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THE HEART OF STRENGTH: THE STRONG BLACK WOMAN SCHEMA AND CARDIOVASCULAR DISEASE RISK

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A dissertation proposal submitted in partial fulfillment of the requirements for the degree of Doctor of Philosophy at Virginia Commonwealth University

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Acknowledgements

"Here's to Strong Women…

May we know them,

May we raise them,

May we be them."

- Unknown

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Abstract

THE HEART OF STREGNTH: THE STRONG BLACK WOMAN SCHEMA AND CARDIOVASCULAR DISEASE RISK AMONG BLACK WOMEN

By Jasmine Alexis Abrams, B.S., M.S.

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Black women are disproportionately affected by cardiovascular disease (CVD). While chronic stress has been identified as a key contributor to CVD risk, research has not identified the specific mechanisms through which stress influences CVD risk among Black women. Research suggests that in response to stress, Black women who internalize the SBW Schema engage in high effort coping, avoidant coping, postponement of self-care, and other maladaptive health behaviors and experience premature health deterioration. However, it is important to consider that internalization of the SBW Schema may exert differential effects on the physiological profiles of Black women due to varied interpretations of experiences filtered through the Schema and differences in emotion regulation. As emotion regulation has a robust impact on cardiovascular outcomes, individual differences in internalization of the SBW Schema

may be explained by this related construct. Given that limited research has examined the impact of psychological factors associated with CVD risk in Black women, the current study examined relations between CVD risk, chronic stress, emotion regulation, and the Strong Black Woman (SBW) Schema. Hypotheses were: 1) internalization of the SBW Schema (i.e., higher levels of endorsement) and chronic stress are unique predictors of CVD risk, 2) the relation between internalization of the SBW Schema and CVD risk will be partially mediated by emotion regulation, and 3) the effect of chronic stress on CVD risk will be moderated by internalization of the SBW Schema. Results provided partial support for the first hypothesis and did not support the second and third hypotheses. Results of exploratory analyses revealed relationships among psychological variables, such that greater endorsement of SBW Schema characteristics (obligation to manifest strength, dedication to care, independence, and emotion suppression) was related to greater overall difficulties with emotion regulation. Additionally, greater dedication to care predicted lower CVD risk and greater emotional suppression predicted higher CVD risk. The relationship between emotional suppression and CVD risk was mediated by emotion regulation. Results stand to inform future research and culturally specific prevention strategies to decrease CVD risk in Black women.

The Heart of Strength: The Strong Black Woman Schema and Cardiovascular Disease Risk

> …while struggling with the reality of being a human instead of a myth, the strong black woman passed away…those who knew her know she died from being silent when she should have been screaming …She died from raising children alone … from sacrificing herself … from race memories of being snatched and raped and snatched and sold and snatched and bred and snatched and whipped and snatched and worked to death… from hiding her real feelings until they became hard and bitter enough to invade her womb and breasts like angry tumors… from never being enough of what men wanted, or being too much for the men she wanted. She died from being too black and died again for not being black enough… from castration every time somebody thought of her as only a woman, or treated her like less than a man …executed by high tech ignorance while she carried the family in her belly, the community on her head, and the race on her back… (Mataka, 2000).

The above excerpt is from a poem entitled "The Strong Black Woman is Dead." The poem takes readers on a journey through frequently encountered struggles of Strong Black Women. The author details the repercussions Black women face for constantly living up to societal expectations of strength. In this poem, Mataka (2000) highlights the stressors experienced by Strong Black Women and points to their strength as the cause of psychological turmoil, premature health deterioration, and ultimately their untimely death. Is there any validity to this metaphorically laced literature? Disparate health conditions experienced by Black women, including disproportionately high cardiovascular morbidity and mortality, pose the question: What is at the heart of Black women's strength? Moreover, what does the heart of a

stress-laden Strong Black Woman look like? Can chronic stress and beliefs about what it means to be a Black woman interact to produce adverse health outcomes? This study seeks to shed light on these questions by better understanding the psychological processes associated with cardiovascular disease (CVD) risk and outcomes among Black women.

In this introductory section, key terms are defined, followed by a description of the importance of examining CVD risk among Black women. This section ends with an overview of the current study and an explanation of the study's significance.

Definition of Key Terms

Two terms that are frequently used in this study are "Black" and "CVD." As defined by the United States (U.S.) Census Bureau (2011), the term "Black" is used to describe people whose ancestry is rooted in Black ethnic groups of Africa. Black people include, but are not limited to, individuals who identify as Black and/or are from Africa or it's diaspora (e.g., African American, Kenyan, Nigerian, or Haitian).

CVD includes a number of disorders. Specifically, CVD is defined as various disorders that affect the blood vessels, the heart, or both. These illnesses include, but are not limited to, coronary heart disease, heart failure, and stroke (Go et al., 2013).

Why is it Important to Study CVD Risk Among Black Women?

Higher prevalence of CVD risk. CVD is a 444 billion dollar epidemic impacting the lives of an estimated 80 million people living in the United States (U.S.) (Lloyd-Jones, Adams, & Carnethon, 2009). Killing roughly one woman each minute, CVD results in one in three deaths among women annually. Compared to women of other ethnic groups, Black women bear a disproportionate CVD burden as they more likely to experience CVD and associated risk factors compared to women of other racial/ethnic backgrounds (Roger et al., 2012). CVD among Black

women in the U. S. is a national public health concern and a threat to individual and public health.

CVD affects 46.9% of Black women age 20 and over (Roger et al., 2012) and is the leading cause of death in this demographic group (National Center for Health Statistics, 2009). Rates of CVD are expected to increase and continue to follow current trends. By the year 2030, it is expected that 116 million U.S. residents will have some form of CVD and direct medical costs are expected to exceed 800 billion dollars. Racial/ethnic disparities are also projected to persist, such that Blacks will continue to experience higher cardiovascular morbidity and mortality (Heidenreich et al., 2011).

Disparities in treatment. Given the disparities in prevalence, it is not surprising that Black women are less likely to receive appropriate disease management treatments for CVD (Canto et al., 2000; Cook, Ayanian, Orav, & Hicks, 2009; Howard et al., 2006; Smedley, Stith, Nelson, & Institute of Medicine - U.S., 2003; Vaccarino et al., 2005). A study of approximately 27, 000 Medicare recipients found that Black women were least likely to receive lifesaving treatment for a heart attack compared to Black men, White men, and White women (Canto et al., 2000). Similar trends hold for Black women regardless of physician race (Chen, Rathore, Radford, Wang, & Krumholz, 2001). Another study, conducted with 720 physicians found that Black women were less likely to be referred for cardiac catheterization (a procedure used to diagnose and treat some forms of CVD) when experiencing identical symptomatology to Black men and Whites (Schulman et al., 1999). In addition, Black women are more likely to receive insufficient preventive care, which is essential to abating the personal, societal, and economic burden of CVD (Jha et al., 2003).

Why are women and especially Black women more likely to receive inferior preventative care and treatment? Researchers have speculated that this may be due to differences in and presentation of CVD symptoms among men and women (Kannel, Wilson, D'Agostino, & Cobb, 1998; McSweeney, Cody, O'Sullivan, Elberson, Moser, & Garvin, 2003; Shaw, Bugiardini, & Merz, 2009). This finding emerges out of the methodological and practical problems associated with generalizing results of male dominated CVD research to other populations. In response to this issue, the National Institutes of Health (NIH) began to require that researchers address the inclusion of women and minorities in clinical research (Freedman et al., 1995). Researchers have made efforts to focus on women specifically in heart related research, pointing to gender differences in psychological and physiological factors as reasons for elevated CVD risk and inferior prevention and treatment strategies among women.

A meta-analysis of research from 1995 to 2009 found unique psychological factors (beyond depression, anxiety, anger suppression, and general interpersonal stress) that increase CVD risk among women relative to men. Such factors include general anxiety, hostility, work-related stress, and stress from responsibilities at home or multiple roles (Low, Thurston, & Matthews, 2010). Though informative, these studies fail to explain Black women's elevated risk above women of other ethnic groups. It is possible that Black women experience unique forms of stress and/or cope with stress differently than women of other ethnic groups. Knowledge about the unique experiences and practices of Black women need further investigation to provide greater insight into their experience with disparate rates of CVD.

Importance of research. Research on cultural beliefs and practices that influence patient preferences, lifestyle choices, and patterns of healthcare service utilization is needed as these are important factors that influence health outcomes (Mensah, 2005). Further, culturally

relevant prevention and treatment strategies are more effective than non-tailored strategies for improving health outcomes (Anderson, Scrimshaw, Fullilove, Fielding, & Normand, 2003; Campbell & Quintiliani, 2006). However, limited research has examined such factors among Black women at risk for CVD. Despite Black women's overrepresentation in CVD, they continue to be underrepresented in heart related studies. Women comprise only 24% of participants (Roger et al., 2012) and Black women likely account for an even smaller percentage given the historical underrepresentation of Blacks in health related research (Hilton et al., 2010; Sheikh, 2005). The poor representation of women, Black women in particular, in CVD research compromises the quality of information available to researchers, health care providers, and consumers.

A better understanding of the psychological and cultural underpinnings of Black women's experiences may assist in identifying specific processes that contribute to increased CVD risk and negative health outcomes. Increasing available knowledge about factors that influence the cardiovascular health of Black women can assist in bolstering prevention and treatment efforts. Such knowledge will be useful for future research, program development, and treatment of Black women with CVD. The current study seeks to contribute to the literature with the goal of enhancing understanding of psychological processes that influence CVD risk among Black women.

Study Overview

Although chronic stress has long been implicated in the etiology of CVD (Cohen, Janicki-Deverts, & Miller, 2007; Dimsdale, 2008; Epel et al., 2006; Hamer, Molloy, & Stamatakis, 2008; Hamilton-Mason, Hall, & Evertt, 2009; House, 1974) there remains a need to better understand the mechanisms through which chronic stress increases risk among Black

women. The literature has identified maladaptive emotion regulation as a process that increases CVD risk (Lovallo & Gerin, 2003). However, limited research has investigated the relationship between emotion regulation and CVD risk among Black women. It is possible that Black women experience disproportionately higher rates of CVD due to unique ways of perceiving and coping with chronic stress. These gaps in the literature increase difficulty in fully understanding the relationship between chronic stress and CVD outcomes among this population.

Recent research suggests that Black women engage in behaviors associated with CVD risk as a consequence of internalization of a gendered schema, known as the Strong Black Woman (SBW) Schema (Woods-Giscombé, 2010). The SBW Schema is a salient cultural construct characterized by dedication to the care of others, resilience, racial/ethnic pride, the perceived obligation to independently embrace multiple roles and expectations (e.g., economic welfare, childcare, etc.), determination to succeed, and the perceived obligation to exude strength and suppress emotions (Abrams, Maxwell, Pope, & Belgrave, 2014; Woods-Giscombé, 2010). Research suggests that in response to stress, Black women who internalize the SBW Schema engage in high effort coping, avoidant coping, and postponement of self-care. It is theorized that Strong Black Women engage in health compromising behaviors and experience role strain, psychological distress, prolonged physiological activation of stress responses, and premature health deterioration as a result of internalizing the SBW Schema (Black & Woods-Giscombé, 2012; Woods-Giscombé, 2010).

However, it is important to consider that internalization of the SBW Schema may exert differential effects on the physiological profiles of Black women due to varied interpretations of experiences filtered through the Schema and individual differences in emotion regulation. For example, some women internalizing the Schema may experience positive emotions (e.g., feelings

of self-efficacy), while others experience negative emotions (e.g., feeling overwhelmed). As emotion regulation has a robust impact on cardiovascular outcomes, individual differences in internalization of the SBW Schema may be explained by this related construct. No research exists to support or refute these notions. Further, given that limited research has examined the impact of psychological factors associated with CVD risk in Black women, the current study examined relations between CVD risk, perceived chronic stress, emotion regulation, and the Strong Black Woman (SBW) Schema.

Significance of the Study

The current study offers an important contribution to the literature through its cultural specificity and use of objective measures to examine CVD risk among a high-risk and traditionally underserved group. In addition, this research offers more comprehensive information than has previously been available about the psychological underpinnings of CVD risk among Black women. Identifying gender and culturally specific variables associated with increased CVD risk should provide valuable information that can directly inform more culturally specific prevention programs and treatments.

The following section provides a literature review of CVD among Black women, including a discussion about types of CVD that impact Black women and common risk factors. In addition, chronic stress and emotion regulation are discussed as they relate to CVD. Next, the SBW Schema is reviewed, the theoretical framework is explained, and a framework is presented to illustrate the influence of the SBW Schema on health outcomes, namely CVD. The statement of the problem including hypothesis follows. After which the methods, results, and discussion sections are presented.

Literature Review

This section begins with a review of CVD among Black women, including prevalence rates and disparity statistics for different types of CVD as well as information about risk factors. Chronic stress and emotion regulation will also be discussed as they relate to CVD risk. The review of relevant literature on the SBW Schema includes a detailed description of the construct, historical context in which the construct was developed, and an overview of related constructs. A discussion of the theoretical perspectives used to guide this study is provided, including descriptions of Gender Schema Theory (Bem, 1981) and Identity Based Motivation Theory (Oyserman, 2007). The relation of the SBW Schema to health behaviors and outcomes is reviewed concluding with a summary of the literature review.

CVD Among Black Women

Types of CVD and prevalence among Black women. While hypertension and coronary heart disease are the most common types of CVD, other types include heart failure and stroke (Go et al., 2013). Each of these diseases will be discussed with regard to prevalence rates and disparities for Black women.

Hypertension (HTN). HTN, also known as high blood pressure, is a condition in which the force of blood applied to the walls of veins is consistently elevated (National Heart, Lung, and Blood Institute, 2012d). Blood pressure is expressed in two numbers, systolic (pressure when the heart beats) and diastolic (pressure when the heart is resting between beats) pressures. When blood pressure measurements are expressed, the systolic number is written before or above the diastolic number. Stage 1 HTN is quantified as systolic pressure between 140-159 millimeters of mercury (mmHg) or diastolic pressure between 90-99 mmHg. Stage 2 HTN is quantified as systolic pressure of 160 mmHg or higher or diastolic pressure of 100 mmHg or higher (National Heart, Lung, and Blood Institute, 2012d).

Among adults age 20 and over, 50% of Black women have HTN compared to 42.6% of Black men (Go et al., 2013). According to the U.S. Department of Health and Human Services (2009), this condition tends to develop earlier in life for Black women when compared to White women, with many Black women developing HTN by the age of 55 (Oparil, Zaman, & Calhoun , 2003). HTN increases risk for stroke, heart failure, and other types of heart disease, all of which are experienced at higher rates among Black women (U.S. Department of Health and Human Services, 2009).

Coronary heart disease (CHD). CHD, also called coronary artery disease, is a disease of the blood vessels that supply oxygen and blood to the heart. This disease is typically caused by atherosclerosis, the build-up of plaque (a waxy substance made primarily of cholesterol, fat, and calcium) that results in narrowed or blocked arteries and prevents the heart from receiving the oxygen and blood flow needed to function properly. Over time, CHD can lead to angina (chest pain) and myocardial infraction, also called heart attack (blood flow to the part of the heart is blocked typically resulting in death of part of the heart). CHD can also contribute to heart failure (heart is not able to pump enough blood to meet the body's needs) or arrhythmias (heart beats at an abnormal rate or rhythm) (National Heart Lung and Blood Institute, 2012b).

Black women experience CHD at a rate slightly higher (7.1%) than that of Black men (6.8%). According to the American Heart Association, nearly 20,000 Black women died from CHD in 2009. Further, Black women die from CHD at higher rates than White women, with 37.9% of Black women dying before age 75 compared to 19.4% of White women (Go et al., 2013).

Heart failure (HF). HF occurs when the heart is unable to adequately pump blood to meet the body's needs. This condition can manifest in two ways; either the heart has difficulty

filling up with blood or the heart does not have enough force to distribute blood throughout the entire body. It is possible for people to simultaneously experience both variations of this condition (National Heart, Lung, and Blood Institute, 2012c).

In general, Blacks experience higher rates of HF than other racial or ethnic groups (American Heart Association, 2010). One in 100 Blacks under the age of 50 develops HF (Bibbins-Domingo et al., 2009). Though the prevalence of HF is smaller than that of other types of CVD, the rate of HF is 20 times higher among Blacks than Whites of similar ages. The rate of HF among Black adults in their 30s and 40s is similar to rates experienced by Whites in their 50s and 60s (Bibbins-Domingo et al., 2009). Specifically, among adults age 20 and over, Black women experience the highest prevalence (3.6%) of HF compared to Black men (3.0%), White men (3.2%), White women (2.1%), Mexican American men (1.7%), and Mexican American women (1.8%) (Go et al., 2013).

Stroke. A stroke, also called cerebral vascular accident (CVA), occurs when blood flow to the brain is stopped or interrupted by a blocked blood vessel or a blood vessel ruptures causing bleeding in or around the brain. When the brain is not receiving oxygen rich blood, brain cells may die which can cause irreparable damage to the brain and body (National Institute of Neurological Disorders and Stroke, 2013).

In recent years the incidence of CVA has decreased among Whites. Blacks, however, have not experienced decreased incidence rates. Further, the risk of first ever CVA among Blacks is about twice the risk of Whites (Go et al., 2013). Data from a longitudinal study sponsored by the National Heart, Lung, and Blood Institute, revealed that the incidence of CVA among Black women was higher than that of White men and women. For example, the incidence rate (per 1,000 persons) for Black women age 45 to 54 was 7.2, the incidence rate for ages 55 to

64 was 10.0, and 15.0 for ages 65 to 75. Incidence rates for White women in the same age ranges were 2.4, 4.8, and 9.8, respectively (National Heart, Lung, and Blood Institute, 2006). In addition, recent data show that the prevalence of CVA is slightly higher for Black women than Black men, 4.7% and 4.3% respectively. Black women also have higher rates of premature deaths due to CVA, with 39% dying before age 75 compared to 17.3% of White women (Keenan & Shaw, 2011).

As Black women suffer disproportionately from various types of CVD, it is important to have a better understanding of what factors increase their risk for experiencing these conditions disparately. The following section will explore, in greater detail, some of the most common CVD risk factors among Black women.

Common risk factors for CVD. In addition, to experiencing CVD disproportionately, Black women also experience higher rates of risk factors than women of other ethnic groups (U.S. Department of Health and Human Services, 2009). These risk factors include family history and genetics, physical inactivity, overweight/obesity, and diabetes. Though not experienced disproportionately by Black women, smoking and high cholesterol are also common risk factors for CVD.

Family history and genetics. Individuals with a family history of CVD experience a dramatic increase in CVD risk. For example, parental history of premature heart attack increases heart attack risk in women by 70% (Lloyd-Jones et al., 2004; Sesso et al., 2001). In addition, sibling history of CVD increases CVD risk by 50% (Murabito et al., 2005). Researchers hypothesize that the increased risk of CVD in individuals with a family history of CVD can be partially explained by genetics. However, a full explanation of the role of genetics in CVD risk

does not yet exist. Further, genetic markers of risk do not increase predictability of CVD risk assessment measures (Paynter et al., 2010).

Smoking. Approximately 19% of adult Black women are smokers, a rate lower than that of Black men (23%) and White women (21%) (National Center for Health Statistics, 2010). Smoking is a means to relieve psychological stress (O. Pomerleau & C. Pomerleau, 1984). Numerous studies have shown a strong correlation between smoking and stress among Black women (Budescu, Taylor, & McGill, 2011; Fernander, Moorman, & Azuoru, 2010; Fernander, Schumacher, & Nasim, 2008). Smoking is highly addictive making it difficult to quit particularly in the face of chronic stress. However, quitting smoking reduces CVD risk by more than half within one year (U.S. Department of Health and Human Services, 2009).

Physical inactivity. According to the 2008 Physical Activity Guidelines for Americans (U.S. Department of Health and Human Services, 2008), adults should participate in 2.5 hours of moderate intensity physical activity (e.g., walking briskly, bicycling at less than 10 mph, general gardening) weekly. Guidelines state that 1.25 hours of vigorous intensity physical activity each week or an equal combination of vigorous and moderate intensity exercises is also acceptable. In addition, it is recommended that adults engage in strength training (muscle-building) activities twice per week. Physical activity reduces CVD risk by 30 – 50% (Wannamethee & Shaper, 2002). Less than 20% of Black adults meet the physical activity guidelines (Go et al., 2013). In addition, nearly 55% of Black women of varying ages report no physical activity (U.S. Department of Health and Human Services, 2009). Physical inactivity contributes to Black women's high rates of overweight/obesity, another risk factor for CVD.

Overweight/obesity. Overweight and obesity are terms to describe individuals who weigh more than what is considered healthy for a certain height. Overweight and obesity classifications

are determined by body mass index (BMI), a number calculated from an individual's weight and height (typically correlates with body fat). Overweight is indicated by a BMI between 25 and 29.9 and obesity by a BMI of 30 or higher. For example, a person that is five feet, six inches tall and weighs 210 pounds has a BMI of 34 and would be considered obese (Centers for Disease Control and Prevention, 2012). Approximately 80% of Black women are classified as overweight or obese compared to 70% of Black men, 73.6% of White men, and 60.3% of White women (Office of Minority Health, 2013). Black women have higher rates of obesity (53.9%) than Black men (37.9%), White men (25.4), White women (21.8%), Hispanic men (27.8), and Hispanic women (29.4) (Centers for Disease Control and Prevention, 2010; Go et al., 2013).

High cholesterol. Cholesterol, a fat-like material needed by the body for multiple processes, is carried through the blood in lipoproteins, small packages made of fats and proteins. The body has two types of lipoproteins: high density lipoproteins (HDL) and low density lipoproteins (HDL). Higher levels of HDL, "good cholesterol," in the blood are related to lower risk of CVD while higher levels of LDL, "bad cholesterol," are related to increased risk for CVD. "Good cholesterol" is responsible for facilitating the process of cholesterol removal from the blood. "Bad cholesterol" can lead to blockages in vessels that supply blood to the heart through excess buildup (atherosclerosis). A person has high cholesterol (hyperlipidemia) if they have too much cholesterol in their blood. Specifically for women, hyperlipidemia is classified as an LDL at160 mg/dL or above, and HDL less than 50 mg/dL (American Heart Association, 2012; National Heart, Lung, and Blood Institute, 2012a).

Although hyperlipidemia does not disproportionately impact Black women (American Heart Association, 2012), nearly 1 in 2 Black women have the condition. Among adults over age 19, 31.2% of Black women have an LDL of 130 mg/dL or greater, 10.2% have HDL lower than

40 mg/dL, and 40.7% have total cholesterol levels above 200 mg/dL (American Heart Association, 2012). Hyperlipidemia is associated with other CVD risk factors including obesity, sedentary life style, and poor diet (U.S. Department of Health and Human Services, 2009).

