An Exploration of Motherhood: Testing Pathways of the Environmental Affordances Model on Depressive Symptoms and Allostatic Load

by

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Dedication

This dissertation is dedicated to my mother.

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"Real generosity towards the future lies in giving all to the present."
– Albert Camus

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Abstract

This dissertation examines the influence of the motherhood role on the experience of maternal role strain and maternal racial worries. Black mothers are centered in the conceptual framing of the pathways that exist between these subjects. The dissertation focuses on outcomes of psychophysiological importance as they best illustrate how *stress gets under the skin* to imprint consequences of chronic engagement with the stress process, to recruit coping resources, to contend with the overload of a mother's internal capacity to address the obligations, responsibilities, and expectations associated with the social roles she inhabits. The psychological outcome indicator used in this dissertation was depressive symptoms and the physiological outcome indicator used was allostatic load. The evaluation of factors that could exasperate this included life stressors and the gender of one's child, while social support was examined as a protective factor.

We completed three empirical studies using data from 678 Black mothers and 685 white mothers at midlife who participated in the Study of Women Across the Nation (SWAN), for Studies 1 and 2, and 239 Black mothers from the Racial Socialization Competency (RaSC) study, for Study 3. The primary outcome variable for Studies 1 and 3 was depressive symptoms. For Study 2, the primary outcome variable was allostatic load scores. In Chapter 2, we documented that maternal role strain was positively associated with depressive symptoms, although there were no racial differences in this association among this sample. In Chapter 3, we found that while there was not a direct association between maternal role strain and allostatic load, there was a significant association between mother's race and allostatic load scores – Black

mothers exhibited higher allostatic load scores than white mothers. In Chapter 4, we found that higher levels of maternal racial worries were associated with greater odds of experiencing severe depressive symptoms were similar for Black mothers, regardless of the gender of their child.

Implications include: (1) suggestions for psychophysiological measurement tools helpful in better contextualizing motherhood; (2) better understanding of maternal role strain and its relationships with maternal mental health, as it is an emergent concept; (3) theoretical support for frameworks that help conceive linkages between marginalization, motherhood and health; (4) interventions to improve maternal health; and (5) findings that support the dismantling of racist systems that hold immense sway of the well-being of Black mothers and Black people more broadly.

Chapter 1
Introduction and Literature Review

…is this what it is to be a mother who has to carry the weight of having to protect her children in a world that is conspiring to kill them? Are you forced to exist within a terrible trinity of emotion: rage, grief or guilt? What of the joy and the peace that loving a child brings? What of pride and of hope? Could it really be true that my mother has been given no door number four or five or six or even seven to walk through in order to know the wholeness of motherhood? Is she one in a long line of Black mothers limited to survival mode or grief?
— Patrissse Khan-Cullors, When They Call You a Terrorist: A Black Lives Matter Memoir

Introduction

Motherhood for Black women comes with considerable complexity. The weight of motherhood on their mental health is shaped by social contextual factors not historically considered in psychological assessments, such as the experiences of racism and sexism (Williams, 2018). Philomena Essed (1991) introduced the term *gendered racism* to describe how racism and sexism, "narrowly intertwine and combine under certain conditions into one, hybrid phenomenon" (pp. 31). Gendered racism speaks to the unique form of oppression generated while experiencing *Blackness* and *femaleness* simultaneously. Although women generally encounter sexism and bias, the convergence of gendered harassment and racist attitudes manifest an intersectional experience that makes the reality of being both a woman and Black impossibly separated. Kimberle Crenshaw (1989) presented intersectionality as a conceptual framing to understand how interlocking forms of oppression concurrently operate and marginalize Black women (Crenshaw, 1989). Together, gendered racism and intersectionality build a more complex

profile to understand Black women's experiences with oppression (Moody & Lewis, 2019; A. J. Thomas et al., 2008).

