2008; Geronimus, 1992; Paradies et al., 2015; Rosenthal & Lobel, 2011b).

### ***Depression and BMI***

According to the CDC (2017), BMI is divided into four categories: underweight (BMI less than 18.5 kg/m<sup>2</sup>), normal weight (BMI greater than 18.5 and less than 25 kg/m<sup>2</sup>), overweight (BMI greater than 25 and less than 30 kg/m<sup>2</sup>), and obese (BMI greater than 30 kg/m<sup>2</sup>). More than 70% of the adult U.S. population is overweight or obese (CDC, 2016b), which places them at risk for a variety of health conditions including coronary heart disease, stroke, and mortality (CDC, 2020).

Research suggests that being overweight and obese is highly comorbid with a number of health issues, including depression, which is also associated with coronary heart disease, heart failure, and increased mortality (Faith et al., 2002; Gelenberg, 2010; Luppino et al., 2010).

Cross-sectional studies on obesity and depression report positive and significant associations between the two variables (Istvan et al., 1992; Wing et al., 1991). In a community-based study conducted in Sweden, researchers compared the psychological status of 1,743 obese individuals to that of 89 non-obese participants and found that the former reported higher levels of anxiety, depression, and poor mental-wellbeing than the latter (Sullivan et al., 1993). In a prospective longitudinal study, Pine, Goldstein, Wolk, and Weissman (2001) examined adulthood BMI levels amongst children with and without depression at ages 6 – 17. Results indicated that children who were depressed had a significantly higher adulthood BMI than children who were not depressed. In a longitudinal study of adolescents, researchers discovered that among participants in the highest BMI range, those who were depressed at baseline were statistically significantly more likely to gain more than 20 pounds over 20 years compared to their non-depressed counterparts (Barefoot et al., 1998). In a cross-sectional study of German women between 18 – 24 years old, researchers collected data on weight as well as the incidence and prevalence of psychological disorders via structured clinical interviews and questionnaires (E. S. Becker et al., 2001). A total of 2,064 women participated in the interviews and 998 filled out the questionnaires. Results indicated that obese women had the highest rates of overall mental disorders and subgroups of mental disorders.

Researchers have also identified a dose-response relationship between depression and BMI such that the association between depression and obesity is stronger than that between depression and overweight (Luppino et al., 2010). In their systematic review of longitudinal studies related to overweight, obesity, and depression, Luppino et al. (2010) suggest that the association between depression and BMI may be attributable to neuroendocrine disturbances. More specifically, depression promotes the long-term activation of the hypothalamic-pituitary-adrenal (HPA) axis which subsequently increases levels of cortisol, an adrenal hormone that has been linked to centralization of body fat and obesity (Björntorp, 2001; Lovejoy et al., 1996; Polderman et al., 1994). Depression might also prompt the adoption of unhealthy lifestyle habits, including insufficient physical exercise and poor dietary choices, both of which may lead to obesity (Luppino et al., 2010).

Some studies have identified gender and race dimensions in the association between depression and BMI. Compared to men, women are consistently identified as more likely to experience obesity (Ogden et al., 2006), depression (Cyranowski et al., 2000; Kuehner, 2003), and both conditions in tandem (L. Li et al., 2017; D. S. Pine et al., 1997). In a comparative study of the effects of BMI and gender on DSM-IV mood and anxiety disorders, researchers examined data available from both men and women in the National Epidemiologic Survey on Alcohol and Related Conditions (Barry et al., 2008). The sample was comprised of 40,790 adults, of whom 22,796 (56%) were women. While obesity was associated with increased risk for any mood disorder, any anxiety disorder, and specific phobias for both men and women, risk of bipolar I and II disorders and social phobia was elevated in obese women but not

men. Moreover, being overweight indicated increased risk for any mood disorder, bipolar I disorder, social phobia, and specific phobia in women, but not men (Barry et al., 2008). Such findings indicate that both obese and overweight women are at increased risk for adverse psychological health outcomes compared to their male counterparts.

Race also serves a key function in the association between depression and obesity, as evidenced by a study conducted by Gavin, Rue, and Takeuchi (2010) in which they examined the association among 16,450 non-Hispanic White, African American, Latina, and Asian women who completed the Comprehensive Psychiatric Epidemiology Survey. Results indicated that the association between depression and obesity was significant among non-Hispanic White and African American women. Such findings are in line with research that states that African Americans are more likely to be obese (Hedley et al., 2004; Y. Wang & Beydoun, 2007) and severely and chronically impaired by depression compared to other racial/ethnic groups (Alegría et al., 2008; Breslau et al., 2005; David R. Williams et al., 2007).

### ***BMI and Reproductive Health Outcomes***

High BMI, particularly that which meets the threshold for obesity, is associated with a number of adverse reproductive health outcomes such as: irregular menstrual cycles (Castillo-Martínez et al., 2003; Douchi et al., 2002); PCOS (Practice Committee of American Society for Reproductive Medicine, 2008); pregnancy loss (Fedorcsák et al., 2004); pregnancy complications including preeclampsia, gestational diabetes, and caesarean delivery (Cedergren, 2004; Dokras et al., 2006; Weiss et al., 2004); stillbirth (Chu et al., 2007); birth defects (Blomberg & Källén, 2010; Practice



Committee of American Society for Reproductive Medicine, 2008; Watkins et al., 2003); and suboptimal assisted reproduction technique outcomes (Fedorcsák et al., 2004; Maheshwari et al., 2007). Obesity is also associated with infertility, as high weight may be associated with ovulatory dysfunction (A. M. Clark et al., 1995; J. W. Rich-Edwards et al., 1994), delayed time to conception (van der Steeg et al., 2008; Zaadstra et al., 1993), and decreased fecundity (Bolumar et al., 2000; Gesink Law D.C. et al., 2007).

In one case-control study of BMI and fertility, researchers compared 2,527 women with anovulatory infertility (that is, infertility that results when the ovaries do not release an egg each cycle) to 46,718 control subjects and found an association between BMI at age 18 and subsequent infertility (J. W. Rich-Edwards et al., 1994). They also found that women who were overweight and obese were statistically significantly more likely to experience anovulatory infertility (J. W. Rich-Edwards et al., 1994). In another study, researchers examined assisted reproduction treatment outcomes among 2,660 women with infertility who were either underweight or obese. Results indicated that obesity is associated with increased risk of early pregnancy loss, lower chances for a live birth, and impaired response to ovarian stimulation (which is designed to induce a normal menstrual cycle in which an egg is released) (Fedorcsák et al., 2004). And in a prospective study that investigated the effects of a weight loss program on ovulatory function among obese women, researchers determined that 12 of the 13 women in the study group lost weight and resumed ovulation and 11 became pregnant (A. M. Clark et al., 1995). Thus, weight loss significantly improved both ovulatory function and pregnancy rates in this sample.

In recent years, a growing number of researchers have begun to investigate the association between BMI and uterine fibroids (D. D. Baird et al., 2007; Moore et al., 2008; Neri et al., 2016; Parazzini, 2006; Sommer et al., 2015; Takeda et al., 2008; Templeman et al., 2009; Wise et al., 2005; Yang et al., 2014). In one study, researchers examined the association between BMI and uterine fibroids in a sample of Italian women (Neri et al., 2016). Participants included 209 women with fibroids that required surgical intervention and 137 without fibroids who served as controls. Results indicated that overweight and obese women were statistically significantly more likely to have fibroids, suggesting that weight might predispose women to clinical manifestations of the tumor that require medical treatment (Neri et al., 2016). In their cross-cultural study, Yang, He, Zeng, and Shuzhang (2014) investigated the association between body size, body fat distribution, and uterine fibroids among Chinese women using data collected between 2009 and 2012 at a health examination center in Beijing. The researchers analyzed data from the records of 826 women, including 316 women with fibroids and 510 control cases. Results indicated that BMI, waist circumference, hip circumference, waist-to-height ratio, body fat mass, body fat percentage, and intracellular water were each positively associated with uterine fibroids. Moreover, women who had high BMI levels, high waist-to-hip ratios, and body fat percentages above 30% were at the greatest risk of developing fibroids (Yang et al., 2014).

Noting that African American women are significantly more likely to develop uterine fibroids (Anachebe & Sutton, 2003; J. W. Collins & David, 2009; Lu & Halfon, 2003) and that fibroids are a major source of morbidity within this

demographic (D. D. Baird et al., 2003; Kjerulff et al., 1996), Wise et al. (2005) investigated the risk of fibroids in relation to BMI, weight change, height, waist, and hip circumferences, and waist-to-hip ratio. The researchers utilized data from the Black Women's Health Study, a prospective cohort study of African American women in the U.S. The sample consists of 21,506 premenopausal women who completed self-report health questionnaires between 1997 – 2001. At baseline, each woman had an intact uterus and no prior diagnosis of uterine fibroids. A total of 2,146 new cases of uterine fibroids were reported after 70,345 person-years of follow-up. Results indicated a complex relationship between BMI and uterine fibroids that was represented by an inverse J-shaped pattern. Incidence rate ratios were high for all categories of BMI above 20.0 kg/m<sup>2</sup> (i.e., those in the “normal” range and above) with a peak incidence rate ratio associated with those in the 27.5 – 29.9 kg/m<sup>2</sup> range (i.e., women in the “overweight” range); conversely, there was reduced risk of uterine fibroids among the leanest women (BMI < 20 kg/m<sup>2</sup>). The incidence rate ratios were stronger among parous women. Moreover, weight gain since age 18 was positively associated with risk of uterine fibroids only among the parous women in the sample. Researchers suggest the inverse J-shape findings might be explained by decreased menstrual cycling in underweight and obese women, which may reduce the risk of uterine fibroids as a function of lowered levels of estrogen and progesterone (Wise et al., 2005). Alternatively, the results may be due to detection bias if clinicians experienced difficulty detecting tumors by pelvic exam for obese women (Wise et al., 2005). Due to the complexity of the findings, the researchers were unable to make definitive recommendations for the prevention of uterine fibroids.

The current literature base establishes clear associations between depression and BMI, with a number of studies indicating a positive and significant relation between the two. That is, depression has been associated with higher BMI levels; moreover, there is typically a dose-response relationship between the two variables such that higher levels of one indicates higher levels of the other over time (L. Li et al., 2017; Luppino et al., 2010; D. S. Pine et al., 1997; D. S. Pine et al., 2001). BMI is also associated with a number of adverse reproductive health issues, including infertility, pregnancy complications, and birth defects (Blomberg & Källén, 2010; Bolumar et al., 2000; Gesink Law D.C. et al., 2007; Practice Committee of American Society for Reproductive Medicine, 2008; van der Steeg et al., 2008). A small number of researchers have directly examined the associations between BMI and uterine fibroids (D. D. Baird et al., 2007; Giri et al., 2017; Marshall et al., 1998; Moore et al., 2008; Neri et al., 2016; Parazzini, 2006; Sommer et al., 2015; Takeda et al., 2008; Templeman et al., 2009; Wise et al., 2005; Yang et al., 2014), which are the reproductive health outcome of interest for the present work. The one study that explored the association among African American women, in particular, revealed complex results for the association between BMI and fibroids (Wise et al., 2005). The current study will expand the literature base on the association between the two by incorporating BMI as a mediator along a casual pathway that also examines the influence of racism, depressive symptomology, religiosity, and social support on uterine fibroid diagnosis among African American women.

## **Racism, Religiosity, and Reproductive Health**

Religion has historically served a critical role in the African American community and remains a primary coping mechanism for many, particularly African American women (Boyd-Franklin, 1989; Broman, 1996; G. W. Brown, 2003; Ellison, 1997; Mays et al., 1996; R. J. Taylor & Chatters, 1991). Researchers have found that prayer, church attendance, and a belief in God are critical pathways by which many African American women find strength to contend with a multitude of challenges (Broman, 1996; G. W. Brown, 2003; R. J. Taylor & Chatters, 1991). Religiosity also provides a crucial source of psychological and emotional support during periods of crisis (R. J. Taylor & Chatters, 1991).