Diabetes. The most common type of diabetes in Black women is type 2 diabetes, a condition that develops over time and is associated with obesity, physical inactivity, and a poor diet (U.S. Department of Health and Human Services, 2009). Diabetes is a metabolic condition in which the body is unable to produce enough insulin. In addition, the body, particularly in obesity, is less responsive to the insulin that is produced. Insulin is needed to assist glucose (sugar in the blood used for bodily fuel) with getting into the body's cells so it can be used for energy and growth. In diabetic individuals, the body's inability to produce insulin typically results in elevated blood sugar and the body being unable to make use of its major source of fuel (National Diabetes Information Clearing House, 2013).

Nearly 26 million Americans are estimated to have diabetes and of those roughly 7 million are undiagnosed. When compared with Whites, the risk for diagnosed diabetes is 77% higher among Blacks. Among adults age 20 and over, Blacks experience diabetes at rates higher than that of Hispanics, Asian Americans, and Whites, with rates of 12.6%, 11.8%, 8.4%, and 7.1% respectively (Centers for Disease Control and Prevention, 2013).

Stress as a risk factor. According to the cardiovascular reactivity (CVR) hypothesis, individuals are at higher risk for CVD when they frequently experience physiological responses to psychological stressors (Blascovich & Katkin, 1993; Manuck, 1994; Obrist, 1981). Lazzarus and Folkman (1984) define stress as an experience in which demands exceed resources, both individual and social. Increased CVD risk can occur when an individual experiences chronic

stress, the frequent experience of stress or persistence of stress over long periods of time (American Psychological Association, 2013).

The experience of chronic stress can cause physiological dysregulation of the autonomic nervous system (ANS). The ANS includes the sympathetic nervous system (SNS) and the parasympathetic nervous system (PNS) and is responsible for regulating various automatic involuntary bodily functions. The SNS is designed for mobilization and regulates involuntary bodily functions (i.e., the cardiovascular system) that respond to stressors (Kemeny, 2007). Acute stressors trigger activation of this system, which is seen in accelerated heart and breathing rates. The PNS acts as an inhibitory agent, slowing reactivity (i.e., increased heart rate and blood pressure) caused by the SNS, thus calming a person. When the body is not responding to threats, the PNS controls involuntary resting functions and activates organ systems to engage in restorative functions. These two systems are integral to the body's ability to adapt successfully to physiological and behavioral change. Inactivity, overactivity, or delayed recovery of the body's stress response systems are related to chronic stress and can cause various health problems (Kemeny, 2007).

Chronic stress. Common sources of chronic stress for Black women include financial issues, work, family, friends, and racial/ethnic discrimination (Moore-Greene, Gross, Silver, & Perrino, 2012). Research indicates that Black women are exposed to a greater amount of chronic stress compared to White women (R. Clark, Anderson, V. Clark, & Williams, 1999; Davis, Liu, Quarells, & Din-Dzietharn, 2005; Vines, Baird, McNeilly, Hertz-Picciotto, Light, & Stevens, 2006), especially race related stress that contributes to HTN and CVD disparities (Geronimus, 1992; Geronimus, Hicken, Keene, & Bound, 2006; Turner & Avison, 2003).

In a study of 109 Black and 225 Caucasian women, Troxel, Matthews, Bromberger and Sutton-Tyrrell (2003) examined racial differences in relationships between chronic stress, discrimination, and CVD. They found that Black women were more likely to be exposed to chronic stressors and generally more vulnerable to the negative impact of chronic stress (i.e., greater arterial plaque). Further, more arterial plaque was found in Black women who reported experiencing discrimination compared to Black women who reported not experiencing such treatment.

McIlvane, Baker, and Mingo (2008) examined the relationships between disease related stress, chronic life stress, and well-being among Black and White women. They found that Black women reported more life stress, financial stress, and discrimination than White women. In addition, findings revealed chronic life stressors (as compared to disease related stressors) explained more of the variance in depressive symptoms for Black women. These findings suggest that well-being for Black women is related to broader life stressors and that researchers seeking to understand health among Black women should consider the role of chronic stress.

Chronic stress is stress that persists over a prolonged amount of time and has the potential to manifest in continuous arousal of the body's stress response systems (American Psychological Association, 2013). The concept of allostatic load provides a framework for understanding how chronic stress can lead to negative health outcomes. Allostatic load refers to the cumulative wear and tear on the body's regulatory and restorative stress response systems. This accumulation of damage is caused by repeated and/or prolonged physiological adaptations to stressors (Kemeny, 2007). Consistent with the concept of allostatic load is the CVR hypothesis, which highlights the impact of repeated exposure to stress on CVD risk (Blascovich & Katkin, 1993; Manuck, 1994; Obrist, 1981).

In addition, the weathering hypothesis specifically addresses how chronic stress associated with the collective impact of recurrent experiences of social, political, and economic marginalization influences negative health outcomes among Black people (Geronimus, 1992; Geronimus, Hicken, Keene, & Bound, 2006). The weathering hypothesis states that Blacks experience heightened vulnerability to premature health deterioration or stress related illnesses as a result of persistent high effort coping with acute and chronic stress associated with Black identity (e.g., discrimination). However, just as chronic stress impacts Black women differently than White women (Vines, Ta, Esserman, & Baird, 2009), differences may also exist between Black men and women. Emotion regulation may be helpful in understanding how chronic stress differentially impacts the health of Black women. Specifically, emotion regulation strategies can impact levels of stress, which in turn impacts CVD risk.

The role of emotion regulation in CVD risk. Emotion regulation refers to the ability to modify emotive thoughts and control physiological arousal in the presence of stressors (Gross & Thompson, 2007). This concept captures the process by which people influence the types of emotions they experience, when they experience emotion, how they experience emotion, and how they subsequently respond to emotionally arousing stimuli (Gross, 1998). Emotion regulation is learned and comprises a set of strategies acquired through socialization and life experiences (John & Gross, 2004). Through cognitive processing and attention allocation, people are able to regulate their emotions at numerous stages of the emotion generative process, from the selection and modification of a situation to the alteration of thoughts and responses (Gross, 1998). Emotion regulation can be adaptive or maladaptive. Following is a discussion of adaptive and maladaptive emotion regulation strategies.

Adaptive emotion regulation strategies. Adaptive emotion regulation strategies allow individuals to interact in socially acceptable ways and assist with stress management and reduction (Gross, 1998). Adaptive forms of emotion regulation include reappraisal, problem solving, and acceptance (Aldao, Nolen-Hoeksema, & Schweizer, 2010). Reappraisal involves modifying the course of an emotional reaction through a reinterpretation of the meaning of the emotional provocation. Problem solving is action oriented and involves conscious efforts to alter a stressful situation or its consequences. Acceptance is the process of believing in the reality of and coming to terms with emotions (Aldao et al., 2010). Reappraisal, problem solving, and acceptance require emotional clarity, emotional awareness, and a commitment and ability to engage in goal directed behavior that facilitates control of impulsive behaviors (Gratz & Roemer, 2004). The absence of any or all of these characteristics may indicate emotion regulation difficulties (Gratz & Roemer, 2004) that may manifest in maladaptive emotion regulatory processes.

Maladaptive emotion regulation strategies. Emotion suppression, avoidance, and rumination are maladaptive emotion regulation strategies (Aldao et al., 2010). Emotion suppression refers to the conscious effort of inhibiting emotional arousal (Gross & Levenson, 1993; 1997). Avoidance involves trying to escape dealing with a stressor and associated feelings of distress (Aldao et al., 2010). Individuals engaging in avoidance coping may pretend that the stressor is nonexistent or engage in wishful thinking (Carver, 2007). Another maladaptive strategy is rumination which refers to repetitively focusing on the experience of negative emotion and its associated origins and consequences (Aldao et al., 2010). Maladaptive emotion regulation strategies are related to increased mental illness, poor interpersonal functioning, and

increased experiences of negative emotions (Dennis, 2007; Gross & John, 2003; Moore, Zoellner, & Mollenholt, 2008; Wegner, Erber, & Zanakos, 1993).

Negative emotions and CVD risk. The ability of negative emotions to spark "specific action tendencies" lead researchers to believe that negative emotions have evolutionary origins that assisted our ancestors in surviving dangerous situations (Frijda, 1986; Lazarus, 1991). For example, anger provokes the urge to engage in aggressive behavior, which could have been a life-saving reaction for earlier generations of humans. In response to these urges, the body mobilizes various physiological systems and resources to prepare the body for a "fight" or "flight" (Levenson, 1994).

One of the physiological systems mobilized during the "fight or flight" response is the cardiovascular system. As such, negative emotions have the potential to increase CVR. If such reactivity is experienced frequently or over a long period of time, individuals experience a greater risk for CVD (Blascovich & Katkin, 1993; Brosschot, Gerin, & Thayer, 2006; Lovallo & Gerin, 2003). Therefore, emotion regulation serves as a strategy by which individuals can minimize or exacerbate the potentially harmful effects of chronic stress. As stress has a tendency to invoke negative emotions (Feldman, Cohen, Lepore, Matthews, Kamarck, & Marsland, 1999), understanding the impact of emotion regulation on health is especially important for Black women who experience increased chronic stress.

Research has shown that Blacks demonstrate heightened and prolonged CVR to negative emotions (Anderson, McNeilly, & Myers, 1993; Schuler & O'Brien, 1997), which appears to damage inner arterial walls, facilitate atherosclerosis, and weaken vascular responsiveness (Kaplan, Manuck, Williams, & Strawn, 1993). In a meta-analysis examining negative emotions,

stress, and physiology, researchers found that cardiovascular reactivity and negative emotions increased when participants responded to stressors (Feldman et al., 1999).

Adaptive emotion regulation strategies and the experience of positive emotions have the potential to undo the potentially harmful effects of negative emotions (Fredrickson, Mancuso, Branigan, & Tugade, 2000). These findings have prompted researchers to identify emotion regulation as a mechanism through which physiological dysregulation of the stress response is associated with CVD risk (Lovallo & Gerin, 2003). Given the damaging impact of negative emotions on physiological processes and subsequent health outcomes, it is important to consider emotion regulation as a strategy by which Black women may increase or reduce their risk for CVD. This information provides additional clarity in understanding the relations between the experiences of Black women and CVD risk.

Summary of CVD among Black women. In sum, Black women are overrepresented in CVD and experience higher rates of risk factors including but not limited to physical inactivity, overweight/obesity, diabetes, and reported chronic stress. Reports of greater chronic life stress and differences in emotional regulation strategies help us to better understand CVD risk among Black women. Although research has documented the relationship between stress and CVD risk, the current study seeks to provide a better understanding of CVD risk among Black women by exploring a culturally specific risk model. As research suggests that the SBW Schema plays a role in stress related health outcomes among Black women, this construct will be explored in greater detail. The following section provides a detailed description of the SBW Schema and related constructs.

SBW Schema

The SBW functions both as a cultural symbol and a cognitive framework that aids Black women in organizing and interpreting information and experiences (Abrams et al., 2014; Collins, 2005; Hamin, 2008; Harris-Lacewell, 2001; Wallace, 1990). Although prevalence rates for the SBW Schema have not been established, the ubiquity of the SBW phenomenon in Black culture (Parks, 2010) speaks to the pervasiveness of this ideal in the lives of Black women. As a cognitive framework, the SBW Schema provides women with a mental representation of ideal womanhood that is modeled by family members, friends, and celebrities (Abrams et al., 2014). Such modeling reinforces stereotypical views of Black women as unbreakable in the midst of racial and gender oppression, community disorganization, and familial and personal issues (Collins, 2005; Harris-Lacewell, 2001). A SBW is able to portray an unfaltering sense of strength through resilience and assertion of independence (Harris-Lacewell, 2001; Woods-Giscombé, 2010). This outward display of strength is mandated by her family and society, leaving no place for her to express vulnerabilities (Beauboeuf-Lafontant, 2009; Black & Peacock, 2011; Jones & Shorter-Gooden, 2003).

In a qualitative study, Beauboeuf-Lafontant (2007) found that Black women expressed beliefs that at all costs and under any circumstance, Black women should always remain strong. Even when experiencing great pain, anxiety, and distress, Black women have few opportunities to express emotions and doing so is often viewed as a weakness and inadequacy (Beauboeuf-Lafontant, 2007; Jones & Shorter-Gooden, 2003). She meets adversity with solutions and a spirit of steadfast endurance (Parks, 2010). Her dependable, sacrificial, and accommodating nature allows her to take on the burdens of others with an apparent ease (Beauboeuf-Lafontant, 2008). She appears to be able to balance multiple roles simultaneously and effortlessly (Beauboeuf-Lafontant, 2003). A SBW is a provider, housemaid, disciplinarian, cook, and

religious/spiritual servant. Caretaker, nurturer, and mother are names used to describe her. She is proud to be both Black and a woman, radiating confidence and self-assurance. In essence, a SBW is characterized by resilience, independence, dedication to the care of others, self and ethnic pride, the perceived obligation to independently manage multiple roles and expectations, a determination to succeed, and the perceived obligation to exude strength and suppress emotions (Abrams et al., 2014; Woods-Giscombé, 2010).

Historical context. Though women of other ethnic/racial backgrounds possess some of the same characteristics associated with the SBW Schema, the unique sociohistorical experiences of Black men and women (King, 1988) have influenced the development and adoption of this culturally specific construct (Harris-Lacewell, 2001). In a study of stress, strength, and health, Woods-Giscombé (2010) found that women identified the following contextual factors as being associated with the development of the SBW Schema (referred to as the Superwoman Schema): a historical legacy of racial and gender stereotyping or oppression, lessons from foremothers, spiritual values, and a past personal history of disappointment, mistreatment, or abuse. More specifically, women and Black feminist scholars often reference the enslavement of Africans as the birthplace of the SBW Schema. Indeed, enslavement of African women has been rationalized with baseless proclamations of superiority in physical and mental strength compared with White women (Harris-Lacewell, 2001).

Historically, Black women have disproportionately experienced environmental stressors, pre and post enslavement, including institutional, systematic, and cultural oppression that have marginalized them and their families (Anderson, 1994; Beale, 1970; Collins, 2005; King, 1988; Schiele, 2005; Wright, 2000; Young, 1996). Furthermore, as economic and emotional contributions from Black men have been stifled by high incarceration rates (Sentencing Project,

2012), a greater responsibility often falls upon Black women to take care of themselves, their communities, and their families, without support. As a result of these social and personal injustices and hardships, the SBW ideal has been maintained— functioning as a psychosocial coping mechanism, helpful in responding to the challenging conditions of the Black community.

Black women have cited resilience, independence, selflessness, and strength – nested in the SBW Schema – to be the facilitators of the survival of Black families in the face of disproportionately high rates of poverty, crime, single parenthood, and underdeveloped infrastructures (Woods-Giscombé, 2010). Indications of the existence of the SBW Schema can be seen in the large number of Black women who independently manage households and raise families. In 2009, 50.4% of all Black children lived in a single-mother household (Kreider & Ellis, 2011). The increase in Black single mother households in recent years has greatly contributed to the maintenance of the SBW Schema as there is a perceived need for Black women to develop strong and self-efficacious attitudes (Crawford & Unger, 2000; Dade & Sloan, 2000). Though many single mothers identify as Strong Black Women, it is important to note that Black women from varied generational, socioeconomic, and marital backgrounds consider themselves to be Strong Black Women as well (Woods-Giscombé, 2010). For Black women who have assumed roles as breadwinners, caregivers, community agents, mothers, and fathers, internalizing the SBW Schema is not an option but rather a socioeconomic and cultural obligation (Beauboeuf-Lafontant, 2007; Harris-Lacewell, 2001).

The SBW Schema was developed out of necessity, formed to withstand physical and mental subjugation, and sustained through generations for the subsistence of family and community (Mullings, 2006). The Schema continues through familial teachings and behavioral modeling as many Black girls are socialized at a young age to internalize SBW Schema

characteristics, which has led to the integration of strength as a critical facet of Black women's gendered and racial identities (Beauboeuf-Lafontant, 2007; Kerrigan, Andrinopoulos, Johnson, Parham, Thomas, & Ellen, 2007; Wallace, 2007). Learned from mothers, grandmothers, sisters, aunts, and female fictive relatives (Beauboeuf-Lafontant, 2003), such teachings reinforce the expectation of strength among Black women.

Similar constructs. Numerous efforts have been made to create a construct that captures the multidimensionality of Black women's beliefs, perceptions, and experiences. A number of different but overlapping constructs have emerged in the academic literature including the Sojourner Truth Syndrome (Mullings, 2006), Sisterella Complex (Jones & Shorter-Gooden, 2003), and "Superwoman" Schema (Woods-Giscombé, 2010), all of which depict Black women as individuals who selflessly balance multiple roles while showcasing courage in the face of adversity. As concrete definitions do not exist for these constructs the following paragraphs will provide descriptions and associated characteristics for each construct.

Sojourner Truth Syndrome. The Sojourner Truth Syndrome, developed by Mullings (2000), offers an explanatory framework for understanding the complexity and multidimensionality of Black women's lives. The Syndrome captures the obligations of Black women to be unbreakable and self-sacrificing while achieving financial stability and being head of their families and leaders in their communities. The name for the Syndrome was inspired by the "Ain't I a Woman" speech delivered by Sojourner Truth in 1851. In this poetic presentation, Truth shared her personal life experiences of adversity, sacrifice, and mistreatment (Mabee & Newman, 1995). She shared the following:

> That man over there says that women need to be helped into carriages, and lifted over ditches, and to have the best place everywhere. Nobody ever helps me into carriages, or

> over mud-puddles, or gives me any best place! And ain't I a woman? Look at me! Look at my arm! I have ploughed and planted, and gathered into barns, and no man could head me! And ain't I a woman? I could work as much and eat as much as a man - when I could get it - and bear the lash as well! And ain't I a woman? I have borne thirteen children, and seen most all sold off to slavery, and when I cried out with my mother's grief, none but Jesus heard me! And ain't I a woman? (Truth, 1851)

Truth became symbolic of what it meant to be a Black woman— overworked and underappreciated, skilled and proficient in simultaneously assuming socially constructed traditional male and female gender roles. Findings from interviews with Black women (Mullings, 2006) suggest that the Syndrome comprises "the assumption of economic, household, and community responsibilities, which are expressed in family headships, working outside the home, and the constant need to address community empowerment—often carried out in conditions made difficult by discrimination and scarce resources (p.8)." In this regard the Sojourner Truth Syndrome differs from similar constructs in that there is a greater emphasis on the expectation of involvement of Black women in the community. In addition, the Sojourner Truth Syndrome primarily focuses on behavioral characteristics of Black women, while other constructs like the Sisterella Complex, focus more on psychological characteristics.

Sisterella Complex. Conceptualized by Jones and Shorter-Gooden (2003), the Sisterella Complex, comprises the notion that Black women work tirelessly to encourage, care for, and placate others. The Sisterella Complex captures the mental health of Black women, asserting that Black women experience bouts of depression that often go untreated and unnoticed by others. Black women experiencing the Sisterella Complex hurt silently as they labor assiduously to meet familial, relational, societal, and work related expectations. Instead of seeking help, these women

suppress their emotions and experience feelings of guilt and worthlessness for not being able to hold it all together. Moreover, this psychological distress is camouflaged by the display of incomparable strength, the common characteristic that is shared by all of the constructs mentioned in this section.

Superwoman Schema. The Superwoman Schema is another construct that captures the experiences of Black women. This Schema is most closely related to the SBW Schema. Through a qualitative examination of Black women's views on stress, strength and health, Woods-Giscombé (2010) provides a description of the Superwoman Schema. Focus groups, conducted with Black women, exposed the realities of Black Superwomen in the 21st century who are branded by perceived obligations to manifest strength, help others, and suppress emotions. As described by focus group participants, Black Superwomen resist being vulnerable or dependent and are determined to succeed. Women believe that there are both benefits and liabilities associated with being a Superwoman. Perceived benefits of being a Black Superwoman include preservation of self, Black families, and Black communities. On the other hand, liabilities associated with the Superwoman Schema include strain in interpersonal relationships, the embodiment of stress via anxiety or depressive symptoms, and maladaptive stress related health behaviors (e.g., emotional eating and not getting adequate amounts of sleep) (Woods-Giscombé, 2010).

Convergence and divergence among constructs. The Sojourner Truth Syndrome, the Sisterella Complex, the Superwoman Schema, and the SBW Schema are all constructs that capture the perception that Black women are expected to assume multiple roles and responsibilities, sacrifice themselves for others, and maintain the appearance of invincibility. Each construct is reflective of social expectations and entail self-neglect, stress, and the

embodiment of strength. However, some differences exist among the constructs. For example, the Sojourner Truth Syndrome primarily focuses on behavioral qualities such as being a provider, being a caretaker, working just as hard as men, and being a leader within communities. On the other hand, the Sisterella Complex puts a greater emphasis on psychological characteristics such as the internal distress experience by Black women that is quieted via emotional suppression.

The Superwoman and SBW Schemas highlight both psychological and behavioral characteristics. The Superwoman Schema is a relatively inclusive construct grounded in theory and empirical evidence. However, the SBW Schema appears to be most recognizable within the Black community, as demonstrated by its ubiquity in Black culture (Black & Peacock, 2011; Parks, 2010). In addition, the SBW Schema appears to capture the characteristics described by the other constructs, creating a more holistic representation of the strength displayed amongst Black women. Further, the SBW Schema emphasizes Black identity as a key characteristic, while the Superwoman Schema is not unique to Black women as women of various ethnicities are described as and embrace being "Superwomen" (Hart & Kenny, 1997; Rana, Kagan, Lewis, & Rout, 1998). Therefore, a thorough examination of the multidimensionality of Black womanhood and its association with strength seems to be most suitably situated within the SBW Schema.

Theoretical Framework

Two theoretical perspectives are used to help us understand how internalization of the SBW Schema influences health behaviors and ultimately outcomes. Gender schema theory (Bem, 1981) provides information about the process of gender schema development and maintenance. Identity based motivation theory supplements gender schema theory and

illuminates the influence of gender/racial identity on health related decision-making. Each theory is reviewed next.

Gender Schema Theory. A self-schema is an organized collection of information about the self that guides what people attend to, how information is processed, and how people behave and react to/in their environment (Fiske, 2010). A gendered schema is an extension of a self-schema, nested in one's perception of their gender identity. Specifically, gender schema theory (Bem, 1981) explains the process of gender construction and maintenance through cognitive organization and interpretation. Bem (1981) defines a schema as a mental system of associations that categorizes and guides perceptions.