Three landmark studies ground current understandings of the intersection of race and sex for Black women. First, Essed (1991)'s seminal text which introduced gendered racism also examined Black women's experiences with it. Women reported various forms of harassment centered in the following domains: workplace, educational settings, when interacting with service providers and when exposed to negative media and discriminatory language. Noted as particularly distressing, was exposure to stereotypical imagery, patronizing attitudes, rudeness and oppressive jokes and talks (Essed, 1991). Second, in a national study of Black women, Jones and Shorter-Gooden (2003) find Black women report enduring pervasive stereotypes, reflecting most notably, negative representations of themselves based in the traditional racist archetypes of Mammy, Jezebel and Sapphire. Mammies represent maternal figures, obedient and submissive. Jezebels are depicted as sexually irresponsible and promiscuous, while Sapphires are angry and combative (Hancock, 2003). Findings also highlight the workplace as particularly distressing, along with reports of prejudice from store employees and law enforcement (C. Jones & Shorter-Gooden, 2003).

Third, King (2005) examined the relationship between cognitive appraisal and affective stress responses among Black women experiencing racism, sexism and gendered racism. Stress responses were reported from those in the sample who appraised actions towards them as either racism or gendered racism. More significant stress responses were recorded when women appraised those actions as central to affecting their well-being (King, 2005). In particular, these findings suggest that gendered racism is a construct experienced distinctly independent of racism and sexism, and that stress is attributable to its experience. Moody & Lewis (2019) also

investigate stress symptoms related to the experience of gendered racial microaggressions, finding significant associations with traumatic stress symptoms, providing additional evidentiary support of the unique impact garnered from gendered racism.

While there is a growing base of literature examining gendered racism, there is empirical evidence to support associations with poor negative health outcomes, in addition to its link with stress (J. A. Lewis et al., 2017; Moradi & Subich, 2004; A. J. Thomas et al., 2008). Moradi and Subich (2003) find sexism and racism were significantly correlated with psychological distress among Black women. Similarly, Thomas et al. (2008) present significant associations between experiences of gendered racism and psychological distress. Lewis and colleagues (2017) expand their analytic focus to include both mental and physical indicators, reporting significant findings between these indicators and gendered racism among a sample of Black women. Although more research is needed, these studies provide strong indications of a link between gendered racism, stress, and health for Black women.

Black Motherhood

To understand Black motherhood, it must be contextualized in the larger social-historical landscape of the United States (Collins, 1994; Hine et al., 1993). Gendered racism, intersectionality, resiliency, and resistance all fold into the perspective of motherhood for Black women (Collins, 1994; Hine et al., 1993; Mendenhall et al., 2013). The historical and contemporary persistence of these realities shape how Black mothers interact with their environment (Mendenhall et al., 2013).

Oppression on the basis of race and gender for Black women, operates to restrict choices in their lives. Structural barriers exist in access to equal opportunity in employment, education, neighborhood quality and family life, among other domains of American life (Mendenhall et al.,

2013). Despite these barriers, Black women have aroused and maintained profound resiliency; which has aided many in making substantive contributions to collective action (e.g., Civil Rights Movement, Welfare Rights Movement, BlackLivesMatter Movement, the MeToo movement and other sociopolitical campaigns) and preserve their personal wellbeing (Hine et al., 1993; Mendenhall et al., 2013).

Black women have risen out of a legacy of oppression. As such, their *motherwork* reflects this history. Motherwork is a term encapsulating the view that care work and mothering are political interwoven acts responsive to the interlocking systems of oppression bearing down on mothers of color in the United States (Crenshaw, 1989; Hancock, 2003). American sociologist, Patricia Hill Collins, specifies three themes of Black motherwork: survival, power, and identity (Collins, 1994). The contours of Black motherwork are outlined by: (1) ensuring the survival of their children and thus, more broadly, their community; the ability to traverse dynamics of power which situate Black mothers in simultaneous moments of power and powerlessness; and (2) the importance of self-definition in an environment that seeks to define and construct its own racialized caricature of the Black identity (Collins, 1994).

As a fundamental dimension of Black motherwork, survival is often defined as relating to the physical. Black children face infant mortality rates of 11.11 per 1,000 live births, twice that of White infants (T. J. Mathews et al., 2015). Approximately one in four, or 23%, of Black children live in poverty (Koball & Jiang, 2018). Black children are often clustered in harsher urban environments (Hunter & Robinson, 2016), subject to environmental pollutants (Brewer et al., 2017), divestment (Hyra, 2012), and a higher incidence of crime and violence (Eck, 2018). Indeed, the survival of Black children has long been held in low regard. Struggles to promote and

maintain it, continue to be a major theme defining motherhood for Black mothers (Collins, 1994).