A number of researchers have sought to identify the ways in which religiosity serves as a critical coping mechanism for experiences of racism, in particular. African Americans rely on religious coping more frequently than their White counterparts (Chatters et al., 2008; Koenig et al., 1992), oftentimes to effectively manage their responses to racist interactions (Shorter-Gooden, 2004; Utsey, Ponterotto, Reynolds, & Cancelli, 2000). In one qualitative study, Shorter-Gooden (2004) explored coping strategies for racism and sexism among African American women. A sample of 196 women completed a questionnaire in which they were asked to share their experiences of racial and gender discrimination through brief comments and examples. A central theme that emerged was the importance of “resting on faith.” Participants reported relying on prayer, spiritual beliefs, and their relationship with God to cope with the challenges of being ethnic minority women in the U.S. Such findings are corroborated by other research studies that emphasize the importance of

religiosity and spirituality among African American women (Broman, 1996; Burgess & Brown, 2000).

Religiosity has also been linked to improved physical health outcomes, including coronary heart disease (Berntson et al., 2008; Obisesan et al., 2006; Zamarra et al., 1996), hypertension (Gillum & Ingram, 2006; T. W. Graham et al., 1978; I. L. Livingston et al., 1991; Steffen et al., 2001; Timio M et al., 1988), and sexual behavior (Cochran et al., 2004; Nonnemaker et al., 2003; Rostosky et al., 2003; Uecker, 2008). Of particular interest is the influence of religiosity on endocrine functioning, specifically stress hormones such as cortisol, epinephrine, and norepinephrine. Several researchers have identified positive associations between spiritual affiliation and lower stress levels (Carrico et al., 2006; Ironson et al., 2002; Tartaro et al., 2005). In their study, Maselko et al. (2007) explored the pathway between religiosity (measured by religious service attendance) and allostatic load, a representative stress marker, among elderly African Americans. They collected blood and urine samples, as well as information on the frequency of religious service attendance from 853 participants between the ages of 70 – 80 years. Results indicated that attending religious services at least once per week was associated with lower allostatic load levels among African American women in the sample. The finding that religiosity is particularly important in managing stress for African American women has been supported in other research studies as well (McCullough et al., 2000; McCullough & Laurenceau, 2005; Strawbridge et al., 1997).

In a study of African American women's coping strategies for living with uterine fibroids, Myles (2013) conducted in-person interviews with 31 African

American women between the ages of 27 – 62 years. Using a feminist and grounded theory framework to analyze the transcripts, the researcher found that many women reported investing in their spirituality and religiosity as a method of coping with the symptoms of the gynecologic condition. Interestingly, several of the women noted that they wished they had invested more in their spirituality prior to being diagnosed with fibroids, suggesting a potential belief that increased religiosity may have altered the likelihood of ever being diagnosed with fibroids. African American women's reliance on religion to cope with stressors is corroborated in the literature (Abrums, 2004; P. H. Collins, 2000).

In her semi-structured interviews with 10 African American couples struggling with infertility, Ticinelli (2013) found similar results pertaining to religiosity. In the midst of their fear, sadness, and shock about the infertility diagnosis, the couples turned to God and their spirituality for strength. They noted to the interviewer that they had faith that God would ultimately provide peace and joy (Ticinelli, 2013). It is possible that such religious-based coping alleviates psychological distress since it allows individuals to believe that their issues can be placed into the hands of an omnipotent power.

To date, majority of the literature that describes the impact of both racism and religiosity on reproductive health outcomes has been qualitative in nature. In interviews conducted with African American women, religiosity consistently arises as a theme that is central to participants' adaptive coping. The few quantitative studies that have explored these constructs support similar conclusions. However, more quantitative research is needed to assess variability and allow for generalizability.

Structural equation modeling analyses were conducted in the present study in an effort to address this gap.

### **Racism, Social Support, and Reproductive Health**

Social support serves a critical function in managing daily life stressors for all racial/ethnic groups (Coleman & Iso-Ahola, 1993; DeLongis et al., 1988; Kim et al., 2008). Nevertheless, it is particularly important for African Americans, as they oftentimes contend with racist and discriminatory events. A number of researchers have explored the association between social support and health outcomes, with several confirming that support can buffer overall allostatic load (Roy et al., 1998; Singer & Ryff, 1999; Weinstein et al., 2003). Others have identified links between racism, social support, and health, finding that social support often serves a significant mediating or moderating role in coping with the adverse effects of racism and discrimination (Clark, 2003, 2006; Dressler & Bindon, 2000; McNeilly et al., 1995; Thomas, Witherspoon, & Speight, 2008).

In the realm of reproductive health, social support is critical, especially for African American women. During pregnancy, social support has been shown to improve fetal growth (N. L. Collins et al., 1993; Hoffman & Hatch, 1996), a vital measure for African American infants since they are significantly more likely than White infants to be born at low or very low birth weights (Borrell et al., 2016; S. A. James, 1993). Social support has also been linked to improved Apgar scores, fewer issues during labor, higher infant birth weight (N. L. Collins et al., 1993), and fewer pregnancy complications, even among women with high stress levels (Norbeck & Tilden, 1983; Nuckolls et al., 1972),



In one study of racial discrimination and infant birth weight, researchers administered a structured questionnaire to low-income African American women who had given birth to a low-birth-weight or very-low-birth-weight infant within the past 72 hours (J. W. Collins et al., 2000). The sample consisted of 25 women between 18 – 35 years of age. Results from logistic regression analyses indicated a significant association between experiences of racism and the likelihood of delivering a very-low-birth-weight infant. The association was exacerbated by inadequate social support.

In another study, researchers investigated the impact of group prenatal care, a key source of social support, on pregnancy outcomes in a sample of predominantly (80%) African American women (Ickovics et al., 2007). A total of 1,047 pregnant women ages 14 – 25 were recruited and randomly assigned to standard or group care. Care sessions were two hours in length; each session featured physical assessment, education and skills building, and discussion-based social support. Researchers conducted structured interviews with participants at baseline, during the third trimester, and postpartum. Intent-to-treat analyses indicated that women who participated in prenatal group care were significantly less likely to have preterm births, had significantly better prenatal knowledge, felt more prepared for labor and delivery, reported greater satisfaction with care, and had higher breastfeeding initiation compared to their standard care counterparts (Ickovics et al., 2007). Effects of the group intervention were even stronger for African American women.

As mentioned earlier, African American women are the racial/ethnic minority group most likely to experience, but least likely to seek treatment for, infertility

(Chandra & Stephen, 2014; Chin et al., 2015; Kessler et al., 2013). They are also much less likely to reach out to their social networks for support than their White counterparts, despite the documented significance of social support in coping with a wide array of race-based and reproductive concerns (G. W. Brown, 2003; Robinson & Stewart, 1996; Ticinelli, 2013). In their qualitative study on infertility among this group, Ceballo, Graham, and Hart (2015) interviewed 50 socioeconomically diverse African American women ages 21 – 52 to determine the ways in which they cope with the diagnosis. Their findings indicated that infertility greatly impaired participants' sense of self, gender identity, and womanhood. The women also reported silencing and isolating themselves from friends and family members, further exacerbating the loneliness and psychological distress that followed the infertility diagnosis (Ceballo, 2017).

Conversely, in their study on quality of life and psychological health in couples who had been diagnosed with infertility, Zurlo, Cattaneo Della Volta, and Vallone (2018) found that among 206 couples who were undergoing infertility treatments, utilizing social support as a coping strategy was associated with higher quality of life and psychological wellness in female patients. Other researchers have corroborated the importance of social support for women struggling with infertility, with those who reached out to others in their networks reporting greater mental well-being (Boynton-Jarrett et al., 2011; Ticinelli, 2013). In fact, social support has been associated with improved emotional adjustment to the reality of infertility (Verhaak et al., 2005) and decreased psychological distress related to the diagnosis (Berghuis & Stanton, 2002; Peterson et al., 2006).

In one study of the association between childhood adversities and adult health, researchers examined data from 68,505 participants enrolled in the Nurses' Health Study II, a prospective cohort study on premenopausal women aged 25 – 42 at enrollment (Boynton-Jarrett et al., 2011). Results revealed a positive and significant association between childhood sexual abuse and clinically symptomatic uterine fibroids in adulthood (Boynton-Jarrett et al., 2011). Moreover, a dose-response association was evident between cumulative abuse and fibroid risk. Emotional support during childhood, however, attenuated the association.

Researchers posit that stress is the underlying mechanism driving the association between abuse and fibroid development (D. Baird & Wise, 2011). Results from one cross-sectional study indicated a positive association between the number of stressful major life events in a woman's life and fibroid prevalence (Vines et al., 2010). In studies that have explored the impact of emotional and social support on these associations, results suggest that the relationship between stress and fibroid development is weaker among women with higher interpersonal coping skills (D. Baird & Wise, 2011; Boynton-Jarrett et al., 2011; Wise et al., 2007). Thus, social and emotional support may serve as an important buffer between stressful experiences, including those that occurred during childhood, and fibroid development in adulthood.

In sum, depressive symptomology, BMI, religiosity, and social support are key factors that may serve critical functions in the relationship between racism and uterine fibroid development. To date, research has corroborated a link between racism and depressive symptoms, depressive symptoms and physical health, and the

importance of religiosity and social support as key coping mechanisms that may moderate the ultimate effect of racism on reproductive health. The current study adds to the literature base by examining the linkages between racism, depressive symptomatology, BMI, religiosity, social support, and uterine fibroids among African American women.

### **The Present Study**

Overall, much more remains to be understood about the impact of racism—both internalized and that which is perceived—on reproductive health for African American women. Although African American women are most at risk of experiencing infertility (Chandra & Stephen, 2013; Sharara & McClamrock, 2000; Wellons et al., 2008), few researchers have sought to identify infertility risk factors specific to this group. Uterine fibroids are a key indicator of infertility and a reproductive morbidity encountered by the vast majority of African American women throughout their lifetimes (American Society for Reproductive Medicine, 2015; Black Women’s Health Imperative, 2017a). However, to date, little is known about aspects of African American women’s lives that might exacerbate their risk of fibroid development and later infertility issues. Thus, the proposed study addressed the following research questions:

- 1) What is the association between racism (perceived and internalized) and uterine fibroid diagnosis among African American women?
- 2) Is there an interaction effect between perceived and internalized racism that increases the likelihood of uterine fibroid diagnosis?

- 3) Does depressive symptomatology alone or depressive symptomatology and body mass index together mediate the association between racism and uterine fibroid diagnosis?
- 4) Does social support moderate the association between racism and uterine fibroid diagnosis?
- 5) Does religiosity moderate the association between racism and uterine fibroid diagnosis?

The following hypotheses were tested:

- 1) Higher levels of self-reported racism, both perceived and internalized, are associated with uterine fibroid diagnosis.
- 2) There is an interaction effect between perceived and internalized racism such that higher levels of both are significantly associated with a higher likelihood of uterine fibroid diagnosis.
- 3) Depressive symptomatology partially mediates the association between racism and uterine fibroid diagnosis independently and in conjunction with body mass index.
- 4) Social support and religiosity moderate the association between racism and fibroids. The relationship between racism and uterine fibroid diagnosis is weaker among women who report higher levels of both variables compared to those who report lower levels.

The current study fills an important gap in the literature by explicitly examining the association between two forms of racism, perceived and internalized, and uterine fibroid diagnosis, while also investigating the mediating roles of

depressive symptomatology and BMI and the moderating functions of both religiosity and social support among African American women. Findings generated from this research have a number of public health and clinical implications for work with African American women of reproductive age.

## CHAPTER 3: METHODOLOGY

### Data

This dissertation is a secondary analysis of data from the HEART Project (Helping to Examine African American Relationship Traits). The project was funded by the National Institute of Child Health and Human Development under the title, *A Study of African American Marriage and Health*, and was guided under the direction of principal investigator, Dr. Chalandra M. Bryant. The HEART Project was longitudinal, spanning five years to collect data on newlywed African American heterosexual couples ( $n = 699$ ) during their first three years of marriage. All of the couples were located in the southern region of the U.S. The aim of the project was to conduct an in-depth examination of the first three years of marriage for Southern African American heterosexual couples, investigating a variety of intrapersonal, interpersonal, familial, and contextual processes that impact both marriage quality and health over the life course. More specifically, social, familial, economic, occupational, and psychological factors were of particular interest and were investigated to determine their influence on marital and health outcomes.