According to gender schema theory, individuals acquire gender meanings, expectations, and stereotypes from their cultural sharing group at a young age. This learned information is internalized as a core belief, known as a gender schema, which is utilized to organize and interpret experiences. Consequently, experiences and gender schemas interact to produce gendered perceptions of the meanings of womanhood as well as behavioral guidelines and expectations for particular circumstances (Levy & Fivush, 1993). For women who internalize the SBW Schema, expectations of independence, resilience, multiple roles, and self-sacrifice guide perceptions of womanhood and dictate internalization of experiences and behavior.

Identity Based Motivation theory. Identity based motivation (IBM) theory (Oyserman, 2007) compliments Bem's theory in understanding the SBW Schema and provides an explanation for the influence of macro-level factors on micro-level behaviors that influence health outcomes among racial/ethnic minorities. Embedded in social cognition research, IBM theory states that people desire to behave in ways that are consistent with their salient identities, comprising racial, gender, and socioeconomic identities. These situation sensitive identities

prompt meaning making and willingness to behave in identity congruent ways. In other words, individuals will interpret circumstances in ways that are consistent with active identities and desire to partake in identity-congruent behaviors.

If a behavior feels congruent with one's identity, identity based motivation encourages a person to believe the behavior is significant. On the other hand, if a behavior is incongruent with identity, the behavior is meaningless and "not for people like me" (Oyserman & Destin, 2010). For example, a SBW will engage in behaviors that make her feel like a SBW (e.g., enduring hardship on her own) and may forego opportunities for assistance because help seeking is not part of being a SBW. This theory elucidates the importance of perceptions of identity in health related decision making processes and helps us to better understand adherence to "strength behaviors" (e.g., extraordinary caregiving and postponement of self-care) among women internalizing the SBW Schema.

Gender schema theory and IBM theory elucidate the expectation of strength that Black women are confronted with and seem to subsequently internalize. Women internalizing the SBW Schema cope with various life experiences under the perceptual mandate of strength (Beauboeuf-LaFontant, 2003; Beauboeuf-LaFontant, 2007; Woods-Giscombé, 2010). Seeking to meet expectations about what it means to be a SBW is associated with suppression of emotions (Beauboeuf-LaFontant, 2003; Woods-Giscombé, 2010) and role strain among Black women (Lewis, 1989). Such characteristics are transmitted generationally and shape gendered schemas, which are maintained through identity-based motivation. This type of motivation facilitates the need for many Black women to behave in ways that a SBW should behave, encouraging women to continue to suppress their emotions, negate vulnerability, and help others at the expense of their mental and physical health. In an effort to better describe how the SBW Schema relates to

health outcomes, the following section describes the relations of relevant psychological, behavioral, and physiological processes through an integrated conceptual framework.

An Integrated Framework for Examining the Impact of the SBW Schema on Health Outcomes

What is needed in research on stress and health among Black women is an approach that captures the interconnectedness of physiological and culturally specific psychological processes. As such, it is worth exploring the culturally salient SBW Schema as a mechanism through which psychological processes interact with physiology to influence health behaviors and outcomes. A conceptual framework of how these processes are theorized to interact is shown in Figure 1. The diagram depicts the process through which stress influences cognition, emotion, behavior, physiology, and ultimately health outcomes for women internalizing the SBW Schema. Of note, this framework will not be tested in the current study but is provided for illustrative purposes only.

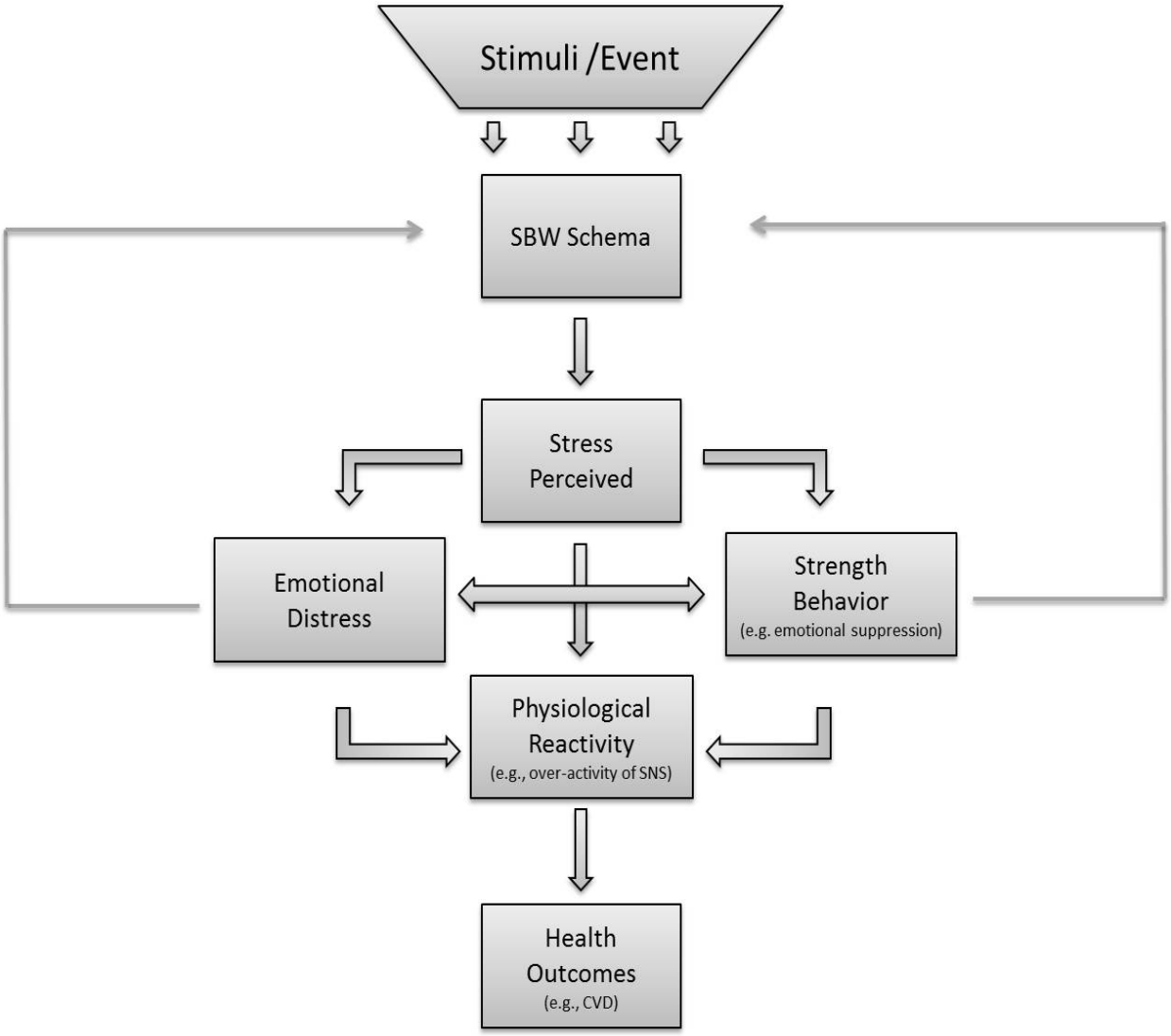

Figure 1. Conceptual framework illustrating hypothetical pathways by which women internalizing the SBW Schema experience and respond to stress. This diagram is an oversimplification of processes and does not capture all of the bidirectional relationships among the illustrated variables.

The diagram features pathways through which the SBW Schema influences stress and subsequent health outcomes. Chronic stress occurs when women frequently experience stress (via frequent experience of stressors or stressors that persist over time), giving their psychological and physiological systems little time for rest or recovery (McEwen, 1998). The

experience of chronic stress and long term health outcomes will be discussed after a detailed explanation of the framework's pathways.

Filtering stimuli through the SBW Schema. The first panel represents the presentation of internal or external stimuli that have the potential to cause stress. Stimuli are processed through the SBW Schema, the cognitive framework through which stimuli are filtered. As described above, a schema is an organized collection of information about the self that guides what people attend to, how information is processed, and how people behave and react to/in their environment. Thus, the SBW Schema serves as an existing framework through which all stimuli are filtered. Once stimuli are filtered through the Schema, women use their schematic frame of reference to appraise the stimuli as threatening, harmful, non-threatening, or beneficial, mimicking processes described by Folkman, Lazarus, Dunkel-Schetter, DeLongis, and Gruen (1986). In other words, once stimuli have been filtered through the Schema, women engage in the process of cognitive appraisal to determine whether the experience will be regarded as stressful or not (Folkman & Lazarus, 1985; Lazarus, 1966).

Cognitive appraisal is the process through which an individual assesses the relevance of a particular situation to their well-being (Folkman et al.,1986). Stimuli can be perceived as stressful or not stressful. Figure 1 focuses on the experience of stress and only depicts the experience of stimuli perceived as stressful. If a stimulus is not perceived as stressful, the stress response does not begin. If a stimulus is perceived as stressful, the stress response begins and an individual must determine options for preventing or overcoming harm (Folkman et al., 1986). Values and beliefs about self (e.g., those held by women internalizing the SBW Schema) help to define the risks or benefits that an individual identifies as relevant in a stressful situation

(Folkman et al., 1986). Stressful experiences have the potential to influence behavior, emotion, and/or physiology (Baum, Gatchel, & Schaeffer, 1983).

Influence of perceived stress on behavior and emotional distress. The perception of stress influences an individual's subsequent behavior and experience of emotional distress (Folkman et al., 1986). A SBW's beliefs about the amount of stress she should be able to handle and how she should handle it are activated the moment she perceives a situation as stressful. For example, her beliefs about the need to be independent may influence her to dismiss assistance or support and she may handle a stressful experience on her own (strength behavior). Her independent behavior may influence her emotions and contribute to her feeling overwhelmed, exhausted, frustrated, or prideful (emotional distress). In addition to influencing behavior and emotional state, the experience of stress can also directly impact physiology.

Influence of perceived stress on physiology. Once stress is perceived, physiological reactions via the SNS prepare the body to respond to the perceived stressor. This process is more commonly known as the "fight or flight" response (Cannon, 1914). As stated previously, the SNS is designed for mobilization (Kemeny, 2007) and activation of this system is indicated by hastened heart and breathing rates. In addition, the hypothalamic-pituitary-adrenocortical axis (HPA) functions similarly to the SNS and is activated during the stress response. Through the release of cortisol, the HPA axis mobilizes the body's resources to provide energy that may be needed in a stressful encounter (Kemeny, 2007). The mobilization of the body's stress response systems can, however, lead to adverse health outcomes if systems are hyperactive (due to frequent or persistent experiences of stress). These processes will be discussed in a later section.

Influence of emotional distress and behavior on physiology. As stated previously, emotional distress and behavior are influenced by perceived stress. Emotional distress and

behavior also have the potential to influence physiology. Emotional distress involves physiological systems by prompting neural activity (Northoff et al., 2000), which manifests in changes in the ANS and endocrine system (Larsen, Berntson, Poehlmann, Ito, & Cacioppo, 2008). Negative emotions tend to result in increased and prolonged physiological arousal while positive emotions almost always have the reverse effect (Anderson, McNeilly, & Myers, 1993). Similarly, the impact of behavior on physiology can manifest in different ways. Some behaviors can cause a person to be more physiologically aroused and others can decrease physiological reactivity (Kemeny, 2007). For example, a woman internalizing the SBW Schema may engage in self-silencing in response to stressful stimuli. Self-silencing is related to reactive physiological changes that are linked to psychological stress and depression (Jack & Ali, 2010).

Bidirectional influences of behavior and emotional distress. According to the Mood Behavior Model (MBM), emotions or moods impact behavior through two processes: 1) knowledge based assessments and judgments that result in behavioral modifications and through the 2) influence of the need for behavioral inclinations to be in compliance with a beneficial motive (Gendolla, 2000). It is possible that a SBW may experience emotional distress associated with SBW identity congruent behaviors.

Despite the specific emotional motive, a SBW will cope and behave in a manner that allows for the maintenance of her identity as a SBW (Oyserman, 2007). This may be why a SBW will not reach out or accept help, why she is able to endure strenuous environmental stressors, and provide an unmatched level of care to loved ones. IBM theory further explains this phenomenon, providing relevant information about how behavior can influence emotions. IBM suggests that behavior is the result of intrinsic desires to behave in ways that are consistent with salient identities (Oyserman, 2007). For example, a woman, with a salient SBW identity

operating in ways that are congruent with that identity, may experience feeling overwhelmed or depressed (Beauboeuf-Lafontant, 2003) or happy and prideful (Morgan, 1999).

Potential Long-Term Physiological Impact of Internalizing SBW Schema

Highlighting the influence of chronic stress on the health of Black women, Woods-Giscombé (2010) contends that the SBW Schema may be related to adverse health outcomes through increased vulnerability to psychological stress and premature stress related illness through cumulative wear and tear on the body's regulatory systems (allostatic load) from persistent high effort coping. As described above, in response to stress the body begins very calculated rituals to help prepare an individual to deal with a stressor (Kemeny, 2007). The concept of allostatic load is relevant to the discussion of the long-term physiological impact associated with internalizing the SBW Schema.

It is associated with four types of situations: 1) recurrent exposure to stressors, 2) inability to adapt to frequent stressors, 3) inefficiency to end stress response after stressor is removed, and 4) inadequate responses (McEwen, 1998). Allostatic load is characterized by physiological dysregulation that has the potential to manifest in weakened cardiovascular and immune functioning (McEwen, 1998) and disease promotion (McEwen & Seeman, 1999). Consistent with the concept of allostatic load are the previously mentioned weathering hypothesis (Geronimus, 1992; Geronimus, Hicken, Keene, & Bound, 2006) and CVR hypothesis, which elucidate the relationship between chronic stress and adverse health outcomes. Combining relevant information on physiological stress response processes with identified behavioral manifestations of the SBW Schema allows for a clearer conceptualization of relationships between cultural, psychological, and physiological factors. This information helps

provide clarity with regard to possible pathways of influence for the hypothesized relation between the SBW Schema CVD risk.

The following section extends the explanation of such relationships by providing examples of how the SBW Schema is related to health outcomes (via physiological and behavioral responses to stress). More specifically, the following section integrates existing research through explanations of how behavior related to the SBW Schema may interact to influence the dysregulation of various physiological processes that are related to adverse health outcomes.

Characteristics of the SBW and Associated Health Behaviors and Outcomes

The Stress and Strength Hypothesis (Black & Woods-Giscombé, 2012) provides a distinct and culturally sensitive approach to understanding health outcomes among Black women. Used as a framework for understanding behavioral responses to stress, this theory explains how preventative and enhancing health behaviors are compromised by an exhaustion of personal resources. These resources are exhausted through engaging in "strength behaviors" such as "extraordinary caregiving, emotional suppression, and delayed self-care" (Black & Woods-Giscombé, 2012).

This theory is similar to the concept of ego depletion, which refers to a "temporary reduction in the self's capacity or willingness to engage in volitional action (including controlling the environment, controlling the self, making choices, and initiating action) caused by prior exercise of volition" (Baumeister, Bratslavsky, Muraven, & Tice, 1998). After meeting expectations associated with being a SBW, Black women may feel as if they are unable to engage in health enhancing behaviors because they have exhausted the needed mental resources to make such decisions (Black & Woods-Giscombé, 2012). Strength behaviors and their

associated health outcomes are explored below after briefly reviewing the mechanisms through which psychological processes associated with the SBW Schema are related to physiological processes.

The SBW Schema and stress responses: pathways of influence. The effect of psychological factors on physiology typically manifests in three ways: 1) direct biological change preceded, paralleled, or induced by emotional reactions or behavioral patterns, 2) health compromising behaviors, and 3) health enhancing behaviors (Baum & Posluszny, 1999).

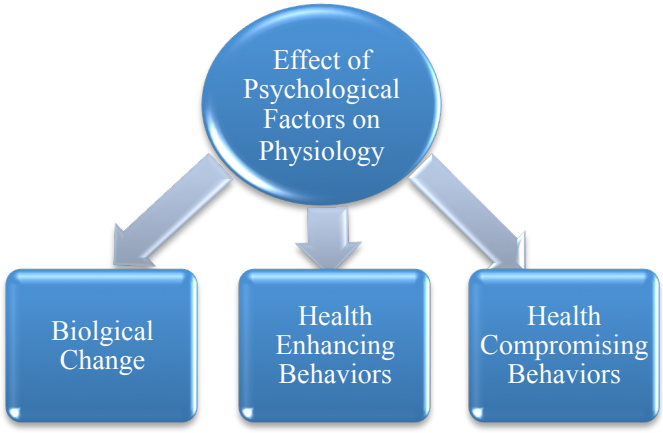

Figure 2. Mechanisms through which Psychological Factors Impact Physiology

Physiological processes related to emotional and behavioral responses to stress are of importance when attempting to understand the link between stress and health. The SBW Schema includes characteristics (e.g., resilience and ethnic pride) that have been associated with positive health behaviors and associated outcomes in the literature (Mossakowski, 2003; Tugade, Fredrickson, & Feldman-Barrett, 2004). However, some characteristics of the SBW Schema are related to health compromising behaviors and negative health outcomes. This study considers psychosocial stress associated with characteristics of the SBW Schema that appear to pose the greatest health

risk: 1) Exuding Strength, 2) Obligation to Manage Multiple Roles, and 3) Determination to Succeed.

Exuding strength. As the central characteristic of the Schema, exuding strength captures a breadth of psychological and behavioral features (Romero, 2000). Strength is ever-present, transcending time and situations. As a multidimensional construct, strength manifests in independence and resilience (Beauboeuf-Lafontant, 2007; Romero, 2000; Woods-Giscombé, 2010). Independence is most readily conceived as being able to provide for oneself and accomplish goals without assistance. Independence is sometimes rooted in disdain for or resistance to vulnerability (Woods-Giscombé, 2010). Thus, the assumption of independence implies lack or denial of social support.

The perceived lack of social support expressed by Black women is supported by various social conditions of the Black community. For example, Black women experience high rates of single motherhood and are more likely to be a single head of household (Kreider & Ellis, 2011; U.S. Department of Health and Human Services, 2011). The Black community also experiences the highest rates of male incarceration (Mauer & King, 2007), leaving many Black girls and women without supportive networks in the form of fathers, brothers, uncles, or potential spouses which intensifies the issue of single motherhood.

Independence also manifests in resistance to being vulnerable. For example, a SBW who has the luxury of social support will often forego utilization of these networks due to desire to show themselves and others that she has the ability to manage responsibilities on her own (Wood-Giscombé, 2010). Strong Black Women may also be resistant to being vulnerable because they view support seeking as evidence of weakness (Beauboeuf-Lafontant, 2007; Thomas, Witherspoon, & Speight, 2004).

No matter the origin of independence, the result is the same – Strong Black Women do not often seek or utilize social support. Thus, these strong independent women forego the numerous health benefits that have been associated with social support including reductions in physiological stress reactivity (Gerin, Pieper, Levy, & Pickering, 1992; Kirschbaum, Klauer, Filipp, & Hellhammer, 1995; Lepore, Allen, & Evans, 1993; Uchino & Garvey, 1997) and mental illnesses (Buchanan, 1995; Sayal et al., 2002). Health outcomes associated with single motherhood provide support for this premise as single mothers are more likely to report poorer health, have longstanding illnesses, and lower levels of physical, emotional, and cognitive functioning (Benzeval, 1998; Waite & Hughes, 1999).

Another form of strength is resilience. Resilience is regularly cited as an adaptive protective factor against negative health behaviors and associated outcomes (e.g., Tugade et al., 2004). However, as resilience functions as a form of ever present strength for the SBW, capacities supporting resilience may be exhausted from overuse of this characteristic (Black & Woods-Giscombé, 2012). An excessive reliance on resilience to overcome obstacles for a SBW implies that she is faced with an incessant amount of stress that requires frequent and effective adaptation. Having to exhibit resilience frequently may erode psychological resources and lead to psychological distress (Black & Woods-Giscombé, 2012) as suggested by the concept of ego depletion.

It is important to note that exuding strength is different from being strong in that a woman gives the appearance that she is strong whether she feels like it or not. Thus women make conscious efforts to regulate and conceal emotional responses that may be associated with vulnerability or weakness (Beauboeuf-Lafontant, 2009; Black & Peacock, 2011; Jones & Shorter-Gooden, 2003). Emotional suppression, a maladaptive emotion regulation strategy,

supports women's portrayal of strength, allowing a SBW to appear unwavering in her courage and ability. Emotional suppression and avoidant coping can have serious health implications when exercised consistently over time.

Women with breast cancer who engage in emotional suppression report higher rates of symptoms related to poor immune functioning and increased cardiovascular arousal (Schlatter & Cameron, 2010). They also experience poorer survival rates in comparison to women who engage in emotion focused coping (Reynolds, Hurley, Torres, Jackson, Boyd, & Chen, 2000). Emotional suppression has also been related to cardiovascular disease risk (Brosschot & Thayer, 1998; Gross, 2002; Gross & Levenson, 1997; Horsten et al., 1999), cardiac morbidity and mortality (Matthews, Owens, Kuller, Sutton-Tyrrell, & Jansen-McWilliams, 1998; Steffen, McNeilly, Anderson, & Sherwood, 2000), HIV disease progression (Eisenberger, Kemeny, & Wyatt, 2003; Strachan, Bennett, Russo, & Roy-Byrne, 2007), and obesity via decreased dietary restraint and excessive eating (Butler, Young, & Randall, 2010).

Obligation to manage multiple roles. A SBW is a mother (even if she has no children), wife, friend, sister, worker, homemaker, provider, protector, and above all she is an extraordinary caregiver. As a woman dedicated to the care of others, she sacrifices without limit and offers her time, energy, and resources selflessly to her significant other, children, family, and friends. It is her responsibility to look out for others - her social and moral obligation (Beauboeuf-Lafontant, 2007; Black & Woods-Giscombé, 2012; Romero, 2000; Thomas, Witherspoon, & Speight, 2004). Balancing the caregiver role in addition to other roles and expectations may cause her to experience role strain as a result of not being able to successfully fulfill all of the expectations associated with each role. Role strain resulting from balancing work, family, and/ or caregiver roles is associated with chronic stress, psychological distress, depressive symptomology, preterm

delivery, low birth weight, reduced physical activity, and fatigue (Hogue, Hoffman, & Hatch, 2000; Linville, 1985, McConnell et al., 2005; Moore-Green et al., 2012; Nordenmark, 2004). Many of the deleterious effects of role strain are exacerbated by low levels of social support, which as previously described is often absent for a SBW.

For a SBW, the caregiver role is so salient that care of others precedes care for self. Moreover, a SBW often experiences feelings of guilt if she places her needs or wants before that of others (Woods-Giscombé, 2010). Dedication to this aspect of the SBW Schema is associated with health compromising behaviors such as not attending regular screening appointments and dismissing disease symptoms (Black & Woods-Giscombé, 2012).