Traversal of the dialectical nature of power in the fabric of Black motherhood exists at the junction of efforts by Black mothers to respond to the dominant hegemonic narrative of motherhood as defined by Whiteness, while attempting to maintain power and agency over their own mothering so it serves their authentic needs (Collins, 1990). Power and powerlessness, and the desire for maternal empowerment, play out most commonly within social institutions that structure the agency of Black mothers. Collins (1994) posits this conceptual understanding revolves around three themes: (1) ownership over one's own body; (2) challenges to nurturing children they want to raise; and (3) power over their children's perspective of their Blackness.

Efforts to manipulate the fertility of Black women, in America, have ranged from institutionalized rape through chattel slavery to sterilization abuse in modern times (Eichelberger et al., 2016; J. Jones, 2009). Welfare policy has been notably influenced by cultural caricatures of Black women (Collins, 1990; Hancock, 2003). The archetype of the *Welfare Queen* has remained a stigmatizing caricature of Black mothers that represents a successful attempt to politicize and control public discourse around welfare programming. The welfare queen is a constructed identity designed to justify political marginalization of Black mothers and the manipulation of poverty solutions to be filtered through the misrepresentation of welfare recipients (Hancock, 2003). Power and powerlessness play out in these domains by restricting agency over the choice to become mothers and the availability of services that are aimed at assisting them economically provide for their children; and further, effortfully stigmatizing Black women when they attempt to access services.

The burden of sociopolitical and cultural narratives on Black motherhood extend further to cause obstacles in the cultivation and maintenance of racial identity for Black mothers and their children. Retaining power over the narrative of Blackness ensures Black children have the internal capability to understand their social positionality, while not internalizing negative narratives (Collins, 1994). In contrast to white children, Black children do not have educational experiences that affirm the cultural values and experiences of their identities and of their mothers. Combatting this is difficult. There exists the push for Black children to assimilate in order to succeed. Yet too, exists the need to prepare them with coping strategies to survive systems of oppressions that they will inevitably engage with, while attempting to achieve success. Here, power and powerlessness play out in the following contradiction: while assimilation may be one way to success for Black children, Black children can never be white; making their full assimilation impossible despite their efforts (Collins, 1994).

Underscored partially above, part of Black mother's motherwork lies in the tension inherent in promoting meaningful development of identity in their children, while living in a racially hostile landscape that denigrates Blackness. The cultivation of a positive racial identity is crucial; associated with various outcomes, including academic performance, socioemotional adjustment, and substance use (Neblett et al., 2012). Self-definition enables Black mothers to establish the foundation for self-esteem while concurrently teaching their children how to live their lives under the weight of a system of subordination (Collins, 1990, 1994). Black motherhood scholars posit that Black mothers have uniquely additive psychosocial stressors while mothering (Collins, 1994; Hine et al., 1993) – the added psychological burden of maternal racial worries for their children (Stevenson & Winn, 2019) – suggesting that racism could have uniquely harmful effects on Black maternal mental health. The pressure of Black motherwork

may take a psychophysiological toll on Black mothers and thus, deserves deeper exploration (G. H. Brody et al., 2008).

Black Mothers and Social Roles

Social roles refer to positions associated with each of a person's personal identities. Here, social roles refer to the following social positions: mother, caregiver, wife and careerwoman. These roles come with both extoled social status and socially ascribed responsibilities. Coupled with these responsibilities, are expected behaviors, anticipated obligations, and conferred rights adherent to established social norms (Marks & MacDermid, 1996). Social roles pattern how people interact and how they feel. Performing these roles well can result in feelings of satisfaction. Performing them poorly or perceiving one's internal capacity to perform them properly is insufficient, can result in feelings of guilt, inadequacy and/or worry (Bigler & Patterson, 2007; Hughes et al., 2006; Patterson & Bigler, 2006).

Social roles are also patterned by intergroup attitudes, cultural values and parental socialization around the meaning of social identities. Thus, social roles can be shaped by community standards related to one's race, class and/or gender. Similarly, experiences of privilege, prejudice and oppression can also have implications on the operationalization of one's social roles (Bigler & Patterson, 2007). Social roles are not rigid. There is space for fluidity and flexibility among the prescribed behaviors and responsibilities. For example, many of the same responsibilities and behaviors of motherhood are reflected in caregiving (e.g., providing a safe and comfortable environment) and many of the same role responsibilities as a wife may fold into those of a careerwoman (e.g., negotiation and management) (Marks & MacDermid, 1996; Perry-Jenkins et al., 2000).