The longitudinal project represents one of very few marriage and health research studies focused exclusively on African Americans, who continue to bear the burden of historical trauma rooted in slavery and regularly contend with racism and discrimination. With a sample comprised solely of African American participants, researchers are able to explore mental and physical factors specific to African American marriage and health, examine within-group variability, and generate

conclusions that are specifically targeted to a group that has been systematically understudied in marriage and health research.

The present study is cross-sectional in nature, focusing on the first wave of data collected for the project. Although data were collected from both husbands and wives, only the wives' responses ( $n = 699$ ) were analyzed for the purposes of this dissertation.

### **Procedures**

Heterosexual African American couples who were recently married were identified through public marriage license records. Using the address available on the license, project staff mailed letters to potential participants inviting them to take part in the study. Eligibility criteria required both partners to identify as African American, be 20 years of age or older, be in their first year of marriage, and agree to take part in the project.

Once enrolled, two trained African American interviewers visited participants' homes, obtained their participation consent, administered surveys, and interviewed both partners. Husbands and wives completed the assessments and interviews in separate rooms. The interviewers followed a structured interview format, which included reading each question to the participants. The average length of each visit was approximately two hours. Topics covered during the interview period included individual and relationship characteristics, racial discrimination, health, marital interactions, mental health, social networks, community characteristics, and psychological resources. Subsequent visits conducted with



couples over the next two years followed a similar format. Participants received a monetary honorarium for their participation.

Study procedures were approved by the Institutional Review Board of the principal investigator's home institution.

## **Measures**

### ***Uterine Fibroids***

The presence of uterine fibroids was assessed using a question that asked female participants if they had ever been diagnosed with uterine fibroids. The question has a dichotomous response option: *0* for “no” and *1* for “yes.”

### ***Racism***

Experiences of racism were assessed via two separate measures. One focused on perceived racial discrimination, while the other assessed the degree of internalized racism reported by participants.

#### **Perceived Racial Discrimination.**

Perceived racial discrimination was measured using 10 self-report items, adapted from McNeilly et al. (1996) and Murray et al. (2001b), that asked participants how often they had been a victim of discrimination in a variety of situations during the *past year*. Sample items included: “During the past year, how often has someone said something derogatory or insulting to you just because you are African American?” and “During the past year, how often have the police stopped you just because you are African American?”. See Appendix A for a full list of items.

Response options range from *1* for “never” to *5* for “more times than I can count.” The 10 items were summed to create a composite score of racial

discrimination. Possible scores ranged from 10 to 50. High scores reflected a greater frequency of racially discriminatory experiences. The computed alpha score for the scale in this study sample is .84.

### **Internalized Racism.**

Internalized racism was assessed using 13 self-report items that asked participants how they felt about being African American and about African Americans as a whole. The scale was adapted using measures developed by Allen, Bat-Chava, and Aber (2005), Strauss and Cross (2005), and Parham and Helms (1981). Sample items included: “Being African American is an important part of my self-image” and “Sometimes I wish I were White (R).” Response options range from 1 for “strongly agree” to 5 for “strongly disagree.” Items indicated by “(R)” in Appendix B, were reverse-scored such that higher scores indicated negative feelings about race (i.e., low racial regard and high internalized racism) and lower scores indicated positive feelings about race (i.e., high racial regard and low internalized racism). The 13 items were combined to create a composite score of internalized racism for participants. Total possible scores ranged from 13 – 65.

The computed alpha score for the scale in this study sample is .70.

### ***Depressive Symptomology***

Depressive symptomatology was assessed using 20 self-report items from the Center for Epidemiological Studies-Depression Scale (CES\_D) (Radloff, 1977). The measure asked participants to indicate how often they experienced each condition within the *past week*. Sample items included: “I thought my life had been a failure,”

“I felt hopeful about the future,” “My appetite was poor and I did not feel like eating,” and “I felt people were unfriendly to me.” See Appendix C for the full scale.

Response options ranged from 0 for “less than 1 day a week (rarely)” to 3 for “5 – 7 days (most of the time)”. Positive items were reverse-scored such that higher scores indicated more depressive symptoms and worse affect. The 20 items were summed to create a composite score of depressive symptoms among participants. Total possible scores ranged from 0 - 60.

The CES-D has been widely used cross-culturally (D. R. Brown & Gary, 1988; Noh et al., 1999; Wickrama & Bryant, 2003) and has outstanding psychometric properties. The computed alpha score for the scale in this study sample is .87.

### ***Body Mass Index***

Body mass index was manually calculated using the standard formula with English measurements recommended by the Centers for Disease Control and Prevention (2014). The formula is as follows:  $\text{weight (lb)} / [\text{height (in)}]^2 \times 703$ .

### ***Religiosity***

Religiosity was measured using one self-report item that reflected the degree to which participants endorsed a religious affiliation. The item read as follows: “How religious would you say you are?” The original response options ranged from 1 for “extremely religious” to 5 for “not religious at all.” The scale was reverse-scored so that higher scores indicated more religiosity and lower scores indicated less religiosity. Scores were summed to create a composite score, with options ranging from 1 – 5.

### ***Social Support***

Social support was assessed using five items that reflected the degree of support that participants obtained from family and friends other than their spouse. The items were adapted from a measure developed by Turner (1992). Sample items included, “No matter what happens, I know that my friends will always be there for me,” and “I have at least one friend or family member I could tell anything.” The original response options ranged from 1 for “strongly agree” to 5 for “strongly disagree.” For consistency in scoring across measures, the items were reverse-scored, indicated by “(R)” in Appendix D, such that higher scores reflected higher levels of perceived social support and lower scores reflected lower levels of perceived social support. Possible scores ranged from 5 to 25. Items were summed to create a composite social support scale with an alpha of .75 in the current sample.

### ***Covariates***

I controlled for a number of sociodemographic variables, including age (in years), education level (“trade school or less” and “some college or more”) and income (gross annual income less than or equal to \$40,000 or more than \$40,000). Additionally, I controlled for hypertension diagnosis (“yes” or “no”), which has been linked to a higher likelihood of uterine fibroid development, and parity (i.e., having three or more live births, coded as “yes” or “no”) since it has been identified as a protective factor for uterine fibroids.

### ***Analyses***

Analyses were conducted using SPSS statistical software version 25 and MPlus version 8.0. Using SPSS, descriptive statistics of all variables were obtained.

The proposed study addressed the following research questions: 1) What is the association between racism (perceived and internalized) and uterine fibroid diagnosis among African American women? 2) Is there an interaction effect between perceived and internalized racism that increases the likelihood of uterine fibroid diagnosis? 3) Does depressive symptomatology alone or depressive symptomatology and body mass index together mediate the association between racism and uterine fibroid diagnosis? 4) Does social support moderate the association between racism and uterine fibroid diagnosis? 5) Does religiosity moderate the association between racism and uterine fibroid diagnosis?

The following hypotheses were tested:

- 1) Higher levels of self-reported racism, both perceived and internalized, are associated with uterine fibroid diagnosis.
- 2) There is an interaction effect between perceived and internalized racism such that higher levels of both are significantly associated with a higher likelihood of uterine fibroid diagnosis.
- 3) Depressive symptomatology partially mediates the association between racism and uterine fibroid diagnosis independently and in conjunction with body mass index.
- 4) Social support and religiosity moderate the association between racism and fibroids. The relationship between racism and uterine fibroid diagnosis is weaker among women who report higher levels of both variables compared to those who report lower levels.

The measured variable path analysis was conducted using MPlus. To test the four hypotheses, I created a mediated-moderated path model that included perceived and internalized racism as exogenous variables, depressive symptomology and BMI as partial mediators of the direct associations between perceived and internalized racism and fibroid diagnosis, religiosity and social support as moderators of the direct association between perceived and internalized racism and fibroid diagnosis, and a fibroid diagnosis as the outcome of interest. In order to assess an interactional effect of perceived and internalized racism, I created a third predictor variable that represented an interaction (internalized x perceived) of the two forms of racism. This was created by centering then multiplying the perceived and internalized racism variables together. Like the other two exogenous variables, the interaction term was expected to have a direct association with uterine fibroid diagnosis that was mediated by depressive symptomatology and BMI and moderated by religiosity and social support. The purpose of adding this racism interaction variable was to provide clarity about whether the combination of the two forms of racism is more impactful than either of them separately.

Further, to accurately and precisely assess the differential impact that varying levels of perceived and internalized racism might have on uterine fibroid development, I had originally planned to run two versions of the model: one in which the racism variables were continuous and one in which the racism variables were dichotomous. The purpose of the continuous version was to capture the nuances of a gradual effect of racism. In the dichotomous version, I originally planned to create high and low categories for both racism variables in order to indicate whether there

was a threshold effect. However, during the analytic phase of this dissertation, I discovered that there was not enough variation in the independent predictors to allow for reliable dichotomization. Thus, the results presented in the following chapter were generated solely from the continuous version of the proposed model.

Structural equation modeling in MPlus allows for the inclusion of all hypothesized variables in a single model; thus, I included pathways that led from the predictor variables to the mediators and from the mediators to the outcome, with moderator and covariate paths also built in. During the initial analytic phase, I realized that part of the sample was initially lost in the first iterations of the model due to missing data on the exogenous control variables. I did two things at this stage. First, I assessed for group differences between people who were missing values on the racism variables compared to those who were not by using chi-squared and independent sample *t*-tests among the variables of interest. Second, to resolve the issue of sample loss, I created single-indicator factors without error terms, which allows the MPlus software to recognize the factors as the variables, instead. MPlus only does full-information maximum likelihood (FIML), which accommodates missingness, around dependent elements in a model. Creating the single-factor indicators transformed the exogenous variables into endogenous (i.e., dependent) variables which allowed the software to apply FIML to all of the variables in the model, including the covariates. Using this procedure, I was able to retain all of the data. Thus, the analytic sample consisted of all 699 participants.

While testing the effects of the mediators and moderators, it became evident that the moderators did not make meaningful contributions to the model. Similar to

the analytic procedure for regression analyses, I ran the model both with and without the interaction terms associated with religiosity and social support. Examination of the model fit statistics and path coefficients revealed that when the moderators were included, the model fit statistics remained approximately the same as when they were not part of the model; furthermore, none of the paths associated with the moderators were significant. In light of these findings, the moderators were removed from subsequent analyses and will not be discussed further in subsequent chapters.

Thus, the final analytical model consisted of perceived racism, internalized racism, and the interaction of the two forms of racism as predictors, depressive symptomology and BMI as mediators, and uterine fibroid diagnosis as the outcome variable of interest. To reflect this change, the research questions (#3 and #4) and hypothesis (#4) pertaining to the moderator variables have been omitted from further discussion.

The bootstrapping method is the most highly-recommended approach for mediation analyses (Preacher & Hayes, 2008; J. Williams & MacKinnon, 2008) as it assesses indirect effects and also corrects for the non-normality that inevitably arises when taking the products of paths (which is required when calculating indirect effects). I used the bootstrapping method with 1,000 re-samples, which allowed for accurate confidence interval estimates. When the bootstrapping method procedure was requested in the code, the software provided results for specific indirect and total indirect (sum of indirect) effects, as well as their associated confidence intervals.

In addition to direct and indirect effect results, I examined several indicators of overall model fit statistics during the analytic phase of this dissertation. These



included a small, non-significant chi-squared value, which specifies whether the sample data is representative of the population, and a root mean square error of approximation (RMSEA) value, which is a supplementary statistic that adjusts for sample size and aids in interpretation of the chi-squared statistic by identifying how far the hypothesized model is from a “perfect” model (Rasch, 1993), less than or equal to .06. Other fit statistics of interest included the weighted root mean square residual (WRMR), which is utilized with categorical data to determine goodness of fit and should ideally should be a value less than .90 (DiStefano et al., 2018), and the comparative fit index (CFI) which compares the fit of the hypothesized model with the baseline (i.e., worst) model and should be greater than or equal to .95 (Bentler, 1990; Xia & Yang, 2019).