Determination to succeed. Operating with an internal locus of control, a SBW focuses on accomplishing her goals at any cost (Woods-Giscombé, 2010). When obstacles arise on her path to success, she responds with problem focused coping techniques that allow for quick resolution of problems – often failing to deal with the emotional and psychological ramifications of the issues. It is possible for an internal locus of control to be maladaptive in this instance. The John Henryism hypothesis provide a relevant comparison to a SBW's determination to succeed.

The John Henryism hypothesis posits that high effort coping has adverse effects on health, particularly for those of lower SES backgrounds (James, 1994). Individuals operating from this framework believe the outcomes in their lives are directly related to their ability to work hard and actively solve problems. Developed by James (1994), the John Henryism hypothesis is based on the folkloric legend John Henry; a Black man who won a race against a machine that was built to take his place as a worker on a railroad. Although John Henry proved to be superior to the machine, it cost him his life as he died from mental and physical overexertion and exhaustion.

As such, John Henry has been become symbolic of persistent, high effort coping responses to social hardships among Black people, especially Black men (James, 1994). Individuals embracing this type of coping style operate with an internal locus of control, similar to those internalizing the SBW Schema. Further, high effort coping is associated with women's strength portrayals given its likelihood to promote the suppression of psychological distress and deter women from seeking help (Bronder, Speight, Witherspoon, & Thomas, 2013).

The literature reflects mixed findings for the John Henryism hypothesis. The differences in results are found mainly when comparing physical and mental health outcomes. For example, some researchers have found this form of high-effort active coping to be associated with CVD risk such as higher resting heart rate and blood pressure (Bennett et al., 2004; Fernander, Duran, Saab, & Schneiderman, 2004) while other studies have found associations with positive mental health outcomes such as lower depressive symptomatology (McDougald et al., 2009) and a sense of meaning for life (Keyes, 2009). The John Henryism hypothesis has been researched with both Black men and women. However, this construct may not be as relevant for Black women as the measure used to asses John Henryism is a 12 item scale (James, Hartnett, & Kalsbeek, 1983) that fails to capture the multidimensionality of Black womanhood.

As previously stated, the SBW schema is a multidimensional construct that can facilitate both positive and negative behavioral and health outcomes depending on interpretation of experiences and subsequent regulation of emotions. Cardiovascular disease is among the negative health outcomes associated with characteristics of the SBW Schema. As research points to the influence of psychological distress on physiological indicators of CVD risk, it is important to consider the internalization of the SBW Schema as a possible mechanism associated with Black women's increased risk for this disease. However, it is important to consider that although

internalization of the SBW Schema manifests in distinct characteristics and is associated with adverse health outcomes, it may exert differential effects on the physiological profiles of individual Black women due to individual differences. One difference worth exploring further is emotion regulation. Differences in emotion regulation and varied interpretations of experiences filtered through the SBW Schema may allow women internalizing the SBW Schema to experience differential physiological reactions to stressors.

Summary. In sum, while the relation between stress and CVD risk is unequivocal, empirical studies have not identified culturally specific explanatory mechanisms. The current study is significant because it addresses an important gap in the literature regarding CVD risk in a historically understudied population at high risk for CVD. Research on CVD has shown women to present with more advanced CVD and different symptoms than men (Low, Thurston, & Matthews, 2010).

While research has identified gender related CVD differences, few studies have identified ethnic and/or racial specific factors that moderate the relation between prolonged physiological activation and CVD risk among women. Moreover, while researchers have suggested negative health outcomes associated with internalization of the SBW Schema, few studies have tested such assertions empirically. Further, no studies have tested these assertions using objective measures of health. This study examined the influence of the SBW Schema on CVD risk among Black women using objective measures of health (i.e., body mass index). The findings of this study will inform future research and the development of gender and race specific CVD prevention strategies.

Statement of the Problem and Hypotheses

Research has shown that effective coping and resources, including social support, help to mitigate the harmful effects of psychological stress (Gerin, Pieper, Levy, & Pickering, 1992; Kirschbaum, Klauer, Filipp, & Hellhammer, 1995; Lepore, Allen, & Evans, 1993; Uchino & Garvey, 1997). As suggested by emotional suppression and self-neglect, women who internalize the SBW Schema simply "maintain a certain kind of decorum, and a certain kind of outward togetherness. Even if inside, she's conflicted or she's having a nervous breakdown…nobody else knows" (Beauboeuf-LaFontant, 2007, pg. 39). Such behaviors, especially the maladaptive emotion regulation strategy of emotional suppression, highlight the need to examine the potential health risks associated with this cultured response to psychological stress.

In the developing area of research about the SBW Schema, much of the literature focuses on examining the gender role identity of Black women as it relates to stress, health, families, or society (Amankwaa, 2003; Beauboeuf-Lafontant, 2003; Beauboeuf-Lafontant, 2007; Broman, 1991; Collins, 2000; Woods-Giscombé, 2010). However, there is limited literature that examines the relation of emotion regulation to this Schema and few studies, if any, that utilize objective measures of health to examine related health outcomes associated. These are contributions of the current study. Understanding these relations will allow researchers to support more culturally specific treatments and prevention and intervention programs. Having a better understanding of the physiological effects of the SBW Schema may provide a more complete picture of risk associated with cardiovascular health of Black women. The current study examined the relations between chronic stress, CVD risk, internalization of the SBW Schema, and emotion regulation. The hypotheses of this study are:

Hypothesis 1. It is hypothesized that internalization of the SBW Schema (i.e., higher levels of endorsement) and chronic stress will be unique predictors of CVD risk. Numerous

studies have found chronic stress to be related to and predictive of CVD risk (Black & Garbutt, 2002; Cohen, Janicki-Deverts, & Miller, 2007; Öhlin, P. Nilsson, J. Nilsson, & Berglund, 2004; Troxel, Matthews, Bromberger, & Sutton-Tyrrell, 2003; Vitaliano et al., 2002). In addition, characteristics of the SBW Schema and associated psychological conflict/distress (e.g., emotional suppression, role strain, high effort coping) are related to negative health outcomes as well as an increased risk for CVD (Bennett et al., 2004; Benzeval 1998; Brosschot & Thayer, 1998; Fernander et al., 2004; Gross, 2002; Gross & Levenson, 1997; Hogue et al., 2000; Horsten et al., 1999; Linville, 1985; Matthews et al., 1998; McConnell et al., 2005; Moore-Green et al., 2012; Nordenmark, 2004; Schlatter & Cameron, 2010; Steffen et al., 2000; Waite & Hughes, 1999). Thus, it is expected that chronic stress and internalization of the SBW Schema will have unique effects on CVD risk. The SBW Schema is different from chronic stress in that the Schema dictates how women perceive and cope with stress. Although the Schema may influence increased stress levels it is conceptually different.

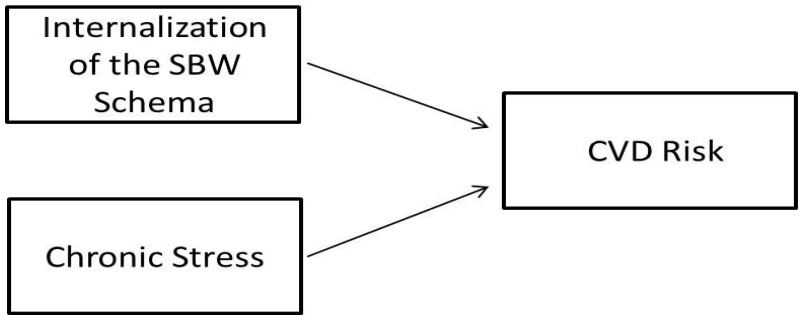

Figure 3. Internalization of the SBW Schema and Chronic Stress on CVD Risk

Hypothesis 2. It is hypothesized that the relation between internalization of the SBW Schema and CVD risk will be partially mediated by emotion regulation. When internalization of the SBW schema is higher, greater difficulties in emotion regulation will partly explain increased

CVD risk. When internalizing the SBW Schema, some women may experience positive emotions (i.e., feelings of accomplishment, validation, or self-efficacy), while others may experience more negative emotions (i.e., feeling overwhelmed, feeling as if they lack social support, etc.). Differences in emotion regulation have an impact on physiological outcomes (Fredrickson et al., 2000).

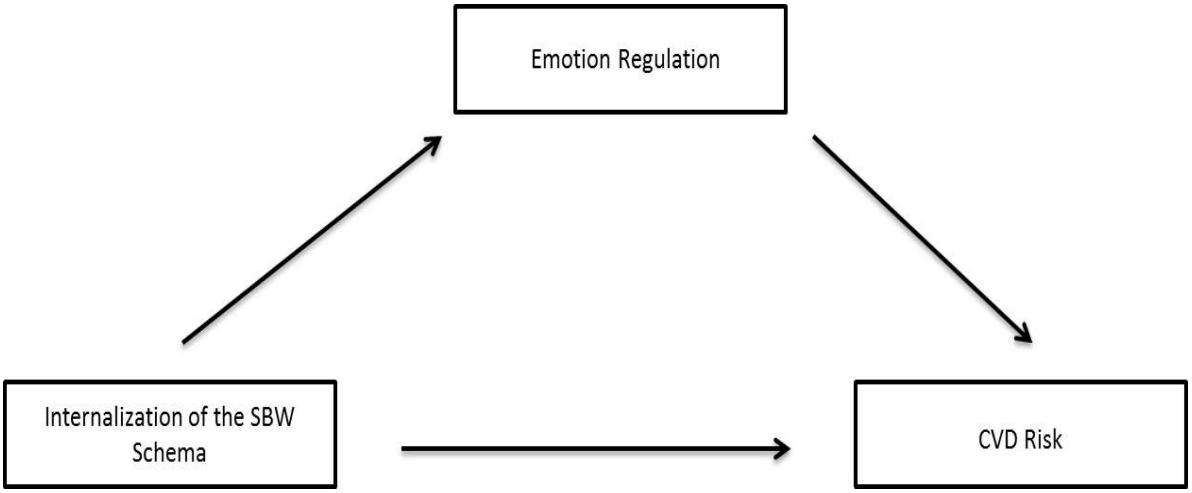

Figure 4. Emotion Regulation as a Mediator of Internalization of the SBW Schema on CVD Risk

Hypothesis 3. It is hypothesized that the effect of chronic stress on CVD risk will be moderated by internalization of the SBW Schema. More specifically, women with higher internalization of the SBW Schema experiencing chronic stress will have an increased risk of CVD than women lower in internalization of the SBW Schema with similar levels of chronic stress. According to gender schema theory (Bem, 1981), life experiences are filtered through gendered schemas. IBM theory (Oyserman, 2007) furthers this concept, by stating that people seek to engage in behaviors that are consistent with their identities. According to these theories, a SBW experiencing chronic stress will filter stressful experiences through the Schema and engage

in identity congruent behaviors (e.g., being independent, caring for others before self, etc.). Such behaviors leave little time for rest and recovery of physiological systems and may exacerbate the effects of chronic stress.

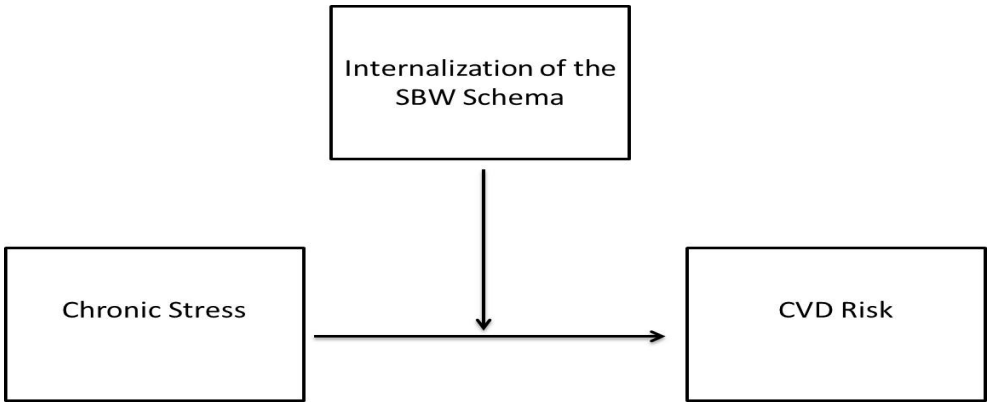

Figure 5. Internalization of the SBW Schema Moderates the Relation between Chronic Stress and CVD Risk

Method

This study was part of a larger study that sought to identify CVD risk factors among Black women. The Institutional Review Board at Virginia Commonwealth University approved the methods for the current study.

Participants

Power analysis. Cohen's (1992) recommendations were utilized to determine the appropriate sample size for the current study. According to Cohen (1992), a minimum of 102 participants are needed when conducting multiple regression analyses with 7 independent variables (including covariates) at power .80, with a medium effect size at $\alpha = .05$. Thus, recruitment efforts were aimed at enrolling 150 to 200 women to account for missing data.

Recruitment. Convenience and snowball sampling strategies were utilized in the current study. Convenience sampling involves selecting participants based on their willingness to

participate and ease of access (Saumure & Given, 2008). Snowball sampling is a recruitment method that utilizes the social networks of existing participants through referral. It often increases access to a greater number of potential participants (Atkinson & Flint, 2004).

Participants were recruited from community locations in the Mid-Atlantic region of the U.S. Permission was obtained from appropriate staff to post flyers and recruit women at community agencies, facilities, and businesses where Black women frequent. Initial contact and support for the study was established with several community organizations, including St. Paul's Baptist Church, Minority Health Consortium, and local Black sororities, including Delta Sigma Theta Sorority, Incorporated. Flyers were also given to staff at recruitment sites to disseminate. The staff at the sites were asked to refer potential participants to the primary researcher if questions arose. Flyers (see Appendix A) described participation eligibility and provided instructions to contact the primary researcher via phone or email if interested.

Initial communication involved informing potential participants of the purpose of the study and screening them to confirm that they were eligible to participate based on inclusion and exclusion criteria (described below). Participants were informed that all data would be kept anonymous and confidential. Potential participants were also informed that participation in the study would last for about one hour and 30 minutes and that a monetary incentive of $25.00 would be provided for their participation.

Exclusion and inclusion criteria. Due to the focus of the current study and the exclusionary criteria for the measure of CVD risk, only Black women age 35 to 75 without prior heart disease were included in this sample. This age group was recruited because of the increase in CVD death rates for women between the ages of 35 - 44 (Ford & Capewell, 2007). Thus, women age 35 and older are expected to have typical rates of CVD risk for Black women.

Participants were excluded from the study if they did not self-identify as a Black woman, were not between the ages 35 and 75, and had a history of certain diagnosed heart disease. Women with CVD risk factors, including HTN, obesity, and type 2 diabetes were not excluded.

Interested individuals were screened via telephone interviews. Potential participants were asked about their ethnicity, age, and heart disease status. The following script was utilized to screen participants for participation eligibility:

> *Thank you so much or your interest in this research on Black women and heart health. We are looking for Black women age 35 and older (up to 75) without a personal prior history of heart disease such as coronary artery disease (narrowing of the arteries), heart attack, heart failure, heart valve disease, congenital heart disease, heart muscle disease (cardiomyopathy), pericardial disease, aorta disease and marfan syndrome, or vascular disease (blood vessel disease). Do you meet those criteria?*
>
> Individual does not meet criteria*: I am sorry to inform you that you are not eligible to participate in this study but we appreciate your interest. If you have any friends or family members who are interested and eligible please pass along our contact information and have them give us a call.*
>
> Individual meets criteria: *Awesome, that is great news! You are eligible to participate. Let me give you a brief overview of the study. You are being asked to participate in a research study that examines the relationships between heart disease risk and experiences with being a Black woman. Participation will last for about an hour and a half. We will measure your height, weight, and blood pressure. Also, you will be asked to*

complete a survey. All of the data that we collect will be anonymous and confidential. For your participation you will receive $25.00 cash and a heart health information packet. Does that sound all right to you? Do you have any questions?

Upon confirmation of their desire to participate, women were provided with a date, time, and location for their study visit.

Measures

Participants were asked to complete a battery of measures (see Appendix B). The following paragraphs describe measures used to assess the variables of interest including CVD risk, chronic stress, internalization of the SBW Schema, emotion regulation, and demographic data.

Dependent variable.

CVD risk assessment. CVD risk was assessed via a noninvasive method that considers several risk factors. This method was developed using a sample of 6,186 female (n = 3349) and male (n = 2837) participants from the National Health and Nutrition Examination Survey (NHANES) (T. Gaziano, Young, Fitzmaurice, Atwood, & J. Gaziano, 2008). Data regarding the racial/ethnic background of participants was not reported in this study. The noninvasive model is just as effective at predicting cardiovascular events as a laboratory-based model that requires a blood draw to assess cholesterol. Both models use the following indicators: age, smoking status, systolic blood pressure, and reported diabetes status. However, the laboratory-based model also uses cholesterol, whereas the non-invasive model substitutes BMI for cholesterol. Specifically, the laboratory based assessment predicted cardiovascular events with a c statistic (result of a Cox regression that is often used in the CVD literature to judge the performance of risk prediction models) of 0.829 and the non-laboratory method yielded a c statistic of 0.831. The probability

that the laboratory based assessment accurately predicts heart disease is 82.9% and 83% for the non-laboratory assessment thus demonstrating that both methods are equally effective at predicting cardiovascular events.

Predictor variables.

Perceived Stress Scale. Chronic stress was measured with the Perceived Stress Scale (PSS) (Cohen, Kamarck, & Mermelstein, 1983), a 14 item five-point Likert scale that assesses global perceptions of stress. The widely used PSS operates under the underlying principle that stressful events perceived as threatening or demanding can increase the risk of health problems. Responses range from zero (never) to four (very often). Participant scores can range from 0 to 56, with greater scores indicating elevated levels of perceived stress. The PSS has been shown to be a reliable and valid measure of perceived stress (Cohen et al., 1983), demonstrating adequate internal consistency, test retest reliability (≥.70), and convergent, divergent, and predictive validity. Also, the PSS operates well with ethnically and generationally diverse participants (Cole, 1999). In the current study, the reliability coefficient for the PSS was .63, indicating a moderate level of reliability.

Internalization of SBW Schema. Currently, there is not a published validated measure to capture internalization of the SBW Schema. The construct was measured by developing a composite score based on participant responses on measures capturing four salient features of the Schema. These include dedication to the care of others, obligation to exude strength, emotional suppression, and independence. This method for assessing internalization of the SBW Schema is modeled after a published empirical examination of the construct (Harrington, 2010) in which a composite score was created from scales and subscales used as indicators of internalization of the SBW Schema. These include the Superwoman and Mammy subscales from the Stereotypic

Roles for Black Women Scale (SRBWS; Thomas, Witherspoon, & Speight, 2004), Efficacy of Help-Seeking Scale (EHSS; Eckenrode, 1983), and the Silencing the Self Scale (STSS; Jack & Dill, 1992).

Mammy subscale of the Stereotypic Roles for Black Women Scale (SRBWS). The SRBWS (Thomas, Witherspoon, & Speight, 2004) contains 34 items and is used to assess the extent to which Black women internalize common stereotypes (i.e., Mammy, Superwoman, Jezebel, and Sapphire). To assess the "dedication to care for others" component of the SBW Schema, the Mammy stereotype subscale from the (SRBWS) was used. Examples from the six item Mammy subscale include "I often put aside my own needs to help others," "People often expect me to take care of them," and "I feel guilty when I put my own needs before others." Responses range from "strongly disagree" to "strongly agree" on a five-point scale. Higher scores indicate greater endorsement of the Mammy stereotype. In previous research, the Mammy subscale has demonstrated low to moderately low internal consistency with alpha coefficients ranging from .52 to .64 (Harrington, 2007; Thomas, Witherspoon, & Speight, 2004). It is possible that this scale demonstrates low to moderate internal consistency because it is only comprised of six items. The reliability coefficient for the Mammy subscale was .62 in the current study.

Superwoman subscale of the Stereotypic Roles for Black Women Scale (SRBWS). To assess the obligation to manifest strength component of the SBW Schema, the Superwoman stereotype subscale from the SRBWS (Thomas, Witherspoon, & Speight, 2004) was used. Examples from the 11-item Superwoman subscale include "If I fall apart, I will be a failure," "Black women have to be strong to survive," and "I tell others that I am fine when I am depressed or down." Responses range from "strongly disagree" to "strongly agree" on a five-point scale. Higher scores indicate greater endorsement of the Superwoman stereotype. The

Superwoman subscale has exhibited sufficient internal consistency in previous studies with alpha coefficients ranging from .67 to .77 (Harrington, 2007; Thomas, 2004). The reliability coefficient for the Superwoman subscale was .74 in the current study.

Silencing the Self subscale of the Silencing the Self Scale (STSS). The Silencing the Self subscale of the STSS (Jack & Dill, 1992) was used to assess emotional suppression. The STSS contains 31 items and is used to assess internal processes associated with depression in women. The Silencing the Self Scale assesses the extent to which individuals inhibit their thoughts and behaviors when experiencing negative emotions. Sample items from the nine-item Silencing the Self subscale include "I rarely express my anger at those close to me" and " I think it's better to keep my feelings to myself when they conflict with my partner's." Responses are indicated on a five-point Likert scale, ranging from "strongly disagree" to "strongly agree." Higher scores indicate greater self-silencing. With alpha coefficients ranging from .76 to .83, the Silencing the Self subscale has demonstrated high internal consistency in previous research (Brody et al., 2014; Jack & Dill, 1992). In the current study, the reliability coefficient for the Silencing the Self Subscale was .69, indicating a moderately low level of reliability.

Efficacy of Help-Seeking Scale (EHSS). To assess the independence component of the SBW Schema, the EHSS (Eckenrode, 1983) was used. The EHSS is a six-item scale, with responses ranging from "strongly agree" to "strongly disagree" on a four-point scale. Lower scores indicate lower beliefs in the efficacy or benefits of seeking and accepting help. Sample items include "It is better to take care of your own problems than to rely on others for help" and "Admitting hardships to others is a sign of weakness." In previous studies, the scale has established minimal to adequate internal consistency with alpha coefficients ranging from .60-

.70 (Eckenrode, 1983; Harrington, 2007; Wright, 2000). In the current study, the reliability coefficient for the EHSS was .63, indicating a moderately low level of internal consistency.

Prior to computing the composite score of the SBW Schema, scales were standardized. A composite score, combining mean scores from the previously described measures was created to reflect the degree to which women internalize the SBW Schema. Higher scores indicate a greater internalization of the measured SBW Schema characteristics.

Mediating variable.