The occupancy of multiple social roles can put a role holder in a position to experience role strain due to role overload. With each role that an individual holds come demands. While social roles may have overlapping responsibilities or provide opportunities to use the same skillset for a variety of tasks, ultimately, each role comes with specific obligations and may result in overloading obligations from competing life domains. When there is an incongruence between capacity and responsibilities, role strain can occur (Goode, 1960; Hirsch & Rapkin, 1986). Recent findings indicate that Black women are more likely to hold a greater number of social than their peers and that this is associated with a higher stress burden (Lanza di Scalea et al., 2012). Jackson and Erving (2020) found complementary evidence, examining social roles, race/ethnicity, and mental health. They found that Black Americans held an average of three social roles (out of a possible 5) and that the number of roles held by Black Americans was associated strongly with poorer psychological distress (P. B. Jackson & Erving, 2020).

Dissertation Outcomes

In this dissertation we specifically explore psychophysiological outcomes of depressive symptoms and allostatic load. Depressive symptoms are symptoms resulting from negative mood such as sadness, hopelessness and a loss of pleasure and enjoyment in things that once sparked joy. The orientation of one's mental state is characterized by a general listlessness (Glannon, 2002). Depressive symptoms have a negative impact on functional, relational, and occupational operations for those experiencing them. Common symptoms resulting from this affective state are the reduced internal capacity for enjoyment, interest, and concentration. Notably, these symptoms are experienced with significant exhaustion. The experience of depressive symptoms is also categorized by disturbed sleep, reduced appetite, diminished self-esteem, lowered self-

confidence, feelings of guilt or worthlessness and a lack of variation in mood (Pace & Husain, 2022).

Allostatic load is a conceptual proxy to describe the process by which stress gets under the skin (McEwen, 2012). The chronic adaptation of the stress response leads to a cascading of physiologic events that hinge on allostatic load as a mechanism for understanding how the body reacts to the brain's perception of stressful stimuli and circumstances. The cascade of biological processes occurs to mobilize the energy to engage the body's *fight or flight* response to ensure survival. Chronic activity of the stress response is at the cost of regular biologic functions, to counterbalance the recruitment of energy towards the process of allostatic adaption (e.g., such as increased neurological and cardiovascular activity), in response to repeated experiences of significant adversity, stress or trauma where there is an inadequacy of resources to properly cope (Juster et al., 2016).

Allostatic Load: The Racial Landscape and The Stress Response

Black Americans contend with racism and racial discrimination using a dual-process model of adaption and physiological response (J. M. Jones, 1997). The stress process consists of an explicit or conscious response (i.e., cognitive recognition and the employment of a coping strategy) and an unconscious or implicit physiologic elicitation (i.e., engagement of the physiological stress process) (Anderson & Stevenson, 2019; J. M. Jones, 2003; Lazarus & Folkman, 1984; McEwen, 2000; McEwen & Seeman, 1999). The perennial experience of this mechanistic pathway informs the process by which Black Americans develop coping measures to anticipate and deal with living in a racially hostile landscape (J. M. Jones, 2003). In his text *The Souls of Black Folk,* W.E.B. DuBois describes "double consciousness":

> ...born with a veil, and gifted with second-sight in this American world, – a world which yields him no true self-consciousness, but only lets him see himself

> through the revelation of the other world. It is a peculiar sensation, this double-consciousness, this sense of always looking at one's self through the eyes of others, of measuring one's soul by the tape of a world that looks on in amused contempt and pity. One ever feels his twoness, – an American, A Negro; two warring ideals on one dark body, whose dogged strength alone keeps it from being torn asunder... (pp. 3)

DuBois' (1903) details the internal conflict inherent in Blackness; operating within the veil, wherein Black Americans attempt to reckon with "the strange meaning of being Black" (pp.1); navigating between the inner self and the view of self through the white gaze. DuBois hypothesizes that internal tension occurs with the framing of the ever present, unasked question: *How does it feel to be a problem?* (DuBois, 1903). As individual rights and protections have advanced, this question has become more subtly implied in today's *everyday* context. DuBois' observation, birthed out of a need for individual survival, has evolved into a need for both physiological and psychological wellness. While threats are more veiled, their impact is not necessarily any less deleterious (J. M. Jones, 2003). The cognitive and behavioral mechanisms that mediate adaption to these more ambiguous racial stimuli are important to investigate given they may yield reactionary, physiological consequences.