## CHAPTER 4: RESULTS

### Sample Characteristics

The final analytic sample consisted of all 699 participants. The mean age of participants was 33 (SD = 9.58, range = 21 – 71). Approximately two-thirds of the women ( $n = 454$ , 65%) had attained some college or more and majority ( $n = 549$ , 79%) had a gross annual income that was less than or equal to \$40,000 per year. Approximately one-third of the sample ( $n = 189$ , 27%) had birthed three or more children. Most of the women ( $n = 552$ , 79%) had not been diagnosed with hypertension. In total, 89 (13%) women reported having been diagnosed with uterine fibroids at some point in their lives. Sample characteristics are also provided in Table 1.

The mean score for perceived racism was 14.38 (SD = 4.95, sample range = 10 – 39) and was 22.88 for internalized racism (SD = 4.97, sample range = 13 – 42), which reveal fairly low levels of both forms of racism amongst participants. The mean score on the CES-D, which assessed depressive symptomology, was 8.27 (SD = 8.42, sample range = 0 – 50), indicating low levels of depressive symptoms amongst the women. BMI scores revealed an average of 30.43 (SD = 7.63, sample range = 17.16 – 71.22). Across the sample, 46 (7%) women were underweight, 166 (24%) were normal weight, 195 (30%) were overweight, and 292 (42%) were obese. Thus, on average, women in this sample met the criteria for obesity. The mean score for religiosity was 3.66 (SD = .79, range = 1 – 5) and 21.04 for social support (SD = 3.45, sample range = 6 - 25). These results indicate that sample participants were both religious and confident that they could rely on family and friends when needed.

Overall, the present study's sample was comprised of African American women who reported low levels of perceived racism, internalized racism, and depression, high levels of religiosity and social support, and hovered around the cusp of overweight and obese BMI levels.

### **Bivariate Analyses**

Among the continuous variables in the model, age was positively correlated with BMI ( $r = .17, p \leq .01$ ), internalized racism ( $r = .14, p \leq .01$ ), religiosity ( $r = .11, p \leq .01$ ). This finding indicates that women who were older were more likely to have higher BMIs, greater levels of internalized racism, and higher religiosity. Age was negatively correlated with social support ( $r = -.08, p \leq .05$ ), indicating that as women age, their perceived social support from people other than their spouse declines. Perceived racism and internalized racism were negatively correlated with one another ( $r = -.11, p \leq .01$ ), indicating that higher levels of one are associated with lower levels of the other. BMI was negatively correlated with religiosity ( $r = -.08, p \leq .05$ ), indicating that women with higher BMI scores were more likely to report lower religiosity. Depressive symptomology was correlated with internalized racism ( $r = .09, p \leq .05$ ), perceived racism ( $r = .19, p \leq .01$ ), and social support ( $r = -.09, p \leq .05$ ). Such findings indicate that depressive symptomology was higher among participants with higher levels of internalized and perceived racism and lower among those with high levels of social support. Internalized racism was negatively correlated with social support ( $r = -.17, p \leq .01$ ), which indicates that women with higher levels of social support have lower levels of internalized racism. These associations are shown in Table 3.

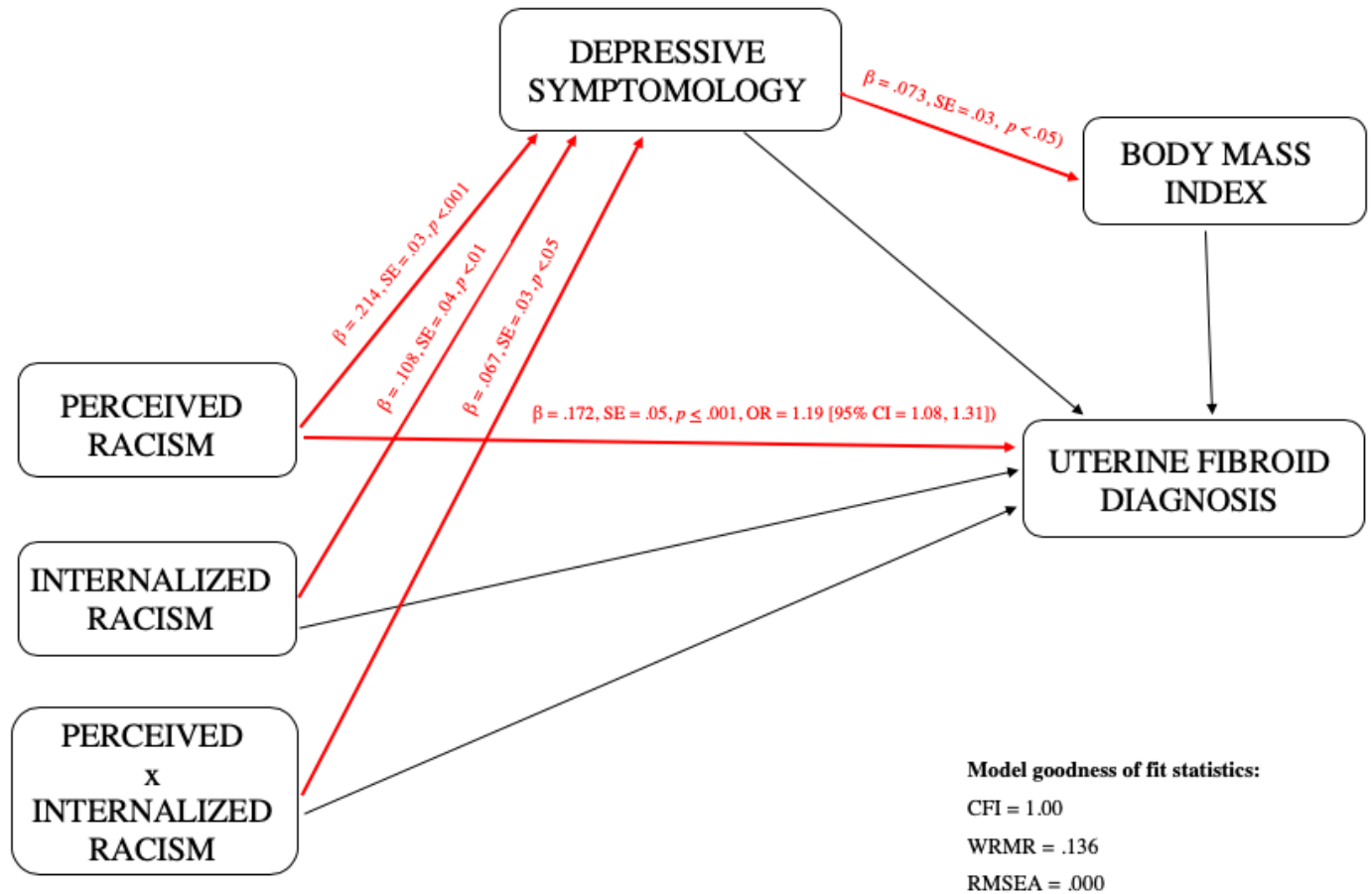
Chi-squared tests of independence were performed to examine the associations between the categorical covariates (i.e., education, income, parity, hypertension) and uterine fibroid diagnosis. There was a significant association between fibroids and hypertension,  $\chi^2 (1, N = 697) = 34.88, p < .001$ , indicating that having hypertension is associated with a greater likelihood of a fibroid diagnosis. There was also a significant association between fibroids and income  $\chi^2 (1, N = 654) = 13.92, p < .001$ . This indicates that women with higher income levels are more likely to report being diagnosed with uterine fibroids. As will be discussed later, this finding is likely indicative of access to care, which is greater among women with higher income since it often entails health benefits. Finally, chi-squared and independent sample *t*-tests showed no significant differences among people who had missing data on the racism variables compared to those who did not.

### **Measured Variable Path Model Analyses**

Model goodness-of-fit indices indicated acceptable model fit. The CFI is 1.00; WRMR is .136; and RMSEA is .000. The chi-squared value is 2.79 and is non-significant ( $p = 0.42$ ). A diagram of the final model is shown in Figure 3. To aid in interpretation, majority of the results presented below are standardized. Unstandardized beta coefficients are presented alongside the standardized beta coefficients in Tables 4, 5, and 6.

**Figure 3**

*Measured Variable Path Model Diagram*



***Direct Effects***

Perceived racism was positively and statistically significantly associated with the likelihood of a fibroid diagnosis ( $\beta = .172, SE = .05, p \leq .001, OR = 1.19 [95\% CI = 1.08, 1.31]$ ). These results show that there is a 1.19 times higher odds of a fibroid diagnosis for each one-unit increase in perceived racism. Internalized racism and the interaction of perceived and internalized racism were not significantly associated with the likelihood of a fibroid diagnosis.

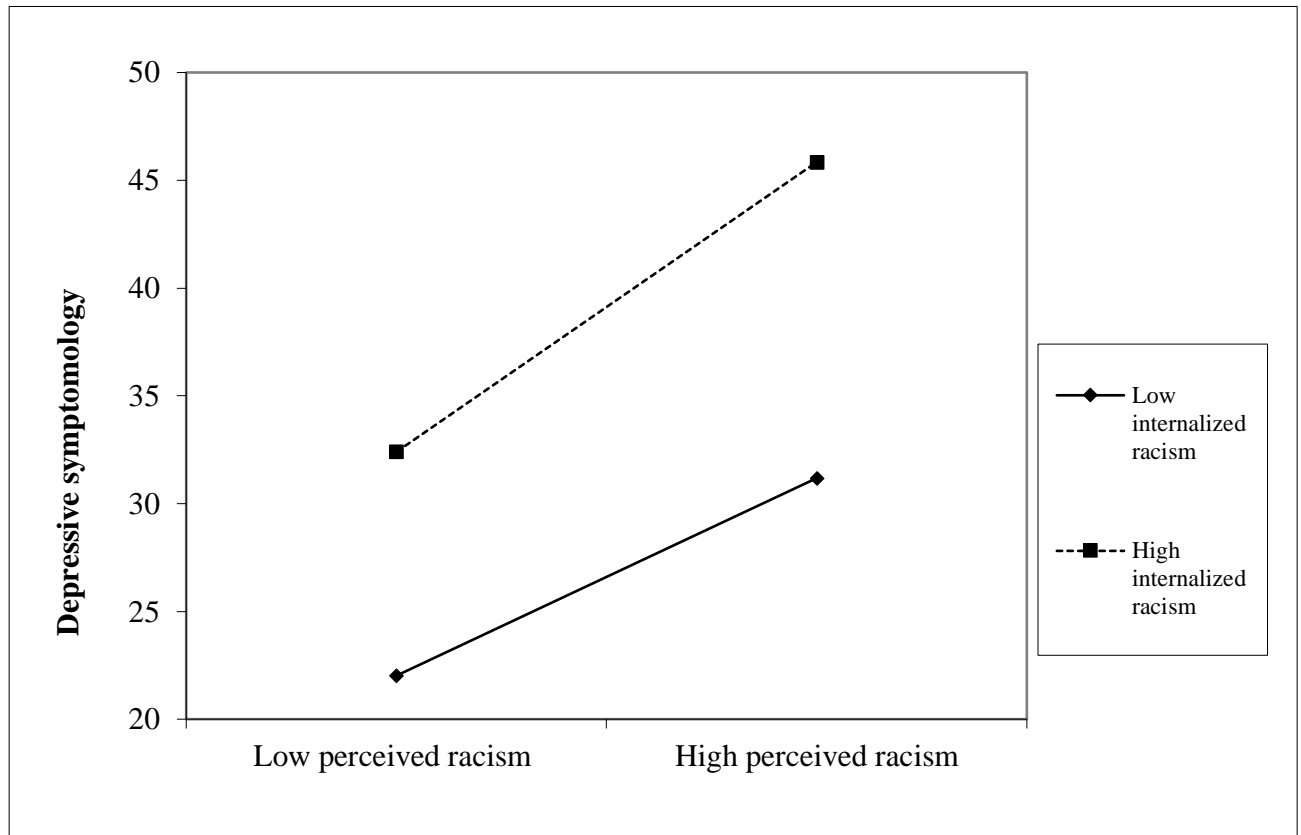
Both perceived racism ( $\beta = .214$ ,  $SE = .03$ ,  $p < .001$ ) and internalized racism ( $\beta = .108$ ,  $SE = .04$ ,  $p < .01$ ) were positively and statistically significantly associated with depressive symptoms. This indicates that higher levels of both perceived and internalized racism are associated with higher levels of depressive symptoms in this sample of African American women.