Difficulties in Emotion Regulation Scale. The Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004) is a 36-item measure used to assess emotion regulation. The scale contains six domains that reflect six subscales (listed in parentheses): 1) Non-acceptance of Emotional Responses (Non-acceptance), 2) Difficulties Engaging in Goal-Directed-Behavior (Goals), 3) Impulse Control Difficulties (Impulse), 4) Lack of Emotional Awareness (Awareness), 5) Limited Access to Emotion Regulation Strategies (Strategies), and 6) Lack of Emotional Clarity (Clarity). Items are rated on a five-point scale with responses ranging from "almost never" to "almost always." Higher scores indicate greater emotion regulation difficulties. This scale has previously been used in studies with Black women and has demonstrated high internal consistency (alpha coefficient = .93) (Harrington, 2007). In the current study, the reliability coefficient for the total DERS was .86, indicating a high level of internal consistency. The reliability coefficients for the Non-acceptance, Goals, Impulse, Awareness, Strategies, and Clarity subscales were .82, .72, .77, .73, .84, .72, respectively.

Demographics questionnaire. Demographic data was collected to assess age, race, income level, education level, marital status, partner status, sexual orientation, birth order, number of children (including number in home), and employment status. Information about

physical activity and current health status (smoking status, reported diabetes status, and current treatment for hypertension) was also gathered. In addition, a trained researcher took participants' height, weight, and blood pressure and record these measurements on the demographic data form.

Procedure

Data collection occurred at a center on the academic campus of Virginia Commonwealth University (Center for Cultural Experiences in Prevention) and in various community locations, including three churches. Participants were greeted upon arrival and a grace period of five minutes was given for women who did not arrive at the study location at the appointed time. Participants who did not arrive within the five minute grace period were called to verify their interest in participating and to ensure that they were able to find the study location and parking (if they were driving). If participants were not within five minutes of the study location, their study appointment was rescheduled for a later time that day or another day and time.

At the start of the study session, the purpose of the study was explained again. The following script was used to orient participants to the study's purpose and procedures:

> *Thank you so much for your interest in this research. We are happy to have you. The purpose of this study is to examine relationships between heart disease risk and experiences associated with being a Black woman. You are being asked to participate in this study because you are a Black woman age 35 or older. In this study you will be asked to complete a survey about your personal life experiences. Your height, weight, and blood pressure will also be taken. All of the information collected during this research study will be kept anonymous and confidential. This should take about an hour and 30 minutes*

and you will receive $25.00 cash for your participation. Also, if you would like, you will have the opportunity to learn about your heart disease risk at the end of the study.

Next, informed consent was obtained via a consent form (see Appendix C). After reviewing the form and having their questions answered, the consent forms were signed by women and collected. Women were then asked to complete a demographic data form. During the time women were completing demographic data forms, blood pressure, height, and weight measurements were taken (one participant at a time) in areas/rooms separate from other participants. Space varied depending on study location but efforts were made to maximize the privacy of participants during the collecting of height, weight, and blood pressure data. Afterwards, participants were asked to complete a questionnaire, including measures of chronic stress, internalization of the SBW Schema, and emotion regulation.

Upon completion of the questionnaire, the researcher thanked women for their participation and provided them with an incentive of $25.00 and an information packet regarding CVD risk. The information packet included a document containing facts about CVD risk among Black women (American Heart Association, 2009; Appendix D) and a list of free and low cost health care providers in the local area (Appendix E). Women also received a letter thanking them for their participation and describing their cardiovascular disease risk information (blood pressure and BMI). This letter (Appendix F) also included contact information for the research coordinator. These documents along with the $25.00 incentive were given to participants in envelopes. When the envelopes were given to participants they were encouraged to review their CVD risk information with a health care provider. Participants were informed that if they did not have a provider, the envelope contained a list of resources that could be used to identify and contact a provider who could review their results and provide further consultation.

Data Analytic Plan

The Statistical Package for the Social Sciences (SPSS) 21.0 was used to generate an electronic data set and conduct all analyses. Trained research assistants entered data into SPSS and I verified the accuracy of the data by proofreading each of the original completed questionnaires against the computerized data file (Tabachnick & Fidell, 2001).

Pre-analysis screening. Descriptive statistics were computed for all variables. Exploratory analyses were conducted to confirm that the data met the necessary assumptions for performing multivariate analyses. These assumptions included absence of multicollinearity, outliers, and homoscedasticity and evidence normality and linearity.

Multicollinearity. Multicollinearity refers to high correlations among predictor variables. I checked for multicollinearity by computing a correlation table and examining correlations among predictor variables. If predictor variables are highly correlated (correlations higher than .7, tolerance less than .10, and VIF greater than 10), centering is done to decrease the correlation and increase the interpretability of the findings (Aiken & West, 1991). Centering of predictor and moderator variables is recommending when testing interaction effects (Aiken & West, 1991; Darlington, 1990). Centering is complete when the mean score of a variable is subtracted from all scores (establishing a new mean of 0). This strategy does not change the assessment of significance of a predictor variable (Garson, 2008). Centering was not done because the correlation matric did not reveal high correlations among predictor variables.

Outliers. Outliers are data points that are far outside of the norm for a given variable or population. I checked for univariate outliers by checking the standardized values of each variable against suggested cutoff scores presented by Van Selst and Jolicoeur (1994). Upon examination

of standardized (Z-Scores), one outlier was identified for the chronic stress variable. The outlier was removed from analyses, by designating the stress data as missing for that particular case.

Normality. Univariate and multivariate normality are assumptions of regression analyses. Univariate normality refers to data points for a variable that are normally distributed according to the standard normal distribution. Univariate normality must be examined prior to examining multivariate normality, the assumption that predictor variables have a linear relationship with dependent variables. Graphic representations of the data were eyeballed to assess both univariate and multivariate normality (Tabachnick & Fidell, 2001). Upon observation of histograms, all variables were identified as normally distributed, with the exception of the chronic stress variable. To verify skewness and kurtosis were also assessed.

Skewness refers to the symmetry of the distribution. A variable is skewed if the mean of the distribution is not at the center. Kurtosis refers to the peakedness of the distribution, indicating a departure from normality. A variable is considered kurtotic if the distribution is too flat or too peaked. Upon examination of skewness and kurtosis scores, the chronic stress variable was identified as leptokurtotic, having a highly positive peak in the data around the midpoint. A log10 transformation was used to normalize the data. The transformation assisted with reducing the kurtosis of the data, however the data still remained leptokurtotic as the kurtosis value was 1.67 after the transformation.

Preliminary analyses. Descriptive statistics of demographic variables, including income level, education level, marital status, sexual orientation, number of dependents, and employment status, were computed to provide a detailed picture of the sample. A correlational matrix was generated to examine bivariate relationships among all variables. Bivariate analyses were examined to determine if any demographic variables (i.e., education level) correlated with the

dependent variable, CVD risk, in order to control for these variables in subsequent analysis. Age, smoking status, reported diabetes status, height, weight, and blood pressure were used to compute the CVD risk score.

Hypothesis testing. The purpose of this study was to determine the relationships between internalization of the SBW Schema, chronic stress, emotion regulation, and CVD risk among Black women. Specifically, this investigation examined predictive, moderating, and mediating relationships. Hierarchical multiple regression analyses should be conducted to test hypotheses. Data analysis plans for each hypothesis follows.

Hypothesis 1: It was hypothesized that internalization of the SBW Schema (i.e., higher levels of endorsement) and chronic stress will be unique predictors of CVD risk. In order to test the first hypothesis a hierarchical multiple regression should be conducted. Covariates (i.e., education level) would be entered into the model first. Internalization of the SBW Schema along with chronic stress would be entered into the model in the second step.

Hypothesis 2: It was hypothesized that the relationship between internalization of the SBW Schema and CVD risk will be mediated by emotion regulation. A mediator variable is a variable that explains the relationship between a predictor variable and the dependent variable (Baron & Kenny, 1986). In the current study, internalization of the SBW Schema is the predictor variable, emotion regulation is the mediating variable, and CVD risk is the dependent variable.

According to Baron and Kenny (1986), in order to test for mediation the following conditions must be met: (1) the predictor variable must account for a significant amount of the variance in the dependent variable, (2) the predictor variable must account for a significant amount of the variance of the mediator variable, (3) the mediator variable must account for a significant amount of the variance in the dependent variable, and (4) when controlling for the

mediator variable, the relationship between the predictor variable and the dependent variable is not significant (or the significant level is reduced when there is partial mediation). Using variables from the current study, the following conditions must be met: (1) internalization of the SBW Schema predicts CVD risk (predictor variable predicts dependent variable) (as posited in Hypothesis 1), (2) internalization of the SBW Schema predicts emotion regulation (predictor variable predicts mediator), (3) emotion regulation predicts CVD risk (mediator predicts dependent variable), and (4) when controlling for emotion regulation, the relationship between internalization of the SBW Schema and CVD risk is not significant (or reduced in significance for partial mediation) (Baron & Kenny, 1986).

To test for mediation effects, three regression analyses should be performed (Baron & Kenny, 1986). Covariates (i.e., education level) would be entered into the first step of each regression equation. A regression would be performed to determine if internalization of the SBW Schema explains a significant proportion of the variance in emotion regulation. Another regression would be performed to determine if internalization of the SBW Schema explains a significant proportion of the variance in CVD risk. Next, a regression would be performed to determine if emotion regulation accounts for a significant amount of variance in CVD risk. Full mediation exists if the hypothesized significant relationship between internalization of the SBW Schema and CVD risk drops to zero or becomes non-significant after both internalization of the SBW Schema and emotion regulation are entered into the model (Baron & Kenny, 1986). Partial mediation exists if the relationship between internalization of the SBW Schema and CVD risk is reduced.

Baron and Kenny's (1986) approach fails to provide a direct estimate of the size of the indirect effect of the predictor variable on the dependent variable (MacKinnon, Lockwood,

Hoffman, West, & Sheets, 2002). As such, a more conservative test, the Sobel test (Sobel, 1982), should also be used to assess mediation effects. The indirect or mediating effect is the product of the relationships between predictor variable and the mediator variable and the mediator variable and the dependent variable, while controlling for the predictor variable (Preacher & Hayes, 2004). The Sobel test is computed using an online calculation tool developed specifically to perform this analysis (Preacher & Leonardelli, 2001).

Hypothesis 3: It was hypothesized that the effect of chronic stress on CVD risk will be moderated by internalization of the SBW Schema. A moderator variable is a variable that impacts the strength and/or direction of the relationship between a predictor variable and a dependent variable. A "moderation implies that the causal relation between two variables changes as a function of the moderator variable" (p. 1174, Baron & Kenny, 1986). In the current study, chronic stress is the predictor variable, internalization of the SBW Schema is the moderating variable, and CVD risk is the dependent variable.

The third hypothesis should be tested by a hierarchical multiple regression. Hierarchical entry of predictor variables in multiple regression analyses can be used to determine if the relationship between a predictor variable and a dependent variable is influenced by a moderating variable (Nunally & Bernstein, 1994). Analyses would assess whether women with higher internalization of the SBW Schema experiencing chronic stress have an increased risk of CVD than women lower in internalization of the SBW Schema with similar levels of chronic stress.

The covariates (i.e., education level) should be entered into the equation in the first step with CVD risk as the dependent variable. Next, chronic stress and the internalization of the SBW Schema variables should be added. Finally, an interaction term computed as a cross product of predictors in the previous step (chronic stress x internalization of the SBW Schema) should be

entered into the regression equation. The result of this analysis would reveal an estimation of the strength and direction changes in CVD risk that are associated with changes in chronic stress and internalization of the SBW Schema.

Results

Descriptive Statistics for Demographic/Control Variables

See Table 1 for a summary of descriptive statistics, including income level, education level, employment status, marital status, sexual orientation, and number of children.

Income level. Household income ranged among participants from $0 to $840,000 ($M$ = 43500.93, SD = 81398.80). Of the 171 participants that reported income data, 31% reported an income of less than $9,000, 29% reported an income between $9,000 and $37,000, 29% reported an income between $38,000 and $87,000, 9% reported an income between $90,000 and $200,000, and 2% reported an income greater than $200,000. Percentages are based on the 171 participants who provided income data.

Table 1.

Means, Standard Deviations, and Ranges of Independent and Mediator Variables

Variable (Scale)	N	Mean	SD	Item Range
Chronic Stress (PSS)	197	3.44	.44	1 – 5
Dedication to Care (Mammy Subscale_SRBWS)	197	3.06	.82	1 – 5
Obligation to Manifest Strength (Superwoman Subscale_SRBWS)	197	3.09	.69	1 – 5
Independence (EHSS)	197	2.55	.44	1 – 4
Emotional Suppression (STS Subscale 3)	197	2.53	.76	1 – 5
Emotion Regulation (DERS)	188	2.10	.65	1 – 5

Education level. Participants varied in education level. Fifteen percent (n = 30) reported having less than a high school diploma, 16.5% (n = 33) a high school diploma, 4.5% (n = 9) technical or vocational training, 23% (n = 46) some college, 6% (n = 12) an associate's degree, 20% (n = 40) a bachelor's degree, 11% (n = 22) a master's degree, and 2.5%(n = 5) reported having a doctorate. Three participants (1.5%) did not provide information about their education level.

Employment status. Nearly half of all participants were employed, either full time (n = 73, 37%) or part time (n = 20, 10%). Twenty three percent of participants were unemployed and looking for employment and 3% were unemployed and not looking. About 3.5% identified as homemakers, 12% as disabled (receiving benefits), and 10% as retired. Data on employment status was missing for 1% of participants.

Marital status. The majority of women (77%, n = 154) were not currently married. Most reported having a romantic partner (56%, n = 112).

Sexual orientation. Most women identified as straight/heterosexual (94%, n = 188). Three percent identified as bisexual, 1.5% as gay/lesbian, .5 percent as unsure, and 1% as other.

Number of children. The majority of women reported having children (81.5%, n = 163). Of the mothers, most had one or two children, 28.4% and 24.2% respectively. In terms of children living with participants, 53.5% (n = 107) of women reported that no children lived with them, 24.5% (n = 49) reported 1, 11.5% (n = 23) reported 2, 2.5% (n = 5) reported 3, 1.5% (n = 3) reported 4, and 2.5% (n = 5) reported 5 children in their home. Eight women (4%) did not provide data regarding the number of children that lived with them.

Physical activity. Participants were asked to classify their level of physical activity (i.e., no activity, low activity, medium activity, high activity, or somewhere in between the given

choices). Many participants (42%) reported no (12%, *n* = 24) or low (30%, *n* = 60) physical activity. Twelve percent of participants (*n* = 24) reported activity levels between none and low. Eighteen percent of participants (*n* = 36) reported medium physical activity and 13% (*n* = 25) reported activity levels between low and medium. Nearly four percent (*n* = 7) reported activity between medium and high, 10.5% (*n* = 21) reported high activity. Physical activity data was not reported by one percent of women (*n* = 2). Participants in the current study reported physical activity levels higher than that of national averages, which report 55% of Black women to not engage in regular physical activity (U.S. Department of Health and Human Services, 2009).

Descriptive Statistics for Independent Variables

Chronic stress. The Perceived Stress Scale was used to assess chronic stress. The mean score was 3.45 (*SD* = .40) on a scale of 1 to 5, indicating a moderately high level of perceived stress.

SBW Schema.

Composite score. Internalization of the SBW Schema was assessed using a composite score of several different measures, modeled after a published study utilizing the same method of assessment (Harrington, 2010). To compute the composite score, each scale was standardized (scale scores concerted to z-scores) and standardized scores were summed. The measures included Superwoman and Mammy subscales from the Stereotypic Roles for Black Women Scale (SRBWS; Thomas, Witherspoon, & Speight, 2004), Efficacy of Help-Seeking Scale (EHSS; Eckenrode, 1983), and the Silencing the Self Scale Subscale of the Silencing the Self Scale (STS; Jack, 1991). Each scale was formatted such that higher scores indicated greater endorsement of constructs. For participants in the current study, composite scores ranged from

5.73 to 15.89 (M = 10.83, SD = 1.97). Descriptive statistics are provided below for each scale used to comprise the composite score.

Dedication to care. Dedication to care or self-sacrificial caregiving was captured via the Mammy subscale on the SRBWS (Thomas, Witherspoon, & Speight, 2004). The mean score was 3.06 (SD = .82) on a scale of one to five, indicating moderately high levels of endorsement of self-sacrificial care.

Obligation to manifest strength. Perceived obligation to manifest strength was assessed with the Superwoman subscale of the SRBWS (Thomas, Witherspoon, & Speight, 2004). The mean score was 3.09 (SD = .69) on a scale of one to five, indicating a moderately high level of endorsement of self-sacrificial care.

Emotional suppression. Emotional suppression was assessed with the Silencing the Self Subscale of the STSS (Jack, 1991). The mean score was 2.53 (SD = .76) on a scale of one to five, indicating moderate levels of emotional suppression.

Independence. Independence was captured via the EHSS. Mean scores ranged from 1.17 to 3.33 (M = 2.15, SD = .44) on a four-point scale. The mean score indicated moderate levels of help seeking efficacy.

Descriptive Statistics for Mediating Variable

Emotion regulation. Difficulties with emotion regulation were captured with the DERS. The average score was 2.10 (SD = .63) on a five-point scale, indicating relatively low levels of emotion regulation difficulties.

Descriptive Statistics for Dependent Variable

CVD risk. CVD risk score was computed using participant's age, smoking status, reported diabetes status, BMI, and blood pressure (T. Gaziano, Young, Fitzmaurice, Atwood, &

J. Gaziano, 2008). See Table 2 for a summary of these variables. Based on the non-invasive model developed by Gaziano et al. (2008), the previously mentioned participant health data was used to compute a risk score that ranges between one and five. Scores of one and two are designated as low risk, with one indicating a less than five percent and two indicating a five to 10 percent chance of having a cardiac event within five years. A score of three indicates moderate risk – equivalent to a greater than 10 to 20 percent five year risk. Scores of four and five indicate a >20 – 30% and > 30 % five year risk respectively.

Table 2.

Descriptive Statistics for CVD Risk Score Variables

Age (years)*	51.51 (9.04)
Systolic Blood Pressure (mm Hg)*	140.28 (21.62)
Diastolic Blood Pressure (mg/dL)*	83.92 (14.40)
Body Mass Index*	31.29 (7.72)
Current Smoking (%)	33
Diabetes (%)	14

*Mean (SD)

Eighty-two participants (41.6%) were categorized as low risk with 41 participants (20.8%) having a CVD score of one and 41 having a score of two. Fifty-eight participants (29.4%) were categorized a moderate risk. Fifty-five participants (27.9%) were categorized as high risk with 30 participants (15.2%) and 25 participants (12.7%) having scores of four and five respectively. Given missing data for some of these variables, CVD risk scores could not be computed for one percent (n = 2) of participants. Figure 6 displays participant CVD risk scores

for the entire sample and for women over 50, the age at which CVD risk burden can best predict survival rates (Lloyd-Jones, 2006).

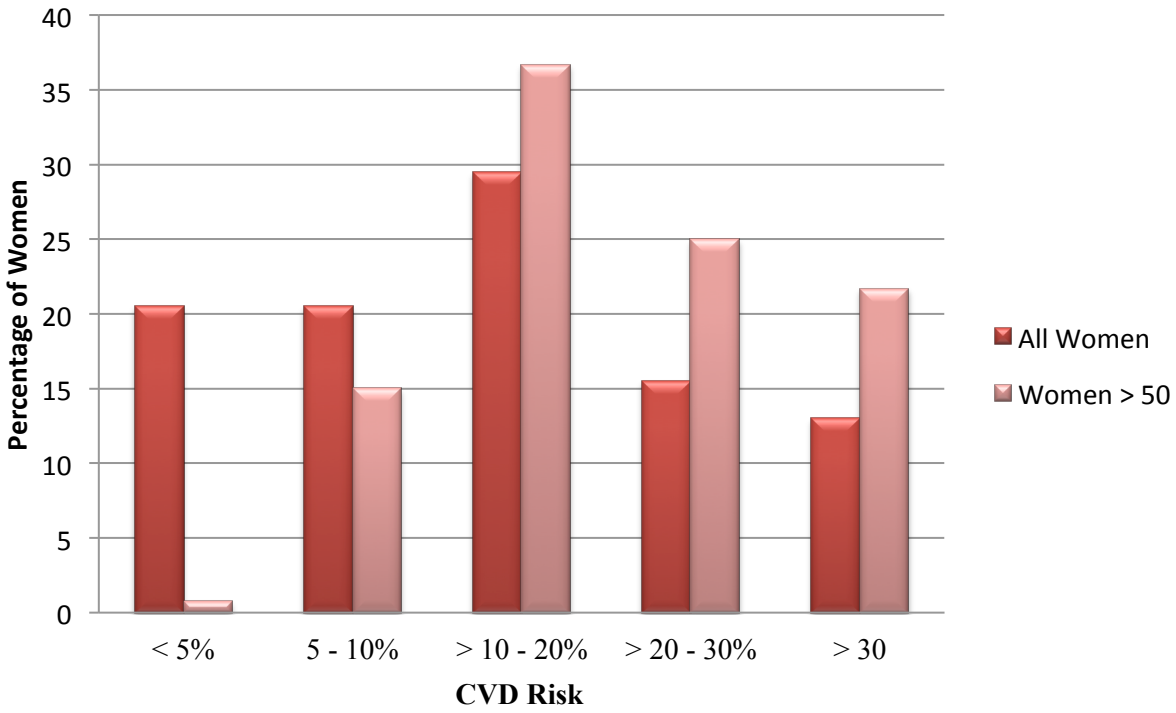

Figure 6. CVD Risk Scores

Age. Participants ranged in age from 35 to 74 ($M = 51.51$, $SD = 9.04$). Sixty percent ($n = 120$) of participants were age 50 and over.

Smoking status. Thirty three percent of participants identified as current smokers. Smoking rates for women in this sample are nearly double that of women in the same geographic region, 17.4%, (Virginia Department of Health, 2011) and Black women across the U.S., 15.4% (CDC, 2014).

Reported diabetes status. Fourteen percent of participants reported having diabetes ($n = 28$).

BMI. BMI ranged from 16 to 65 (M = 31.29, SD = 7.71). The mean BMI for this sample is categorized as class one obesity. Based on NIH classifications, 2.5% (n = 5) of women were underweight, 17.7% (n = 35) of women were of a normal weight, 22.3% (n = 44) were overweight, 57.8% were obese; 30.5% (n = 60) in class one, 13.9% (n = 27) in class two, 13.4% (n = 26) class three. Approximately 80% of women in this study were overweight or obese. These rates are consistent with national averages, as 80% of Black women across the U.S. are overweight or obese (Office of Minority Health, 2013).

Blood pressure. Systolic blood pressures ranged from 86 to 213 (M = 140.28, SD = 21.62) and diastolic pressures ranged from 40 to 120 (M = 83.92, SD =14.40). According to classifications designated by NIH, the mean systolic blood pressure for this sample is considered Stage 1 HTN and the mean diastolic blood pressure is prehypertension. To ensure accuracy of the data, blood pressures were retaken (on the opposite arm) for participants with abnormally high readings (systolic over 180 and/or diastolic over 110). Participants with systolic pressures over 180 mm Hg (n = 5) and diastolic pressures over 110 mm Hg (n = 6) were referred to the care of a health care provider (T. Gaziano, Young, Fitzmaurice, Atwood, & J. Gaziano, 2008). See Table 3 for NIH parameters for blood pressure designations (NHLBI, 2012d). See Table 4 for participant blood pressure designations.