Expanding on this, Harrell (2000) introduced the term *racism-related stress* to describe, "race-related transactions between individuals or groups and their environment that emerge from the dynamics of racism, and that are perceived to tax or exceed existing individual and collective resources or threaten well-being" (p.44). In simplest terms, racism and racial discrimination make the lives of targeted individuals more stressful (C. J. P. Harrell et al., 2011). This stress emerges from the subjective judgment of an individual; the impact of a racially motivated event varies, as those experiencing racial stimuli may differ in their perception and judgment of an encounter (S. P. Harrell, 2000).

Recounting experiences of racial discrimination and commonly also having to defend one's perception from accusations of paranoia or oversensitivity, can lead to stress beyond that of the initial experience. Replaying and repeatedly describing an encounter, to identify and explain perceived or explicit racial undertones, can cause considerable stress on one's psyche (Essed, 1991; Pierce, 1995). Thus, stress amounts not only from the initial incident, but also in the retelling and in the possible resistance of others to validate the actuality of the encounter (S. P. Harrell, 2000).

Exposure to racial discrimination is stressful, and as such, initiates a series of psychophysiological processes that link the experience of racism and racial discrimination to disease (C. J. P. Harrell et al., 2011; Paradies et al., 2015; Williams, 2018). Physiological arousal includes activation of the cardiovascular, immune/inflammatory, and neuroendocrine systems. The elicitation of the stress process occurs after the release of cortisol, a stress hormone, which initiates mechanistic functions at the biological level (Geronimus, 1992; Geronimus et al., 2006; McEwen, 2002, 2012, 2018; McEwen & Rasgon, 2018; McEwen & Seeman, 1999).

Repeated encounters with racial discrimination can make targets feel they are out of control in regard to their own self-determination and in steering the direction of their lives; instead, victims to the racial landscape that patterns circumstances, and over time, this can elicit unconscious physiological adaptions from targets (C. J. P. Harrell et al., 2011). The brain interprets events, people, and environments as either threatening or nonthreatening. By assigning an encounter as threatening, the brain links a physiologic stress response. The brain learns to sharpen its responses to threatening encounters by storing memories – learning from past experiences and letting them influence future responses (McEwen, 2007).

In this way, the brain adapts to environmental stimuli unconsciously, such that a setting or social cue where previous reactions deemed threatening have occurred, can elicit the activation of the stress response, even without the presence of an active threat (McEwen, 2007, 2018; McEwen & Getz, 2013). Thus, the omnipresent nature of racism and the everyday reality of racial discrimination, may overload normal process functioning. More simply, if this process is constantly activated, it eventually initiates adaption by the brain. And in this case, adaption can mean dysregulation of the stress response, if engaged too frequently. This is also known as allostatic overload (C. J. P. Harrell et al., 2011; J. P. Harrell et al., 2003).

Theoretical Framework and Conceptual Model

The theoretical framework for this dissertation is modeled after the Environmental Affordances Model. This research is at the intersection of several larger bodies of literature focusing on the mechanisms by which race, racial discrimination and motherhood impact Black mothers' depressive symptoms and experience of allostatic load. These bodies of research also inform the dissertation conceptual model (Figure 1). The main purpose of this dissertation is to understand how maternal role strain and maternal racial worries influence psychophysiological outcomes among Black mothers. In this section, we give a detailed presentation of the theoretical framework informing this research and conceptual model (Figure 1). Within the conceptual model diagram, theoretical constructs are displayed as boxes, which have been assigned an alphabetic character (e.g., (A)) that is discussed in the text. Relationships and their direction are indicated by arrows that connect each box. The dotted lines indicate relationships that exist but are not tested in this dissertation. Next, we define and review the empirical and theoretical research related to the key constructs and their relationships.