The interaction of perceived and internalized racism was also positively and significantly associated with depressive symptoms ( $\beta = .067$ ,  $SE = .03$ ,  $p < .05$ ). This finding indicates that the multiplicative effect of high levels of both perceived and internalized racism is associated with higher levels of depressive symptoms. I explored the significant interaction effect further in order to clearly understand the nature of the associations between perceived racism, internalized racism, and depressive symptomology. Findings suggest that internalized racism moderates the association between perceived racism and depressive symptomology such that participants with high internalized racism have higher levels of depressive symptomology than those with low internalized racism. Further, depressive symptomology increases significantly when participants with high internalized racism also report high levels of perceived racism. In contrast, participants who have low internalized racism report lower levels of depressive symptomology and do not experience significant increases in depressive symptomology even when they report high levels of perceived racism. This association is depicted graphically in Figure 4.

Finally, there was a statistically significant and positive association between depressive symptomology and BMI ( $\beta = .073$ ,  $SE = .03$ ,  $p < .05$ ). Therefore, as severity of depressive symptoms increases, so, too, does BMI within this sample.

**Figure 4**

*Interaction Effect Between Perceived Racism, Internalized Racism, and Depressive Symptomology*



### ***Indirect Effects***

I had hypothesized that perceived racism, internalized racism, and the interaction of perceived and internalized racism would have an indirect effect on the likelihood of a uterine fibroid diagnosis through depressive symptomology and BMI. In other words, both depressive symptomology and BMI were expected to partially mediate the association between fibroid diagnosis and perceived racism, internalized racism, and the interaction between the two. The bootstrap procedure was performed to accommodate non-normality and accurately assess indirect effects. The estimation

entailed 1,000 samples. The indirect pathway from perceived racism to fibroid diagnosis via depressive symptomology was not statistically significant ( $\beta = -.013$ ,  $SE = .01$ , [95%  $CI = -.043, .017$ ]), nor was the indirect pathway from perceived racism to fibroid diagnosis via depressive symptomology and BMI ( $\beta = -.001$ ,  $SE = .001$ , [95%  $CI = -.004, .002$ ]). The sum of the indirect effects from perceived racism to uterine fibroid diagnosis was not statistically significant ( $\beta = -.014$ ,  $SE = .01$ , [95%  $CI = -.044, .015$ ]).

The indirect pathway from internalized racism to fibroid diagnosis via depressive symptomology was not statistically significant ( $\beta = -.007$ ,  $SE = .01$ , [95%  $CI = -.022, .009$ ]). Similarly, the indirect pathway from internalized racism to fibroid diagnosis via both depressive symptomology and BMI was not statistically significant ( $\beta = -.001$ ,  $SE = .001$ , [95%  $CI = -.002, .001$ ]). The sum of the indirect effects from internalized racism to uterine fibroid diagnosis was not statistically significant ( $\beta = -.007$ ,  $SE = .01$ , [95%  $CI = -.023, .009$ ]).

Finally, the pathway from the interaction of perceived and internalized racism to fibroid diagnosis via depressive symptomology was not statistically significant ( $\beta = -.004$ ,  $SE = .004$ , [95%  $CI = -.017, .009$ ]). Similarly, the indirect pathway from the interaction of perceived and internalized racism to fibroid diagnosis via both depressive symptomology and BMI was not statistically significant ( $\beta = .001$ ,  $SE = .001$ , [95%  $CI = -.002, .001$ ]). The sum of the indirect effects from the interaction of perceived and internalized racism to uterine fibroid diagnosis was not statistically significant ( $\beta = -.005$ ,  $SE = .004$ , [95%  $CI = -.017, .008$ ]).



### ***Covariate Direct Effects***

Five covariates were incorporated in the statistical model. They included: age, education, income, hypertension, and parity. Education was negatively and significantly associated with depressive symptomology ( $b = -1.62$ ,  $SE = .04$ ,  $p < .05$ ), indicating that lower educational attainment is associated with greater depressive symptoms. There was also a statistically significant negative relationship between education and BMI ( $b = -1.40$ ,  $SE = .01$ ,  $p < .05$ ), indicating that lower educational attainment is associated with higher overall BMI. BMI was positively and significantly associated with hypertension in this sample ( $b = .5.20$ ,  $SE = .01$ ,  $p < .001$ ), indicating that higher overall weight is associated with increased likelihood of a hypertension diagnosis.

Additionally, age was positively and significantly associated with the likelihood of a uterine fibroid diagnosis ( $\beta = .373$ ,  $SE = .05$ ,  $p < .001$ ,  $OR = 1.45$  [95% CI = 1.32, 1.60]). This finding indicates that there is a 1.45 times higher odds of uterine fibroid diagnosis for each one-unit increase in age in this sample. Income ( $\beta = .127$ ,  $SE = .05$ ,  $p < .05$ ,  $OR = 1.14$  [95% CI = 1.03, 1.25]) and hypertension ( $\beta = .149$ ,  $SE = .05$ ,  $p < .01$ ,  $OR = 1.16$  [95% CI = 1.05, 1.28]) also had a statistically significant and positive relationship with fibroid diagnosis. These results show that there is a 1.14 and 1.16 higher odds of uterine fibroid diagnosis for each one-unit increase in income and hypertension, respectively.

## **CHAPTER 5: DISCUSSION**

The aim of the present study was to investigate the association between two forms of racism, perceived and internalized, and uterine fibroid diagnosis among African American women recruited from a southern region of the U.S. The study also sought to determine whether the interaction of perceived and internalized racism had a significant effect on the likelihood of a uterine fibroid diagnosis as well as whether depressive symptomology and BMI served as mediators of the association between the racism variables and the outcome of interest.

This study addresses critical gaps in the literature on risk factors for the development of uterine fibroids among African American women, who are disproportionately impacted by the gynecologic condition (American Society for Reproductive Medicine, 2015; Black Women's Health Imperative, 2017a; Eltoukhi et al., 2014; National Institutes of Health, 2018). To date, most risk factors that have been investigated are biological in nature, such as hormones (namely estrogen and progesterone), BMI, and age (Bradford, 2017; D. D. Baird et al., 2013; Office on Women's Health, 2016). What remains understudied is the role of psychosocial risk factors in the development of uterine fibroids, with only a small subset of researchers examining the influence of stress, in particular (D. Baird & Wise, 2011; Boynton-Jarrett et al., 2011; Wise et al., 2007). This is only the second study to explore perceived racism as a predictor of uterine fibroid diagnosis and the first to examine the effects of internalized racism. The inclusion of both forms of racism allows for a nuanced conceptualization of the ways in which racism impacts the reproductive health of African American women and moves the field one step closer toward

identifying the determinants of a condition that is ubiquitous among all women, but is especially so within this particular demographic.

The sample for the present study was comprised of newlywed African American women who resided in a southern region of the U.S. On average, the participants scored in the low range for perceived racism, internalized racism, and depressive symptomology, and in the high range for religiosity and social support. Thus, the African American women who comprised this sample were unique in that despite living in an area with a devastating legacy of racial discrimination and segregation, they perceived low levels of racial discrimination, reported strong pride in their racial identity (as evidenced by low scores on the internalized racism measure), felt strongly connected to their religiosity—which is a pervasive and communal experience in the American South—and felt socially connected to and supported by their family and friends. As newlyweds, these women may also have experienced a pronounced degree of happiness as a function of their new marital status.

This study was guided by an expanded ABC-X model that includes elements of the mundane extreme environmental stress theory (Peters & Massey, 1983). The combined ABC-X/MEES model allowed for investigation of the association between racism and uterine fibroid development among African American women by incorporating experiences of racial discrimination, available resources, perceptions, and the stress induced by mundane, extreme environmental racism into one guiding framework. This study was also informed by Ahmed et al.'s (2007) framework which proposes that racial discrimination leads to changes in neuroendocrine, autonomic,

and immune systems that consequently promote psychological (e.g., depressive symptomology) and physiological (e.g., BMI) changes that result in differential health outcomes (e.g., uterine fibroids).

In the following sections, each research question and hypothesis will be discussed in greater detail. Those will be followed by a discussion of the strengths of the study, its limitations, recommendations for future research, practice, and policy, and the study's overall contributions to the literature.

## **Discussion of Findings**

### ***Research Question 1: Association Between Perceived and Internalized Racism and Uterine Fibroid Diagnosis***

It is well-established in the literature that experiences of racial discrimination are associated with adverse physical (Brondolo et al., 2003; Chae et al., 2010; Chrousos, 2000; Harrell et al., 2003; McEwen, 2006; Tsigos & Chrousos, 2002) and reproductive health outcomes (Giscombé & Lobel, 2005; Hogue & Bremner, 2005; Kramer & Hogue, 2009; Rosenthal & Lobel, 2011). Studies have also indicated positive and significant associations between internalized racism and adverse mental and physical health outcomes (Kwate & Meyer, 2011; Szymanski & Gupta, 2009; J. Taylor, 1990; Tull et al., 1999; D.R. Williams & Mohammed, 2009).

The results of this current study partially support the proposed hypothesis that higher levels of self-reported racism, both perceived and internalized, would be associated with a confirmed fibroid diagnosis. Results indicated perceived racism was positively and significantly associated with uterine fibroid diagnosis, whereas internalized racism was not. The statistically significant relationship between

perceived racism and fibroid diagnosis corroborates the existing literature which purports the detrimental impact of racial discrimination on reproductive health, including the development of uterine fibroids (Anachebe & Sutton, 2003; Black et al., 2015; J. W. Collins et al., 2004; Dominguez, 2008; Geronimus, 1992; Lu & Halfon, 2003; Prather et al., 2016; Rosenthal & Lobel, 2011b). This finding is also in line with the MEES theory (Peters & Massey, 1983), which asserts that the extreme stress caused by racism has debilitating effects on the health of African Americans. By establishing a link between experiences of perceived racism and uterine fibroid diagnosis, the present study corroborates the theory. As established in the racial discrimination framework proposed by Ahmed et al. (2007), it is possible that the chronic and persistent psychosocial distress caused by racism spurs biological processes that alter neuroendocrine, autonomic, and immune systems, increase allostatic load, and ultimately lead to the development of uterine fibroids among African American women.

To date, this is the second study to specifically examine the link between perceived racism and uterine fibroids among African American women. The first study was conducted by Wise et al. (2007) and also showed a positive and statistically significant association between the two variables. While an important contribution to the literature, that study had a number of limitations, including the nature of the discrimination questions, which assessed “everyday discrimination” among participants in lieu of explicit exploration of whether the differential treatment they reported was believed to be attributable to their race. In contrast, the items in the racial discrimination scale used for the present study were framed in a way that

prompted participants to conceptualize the question and proposed scenario in the context of their lived reality as African American women.

The finding that internalized racism was not significantly associated with uterine fibroid diagnosis was surprising and is not consistent with research that has linked internalized racism to adverse health outcomes, including alcohol consumption, blood pressure, abdominal obesity, cardiovascular disease, fasting glucose, and being overweight (Chae et al., 2010; Chambers et al., 2004; D.R. Williams & Mohammed, 2009; H. L. Jones et al., 2007; Szymanski & Gupta, 2009). A number of studies have specifically examined the link between internalized racism and poor mental health (e.g., psychological distress, depressive symptoms) and consistently found positive and significant associations between the two (Carr, Szymanski, Taha, West, & Kaslow, 2014; Hughes, Kiecolt, Keith, & Demo, 2015; Molina & James, 2016; J. Taylor, Henderson, & Jackson, 1991a). Other important findings related to the internalized racism scale include its negative correlation with perceived racism ( $r = -.11, p \leq .01$ ) and social support ( $r = -.17, p \leq .01$ ). Such results suggest that even in the face of perceived racial discrimination, these participants were able to maintain pride in their ethnic heritage and subsequently reported low levels of internalized racism. Additionally, high levels of social support, presumably by family and friends who share similar backgrounds and interests, also played a role in promoting racial pride since high social support scores were associated with low internalized racism scores. It appears, then, that maintaining a strong sense of racial identity (or, conversely, low levels of internalized racism) serves a protective effect

that may mitigate the impact of perceived racism and is also bolstered by strong social support.