Table 3.

Blood Pressure Categories

Blood Pressure Category	Systolic (mm Hg)	Diastolic (mm Hg)
Normal	Less than 120	And less than 80
Prehypertension	120 – 139	Or 80 – 89
High Blood Pressure (Hypertension) Stage 1	140 – 159	Or 90 – 99
High Blood Pressure (Hypertension) Stage 2	160 or higher	Or 100 or higher
Hypertensive Crisis	Higher than 180	Or Higher than 110

Table 4.

Blood Pressure Categories of Participants

Blood Pressure Category	Systolic (mm Hg)	Diastolic (mm Hg)
Normal	15.7% (n = 31)	
Prehypertension	30.5% (n = 60)	34.5% (n = 68)
High Blood Pressure (Hypertension) Stage 1	32.5% (n = 64)	16.2% (n = 32)
High Blood Pressure (Hypertension) Stage 2	18.8 % (n = 37)	10.7% (n = 21)
Hypertensive Crisis	2.5% (n = 5)	3.1% (n = 6)

Bivariate Correlations Among Variables

Chronic stress was not significantly correlated with other predictor variables (internalization of the SBW Schema and emotion regulation) and was marginally correlated with the dependent variable (CVD risk), $r = .13$, $p = .068$. That is, there was a trend for higher perceived chronic stress to predict higher CVD risk. CVD risk was also not significantly correlated with any of the predictor variables, including internalization of the SBW Schema and

emotion regulation. The only significant correlation among variables was the positive correlation between internalization of the SBW Schema and emotion regulation ($r = .52$, $p < .01$) (see Table 5).

Table 5.

Correlations Among Variables

	1	2	3	4
Chronic Stress (1)	1.0	.093	.004	.133
Internalization of SBW Schema (2)		1.0	.524**	-.042
Emotion Regulation (3)			1.0	-.008
CVD Risk Score (4)				1.0

**Correlation is significant at the .01 level (2-tailed).

Hypothesis Testing

Hypothesis 1: Internalization of the SBW Schema (i.e., higher levels of endorsement) and chronic stress will be unique predictors of CVD risk. A hierarchical multiple regression was conducted to test the first hypothesis. Education was entered into the model first as a covariate and internalization of the SBW Schema and chronic stress were entered into the second step of the model. Analyses revealed that chronic stress, when controlling for education, was a significant predictor of CVD risk ($\beta = .147$, $t(187) = 2.06$, $p < .05$). However, internalization of the SBW Schema (as measured by the composite score; $\beta = -.04$, $t(187) = -.53$, $p = .58$) was not a significant predictor of CVD risk. As such the first hypothesis was partially supported.

Hypothesis 2: The relation between internalization of the SBW Schema and CVD risk will be partially mediated by emotion regulation. Three regression analyses were performed to test for mediation effects (Baron & Kenny, 1986) and education level was entered into the first step of each regression equation that had CVD risk as an outcome variable. Results of these analyses revealed that internalization of the SBW Schema explained a significant proportion of the variance in emotion regulation, $\beta = .524$, $t(185) = 8.37$, $p < .001$, such that greater internalization of the schema predicted greater difficulties with emotion regulation. Internalization of the SBW Schema did not explain a significant proportion of the variance in CVD risk, $\beta = -.050$, $t(188) = -.694$, $p = .488$ and emotion regulation did not explain a significant amount of variance in CVD risk, $\beta = -.069$, $t(182) = -.906$, $p = .366$. Given these results, conditions for conducting mediation analyses were not met and hypothesis 2 was not supported. Specifically, the predictor (internalization of the SBW Schema) and mediator (emotion regulation) variables did not account for a significant amount of variance in the dependent variable (CVD risk).

Hypothesis 3: The effect of chronic stress on CVD risk will be moderated by internalization of the SBW Schema. The third hypothesis was tested with a hierarchical multiple regression. Education was entered into the model in the first step as a covariate. Chronic stress and internalization of the SBW Schema were added in the second step. Last, an interaction term, chronic stress x internalization of the SBW Schema, was entered into the model. Results of this analysis revealed that internalization of the SBW Schema does not moderate the relation between stress and CVD risk. Thus, the nature of the relationship between stress and CVD does not differ based on internalization of the SBW Schema and hypothesis 3 was not supported.

Exploratory Analyses

Exploratory analyses began by deconstructing the score used to capture internalization of the SBW Schema (SBW composite score). The score was deconstructed to better examine the scores of the measures used to create the composite score and their relation to the predictor variables and dependent variable. Table 6 details bivariate correlations among variables.

Table 6.

Correlations Among Stress, SBW Characteristics, Emotion Regulation, and CVD Risk

	1	2	3	4	5	6	7
Chronic Stress (1)	1.0	-.082	-.197**	-.009	.022	-.047	.133
Dedication to Care (2)		1.0	.727**	.195	.281**	.278**	-.143*
Obligation to Manifest Strength (3)			1.0	.200*	.327**	.346**	-.138
Independence (4)				1.0	.268**	.369**	.020
Emotional Suppression (5)					1.0	.535**	.177*
Emotion Regulation (6)						1.0	-.008
CVD Risk Score (7)							1.0

**Correlation is significant at the .01 level (2-tailed).

*Correlation is significant at the .05 level (2-tailed).

Positive correlations existed among all of the measured characteristics of the SBW Schema, including dedication to care, obligation to manifest strength, independence, and emotional suppression. Chronic stress was negatively correlated with the perceived obligation to

manifest strength (r = -.20, p < .01), such that higher perceived chronic stress was related to lower endorsement of perceived strength obligations. Emotion regulation was positively correlated with each of the measured SBW characteristics, including dedication to care (r = .28, p < .01), obligation to manifest strength (r = .35, p < .01), independence (r = .37, p < .01), and emotional suppression (r = .54, p < .01). That is, greater difficulties with emotion regulation was related to greater endorsement of self-sacrificial caregiving, the Superwoman stereotype, self-silencing, and disdain for seeking and accepting help.

Using age as the independent variable, regression analyses revealed increases in age to be predictive of greater stress, F (1, 194) = 8.79, p < .01, R^2 = .043, and greater endorsement of self-silencing, F (1, 195) = 4.07, p < .05, R^2 = .020. Also, increases in age were predictive of lower endorsement of dedication to care, F (1, 195) = 4.50, p < .05, R^2 = .023. In addition, a lower obligation to manifest strength predicts higher stress, F (1, 194) = 7.82, p < .01, R^2 = .039.

Higher CVD risk scores were associated with greater difficulties with emotion regulation, specifically the subscale that captured difficulties engaging in goal directed behavior (r = .154, p < .05). CVD risk was positively correlated with emotional suppression (r = .177, p < .05) and negatively correlated with dedication to care (r = -.143, p < .05). That is, higher CVD risk was related to greater endorsement of emotional suppression, lower endorsement of dedication to care, and greater difficulties engaging in goal directed behavior. Mediation analyses were conducted to obtain a better understanding of the relationships among these variables.

To test for mediation effects, three regressions were performed. First the covariate of education level was entered into the first step of each regression equation that had CVD risk as a dependent variable. Regressions revealed that dedication to care predicted CVD risk (β = - .15, p < .05), dedication to care predicted emotional suppression (β = .28, p < .01), and emotional

suppression predicted CVD risk (β = .16, p < .05). Finally, when controlling for emotional suppression, the relationship between dedication to care and CVD risk was reduced (β = - .21, p < .05), indicating partial mediation. Results of the Sobel test (Sobel, 1982) confirmed the mediating effect of emotional suppression on the relationship between dedication to care and CVD risk, z = 1.98, p < .005. These analyses revealed that dedication to care had a positive indirect and a negative direct effect on CVD risk (see Figure 7). In other words, dedication to caregiving is indirectly predictive of higher and directly predictive of lower CVD risk.

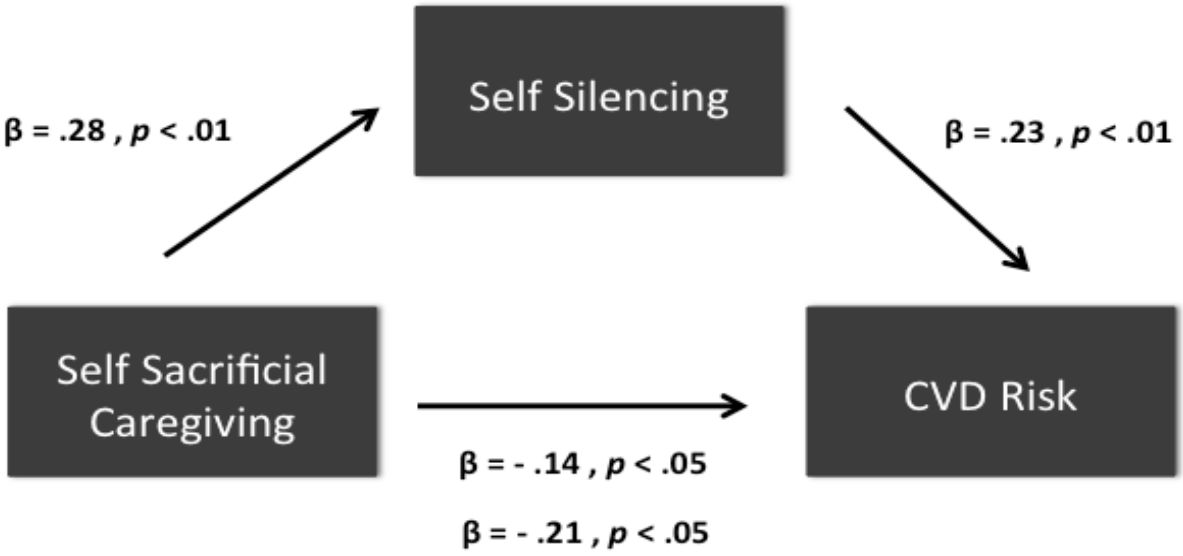

Figure 7. Mediation Model on Relationships between SBW Schema Characteristics and CVD Risk

Efforts were made to determine if differences in CVD risk existed between women who were high versus medium or low in SBW Schema characteristics. Means and standard deviations were calculated for all measured SBW variables, including dedication to caregiving (Mammy Subscale), obligation to manifest strength (Superwoman Subscale), emotional suppression (Self-Silencing Subscale), and independence (Efficacy of Help Seeking Scale). Scores one standard

deviation above the mean and greater were categorized as high. Scores one standard deviation below the mean and lower were categorized as low. Scores in between high and low cut off points were categorized as medium. A one-way analysis of variance (ANOVA) was conducted for each SBW variable to determine if differences existed in CVD risk among high, medium, and low scoring groups. Results did not reveal any significant differences in CVD based on group scores.

Summary

In sum, results of hypothesis testing provided partial support for the first hypothesis and did not support the second and third hypotheses. Results of exploratory analyses revealed relationships among psychological variables, such that greater endorsement of SBW Schema characteristics (obligation to manifest strength, dedication to care, independence, and emotion suppression) was related to greater overall difficulties with emotion regulation. Additionally, a lower obligation to manifest strength was found to predict higher perceived stress.

Age was a significant predictor of endorsement of SBW Schema characteristics. Expressly, increases in age were predictive of greater stress, greater endorsement of self-silencing, and lower endorsement of dedication to care. Results of exploratory analyses also revealed CVD risk to be related to psychological variables. Specifically, greater dedication to care predicted lower CVD risk and greater emotional suppression predicted higher CVD risk. Further, the relationship between emotional suppression and CVD risk was mediated by emotion regulation.

Discussion

Black women continue to be underrepresented in CVD risk studies, despite being overrepresented in CVD (Roger et al., 2012). Excluding Black women from this type of research compromises information utilized to make decisions regarding Black women's health. In other words, utilizing research

conducted with largely male and White samples to make decisions about Black women's health is problematic. Thus, findings of this study are significant because they shed light on the nature of CVD risk in a historically marginalized and understudied population at high risk for CVD.

There is limited research that investigates the influence of psychological factors on CVD risk among Black women. The current study fills gaps in the literature by utilizing a cultural lens to investigate relationships between CVD risk and psychological variables (i.e., perceived chronic stress, emotion regulation, and the SBW Schema). Furthermore, although negative health outcomes have been associated with internalization of the SBW Schema, few studies have examined these assertions quantitatively and no studies, as of this writing, have utilized objective measures of health in research on the SBW Schema. This is also the first known study to identify a relationship between CVD risk and difficulties engaging in goal directed behavior among Black women, another important contribution of the current study.

Overview of Findings

Support for hypotheses. This study tested three hypotheses. The first hypothesis posited that internalization of the SBW Schema and chronic stress would be unique predictors of CVD risk. Results provided partial support for the first hypothesis. Specifically, analyses revealed chronic stress to be a predictor of CVD risk (Blascovich & Katkin, 1993; Manuck, 1994; Obrist, 1981). It was unexpected, however, to find that internalization of the SBW Schema was not a predictor of CVD risk given that the Schema is associated with a variety of negative health outcomes (Wood-Giscombé, 2010; Black & Woods-Giscombé, 2012; Harrington et al., 2010). It is possible that the Schema does not have an influence on CVD risk. However, it is also possible that it does and the method of measuring the Schema allowed for these effects to go undetected. That is, utilizing a composite score to measure the SBW Schema may have prevented the detection of findings that would have been detected via other methods of measurement.

The second hypothesis posited that the relation between internalization of the SBW Schema and CVD risk would be partially mediated by emotion regulation. Results did not support the second

hypothesis. There was not a significant relationship between internalization of the SBW Schema and CVD risk or between emotion regulation and CVD risk. As such, the conditions for mediation were not met and the model could not be fully tested.

In addition, hypothesis three was not supported. Hypothesis three posited that the effect of chronic stress on CVD risk would be moderated by internalization of the SBW Schema. Although chronic stress was related to CVD risk, the SBW Schema did not moderate that relation. It is possible that the relationships between variables do not exist as hypothesized. However, it is also possible that measurement issues obscured findings.

Indeed, disaggregating the composite score of the SBW Schema and the subscales of the DERS (Difficulties with Emotion Regulation Scale) proved to be useful as CVD risk could be linked to specific aspects of each construct, rather than the constructs as a whole. Contrary to the results of hypothesis testing, results of exploratory analyses with disaggregated scores and subscales revealed relationships between CVD risk and psychological variables, including perceived chronic stress, specific types of emotion regulation difficulties, and aspects of the SBW Schema. These are important observations for researchers to consider given that disaggregating variables resulted in findings not otherwise observed. These findings are discussed in the following paragraphs.

CVD risk and psychocultural variables. Greater emotional suppression (an aspect of the SBW Schema) and greater difficulties engaging in goal directed behavior (an emotion regulation difficulty) were predictive of higher CVD risk. This finding supports the literature that highlights the relation of CVD risk to emotional suppression, and other emotional regulation difficulties (Brosschot & Thayer, 1998; Gross, 2002; Gross & Levenson, 1997; Horsten et al., 1999; Roberts, Levenson, & Gross, 2008; Schlatter & Cameron, 2010).

Emotion suppression is the deliberate effort of constraining emotional arousal (Gross & Levenson, 1993; 1997). Research suggests that the experience and suppression of negative emotions is detrimental to health. Further, Blacks experience increased and protracted CVR to negative emotions (Anderson, McNeilly, & Myers, 1993; Schuler & O'Brien, 1997) that can accelerate atherosclerosis,

impair inner arterial walls, and deteriorate vascular responsiveness (Kaplan, Manuck, Williams, & Strawn, 1993). Findings of the current study add to this literature and to the scarcity of research on these topics among Black women.

This is also the first known study to identify difficulties engaging in goal directed behavior as a risk factor for CVD among Black women. The ability to engage in goal directed behavior is reflective of an individual's capacity to accept and experience negative emotions, without avoiding or escaping a condition, to ultimately accomplish a goal-directed action (Linehan, 1993; Melnick & Hinshaw, 2000). Greater difficulties engaging in this particular emotion regulation strategy are associated with higher anxiety (Salter-Pedneault, Roemer, Tull, Rucker, & Mennin, 2006), which is associated with hypertension and CVD risk (Player & Peterson, 2011). Thus it is possible that women in this study who were less likely to engage in goal directed behavior had higher CVD risk due to greater levels of anxiety that arise from employing maladaptive emotion regulation strategies. This is a plausible explanation as anxiety can cause sympathetic nervous system activation that if activated frequently or for an extended period of time, can have a negative impact on cardiovascular health (Piccirillo, Elvira, Viola, Bucca, Durante, Raganato, & Marigliano, 1998; Virtanen, Jula, Salminen, Voipio-Pulkki, Helenius, Kuusela, & Airaksinen, 2003). Although this possibility could not be examined (anxiety was not measured in the current study), anxiety as it relates to CVD risk in Black women should be investigated in future research.

Another aspect of the SBW Schema, dedication to care, was also related to CVD risk. Specifically, lower CVD risk was associated with higher dedication to care. This was an unanticipated finding as it was expected that increased stress and CVD risk would be related to a greater dedication to care. Undeniably, the caregiver role has been associated with risk factors for CVD including chronic stress, psychological distress, depressive symptomology, and reduced physical activity (Linville, 1985, McConnell et al., 2005; Moore-Green et al., 2012; Nordenmark, 2004). However, in the current study higher dedication to care was not related to stress, but was predictive of lower CVD risk.

Despite these unexpected findings, it is possible that Black women with higher levels of dedication to care experience health benefits associated with having a complex self-identity. For example,

there is research to suggest that self-complexity, the quantity of individual aspects that cognitively represent the self, can be a buffer for stress-related illness (Linville, 1987; Rafaeli-Mor & Steinberg, 2002). However, other researchers have found limited support for these beneficial claims (Hershberger, 1990; Rafaeli-Mor & Steinberg, 2002; Solomon & Haaga, 2003). But, it is important to note that limited research has examined the relation between self-complexity and health among Black women. Therefore, given the complex self-identities of Black women, their overrepresentation in numerous stress-related illnesses, and the findings from this study, this is an area of research that merits further investigation.

It is also possible that the relation between lower CVD risk and higher dedication to care can be explained by altruistic emotions and related benefits. Altruism and helping are associated with positive health outcomes (Post, 2005). Specifically, engaging in altruistic behaviors and experiencing related positive emotions can reduce morbidity and mortality and can buffer associations between stress and mortality (Brown, et al., 2009; Post, 2005; Poulin, Brown, Dillard, & Smith, 2013). Although caregiver research highlights the relation between the caregiver role and negative health outcomes (Kiecolt-Glaser, Preacber, Mac-Callum, Malarkey, and Glaser, 2003; McConnell et al., 2005; Moore-Green et al., 2012; Nordenmark, 2004), research also highlights that health benefits can be experienced from caregiving and helping behaviors when the experience is not overwhelming (Schwartz, Meisenhelder, Ma, & Reed, 2005). Black women who are dedicated to care may not be overwhelmed and may experience positive emotions associated with their caretaking endeavors that translate into better cardiovascular health outcomes.

Research has shown that engaging in caretaking behaviors releases oxytocin, a hormone that has positive influences on the cardiovascular system. Specifically, oxytocin lowers blood pressure, promotes cardiac health, and serves as an anti-inflammatory agent (Gutkowska & Jankowski, 2012; Petersson, 2002). It is possible that the positive psychological and physiological aspects of caretaking and mothering (without being overwhelmed) buffer against CVD risk via increased levels of oxytocin. This is an area of research that merits further investigation among Black women.

It is important to note that findings also revealed dedication to care have a positive indirect *and* a negative direct effect on CVD risk. Alone, greater dedication to caregiving predicts lower CVD risk. However, greater difficulty with emotion regulation mediates the relation between dedication to caregiving and CVD risk to ultimately predict higher CVD risk. As such, dedication to caregiving is indirectly predictive of higher *and* directly predictive of lower CVD risk. These findings highlight the differential impact that various aspects of the SBW Schema can have on CVD risk.

Relationships among psychocultural variables. In the current study, all of the measured characteristics of the SBW Schema (dedication to care, obligation to manifest strength, independence, and emotional suppression) were related to each other. This was expected and verifies that these characteristics, highlighted in qualitative studies as features of a SBW (Abrams et al., 2014; Woods-Giscombé, 2010), are related constructs. In addition, a greater overall difficulty with emotion regulation was related to greater endorsement of all measured SBW characteristics. These findings support the literature that demonstrates SBW characteristics to be related to maladaptive emotion regulation strategies (Beauboeuf-Lafontant, 2009; Black & Peacock, 2011; Jones & Shorter-Gooden, 2003) and highlights the detrimental impact that the SBW Schema can have on mental health (Beauboeuf-Lafontant, 2007; 2008; Watson & Hunter, 2015).

On the other hand, the finding that higher endorsement of the obligation to manifest strength is related to lower perceived chronic stress is contrary to assertions of the current study and hypotheses posed in qualitative work on the SBW Schema and stress. A possible explanation for this finding could be that Black women may perceive life events as less stressful than women of other racial or ethnic backgrounds. The perceived obligation to exude strength may override perceptions of stress or influence women to report lower levels of perceived stress in an effort to not be seen as weak. Partial support for this contention is provided by results of a study that revealed Black women report lower levels of perceived stress than White women despite experiencing similar amounts of stressful life events (Vines, Ta, Esserman, & Baird, 2009). As such, researchers many need to reconsider utilizing measures of reported "perceived" stress when seeking to understand the mechanisms by which stress influences health

outcomes. In the case of Black women who endorse strength obligations, it may be best to utilize more objective measures of stress (e.g., cortisol).

Findings of the current study and previous studies suggest that the multifaceted nature of the SBW Schema facilitates the experience of positive and negative psychological experiences and encourages health promoting and health compromising behaviors. In other words, certain aspects of the SBW Schema may be both protective and/or detrimental. This emphasizes the importance of researchers and health professionals being aware of the various aspects of the SBW Schema and working to understand which aspects can serve to promote or harm health.

Implications

As research reveals more information about the features of the SBW Schema, a more complete framework for understanding the associated health implications is being established. Given the proclivity for schematic characteristics to influence psychological and physiological experiences as well as health beliefs and behaviors, it is essential to examine implications associated with the construct. Undoubtedly, opportunities abound to utilize knowledge of the SBW Schema to better understand barriers to optimal health and to promote culturally competent research, programming, and care.