The Environmental Affordances Model

The Environmental Affordances model draws an intersection between social structure and context, chronic stressors, stress psychopathology, health behaviors, and mental and physical health. This model is built on the acceptance of three premises. The first is that the environmental landscape is both oppressive and abundant. Constraints are built into the environmental landscape, and they can hinder opportunity and concentrate disadvantage. However, the environment can also be forgiving, in that, it can be a fruitful space for favorable circumstances that encourage growth, evolution, and prosperity. Here, the Environmental Affordances model proposes that context generates chances for the exasperation or mitigation of stress. The second premise asserts that the ability to cope successfully is based on the cultural and social norms that influence individual behavior, self-efficacy, and coping resources. Third, that all living things engage with stressful stimuli and circumstances; that this is normative, and that to embark on a pursuit to mitigate the experience of consequent distress (Mezuk et al., 2013a).

The Environmental Affordances model posits that differential exposure to chronic stress is determined by disadvantages and opportunities patterned by socioeconomic position, geography, race/ethnicity, and gender to impact social groups differently. And that the utilization of poor health behaviors, such as alcohol, tobacco, and drug use, are a result of poorly coping with the stress generated by social structures and context. Further that those experiencing severe levels of chronic stress are more likely to partake in poor health behaviors as individuals attempt to cope (Mezuk et al., 2013a). Exposure to chronic stressors increases the risk of engagement of the stress process, stress-related psychopathy (e.g., depressive symptoms) and the experience of adverse mental and physical health morbidity and mortality, such as allostatic load (McEwen & Seeman, 1999). The use of poor health behaviors fuels the experience of adverse mental and

physical health morbidity and mortality. The Environmental Affordances model also views poor health behaviors as a moderator between chronic stressors and the experience of stress related to them (Mezuk et al., 2013a).

Model Constructs and Relationships

Social Structures and Context – Social structures and context refer to the relationships between social processes and the physical environment to outline the pathways by which social, political, and economic conditions influence one's broader environment – shaping individual and population health. The historic foundation of resource distribution in the United States is highly racialized. A product of Black slave labor, inequalities in wealth, employment, and educational opportunities in the United States are merely mechanisms of that institutionalized legacy. Imbued in national foundations, ideologies about Black Americans, in particular, were translated into policies and societal arrangements that have systematically limited their opportunities and capacity for social mobility and wellness, affecting health status particularly in times of vulnerability (House & Williams, 2000; Schulz & Northridge, 2004; Williams & Collins, 1995).

At the structural level, sociocultural institutions and legal codes institutionalize inequality by producing and reproducing inequitable social relationships and systems. These inequities in economic and political orders, laws, human rights doctrines, and social ideologies have historically led to the creation of spatial concentrations of poverty and wealth and among racial/ethnic groups which have led to constrained access to social, political, and material resources (Schulz & Northridge, 2004). At the community level, historical distributions of poverty and wealth pattern the built environment and social context to construct somewhat static pathways to health and well-being for populations. Thus, populations within concentrations of wealth have greater access to social and economic resources and the power to influence political

decisions, which dictate how policies regarding investment and development – the social context – influence features of the built environment. In contrast, groups residing in concentrations of disadvantage do not have access to this process and are more likely to experience environmental exposures to toxins and a lack of access to infrastructure such as transportation systems, heath care and affordable housing. Similarly, these concentrations of wealth and poverty influence the adequacy of community infrastructure to support and maintain public resources such as parks and libraries and the enforcement of ordinances within the built environment (Schulz & Northridge, 2004).

Racial Discrimination - Racial discrimination describes racism experienced at the interpersonal level. These everyday encounters of discrimination are the byproducts of living in a racialized society. At this level, race-related experiences of prejudice and discrimination can manifest to impact individuals either directly or vicariously. These interactions can occur as verbal and nonverbal cues and behavioral actions (S. P. Harrell, 2000). Racial discrimination has been extensively linked to adverse mental health outcomes, in particular depressive symptoms (Paradies, 2006a; Williams, 2018).

Chronic Stressors - Chronic stressors are viewed as those persistent stressors that result from conflicts, frustrations and threats and are centered on major social roles (e.g., mother, caregiver, wife, careerwoman). Enduring hardships, these are different from life stressors, as they refer to more extreme or event-based threats and stress inducing events such as the loss of a spouse or child. These chronic stressors result in emotional stress specific to a particular stimuli and circumstances of the environment defined by that stimulus. Chronic stressors have identifiable times of onset and are characterized by coping responses that are limited by resources that are insufficient for properly coping with the conflict, frustration or threat (Pearlin & Schooler, 1978).