The insignificant association between internalized racism and uterine fibroid diagnosis in the measured variable path model can be attributed to the possibility that internalized racism might be operating through a different pathway to uterine fibroid diagnosis in which it is not an independent predictor. An alternative pathway may be one in which perceived racism is associated with internalized racism, which then leads to poor mental health outcomes such as depressive symptomology and subsequently to adverse reproductive health outcomes, including uterine fibroids.

In a recently published literature review, James (2020) summarized findings from 112 empirical quantitative studies to examine the health-related correlates of internalized racism among racial/ethnic minorities. Overall findings indicate that internalized racism is negatively associated with health via decrements in core self-evaluation (C. P. Jones, 2001; CP Jones, 2000; Kohli, 2014; Siy & Cheryan, 2013; Son & Shelton, 2011), exacerbates the association between other stressors and poor health (Glanz & Schwartz, 2008; D. James, 2017; Szymanski & Obiri, 2011a), and, perhaps most interestingly, may mediate the relationship between racial discrimination and health (Banks & Stephens, 2018; J. R. Graham et al., 2016; Tappan, 2006). The mediation hypothesis posits that internalized racism is a result of continued exposure to the stress of racial discrimination (Tappan, 2006) and thus is a critical variable along the pathway between discrimination and outcomes of interest.

In their study of 173 African Americans, Graham et al. (2016) explored internalized racism as a mediator of the association between past-year racist

experiences and anxiety symptomology. Results indicated that internalized racism did, in fact, mediate the association between racial discrimination and anxious arousal and also served as a mediator in the association between past-year racial discrimination and stress symptoms. The researchers conclude that anti-African American messages can normalize stigma, which in turn exacerbates levels of internalized racism, which can subsequently lead to adverse health outcomes (J. R. Graham et al., 2016; D. James, 2020). Based on these research findings, it is possible that internalized racism is not directly associated with uterine fibroids because it should be modeled as a mediator in the pathway instead. In this case, higher levels of racial discrimination might be associated with higher levels of internalized racism, which might then initiate a cascade effect that leads to depressive symptomology, high BMI, and ultimately uterine fibroids.

***Research Question 2: Interaction Effect of Perceived and Internalized Racism on Uterine Fibroid Diagnosis***

The present study is the first to investigate the interactive effect of both perceived and internalized racism on uterine fibroid diagnosis. Study results did not support the hypothesis that there would be an interaction effect between perceived and internalized racism such that higher levels of both would be significantly associated with a higher likelihood of fibroid diagnosis. The lack of a synergistic effect between the two variables and uterine fibroids may be a function of the more pronounced influence of perceived racism compared to internalized racism, as evidenced by the former's strong association with fibroid diagnosis. Moreover, as discussed earlier in the chapter, internalized racism may be a consequence of



experiences of perceived racial discrimination (Banks & Stephens, 2018; J. R. Graham et al., 2016; D. James, 2017; Tappan, 2006). Thus, this form of racism might be more impactful if modeled as a mediator in the pathway rather than an independent predictor since it may be viewed as the result of continued exposure to the stress of racial discrimination.

Undoubtedly, the available literature base supports the continued inclusion of both types of racism variables in addressing adverse health outcomes. For example, in their investigation of the link between racism and cardiovascular disease, Chae, Lincoln, Adler, and Syme (2010) found that internalized racism—operationalized as internalized negative racial group attitudes—was positively associated with cardiovascular disease history. While the authors did not investigate the mediation effect of internalized racism, they found that it moderated the effect of racial discrimination on cardiovascular disease (Chae et al., 2010). Such findings indicate the exacerbated effect that internalized racism may have in the development of cardiovascular disease. This finding is corroborated by other studies which indicate that positive racial regard serves as a protective factor against adverse health outcomes (Haslam et al., 2009; Hughes et al., 2015; Outten et al., 2009; Stets & Burke, 2000; D.R. Williams & Mohammed, 2013). Thus, low levels of internalized racism might prove beneficial in mitigating the effects of distressing racist experiences.

In sum, racial identity serves a key function in the conceptualization of the impact of racial discrimination on overall well-being. While it is informed by perceived racism, it is also distinct since it so closely relates to one's internal sense of

self rather than external forces in society (Ahmed et al., 2007). Thus, racial identity serves a unique role in understanding the ways in which racist events are either integrated into one's sense of self or dismissed entirely. The relationship between the two forms of racism, as it pertains to adverse reproductive health outcomes more broadly, and uterine fibroid development, specifically, needs to be parsed further. Thus, future studies should continue to investigate the combined effects of perceived and internalized racism, perhaps exploring the latter as both a moderator and a mediator of health pathways.

***Research Question 3: Depressive Symptomology and BMI as Mediators of the Relationship Between Racism and Uterine Fibroid Diagnosis***

The results of this study did not support the hypothesis that depressive symptomatology and BMI would partially mediate the association between the racism variables and uterine fibroid diagnosis. Depressive symptomatology did not independently mediate the association between the racism variables and uterine fibroid diagnosis. Similarly, the inclusion of BMI as a second mediator in the model also did not result in a significant mediation pathway between racism and uterine fibroid diagnosis. Nevertheless, various pieces of the proposed pathway were significant in the expected manner. Perceived racism and internalized racism were positively and significantly associated with depressive symptomology such that higher levels of both perceived and internalized racism were associated with greater levels of depressive symptomology. These results are extensively corroborated in the literature (Franklin-Jackson & Carter, 2007; Kwate & Meyer, 2011; Paradies, 2006; Sellers et al., 2003; J. Taylor et al., 1991b; V. L. Thompson, 1996).

Interestingly, the racism interaction term was also positively and significantly associated with depressive symptomology. This additional finding suggests that while perceived and internalized racism are independently associated with depressive symptoms, the multiplicative effect of the two significantly contributes to the development of depressive symptoms above and beyond the main effects of the racism variables individually. More specifically, the results indicated that those who report high levels of internalized racism also report higher levels of depressive symptomology than those who report low levels of internalized racism. Moreover, when high internalized racism is combined with high levels of perceived racism, depressive symptomology increases significantly. This is in comparison to individuals who report low levels of internalized racism and depressive symptomology even while also reporting high levels of perceived racism. Such findings are significant in that they indicate the moderating role of internalized racism in the overall mental health of African American women. That is, when they must contend with high levels of perceived racism in conjunction with high levels of internalized racism, their mental health is significantly and adversely affected. The negative and significant correlation between perceived and internalized racism also corroborates the moderating role of internalized racism. Taken together, these findings indicate that the two forms of racism stand alone as significant predictors of depressive symptomology, and that their combined effect also has impactful and deleterious consequences on the health and well-being of African American women.

There was also a positive and significant association between depressive symptomology and BMI, such that higher levels of depressive symptomology were

associated with higher total BMI. This finding is supported by literature that suggests depressive symptomology may entail decreased or nonexistent motivation to eat healthily and exercise which, in turn, can lead to increased weight and BMI (Faith et al., 2002; Gelenberg, 2010; Luppino et al., 2010). It is also consistent with both the MEES theory (Carroll, 1998; Pierce, 1970, 1974), and Ahmed et al.'s (2007) framework which purport that psychological distress promotes and compounds physiological distress—which may manifest as high BMI—in people of color.

Although current literature has documented that both depressive symptomology and BMI are positively associated with uterine fibroids, such that high levels of both indicate an increased likelihood of uterine fibroid development (Dandolu et al., 2010; Ghant et al., 2015; Neri et al., 2016; Nicholls et al., 2004; Soliman et al., 2017; Wise et al., 2005) those associations were not supported in the present study. These results may be unique to this sample due to the positively skewed distribution of the depressive symptomology variable. The CES-D, which is the depressive symptomology measure used for this study, has a threshold score of 16; if the total scale score is at or above 16, the individual may be at risk for clinical depression. Majority of the women in this sample (85%) had a sum score lower than 16 on the CES-D. Thus, there may not have been enough variability in this variable to accurately reflect the effects of depressive symptomology along the proposed pathway.

Additionally, although more than 50% of the sample consisted of women who were either overweight or obese, BMI was not significantly associated with uterine fibroid diagnosis. Although this is counter to literature that documents a significant

and positive relationship between high BMI and fibroids (D. D. Baird et al., 2007; Marshall et al., 1998; Moore et al., 2008; Neri et al., 2016; Parazzini, 2006; Sommer et al., 2015; Takeda et al., 2008; Templeman et al., 2009; Wise et al., 2005; Yang et al., 2014), it is important to note that none of the available studies have exclusively investigated these associations among African American women. To date, only one study has specifically examined the association between BMI and uterine fibroids among African American women (Wise et al., 2005). Results from that study indicated that normal weight and overweight African American women were at higher risk for developing uterine fibroids when compared to underweight and obese women African American women (Wise et al., 2005). Although the present study did not corroborate such findings, the dearth of literature that explores this phenomenon within this population underscores the need for more research in this area.

It is possible that depressive symptomology did not mediate the pathways between racism and uterine fibroids because other mental health variables might serve as better mediators. Of particular interest is anxiety, which has been linked to racism as well as adverse physical and reproductive health outcomes. Although anxiety is often comorbid with depression, it is unique from the latter namely in that it has a heightening effect rather than the dampening or subduing effect that is typically associated with depression (Fried et al., 2016; Joe et al., 2008; Spence, 1998). This heightened state may promote hypervigilance which, in turn, could exacerbate stress-related physiological processes and lead to adverse health outcomes (Baker et al., 2019; Spence et al., 2001).

Biologically, chronic exposure to racism triggers dysregulation in the HPA axis as well as the cognitive-affective regions of the brain, which includes the prefrontal cortex, anterior cingulate cortex, amygdala and thalamus (Paradies et al., 2015). Disturbed homeostasis in these areas is associated with a number of mental health conditions, including anxiety, and is analogous to activation of brain regions that are associated with physical pain (Berger & Sarnyai, 2015; Eisenberger et al., 2003). The chronic, heightened physiological stress that results from experiences of racial discrimination can also manifest as cardiovascular reactivity and cortisol responses. This heightened stress response and negative emotional stress contribute to higher allostatic load, which has been linked to anxiety and poor physical health outcomes (Bennett et al., 2005; Martin et al., 2003; Miller et al., 2007; Pascoe & Smart Richman, 2009; G. D. Smith et al., 2005).

In addition, a growing number of studies have explored the role of anxiety in reproductive health outcomes. Findings indicate that the mental health condition is consistently associated with adverse outcomes, including shorter gestation, suboptimal fetal neurodevelopment, and poor child outcomes, including attention deficit hyperactivity disorder, impaired cognitive development, and emotional issues (Dunkel Schetter & Tanner, 2012; Glover, 2014).

Overall, it is clear that racial discrimination spurs a number of physiological processes in the human body, many of which promote adverse mental health outcomes, including depression and anxiety. Although the two mental health states prompt similar physiological symptoms, they are also distinct (Fried et al., 2016; Joe et al., 2008; Miller et al., 2007; Pascoe & Smart Richman, 2009) and therefore

deserving of independent investigation. Since anxiety also serves a critical and unique function in the pathway between racism and health (Berger & Sarnyai, 2015; Eisenberger et al., 2003; Glover, 2014; Paradies et al., 2015; Pascoe & Smart Richman, 2009), it may prove to be a better mediator in the proposed pathway than was depression. Thus, future research should investigate anxiety as a mediating variable for the association between racism and uterine fibroid development among African American women.