Research. This study's findings help to illustrate that when conducting research on stress and health among Black women, it may be useful to examine psychological and physiological responses to stress as well as behavioral coping strategies. Given limitations associated with utilizing measures of reported "perceived stress" and "stressful life events" (i.e., stressful life events do not impact everyone the same way); it is recommended that researchers utilize, to the extent possible, objective measures that can assess behavioral and physiological stress responses. Capturing nuances in stress responses may help researchers better understand the mechanisms by which stress influences health outcomes such as CVD.

In addition, this study's findings point to the need for future research to differentiate the SBW Schema's ability to influence health via behavioral, psychological, and/or physiological factors. For example, this study focused on the impact of the SBW Schema on health outcomes via psychological and physiological processes. However, the Stress and Strength Hypothesis (Black & Woods-Giscombé, 2012)

posits that negative physical health outcomes associated with the SBW Schema may be better explained via health compromising behaviors associated with the Schema. For instance, due to the prioritization of caring for others before self, women internalizing this Schema may be more likely to neglect appointments for early screening, eating a healthier diet, and/or exercising. On the other hand, it is possible that health-promoting aspects of the Schema may be better explained via psychological process (i.e., utilization of adaptive emotion regulation strategies, experience of altruistic benefits, etc.). Conducting additional research on the Schema as it relates to health outcomes will provide a more complete picture of the psychological, behavioral, and physiological pathways of influence.

This study offers preliminary support for the potential of a culturally relevant construct, the SBW Schema, to negatively and positively impact CVD risk. Culturally relevant research is essential to assisting health professionals and researchers with better understanding health outcomes in underserved/understudied populations. Furthermore, research that emphasizes culture can facilitate the identification of factors that influence health beliefs and behaviors, lifestyle choices, and healthcare service utilization practices – variables that influence health outcomes (Mensah, 2005). As such, it is imperative to consider and account for the influence of cultural phenomena in research.

In addition, it is important to note that although the SBW Schema is a cultural construct unique to Black women, similar constructs exist and are embraced by women of other racial/ethnic backgrounds (Hart & Kenny, 1997; Herrera & DelCampo, 1995; Rana, Kagan, Lewis, & Rout, 1998). Women's health research may benefit from identifying cultural universals that exist across diverse groups of American women in order to develop prevention and treatment initiatives that can reach larger groups.

Practice and programming. Findings from this study may be useful in enhancing mental and physical health prevention and treatment initiatives for Black women. For example, there was a moderately high level of endorsement for the perceived obligation to manifest strength among women in the current study. This is important, as Black women have identified help seeking as the opposite of exuding strength and independence (Woods-Giscombé, 2010).

One recommendation for health professionals is to utilize a variety of methods to introduce Black women into care. It may be advantageous for practitioners to *seek* clients by introducing and providing health services in familiar and trusted environments (e.g., churches, community centers, or homes). Faith based institutions may be an especially beneficial location for promoting mental and physical health among Strong Black Women. Spirituality and religiosity have been identified as features of the SBW Schema and as a protective factor against mortality and morbidity (Cooper, Thayer, & Waldstein, 2013; Levin et al., 2005; Mattis, 2002).

It may also be beneficial to work collaboratively with trusted and well esteemed community leaders and groups to provide culturally tailored education to Black women about the importance of mental and physical health, treatment processes, and the benefits of health promoting behaviors. It is also important for health professionals to consider positive outcomes associated with the SBW Schema. Because the endorsement of caretaking is associated with lower CVD risk, professionals should think about ways to encourage and promote altruistic activities that elicit positive emotions. These recommendations are made cautiously because caretaking can become overwhelming for women. Thus, it is important that practitioners encourage women to prioritize personal well-being and self-care. It is also important that women are not overwhelmed with caretaking responsibilities and/or engaging in simultaneous emotional suppression, as these factors are associated with higher CVD risk.

Further, findings of this study provide cursory support for research that has identified oxytocin as beneficial to cardiovascular health (Gutkowska & Jankowski, 2012; Gutkowska, Jankowski, & Antunes-Rodrigues, 2014; Petersson, 2002). Given the cardio-protective effects of oxytocin, CVD health interventions should encourage Black women to engage in behaviors known to release oxytocin. Some of these activities can include hugging, breastfeeding, engaging in sexual activity, and having positive interactions with other adults (Uvnäs-Moberg, Handlin, & Petersson, 2015). The benefits of oxytocin on cardiovascular health can be a key element to utilize in the prevention and treatment of CVD among Black women.

Further, numerous interventions have begun to focus on stress reduction among Black women. However, focusing on stress reduction may not be as beneficial as focusing on promoting healthy coping and stress responses. Utilizing biofeedback technology, employing cognitive reframing, and teaching women more adaptive emotion regulation strategies may be beneficial in helping women mitigate negative health outcomes associated with maladaptive coping strategies. This type of work may need to specifically target older women as results of this study reveal emotion suppression to be more prevalent among older Black women.

The previous recommendations are warranted given that culturally tailored prevention and treatment strategies are more effective in improving health outcomes than non-tailored strategies (Anderson, Scrimshaw, Fullilove, Fielding, & Normand, 2003; Campbell & Quintiliani, 2006). Further, mental and physical health professionals knowledgeable of the SBW Schema may be better equipped to anticipate setbacks in care and/or recommend culturally sensitive health promotion strategies and resources. Findings of this study stand to inform ways in which mental and physical health professionals work to meet the uniquely challenging health related needs of Black women.

Limitations

Although this study makes contributions to the literature on CVD risk among Black women, it is not without limitations. One limitation is related to measurement. As of this writing there are no validated measures of the SBW Schema in the literature. Measures used in this study were from a method employed to capture only four aspects of the Schema using validated measures not necessarily developed for Black women (Harrington et al., 2010). These methods are useful but may not capture the Schema in its fullness. For example, research demonstrates that other aspects of the Schema exist beyond the four characteristics measured in this study. Other unmeasured characteristics include self/ethnic pride, spirituality/religiosity, determination to succeed, postponement of self-care, and the embodiment of multiple roles (Abrams et al., 2014; Woods-Giscombé, 2010; Black & Woods-Giscombé, 2012). Further, measures utilized to capture aspects of the SBW Schema demonstrated moderate to moderately low

reliability in the current study with alpha coefficients ranging from .62 to .74. These issues demonstrate the need for a reliable and valid measure of the SBW Schema.

Measurement of the chronic stress variable is another limitation. In the current study, chronic stress was assessed via the PSS (Cohen, Kamarck, & Mermelstein, 1983). The PSS has been used in multiple studies to assess chronic stress among Black women (Cooper, Thayer, & Waldstein, 2013; Hager & Runtz, 2012; Kingston, Heaman, Fell, Dzakpasu, & Chalmers, 2012). Further, the literature has made a strong case for the relationship between chronic stress and CVD risk (Geronimus, 1992; Geronimus, Hicken, Keene, & Bound, 2006; Turner & Avison, 2003). However, in the current study, although stress was related to CVD risk it was not a robust relationship and the variable was also not related to other individual indicators of risk (i.e., blood pressure or BMI). For Black women, a scale that captures *perceived* stress may not be an appropriate measure to assess the impact of chronic stress on CVD risk.

Additionally, although we sampled a relatively diverse group of Black women, larger scale studies are needed to improve the generalizability of findings. For example, it is possible that the SBW Schema may vary in meaning within and between ethnic groups and that various sub-groups of Black women may or may not endorse certain aspects of the SBW Schema. Women in this study were from the Mid-Atlantic region of the United States, self-identified as Black women, and most were heterosexual. Given the lack of diversity in geography and sexual orientation, participants in the current study do not represent all Black American women or those living in other locations within the United States. Thus, findings of the current study should not be generalized to all Black women.

Another limitation is the cross-sectional design of the current study. Longitudinal, between subjects, and/or experimental designs may be better suited to capture interactions between psychocultural variables and health outcomes. Such designs offer the advantage of identifying patterns in variables and offer opportunities for more accurate knowledge to be gleaned from data. For example, a longitudinal study may have revealed relationships between variables that were unrelated in this cross-sectional design. Despite these limitations, the results of this study inform our understanding of how culturally relevant factors influence the mental and cardiovascular health of Black women. Moreover, the findings

presented here add to scarce bodies of research on CVD risk among Black women and the relationship between the SBW Schema and health outcomes.

Future Research

Findings of this study highlight the importance of adequate measurement in future research. The development and validation of a comprehensive measure of the SBW Schema is key to conducting future research on the construct. Such a measure would allow researchers to examine all aspects of the Schema including aspects not captured in the current study such as self/ethnic pride, spirituality/religiosity, determination to succeed, and the embodiment of multiple roles (Abrams et al., 2014; Woods-Giscombé, 2010; Black & Woods-Giscombé, 2012).

Furthermore, as stated previously, objective measures of chronic stress, such as cortisol may be more appropriate to use in future research on physiological experiences of chronic stress among Black women. It is possible that due to variables like the SBW Schema, Black women minimize and/or internalize their experiences with stress and may be less likely to report or experience perceived stress.

Future research should also investigate the SBW Schema's relation to other health outcomes in which Black women are overrepresented such as breast cancer, HIV/AIDS, diabetes, and maternal and infant morbidity and mortality. Some researchers have begun work in this area. For example, researchers have theorized a relationship between the SBW Schema and breast cancer but these assertions have not been empirically examined (Black & Woods-Giscombé, 2012). Given the lack of scholarly research on the relation of psycho-socio-cultural variables and health outcomes among Black women, this is an area of research that is needed.

The relation of the SBW Schema to immune function should also be investigated in future research. Immune function is related to numerous health outcomes, including CVD, cancer, HIV/AIDS, and diabetes (Geerlings & Hoepelman, 1999; Grivennikov, Greten, & Karin, 2010; Nixon & Landay, 2010; Yndestad, Damås, Øie, Ueland, Gullestad, & Aukrust, 2007). Investigating the influence of the SBW Schema on immune health could reveal findings relevant to the prevention, progression, and treatment of numerous diseases that disproportionately impact Black women's health.

In addition, given that findings of the current study identified an aspect of the SBW Schema to be protective to cardiovascular risk, future research should explore potential health benefits associated with the SBW Schema. For example, research could examine differences in psychological and behavioral aspects of the Schema among Black women with or without CVD or with a low risk for CVD (e.g., non-smoking women without diabetes). Research in this area could contribute to a better understanding of culturally relevant health promoting beliefs and behaviors among Black women.

Future research could also explore the SBW Schema and similar constructs among women of other ethnicities, domestically and abroad. The idea of striving and living up to expectations to be a "superwoman" is prevalent in many cultures (Hart & Kenny, 1997; Herrera & DelCampo, 1995; Rana, Kagan, Lewis, & Rout, 1998). Thus, it may be worth investigating this type of construct as it relates to health beliefs, behaviors, and outcomes in diverse groups of women.

Conclusion

In sum, while Black women are overrepresented in CVD, empirical research has been slow to identify culturally specific explanatory mechanisms. The current study hypothesized relationships among CVD risk, stress, the SBW Schema, and emotion regulation. Hypothesis testing revealed that CVD risk was not significantly related to internalization of the SBW Schema and general difficulties with emotion regulation. However, exploratory analyses revealed aspects of SBW Schema and emotion regulation to be predictive of higher and lower CVD risk. These findings improve our understanding of the SBW Schema and CVD risk among Black women. Further, findings of the current study illustrate the complex interaction of cultural, psychological, behavioral, and physiological phenomena, which can inform future research and assist in the development health promotion initiatives.

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Appendix A

Recruitment Flyer

BLACK WOMEN: WE INVITE YOU TO PARTICIPATE!

WHO: Black women age 35 and older without prior history of heart disease.

WHAT: Participate in a research study about Black women and health. Participation lasts for about an hour. Receive $25.00 for your participation.

WHEN & WHERE: _____ at _____

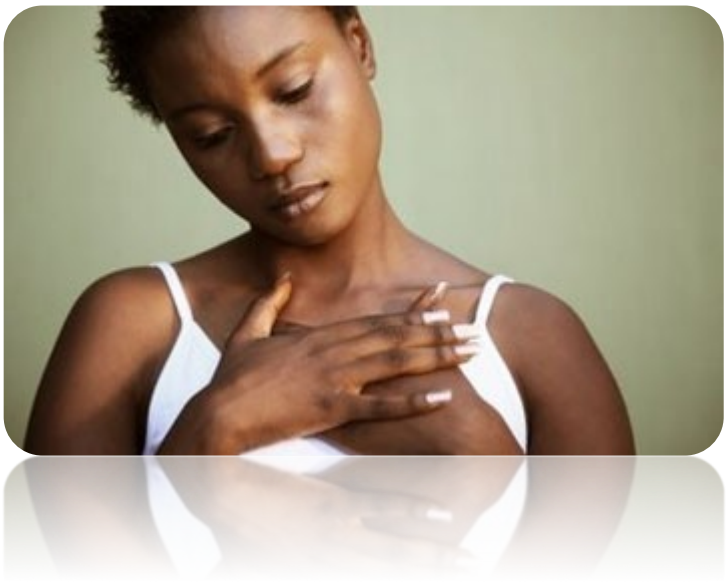
IF INTERESTED CONTACT JASMINE ABRAMS, MS (ABRAMSJA@VCU.EDU) 804-828-6261 OR FAYE BELGRAVE, PHD (FZBELGRA@VCU.EDU)

DEPARTMENT OF PSYCHOLOGY
VIRGINIA COMMONWEALTH UNIVERSITY
VERSION 2: 12/13/13 IRB #: HM15350

Appendix B

Participant Survey

Examining Risk Factors for Heart Disease Risk among Black Women



These questions will help us understand your thoughts health about being a Black woman. Your answers will be kept strictly confidential, which means your family, friends, and others will not know how you answered the questions.

Please do not write your name anywhere on the survey. This is not a test, so there are no right or wrong answers. If you come to a question that you do not want to answer, you do not have to. If you do not understand a question, please ask the person administering the survey.

We think you will find the questions to be interesting and that you will like answering them.

Thank you for your contribution to this research!

Instructions: **The following questions ask you about your feelings and thoughts during the last month. In each case, you will be asked to indicate how often you felt or thought a certain way. Although some of the questions are similar, there are differences between them and you should treat each one as a separate question. The best approach is to answer each question fairly quickly. That is, don't try to count up the number of times you felt a particular way, but rather indicate the alternative that seems like a reasonable estimate. For each question, choose from the following alternatives:**

0 = never 1 = almost never 2 = sometimes 3 = fairly often 4 = very often

1.	In the last month, how often have you *been upset because of something that happened unexpectedly*?	0	1	2	3	4
2.	In the last month, how often have you *felt that you were unable to control the important things in your life*?	0	1	2	3	4
3.	In the last month, how often have you *felt nervous and "stressed"*?	0	1	2	3	4
4.	In the last month, how often have you *dealt successfully with irritating life hassles*?	0	1	2	3	4
5.	In the last month, how often have you *felt that you were effectively coping with important changes that were occurring in your life*?	0	1	2	3	4
6.	In the last month, how often have you *felt confident about your ability to handle your personal problems*?	0	1	2	3	4
7.	In the last month, how often have you *felt that things were going your way*?	0	1	2	3	4
8.	In the last month, how often have you *found that you could not cope with all the things that you had to do*?	0	1	2	3	4
9.	In the last month, how often have you *been able to control irritations in your life*?	0	1	2	3	4
10.	In the last month, how often have you *felt that you were on top of things*?	0	1	2	3	4
11.	In the last month, how often have you *been angered because of things that happened that were outside of your control*?	0	1	2	3	4
12.	In the last month, how often have you *found yourself thinking about things that you have to accomplish*?	0	1	2	3	4

13. In the last month, how often have you *been able to control the way you spend your time*?	0	1	2	3	4
14. In the last month, how often have you *felt difficulties were piling up so high that you could not overcome them*?	0	1	2	3	4

Instructions: **For the next set of questions, please rate the extent of your personal agreement with each of the following statements.**

	Agree Strongly	**Agree Somewhat**	**Disagree Somewhat**	**Disagree Strongly**
1. It is better to take care of your own problems than to rely on others for help.	1	2	3	4
2. Accepting help from other people makes you feel like you owe them something in return.	1	2	3	4
3. You shouldn't offer someone help unless they ask for it first.	1	2	3	4
4. Just talking over your worries with someone can make you feel better.	1	2	3	4
5. Admitting hardships to others is a sign of weakness.	1	2	3	4
6. Opening up to others allows them to take advantage of you.	1	2	3	4

Instructions: **This is a scale to determine attitudes and beliefs. There are no right or wrong answers. Please use the following scale to complete the questions.**

1 Strongly Disagree **2 Disagree** **3 Undecided** **4 Agree** **5 Strongly Agree**

1. Black women have to be strong to survive.	1	2	3	4	5
2. I am often expected to take care of family members.	1	2	3	4	5
3. If I fall apart, I will be a failure.	1	2	3	4	5
4. I often put aside my own needs to help others.	1	2	3	4	5

5. I find it difficult to ask others for help.	1	2	3	4	5
6. I feel guilty when I put my own needs before others.	1	2	3	4	5
7. I do not want others to know if I experience a problem.	1	2	3	4	5
8. People often expect me to take care of them.	1	2	3	4	5
9. I tell others that I am fine when I am depressed or down.	1	2	3	4	5
10. It is difficult for me to share problems with others.	1	2	3	4	5
11. I should not expect nurturing from others.	1	2	3	4	5
12. I am overworked, overwhelmed, and/or underappreciated.	1	2	3	4	5
13. I am always helping someone else.	1	2	3	4	5
14. I will let people down if I take time out for myself.	1	2	3	4	5
15. It is easy for me to tell other people my problems.	1	2	3	4	5
16. I feel guilty if I cannot help someone.	1	2	3	4	5

Instructions: **Please indicate how much you agree with each statement using the following scale:**				
1	**2**	**3**	**4**	**5**
Strongly Disagree				**Strongly Agree**

1. I tend to put myself first because no one else will.	1	2	3	4	5
2. I don't speak my feelings in an intimate relationship when I know they will cause disagreement.	1	2	3	4	5
3. Caring means putting the other person's needs before my own.	1	2	3	4	5

4. Considering my needs to be as important as those of the people I love is selfish.	1	2	3	4	5
5. I find it harder to be myself when I am in a close relationship than when I am on my own.	1	2	3	4	5
6. I tend to judge myself by how I think other people see me.	1	2	3	4	5
7. I feel dissatisfied with myself because I should be able to do all the things other people do.	1	2	3	4	5
8. When my partner's needs and feelings conflict with my own, I always state mine clearly.	1	2	3	4	5
9. In a close relationship, my responsibility is to make the other person happy.	1	2	3	4	5
10. Love means choosing to do what the other person wants, even when I want to do something different.	1	2	3	4	5
11. In order to feel good about myself, I need to feel independent and self-sufficient.	1	2	3	4	5
12. One of the worst things I can do is be selfish.	1	2	3	4	5
13. I feel I have to act a certain way to please my partner.	1	2	3	4	5
14. Instead of risking confrontations in close relationships, I would rather avoid sensitive subjects.	1	2	3	4	5
15. I say how I feel with my partner, even when it leads to problems or disagreements.	1	2	3	4	5
16. Often I look happy enough on the outside, but inwardly I feel angry and rebellious.	1	2	3	4	5
17. In order for my partner to love me, I cannot reveal certain things about myself to him/her.	1	2	3	4	5

18. When my partner's needs or opinions conflict with mine, I usually end up agreeing with him/her.	1	2	3	4	5
19. Whether I am in a close relationship or single, I love who I am.	1	2	3	4	5
20. When it looks as though some of my needs can't be met in a relationship, I usually realize that they weren't very important anyway.	1	2	3	4	5
21. My partner loves and appreciates me for who I am.	1	2	3	4	5
22. Doing things just for myself is selfish.	1	2	3	4	5
23. When I make decisions, other people's thoughts and opinions influence me more than my own thoughts and opinions.	1	2	3	4	5
24. I rarely express my anger at those close to me.	1	2	3	4	5
25. I feel that my partner does not know the real me.	1	2	3	4	5
26. I think it's better to keep my feelings to myself when they conflict with my partner's.	1	2	3	4	5
27. I often feel responsible for other people's feelings.	1	2	3	4	5
28. I find it hard to know what I think and feel because I spend a lot of time thinking about how other people feel.	1	2	3	4	5
29. In a close relationship, I don't usually care what we do, as long as the other person is happy.	1	2	3	4	5
30. I try to bury my feelings when I think they will cause trouble in my close relationship(s).	1	2	3	4	5
31. I never seem to measure up to the standards I set for myself.	1	2	3	4	5

Instructions: For the following questions, please indicate how often each statement applies to you using the following scale: 1 = almost never (0-10% of the time), 2 = sometimes (11-35% of the time), 3 = about half the time (36-65% of the time), 4 = most of the time (66-90% of the time), 5 = almost always (91-100% of the time)

1. I am clear about my feelings.	1	2	3	4	5
2. I feel at ease with my emotions.	1	2	3	4	5
3. I pay attention to how I feel.	1	2	3	4	5
4. I experience my emotions as overwhelming and out of control.	1	2	3	4	5
5. I have no idea how I am feeling.	1	2	3	4	5
6. I have difficulty making sense out of my feelings.	1	2	3	4	5
7. I am attentive to my feelings.	1	2	3	4	5
8. I know exactly how I am feeling.	1	2	3	4	5
9. I care about what I am feeling.	1	2	3	4	5
10. I am confused about how I feel.	1	2	3	4	5
11. My emotions make me uncomfortable.	1	2	3	4	5
12. When I'm upset, I acknowledge my emotions.	1	2	3	4	5
13. When I'm upset, I allow myself to feel that way.	1	2	3	4	5
14. When I'm upset, I become angry with myself for feeling that way.	1	2	3	4	5
15. When I'm upset, I become embarrassed with myself for feeling that way.	1	2	3	4	5
16. When I'm upset, I have difficulty getting work done.	1	2	3	4	5
17. When I'm upset, I become out of control.	1	2	3	4	5
19. When I'm upset, I become scared and fearful of those feelings.	1	2	3	4	5
20. When I'm upset, I believe that I will remain that way for a long time.	1	2	3	4	5

21. When I'm upset, I believe that I'll end up feeling very depressed.	1	2	3	4	5
21. When I'm upset, I believe my feelings are valid and important.	1	2	3	4	5
22. When I'm upset, I have difficulty focusing on other things.	1	2	3	4	5
23. When I'm upset, I feel out of control.	1	2	3	4	5
24. When I'm upset, I can still get things done.	1	2	3	4	5
25. When I'm upset, I feel ashamed with myself for feeling that way.	1	2	3	4	5
26. When I'm upset, I know that I can find a way to eventually feel better	1	2	3	4	5
27. When I'm upset, I feel like I am weak.	1	2	3	4	5
28. When I'm upset, I feel like I can remain in control of my behaviors.	1	2	3	4	5
29. When I'm upset, I feel guilty for feeling that way.	1	2	3	4	5
30. When I'm upset, I have difficulty concentrating.	1	2	3	4	5
31. When I'm upset, I have difficulty controlling my behaviors.	1	2	3	4	5
32. When I'm upset, I believe there is nothing I can do to make myself feel better.	1	2	3	4	5
33. When I'm upset, I become irritated with myself for feeling that way.	1	2	3	4	5
34. When I'm upset, I start to feel very bad about myself.	1	2	3	4	5
34. When I'm upset, I believe that wallowing in it is all I can do.	1	2	3	4	5
35. When I'm upset, I know there are things I can do to manage my emotions.	1	2	3	4	5
37. When I'm upset, I lose control over my behaviors.	1	2	3	4	5

38. When I'm upset, I have difficulty thinking about anything else .	1	2	3	4	5
39. When I'm upset, I take time to figure out what I'm really feeling.	1	2	3	4	5
40. When I'm upset, it takes me a long time to feel better.	1	2	3	4	5
41. When I'm upset, my emotions feel overwhelming.	1	2	3	4	5

Instructions: Below are listed some of the reactions people have to certain feelings or emotions. Read each one and indicate how far it describes the way you *generally* react using the following scale:

1 2 3 4

Almost never **Almost always**

When I feel angry (very annoyed)…

1. I keep quiet	1	2	3	4
2. I refuse to argue or say anything	1	2	3	4
3. I bottle it up	1	2	3	4
4. I say what I feel	1	2	3	4
5. I avoid making a scene	1	2	3	4
6. I smother my feelings	1	2	3	4
7. I hide my annoyance	1	2	3	4

When I feel unhappy (miserable)…

1. I refuse to say anything about it	1	2	3	4
2. I hide my unhappiness	1	2	3	4
3. I put on a bold face	1	2	3	4
4. I keep quiet	1	2	3	4
5. I let others see how I feel	1	2	3	4
6. I smother my feelings	1	2	3	4
7. I bottle it up	1	2	3	4

When I feel afraid (worried)…

1. I let others see how I feel	1	2	3	4
2. I keep quiet	1	2	3	4
3. I refuse to say anything about it	1	2	3	4
4. I tell others all about it	1	2	3	4

5. I say what I feel	1	2	3	4
6. I bottle it up	1	2	3	4
7. I smother my feelings	1	2	3	4

Instructions: Please rate how often you think that each of the following statements apply to you.