### ***Additional Findings***

There were a number of significant associations between the covariates and other variables in the model. The five covariates were as follows: age, education, income, parity, and hypertension. Age was positively and significantly associated with uterine fibroid diagnosis. This indicates that as women age, the likelihood of a uterine fibroid diagnosis increases. This finding has been consistently corroborated in the literature. African American women, in particular, are most likely to develop uterine fibroids as they age and also experience earlier ages of onset for the condition (Baird et al., 2003; Laughlin et al., 2009; Marshall et al., 1997; Wise et al., 2007).

Education was negatively and significantly associated with depressive symptomology. These results indicate that lower educational attainment is associated with greater depressive symptomology in this sample of African American women. The link between education and depression is well-established in the literature and is believed to be a manifestation of the skills- and competence-building associated with attaining higher levels of knowledge. Formal education, particularly that which occurs at institutions of higher learning, teaches people how to communicate, solve

problems, develop ideas, and think rationally and logically (G. S. Becker, 2009; Farkas et al., 1997; Kingston et al., 2003). It helps individuals develop effective habits and attitudes as well as competence and the ability and motivation to shape their lives (Mirowsky & Ross, 2016; Ross & Mirowsky, 2006; Wheaton, 1980). In other words, whereas education promotes learned effectiveness, its absence promotes learned helplessness (Ross & Mirowsky, 2006). Thus, those with low educational attainment may experience feelings of powerlessness and fatalism that contribute to overall depressive symptomology (Wheaton, 1980).

Education was also negatively and significantly associated with BMI, indicating that women with low educational attainment in this sample were more likely to be overweight or obese. A large number of research studies have confirmed the inverse relationship between an individual's socioeconomic status and BMI (Crosnoe, 2016; Della Bella & Lucchini, 2015; McLaren, 2007; Sobal & Stunkard, 1989). Studies have also indicated that it is an individual's education level that most influences BMI (De Irala-Estévez et al., 2000; Varo et al., 2003). This finding holds particularly true for women (Martínez-González et al., 1999; Wardle et al., 2002). The association is likely due to the fact that high educational attainment promotes a sense of mastery, control, self-efficacy, self-investment, and a tendency to adopt a long-term perspective that encourages preventive health behaviors (Lynch et al., 1997; Wardle et al., 2002). Thus, women with low educational attainment might be less likely to adopt a long-term health perspective and may overall be less aware of important health behaviors to incorporate into their everyday lives. Moreover, low educational attainment is often compounded by a number of other lifestyle stressors,



such as low-wage employment, that might prompt individuals to prioritize basic daily survival tasks rather than long-term health goals.

Income was positively and significantly associated with fibroid diagnosis. This indicates that women with higher income levels were more likely to be diagnosed with uterine fibroids. Such a finding is likely indicative of access to healthcare which often coincides with higher income levels. That is, women who are gainfully employed and garner higher income are also more likely to have health insurance that allows them to seek medical treatment when they experience abnormal symptoms. While higher-income individuals are more likely to have access to care and therefore more likely to pursue medical treatment when necessary, low-income individuals who do not have health insurance benefits are less inclined to pursue medical treatment—even when they are in poor health—due to cost barriers. The link between access to healthcare and income has been established in the literature (E. M. Howell, 1988; Lazar & Davenport, 2018; Merzel, 2000).

Hypertension was positively and significantly associated with BMI. This indicates that individuals who contended with high blood pressure were more likely to be overweight or obese in this sample. Research studies reveal that both systolic and diastolic blood pressure increase significantly and linearly across BMI levels (Drøyvold et al., 2005; Landi et al., 2018; Linderman et al., 2018; Roka et al., 2015).

Hypertension was also positively and significantly associated with uterine fibroids, indicating that study participants with high blood pressure were also more likely to have been diagnosed with fibroids. Hypertension is a predictor of a number of adverse physical and reproductive health outcomes due to the strain that it places

on the heart and other bodily organs; results of the present study indicate that uterine fibroids are among those adverse outcomes, which is a finding that has been corroborated in the literature (Armanini et al., 2018; Lumsden et al., 2015; Luoto et al., 2001). The significant association between hypertension and uterine fibroid diagnosis points to the possibility that hypertension might also function as a variable along the pathway between racism and uterine fibroid diagnosis rather than a covariate. Since the stress associated with high blood pressure may cause arterial smooth muscle injuries, it is possible that the stress may also damage the smooth muscle cells of the uterus, thus resulting in uterine fibroid formation (Boynton-Jarrett, Rich-Edwards, Malspeis, Missmer, & Wright, 2005; Wise et al., 2007). Thus, hypertension may act as a mediator between experiences of racism, which are inherently stressful, and the development of uterine fibroids.

### **Strengths of the Present Study**

This study has several strengths. It is unique in both the size and composition of the sample. Data were available for 699 participants, which is a robust sample size, particularly within the social science field. In addition, the sample consists of newlywed African American couples—with complete data available for both partners—of varying ages, education levels, and socioeconomic statuses in the southern region of the U.S. Very few research projects have sampled this particular demographic at this scale.

Another strength is the study's inclusion of racism-specific measures. While many studies that investigate the effects of racism use measures that serve as proxies for the construct (e.g., asking participants to indicate how often they experience

differential treatment but not specifying it as racially motivated; Wise et al., 2007) the present study used measures that were targeted and directly assessed perceived racial discrimination and internalized racism. As aforementioned, it is also one of few studies to assess and explore the impact of internalized racism, which contributes to its uniqueness and novelty. Moreover, this is the first study to establish an association between the interaction of perceived and internalized racism and depressive symptomology in addition to the main effects of the racism variables. Thus, it reveals that the multiplicative effect of the two forms of racism has a particularly salient influence on depressive symptom development above and beyond the impact of each of the variables alone.

The use of structural equation modeling as the statistical technique is also a strength. This technique allows researchers to test complex processes, including mediation and moderation, using statistically sophisticated procedures. Thus, I was able to test an advanced statistical model that assessed intricate patterns of relationships between sensitive variables; moreover, I did not have to run several separate analyses to do so, as is typical with most other statistical approaches.

### **Limitations of the Present Study**

The primary limitation in the present study is its cross-sectional design. The analyses conducted relied on data collected during the first wave of the longitudinal HEART Project. Although two additional waves of data were available, all data were collected within a three-year time span. I, in consultation with my dissertation committee, decided against investigating associations across all three waves as there was little variation in scores on all measures within that time period.

Another limitation is that there was little variation in participants' responses for many of the domains of interest in this study. Overall, majority of the participants scored in the low range for perceived racism, internalized racism, and depressive symptomology. The lack of variability in the three variables may have constrained the ability to detect statistical effects. Although they were ultimately removed from the final analytic model, it is notable that there was little variation in both the social support and religiosity variables as well. Moreover, the average scores for both variables were high, indicating that the participants felt very supported by their social networks and were highly religious. Thus, the combination of low perceived racism, internalized racism, and depressive symptomology scores as well as the high scores on the social support and religiosity measures makes this a very unique sample.

While this is positive overall, it is curious that these African American women seemed so remarkably well-adjusted. This may be attributed to social desirability bias, which refers to the tendency of research participants to offer responses that are socially desirable rather than ones that reflect their true feelings (Grimm, 2010). This bias is more likely to occur if the topics at hand are particularly sensitive, such as the racism and mental health variables that were utilized in this study, and if participants are interviewed by research team members in person, which was part of the procedure for the present study. The likelihood of social desirability bias may be further heightened by the fact all sample participants were newlyweds; as such, they may have felt obligated to appear to be living in happily wedded bliss, even if that did not accurately reflect their emotional state. Thus, the uniqueness of this sample and the potential social desirability bias effects may limit the generalizability of the findings.

The lack of variability and high averages for the social support and religiosity measures might have contributed to the inability to detect significant effects for the proposed moderators, which was another limitation of the present study. The findings may also be a consequence of the limited number of items available to fully capture each construct. The social support scale is comprised of five items whereas the religiosity variable consists of only one item. Studies have suggested that having one or too few indicators for any given variable may adversely affect results due to bias, measurement error, unreliable responses, and the uniqueness of each item (Aaker & Bagozzi, 1979; Anderson & Gerbing, 1984; Bergkvist & Rossiter, 2018; Petrescu, 2013). Thus, future research that includes these constructs would likely benefit from using variables with a greater number of indicators.

It may also be that a different dimension of social support is more applicable as a buffer for the association between racism and uterine fibroid development among African American women. The social support scale used in the current study assessed general support available and obtained from family and friends. Questions were broadly stated and asked participants to endorse whether their friends and family were reliable and trustworthy. Women in the sample scored highly on this measure. It is possible that other forms of support would be better moderators in this sample. The social support scale developed by Kendler et al. (2005), for instance, assesses emotional and instrumental support from a variety of people, including the spouse, parents, children, siblings, other relatives, and friends. The scale also ascertains frequency of contact and network size to help determine the degree and impact of the social support network. Other researchers have defined social support in a number of

ways, including the meaning given to social ties, problem-solving behaviors, doing and giving, sharing activities, and emotional, instrumental, and financial aid (Berkman, 1984; Gottlieb, 1978; Henderson, 1977). Since this study only investigates broad conceptualizations of social support from family and friends, it is possible that more specific forms of social support would meaningfully moderate the association between racism and uterine fibroid development among African American women.

Another limitation was the limited availability of alternative or additional mental health variables in the dataset. As a result, depressive symptomology was the only mental health variable included in the path model for the present study. However, anxiety, global psychological distress, cognitive function, quality of life, or other mental health variables might have served as sufficient and impactful mediators that offered a new dimension to the current work.

The time frames specified in several of the measures may also present as a limitation in the present study. The uterine fibroid measure required participants to indicate if they had ever been diagnosed with the condition in their lifetimes. Although it was not reported here, participants were also asked to indicate in what year the diagnosis was made. The internalized racism scale assessed overall racial/ethnic pride without time constraints. Conversely, the perceived racism scale asked participants to indicate whether they had been racially discriminated against in the *past year*. While this particular measure was time-constrained, studies have indicated that past-year racism serves as an appropriate proxy for chronic racism experienced over a lifetime (D. T. Barry & Grilo, 2003; Bowen-Reid & Harrell, 2016; Landrine & Klonoff, 1996; Paradies, 2006; Sellers et al., 2003; Utsey & Ponterotto,

1996). Additionally, the depressive symptomology measure asked whether they had experienced any depressive symptoms within the *past week*. Since the timing of the variables was not concurrent, it is difficult to establish definitive chronological causation for the reported associations; thus, generalizability for the study may be limited.

### **Recommendations for Future Research, Policy, and Practice**

Future research may build upon this study in a number of ways. First, researchers should continue to explore the role of internalized racism in the pathway between racism and reproductive health outcomes. In a different sample, it may serve well as a predictor, moderator, or mediator, depending on the accompanying variables in the proposed pathway. Analytic models might also incorporate other contributors to stress that may impact the pathway between racism and uterine fibroid development. These might include neighborhood characteristics, financial stress, childhood trauma, intimate partner violence, and relationship characteristics.

In addition, the present study only examines depressive symptomology as a mediating mental health variable. Future studies may benefit from the use of other mental health variables including, but not limited to, anxiety. In the same vein, researchers should also continue to explore potential moderators that might exist along the racism and reproductive health pathway. These might include more robust and varied social support and religiosity measures.

Future researchers might also explore hypertension as a variable in the pathway between racism and uterine fibroid diagnosis rather than a covariate. Hypertension, like uterine fibroids, is a disease of smooth muscle cells. The resultant

stress from elevated blood pressure might cause injury to the smooth muscle cells, which may subsequently lead to uterine fibroid development (Boynton-Jarrett et al., 2005; Luoto, Rutanen, & Auvinen, 2001; Wise et al., 2007). The association between hypertension and uterine fibroids has been established in a small number of research studies, to date (Boynton-Jarrett et al., 2005; Luoto et al., 2001; Faerstein, Szklo, & Rosenshein, 2001) and was also corroborated in the bivariate associations reported in the present study. Thus, future researchers might examine high blood pressure as a predictor in the pathway proposed in this study.