1. I believe that it is best not to rely on others.

Never Rarely Sometimes Frequently Almost Always

2. I feel uncomfortable asking others for help.

Never Rarely Sometimes Frequently Almost Always

3. I have difficulty showing my emotions.

Never Rarely Sometimes Frequently Almost Always

4. I do not like to let others know when I am feeling vulnerable.

Never Rarely Sometimes Frequently Almost Always

5. I believe that everything should be done to a high standard.

Never Rarely Sometimes Frequently Almost Always

6. I am independent.

Never Rarely Sometimes Frequently Almost Always

7. I take on more responsibilities than I can comfortably handle.

Never Rarely Sometimes Frequently Almost Always

8. I believe I should always live up to other's expectations.

Never Rarely Sometimes Frequently Almost Always

9. I should be able to handle all that life gives me.

Never Rarely Sometimes Frequently Almost Always

10. I am strong.

Never Rarely Sometimes Frequently Almost Always

11. I need people to see me as always confident.

Never Rarely Sometimes Frequently Almost Always

12. I like being in control in relationships.

Never Rarely Sometimes Frequently Almost Always

13. I cannot rely on others to meet my needs.

Never Rarely Sometimes Frequently Almost Always

14. I take on others' problems.

Never Rarely Sometimes Frequently Almost Always

15. I feel that I owe a lot to my family.

Never Rarely Sometimes Frequently Almost Always

16. People think that I don't have feelings.

Never Rarely Sometimes Frequently Almost Always

17. I try to always maintain my composure.

Never Rarely Sometimes Frequently Almost Always

18. It is hard to say, "No," when people make requests of me.

Never Rarely Sometimes Frequently Almost Always

19. I do not like others to think of me as helpless.

Never Rarely Sometimes Frequently Almost Always

20. I do not let most people know the "real" me.

Never Rarely Sometimes Frequently Almost Always

21. In my family I give more than I receive.

Never Rarely Sometimes Frequently Almost Always

22. At times I feel overwhelmed with problems.

Never Rarely Sometimes Frequently Almost Always

Instructions: **Please answer the following questions to the best of your ability.**

1. How old are you? _____ (years)
2. What is your race? (Select the one that best applies)
   a. Black/African American
   b. White
   c. Hispanic or Latino
   d. Asian
   e. Native American
   f. Other (specify) _____
3. How would you describe yourself?
   a. Straight/Heterosexual
   b. Bisexual
   c. Gay/Lesbian
   d. Unsure
   e. Other (specify) _____
4. Do you currently have a romantic partner?
   a. Yes
   b. No
5. Are you currently married?
   a. Yes
   b. No
6. How long have you and your romantic partner or spouse been together?
   a. I do not have a romantic partner
   b. We have been together for_____
7. In terms of your place in your family, how would you describe yourself?

a. First born
b. Second born
c. Middle child
d. Youngest
e. Other (specify) _____

8. How many children do you have? _____

a) How many live with you? _____

9. What is your education level?

a. Less than a high school diploma
b. High school diploma
c. Technical or vocational training
d. Some college
e. Associates degree
f. Bachelor's degree
g. Master's degree
h. Doctorate

10. Employment status:
treatment for high

a. Full time employment
b. Part-time employment
c. Unemployed and looking
d. Unemployed and not looking
e. Homemaker
f. Disability Benefits
g. Retired

11. What is your average annual household income?

_____ (amount in dollars)

12. Do you currently smoke?

a. Yes
b. No

15. Do you have diabetes?

a. Yes

b. No

16. Are you currently receiving/on

blood pressure (hypertension)?

a. Yes
b. No

17. Height _____ (inches)

18. Weight _____ (pounds)

13. Have you ever smoked?

a. Yes

b. No

14. Which of the following best describes your physical activity?

***Note: Moderate intensity exercise includes walking briskly, water aerobics, bicycling at less than 10 mph, tennis, ballroom dancing, general gardening. Vigorous intensity exercise includes race walking, jogging, or running, swimming laps, aerobic dancing, jumping rope, heavy gardening, hiking uphill or with a heavy backpack, tennis (singles).

a) None
b) Low (moderate intensity for 150 minutes or vigorous intensity for 75 minutes a week)
c) Medium (moderate intensity for 150 to 300 minutes or vigorous intensity for 75 to 100 minutes a week)
d) High (more than 300 minutes a week)
e) In between A and B
f) In between B and C
g) In between C and D

THE FOLLOWING SECTION IS FOR RESEARCH STAFF USE ONLY

BLOOD PRESSURE_____
BMI_____
CVD RISK_____

Appendix C

Consent Form

RESEARCH SUBJECT INFORMATION AND CONSENT FORM

TITLE: Examining Risk Factors for Heart Disease Risk among Black Women

VCU IRB NO.:

PRINICIPAL INVESTIGATOR
Faye Belgrave, PhD
Department of Psychology
Virginia Commonwealth University
PO Box 842018
fzbelgra@vcu.edu
(804) 827-3908

If any information contained in this consent form is not clear, please ask the study staff to explain any information that you do not fully understand. You may take home an unsigned copy of this consent form to think about or discuss with family or friends before making your decision.

PURPOSE OF THE STUDY
The purpose of this study is to examine the relationships between heart disease risk and experiences associated with being a Black woman. You are being asked to participate in this study because you are a Black woman age 35 or older.

DESCRIPTION OF THE STUDY AND YOUR INVOLVEMENT
If you decide to be in this research study, you will be asked to sign this consent form after you have had all your questions answered. In this study you will be asked to complete a survey about your personal life experiences. Your height, weight, and blood pressure will be taken. In addition, you will be asked to complete a mental math task as best as you can. Before, during, and after this task your heart rate will be measured. This should take about 45 minutes.

RISKS AND DISCOMFORTS
We do not see any risk or discomforts associated with participating in this study. You do not have to complete all of the questions on the survey. At any moment you are free to stop participating.

BENEFITS TO YOU AND OTHERS

You may not get any direct benefit from this study, but, the information we learn from people in this study may help us better understand health among Black women. You will receive $15.00 cash and information about heart disease for your participation in this study. If you would like, you will have the opportunity to learn about your heart disease risk at the end of the study.

COSTS
There are no costs for participating in this study other than time.

CONFIDENTIALITY
Data is being collected for research only. Your data will be identified by ID numbers not names, and stored in a locked research area. All personal identifying information will be kept in password protected files and these files will be deleted after 3 years. Access to all data will be limited to research staff. What we find from this study may be presented at meetings or published in papers, but your name will never be used in these presentations or papers.

VOLUNTARY PARTICIPATION AND WITHDRAWAL
You do not have to participate in this study. If you choose to participate, you may stop at any time without any penalty. You may also choose not to answer particular questions that are asked on the survey.

QUESTIONS
If you have any questions, complaints, or concerns about your participation in this research, contact:

Jasmine Abrams
Department of Psychology
Virginia Commonwealth University
PO Box 842018
abramsja@vcu.edu
(804) 828-6261

If you have any general questions about your rights as a participant in this or any other research, you may contact:

Office of Research
Virginia Commonwealth University
800 East Leigh Street, Suite 113
P.O. Box 980568
Richmond, VA 23298
Telephone: (804) 827-2157

Contact this number for general questions, concerns or complaints about research. You may also call this number if you cannot reach the research team or if you wish to talk with someone else.

General information about participation in research studies can also be found at http://www.research.vcu.edu/irb/volunteers.htm.

CONSENT

I have been given the chance to read this consent form. I understand the information about this study. Questions that I wanted to ask about the study have been answered. My signature says that I am willing to participate in this study. I will receive a copy of the consent form once I have agreed to participate.

Participant name printed	Participant signature	Date

Name of Person Conducting Informed Consent	Signature	Date

Principal Investigator Name (if different from above)	Signature	Date

Appendix D

CVD Information Handout

THE HEART TRUTH® FOR AFRICAN AMERICAN WOMEN: AN ACTION PLAN

When you hear the term "heart disease," what's your first reaction? Like many women, you may think, "That's a man's disease." But here's *The Heart Truth*®: Heart disease is the #1 killer of women in the United States. One in four women dies of heart disease.

For African American women, the risk of heart disease is especially great. Heart disease is more prevalent among black women than white women—as are some of the factors that increase the risk of developing it, including high blood pressure, overweight and obesity, and diabetes.

But there's good news too: You can take action and lower your chance of developing heart disease and its risk factors. In fact, women can lower their heart disease risk by as much as 82 percent just by leading a healthy lifestyle. This fact sheet gives steps you can take to protect your heart health.

WHAT IS HEART DISEASE?

Coronary heart disease is the most common form of heart disease. Often referred to simply as "heart disease," it is a disorder of the blood vessels of the heart that can lead to a heart attack. It is a lifelong condition and will steadily worsen unless you make changes in your daily habits.

Risk Factors for Heart Disease

Lifestyle affects many of the "risk factors" for heart disease. Risk factors are conditions or habits that increase the chances of developing a disease or having it worsen. For heart disease, there are two types—those you can't change and those you can control. The ones you can't change are a family history of early heart disease and age, which for women becomes a risk factor at 55. That's because, after menopause, women are more likely to get heart disease. Partly, this is because their body no longer produces estrogen. Also, middle age is a time when women tend to develop other heart disease risk factors.

But most of the risk factors can be controlled. Often, all it takes are lifestyle changes; sometimes, medication also is needed. Here's a quick review of these risk factors:

Smoking. About one in five black women smokes. Quit, and just one year later, your heart disease risk will drop by more than half. There's no easy way to quit but making a plan helps. You also can try an organized program or a medication—ask your doctor if either is right for you.

High Blood Pressure. Also called hypertension, high blood pressure increases your risk of heart disease, stroke, and congestive heart failure. Even levels slightly above normal—called "prehypertension"—increase your heart disease risk.

Black women develop high blood pressure earlier in life and have higher average blood pressures compared with white women. About 37 percent of black women have high blood pressure. Hypertension also increases the risk of stroke and congestive heart failure—and black women have high rates of both.

Lower elevated blood pressure by following a heart healthy eating plan, including limiting your intake of salt and other forms of sodium, getting regular physical activity, maintaining a healthy weight, and, if you drink alcoholic beverages, doing so in moderation (not more than one drink a day). If you have high blood pressure, you also may need to take medication.

U.S. Department of Health and Human Services
National Institutes of Health
National Heart, Lung, and Blood Institute

THE heart TRUTH™

One good eating plan, shown to lower elevated blood pressure, is called the DASH eating plan—for a copy of the plan, contact the National Heart, Lung, and Blood Institute (NHLBI) Health Information Center, which is listed in "To Learn More."

High Blood Cholesterol. Nearly half of black women have a total cholesterol that's too high. Excess cholesterol and fat in your blood builds up in the walls of vessels that supply blood to the heart and can lead to blockages. A "lipoprotein profile" tests your levels of the key types of cholesterol—total, LDL ("bad"), and HDL ("good") cholesterol—and triglycerides, a fatty substance in the blood.

Lower cholesterol by following a heart healthy eating plan, being physically active, maintaining a healthy weight, and, if needed, taking medication.

Overweight/Obesity. Nearly 80 percent of black women are overweight or obese, increasing the risk not only of heart disease but also a host of other conditions, including stroke, gallbladder disease, arthritis, and some cancers. If you're overweight, even a small weight loss will help lower your risk. At the very least, try not to gain more weight.

Lasting weight loss needs a change of lifestyle—adopt a healthy, lower-calorie eating plan and get regular physical activity. Aim to lose no more than ½ to 2 pounds per week.

Physical Inactivity. Fifty-five percent of black women are physically inactive. They do no spare-time physical activity.

Physical activity is crucial for good health, including heart health. Try to do at least 30 minutes of a moderate-intensity activity such as brisk walking on most, and preferably, all days of the week. If you need to, divide the period into shorter ones of at least 10 minutes each.

Diabetes. About 11 million Americans have been diagnosed with diabetes—and another 5.7 million don't know they have it. About two-thirds of those with diabetes die of a heart or blood vessel disease.

The type of diabetes that adults most commonly develop is "type 2." Diabetes can be detected with a blood sugar test. Modest changes in diet and level of physical activity can often prevent or delay the development of diabetes.

DIANE

"By age 43, I had suffered from congestive heart failure and a damaged heart muscle. My experience with heart disease started with typical symptoms. It took me some time to get my strength back, but now I exercise regularly and eat healthy foods. To me, *The Heart Truth*® is a way of informing women about what they can do to prevent heart disease."

QUESTIONS TO ASK YOUR DOCTOR

1. What is my risk for heart disease?
2. What is my blood pressure? What does it mean for me, and what do I need to do about it?
3. What are my cholesterol numbers? (These include total cholesterol, LDL, HDL, and triglycerides, a type of fat found in the blood and food.) What do they mean for me, and what do I need to do about them?
4. What are my "body mass index" (BMI) and waist measurement? Do they mean that I need to lose weight for my health?
5. What is my blood sugar level, and does it mean I'm at risk for diabetes? If so, what do I need to do about it?
6. What other screening tests for heart disease do I need?
7. What can you do to help me quit smoking?
8. How much physical activity do I need to help protect my heart?
9. What's a heart healthy eating plan for me?
10. How can I tell if I may be having a heart attack? If I think I'm having one, what should I do?

TAKING ACTION

Now that you know *The Heart Truth*, what should you do? Begin by finding out your "risk profile." See the box above for questions to ask your doctor. Then begin taking the steps to heart health—don't smoke, follow a heart healthy eating plan, be physically active, and maintain a healthy weight. Start today to keep your heart strong.

TO LEARN MORE

NHLBI Health Information Center
Phone: 301-592-8573
TTY: 240-629-3255
www.hearttruth.gov

American Heart Association
Phone: 1-888-MY HEART
www.americanheart.org

WomenHeart: the National Coalition for Women with Heart Disease
Phone: 202-728-7199
www.womenheart.org

Office on Women's Health
U.S. Department of Health and Human Services
National Women's Health Information Center
Phone: 1-800-994-WOMAN
TDD: 1-888-220-5446
www.womenshealth.gov

U.S. Department of Health and Human Services
National Institutes of Health

National Heart Lung and Blood Institute

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Appendix E

List of Local Free/Low Cost Providers

CROSS OVER HEALTH CARE MINISTRY

Julie Bilodeau, *Director of Operations*
8600 Quiocassin Road, Suite 102
Richmond, VA 23229

Phone: (804) 422-2600
Fax: (804) 422-2604
Email: jbilodeau@crossoverministry.org
Website: www.crossoverministry.org

Clinic Sites:

Cross Over Main
108 Cowardin Avenue
Richmond, VA 23224
Phone: (804) 233-5016

Cross Over South
2619 Sherbourne Road
Richmond, VA 23237
Phone: (804) 249-4004

Cross Over West
8600 Quiocassin Road, Suite 105
Richmond, VA 23229
Phone: (804) 622-0803

Serving: *Chesterfield County, Hanover County, Henrico County, New Kent County, Richmond city*

CrossOver Health Care Ministry is a 30-year-old Virginia free clinic in Richmond, providing compassionate health care to people in need. CrossOver serves a vulnerable population that includes children, the elderly, low-income families, the uninsured working poor and the working and unemployed homeless. In 2012 we provided more than 40,000 patient visits to people in need. Our patients are uninsured and have incomes of 200% of the federal poverty level or less. More than 50% of our patients have annual incomes of less than $10,000. Two-thirds of our patients are female and more than 700 are single mothers. We serve a very multicultural population with patients coming from more than 130 different countries.

RICHMOND AREA HIGH BLOOD PRESSURE CENTER

Dave Baldwin, *Executive Director*
PO Box 5039
Richmond, VA 23220

Clinic Location:
1200 West Cary Street
Richmond, VA 23220

Phone: (804) 359-9375
Fax: (804) 359-2635
Email: dbaldwin@rahbpc.org
Website: www.rahbpc.org

Serving: *Richmond city, Chesterfield County, Hanover County, Henrico County, Hopewell city, New Kent County, Petersburg City, Goochland County*

All patients served by the Center earn less than 200% of the federal poverty level. We treat approximately 811 patients and provide about 6,500 services every year. Eighty-two percent of the patients are African American and 65% are women. Seventy-two percent of them live in single-family-income homes. Center patients average 2.5 medications per patient. Most of the Center's patients work full-time and or part-time jobs.Some of our patients are people who have lost jobs and cannot afford to purchase COBRA health insurance, or have no insurance available from the employers at all.

HANOVER INTERFAITH FREE CLINICS

Susan Hubbard, Executive Director
PO Box 117
Ashland, VA 23005
Phone: (804) 798-8890
Fax: (804) 798-9797
Email: info@hanoverfreeclinics.com

Serving: *Hanover County*

Hanover Interfaith Free Clinics is a 501(c)(3) non-profit corporation staffed entirely by professional and administrative volunteers dedicated to providing free medical and dental care to eligible, uninsured, low-income residents of Hanover County. Care is offered by appointment one night a week at five clinic sites located at Hanover County churches. Services offered include dental exams, treatment, hygiene, and dentures; medical care, pain management, prescription assistance, eye exams and glasses, podiatry and diabetic instruction. Patients are pre-screened by phone, and they go through a required registration process. If determined eligible, they may make appointments for care.

The five clinic sites are as follows:

St. James the Less Free Clinic
125 Beverly Rd.
Ashland, VA 23005
Phone: (804) 798-8890
Fax: (804) 798-9797
Director: Susan Hubbard

Ashland Christian (Disciples of Christ) Free Podiatry Clinic
302 S. James St.
Ashland, VA 23005
Phone: (804) 752-3456

Fax: (804) 752-3535
Co-Directors: Jennifer Sydnor & Marcie Moyer

Shiloh Baptist Free Eye Care Clinic
106 S. James St.
Ashland, VA 23005
Phone: (804) 798-8890
Fax: (804) 798-9797
Director: Susan Chambers

Mechanicsville Christian Center Free Dental Clinic
8061 Shady Grove Rd.
Mechanicsville, VA 23111
Phone: (804) 559-0995
Fax: (804) 559-2028
Co-Directors: Taunia Stephens & Tanya Hall

Cheryl Watson Memorial Free Medical Clinic
Shady Grove United Methodist Church
8209 Shady Grove Rd.
Mechanicsville, VA 23111
Phone: (804) 559-0486
Fax: (804) 559-0487
Director: Beth-Marie Helmbrecht

Appendix F

Letter to Participants with CVD Risk Information

VCU

Virginia Commonwealth University

Department of Psychology

Center for Cultural Experiences in Prevention
906 West Broad Street
P.O. Box 842018
Richmond, VA 23284-2018
(804) 828-6261

Dear Participant,

Thank you for participating in this study. It was a pleasure working with you.

We have attached the results of your personalized health assessment. Please share these results with your health care provider (doctor or nurse practitioner), who will be able to thoroughly go over your results with you.

If you do not have a health care provider but would like your results explained to you, a list of health care providers that can assist you has been attached as well.

We hope you enjoyed your time with us, as we did with you.

If you have any questions, comments, or concerns please call or email Jasmine Abrams at (804) 828-6261 or abramsja@vcu.edu.

With Sincere Thanks,

Jasmine Abrams, MS
Heart Health Study Team at VCU

Participant Name: _____

Date _____

Procedure	
Height	
Weight	
BMI	
Blood Pressure	

Additional Information

BMI – Body mass index (BMI) is a measure of body fat based on height and weight that applies to adult men and women. A normal BMI is _____. Your BMI was calculated using the National Institutes of Health BMI calculator (https://www.nhlbi.nih.gov/guidelines/obesity/BMI/bmicalc.htm).

Blood Pressure – Blood pressure is the force of blood against the walls of arteries. Blood pressure is recorded as two numbers—the systolic pressure (as the heart beats) over the diastolic pressure (as the heart relaxes between beats). The measurement is written one above or before the other, with the systolic number on top and the diastolic number on the bottom. According to the National Institutes of Health, normal blood pressure is less than 120 mmHg systolic and less than 80 mmHg diastolic.

Note: Consistently high blood pressure and a high BMI are related to increased cardiovascular disease risk. Please discuss this information with a healthcare provider.

Vita

Jasmine Alexis Abrams was born on January 13, 1988, in Norfolk, Virginia, and is an American citizen. She graduated from Yorktown High School in Yorktown, Indiana in 2006. She received her Bachelor of Science in Psychology with the highest honors from Virginia State University in Petersburg, Virginia in 2010 and a Master of Science in Psychology from Virginia Commonwealth University in Richmond, Virginia in 2012.