As this study was cross-sectional in nature, future research should take a longitudinal approach to investigate the influence of racism on reproductive health outcomes among African American women. In addition to bolstering the evidence of a causal association, findings could also serve to determine whether prolonged exposure to racial discrimination or deeply entrenched internalized racism spurs uterine fibroid development and growth. Researchers may also consider incorporating physiological stress measures into future studies. By examining cortisol and other stress hormone levels—including their changes over time—investigators can provide evidence of the biological impact of racism. Such research would be a significant contribution to both the social science and public health literature bases.

Future research might also entail multilevel analyses in an effort to identify higher-level factors that may influence the association between racism and reproductive health outcomes. These could include racial self-concept and community characteristics (e.g., ethnic heterogeneity or homogeneity, attitudes toward



racial/ethnic minorities, access to healthcare services), both of which could be explored as latent factors.

Finally, future research studies should investigate the present study's measured variable path model in a sample with more geographical diversity. This study's sample was comprised entirely of African American couples in the southern region of the U.S. The lived reality of being an African American person varies as a function of a number of factors, including those that are intrapersonal (e.g., genetics, personality), interpersonal (e.g., nature of relationships with other people), and environmental (e.g., community, neighborhood, and regional characteristics). Thus, studies of African Americans in varied contexts, such as the northern, midwestern, and western regions of the country, and who report varying levels of perceived and internalized racism, depressive symptomology, religiosity, and social support, might yield different and noteworthy results.

The results of the present study may influence both policy and clinical practice in a number of ways. First, the findings underscore the role of racial disparities in African American mental health since perceived racism, internalized racism, and the interaction of the two forms of racism were each positively and significantly associated with depressive symptomology. Depressive symptoms adversely impact daily life in multiple arenas, including family engagement and participation and performance in employment and educational settings. These findings highlight the importance of policies that require mental health screening during routine healthcare visits and connection to behavioral/mental health services, as indicated.

In addition, perceived racial discrimination was positively and significantly associated with the likelihood of uterine fibroid diagnosis. Thus, clinical care policy should encourage medical professionals, particularly those who work in fields centered around women's health (e.g., obstetrics and gynecology), to screen patients for experiences of stress, trauma, and discrimination. To minimize burden among doctors and maximize system efficiency, routine screening can be implemented as part of the social work or nursing intake process. If patients score highly on the measures, social workers can connect them to behavioral health care or local advocacy and support organizations. Scores above the applicable threshold should also be documented in the patient's chart and reported to the attending physician who should complete further gynecologic evaluation since the literature, including the present study, establishes that experiences of racism are linked with poor reproductive health outcomes. Since uterine fibroids are risk factors for a variety of poor health conditions (Black Women's Health Imperative, 2017a; Pritts et al., 2009), these evaluations should include ultrasounds that allow for the detection and possible treatment of the benign tumors, if indicated. Screenings might be repeated at appropriate intervals to ensure continued monitoring and linkage to care. A shift toward addressing psychosocial risk factors is occurring in pediatric oncology as medical providers are increasingly recognizing the utility and importance of early detection; in doing so, they mitigate harm and promote long-term wellness for the patients entrusted to their care (Kazak et al., 2012, 2017). I recommend that medical providers in gynecology and obstetrics centers, clinics, and hospital wards move toward this model as well.

For women who do not present for care due to lack of access, distrust in the healthcare system, or other reasons, it is critical to have other ways of guarding against discrimination—to the extent possible—and assessing and addressing it when it does occur. The effort to combat experiences of racial discrimination calls for policy shifts at the institutional, community, regional, and national levels. This might take the form of mandated workplace trainings around cultural competence and revamped legislation that erects safeguards against overt acts of racial discrimination in employment and educational sectors and issues consequences when those safeguards are breached. There should also be widespread, confidential, and user-friendly reporting systems in place whereby women can exhibit agency and report acts of discrimination that they experience in professional settings. Community-based agencies should also work to establish themselves as safe spaces in which African American women can report and process through experiences of racial discrimination and their subsequent effects. Social workers and other staff members at these agencies may serve critical roles in connecting these women to appropriate care so that health professionals can assess the psychological and/or physical consequences that may have been emerged as a function of the oppression.

The findings presented in the current study also inform psychological clinical practice. Leaders and directors of mental health settings should emphasize the importance of cultural competence and require staff trainings on the topic at least once per year. It is imperative that mental health professionals, regardless of their own racial/ethnic background, be willing and able to engage in race-based conversations with clients of all races and ethnicities in order to honor and

acknowledge the privilege or oppression inherent in their daily lives. For people of color who report feeling distraught and oppressed as a result of racially discriminatory experiences, treatment should entail processing adverse encounters that remain psychologically distressing and should prioritize fostering individual strength and capacity. Additional treatment goals might include helping patients develop healthy coping mechanisms, effective communication and problem-solving skills, and a reliable support network on which they can rely in their times of need. Finally, mental health professionals should refer patients to medical doctors for physical and reproductive health evaluations in an effort to facilitate early detection and treatment of any adverse health outcomes that may be a result of their psychological distress.

## **Conclusion**

The present study contributes to and builds upon the existing literature in several ways. First, it corroborates the positive and significant associations between perceived and internalized racism and depressive symptomology, as well as the significant association between depressive symptomology and BMI for African American women. It also establishes a statistically significant association between perceived racism and the likelihood of a uterine fibroid diagnosis, thereby underscoring the adverse impact of racial discrimination on reproductive health. This finding is in line with the sole other study (Wise et al., 2007) on this topic, to date. Importantly, the present study investigated uterine fibroid development in a sample of African American women, who represent the demographic most impacted by the benign tumors. Thus, the present work makes a significant contribution to the body of

knowledge regarding potential psychosocial stressors associated with uterine fibroids for this racial/ethnic minority group.

Overall, this study's findings underscore the physiological manifestation of psychological processes and the continued deleterious effect of racism on African American women's health and well-being. It is my hope that these results will pave the way for continued investigation of uterine fibroids, a gynecologic condition that remains only partially understood in the medical community but hugely impactful in the daily lives and reproductive success of African American women.

## Tables

**Table 1**

*Sample Descriptive Statistics*

	Total sample		Participants with uterine fibroid diagnosis ( <i>n</i> = 89; 13%)		Participants without uterine fibroid diagnosis ( <i>n</i> = 608; 87%)	
	N (%)	Mean (SD)	n (%)	Mean (SD)	n (%)	Mean (SD)
<b>Variable</b>						
Age		33.54 (9.58)		41.65 (10.42)		32.39 (8.87)
Education						
Trade school or less	245 (35%)		30 (34%)		213 (35%)	
Some college or more	454 (65%)		59 (66%)		395 (65%)	
Gross annual income						
Less than or equal to \$40,000	549 (79%)		60 (68%)		487 (80%)	
More than \$40,000	107 (15%)		26 (29%)		81 (13%)	
Hypertension diagnosis						
No	552 (79%)		49 (55%)		501 (82%)	
Yes	147 (21%)		40 (45%)		107 (18%)	
Parity						
0 – 2 births	339 (49%)		41 (46%)		298 (49%)	
3 or more births	189 (27%)		32 (36%)		157 (26%)	

**Table 2***Scale Means and Standard Deviations*

Variable	Mean (SD)
Perceived racial discrimination (range 10 – 39)	14.38 (4.95)
Internalized racism (range 13 – 42)	22.88 (4.97)
Depressive symptomology (range 0 – 50)	8.27 (8.42)
Body mass index (range 17.16 – 71.22)	30.43 (7.63)
Social support (range 6 – 25)	21.04 (3.45)
Religiosity (range 1 – 5)	3.66 (0.79)

**Table 3***Pearson Correlations for Continuous Variables*

Variable	1	2	3	4	5	6	7
1. Age	1.0						
2. Perceived racism	-.07	1.0					
3. Internalized racism	.14**	-.11**	1.0				
4. Depressive symptomology	-.07	.19**	.09*	1.0			
5. Body mass index	.16**	.04	.05	.07	1.0		
6. Religiosity	.11**	.04	-.01	-.03	-.08*	1.0	
7. Social support	-.08*	.01	-.17**	-.09*	-.06	.04	1.0

Note: \* $p \leq .05$ . \*\* $p \leq .01$ .



**Table 4***Path Coefficients with “Uterine Fibroid Diagnosis” as the Dependent Variable*

	Unstandardized coefficient		Standardized coefficient		Sig
	B	Std. Error	$\beta$	Std. Error	
<b>Predictor Variable</b>					
Perceived racism	.03	.22	.17	.05	.001
Internalized racism	-.02	.24	-.10	.06	.090
Racism interaction	.002	.13	.04	.03	.236
Depressive symptomology	-.01	.13	-.06	.05	.241
Body mass index	-.01	.41	-.07	.06	.242
Age	.04	.11	.37	.05	.000
Education	-.02	.13	-.01	.06	.884
Gross annual income	.34	.14	.13	.05	.015
Hypertension diagnosis	.37	.13	.15	.05	.003
Parity	.04	.14	.02	.07	.802

**Table 5***Path Coefficients with “Depressive Symptomology” as the Dependent Variable*

	Unstandardized coefficient		Standardized coefficient		Sig
	B	Std. Error	$\beta$	Std. Error	
<b>Predictor Variable</b>					
Perceived racism	.37	.05	.21	.03	.000
Internalized racism	.18	.06	.11	.04	.004
Racism interaction	.02	.05	.07	.03	.021
Age	-.08	.05	-.09	.05	.084
Education	-.08	.04	-.09	.04	.024
Gross annual income	-.04	.05	-.04	.04	.356
Hypertension diagnosis	.01	.05	.01	.05	.787
Parity	.03	.04	.03	.04	.436

**Table 6***Path Coefficients with “Body Mass Index” as the Dependent Variable*

	Unstandardized coefficient		Standardized coefficient		Sig
	B	Std. Error	$\beta$	Std. Error	
<b>Predictor Variable</b>					
Depressive symptomology	.07	.01	.07	.03	.023
Age	.01	.01	.02	.04	.684
Education	-.03	.01	-.09	.04	.017
Gross annual income	.01	.02	.03	.04	.503
Hypertension diagnosis	.10	.01	.28	.04	.000
Parity	.02	.01	.06	.05	.164

# Appendices

## Appendix A

### Perceived Racial Discrimination Items

- 1) During the past year, how often has someone said something derogatory or insulting to you just because you are African American?
- 2) During the past year, how often has a store owner, sales clerk, or person working at a place of business treated you in a disrespectful manner just because you are African American?
- 3) During the past year, how often have the police stopped you just because you are African American?
- 4) During the past year, how often has someone ignored you or excluded you from some activity just because you are African American?
- 5) During the past year, how often has someone suspected you of doing something wrong just because you are African American?
- 6) During the past year, how often has someone yelled a racial insult at you?
- 7) During the past year, how often has someone threatened to harm you physically just because you are African American?
- 8) During the past year how often have you been treated unfairly just because you are African American?
- 9) During the past year, how often have you encountered anyone who did not expect you to do well just because you are African American?
- 10) During the past year, how often has anyone discouraged you from trying to achieve an important goal just because you are African American?

## **Appendix B**

### **Internalized Racism Items**

- 1) African Americans do not speak as well as Whites. (R)
- 2) Being African American is an important part of my self-image.
- 3) African Americans who make good grades in school are acting White. (R)
- 4) I am more comfortable being around African American than White people.
- 5) In general, I feel close to African American people.
- 6) I often regret that I am African American. (R)
- 7) Most of my close friends are African American.
- 8) I feel good about African American people.
- 9) I wish my skin were lighter. (R)
- 10) I am happy that I am African American.
- 11) White people look better than African American people. (R)
- 12) Sometimes, I wish I were White. (R)
- 13) I believe that because I am African American I have many strengths.

## Appendix C

### Depressive Symptomology Items\*

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

\*Items assessed the frequency of each symptom within the past week.

## **Appendix D**

### **Social Support Items**

- 1) No matter what happens, I know that my friends will always be there for me.  
(R)
- 2) No matter what happens, I know that my family will always be there for me.  
(R)
- 3) I have at least one friend or family member I could tell anything. (R)
- 4) When I want to go out and do things, I have someone who would enjoy doing these things with me. (R)
- 5) There are friends in my life who are so close to me that I think of them as relatives even though they are not really related to me. (R)

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