Maternal Racial Worries for Children – Maternal racial worries for children refer to worries held by mothers that are related to how their children may be treated or perceived by others given their Black womanhood. These worries do not fade over time as children age and can increase in intensity over time, as the problems children encounter grow in complexity (Cardoso et al., 2010; Respler-Herman et al., 2012; Stevenson & Winn, 2019).

Maternal Role Strain - Role strain theory posits that with the addition of social roles, comes the increase in likelihood of experiencing strain when attempting to balance the demands generated from the multitude of social roles that women can embody today (e.g., being a mother, caregiver, wife, careerwoman) (Sieber, 1974). Given the amount of energy available to us is fixed, role strain occurs when the demands of occupying each role exceeds the energy available to an individual. This can lead to negative effect on physical and physiological well-being when the level of capable engagement is reached (Barnett & Hyde, 2001; Goode, 1960). This is known as the experience of role overload, or role strain (Barnett, 2004; Marks, 1977; Sumra & Schillaci, 2015). Maternal role strain refers to specific strain related to the overload of motherhood responsibilities and demands. Prior examinations of maternal role strain have yielded associations between perceived quality of the mother role and depressive symptpms (Gómez & Gómez, 1991; Klein et al., 1998) and role overload and poor mental health (Glynn et al., 2009) and psychological wellbeing and psychological (Ozer et al., 1995).

Gender of Child - This refers to the gender of a mother's child. Here, gender is dichotomized, referring to categories of either male or female.

Perceived Emotional and Instrumental Social Support – Social support refers broadly to the functional content of social relationships. While there are four distinct forms of social support – emotional support, instrumental support, informational support, appraisal support – emotional

and instrument support are solely highlighted in this model. Emotional support involves the ability to show empathy, compassion, and concern. Instrumental support refers to tangible aid and services. Despite the comfort that can be provided through informational support (advice and knowledge) and appraisal support (constructive feedback and affirmation), there is a lack of evidence supporting their benefit in decreasing parental stress or stress due to racial discrimination. There is strong empirical evidence linking emotional and instrumental support to life and parenting stressors (Heaney & Israel, 2008; Respler-Herman et al., 2012).

Life Stressors – Life stressors include circumstances that span sociodemographic groups (i.e., a death, loss of a job, role strain). Encountered in daily life, they are defined as routine challenges occurring during day-to-day living (Lazarus, 2006; Zautra, 2003). These stressors have separate, immediate and direct effects. Concurrent and persistent, these frustrations can result in the gradual overload of emotional and physical functioning (Anderson & Stevenson, 2019). Indeed, these stressors are consistently demonstrated to have an influence on mental health outcomes; with reviews on life stress and depression unanimously concluding life stressors precede the onset of symptomology (Paradies, 2006a; Paradies et al., 2015; Williams, 2018).

Depressive Symptoms – Depression is a mental disorder characterized by negative changes in mood and can cause decreased cognitive, emotional, and physical functionality (Alawieh et al., 2012; Paykel, 2008). Most recently, the National Center for Health Statistics estimates the prevalence of depression among Black women aged 20 and over to be 11% during the period of 2013-2016 (D. J. Brody et al., 2018). Other evidence indicates that while Black Americans have a lower prevalence of depression than their white counterparts, Black Americans experienced a chronicity of disease that was higher; 56% as compared to 38.6% respectively (Williams et al., 2007). Links between experiencing racism, racial discrimination and depression are well

established (Paradies, 2006a; Williams, 2018). Here, depressive symptoms refer to persistent feelings of sadness, hopelessness, and a loss of interest in activities that used to bring pleasure.

Allostatic Load – The chronic adaption of the stress process, due to chronic stress, becomes a catalyst for biological functions that *weather* the body (Geronimus, 1992). Engagement with persistent stressors fundamentally change the body's physiological response, as the brain's neuroplasticity, when confronted with chronic release of the stress process, encourages changes in functioning, at the expense of health long term, to provide faster responses to perceived threats. The presence of stressors then results in the heightened and prolonged engagement of the body's *fight or flight* response, creating physiologic wear and tear (Forde et al., 2019; Geronimus, 1992; Phelan et al., 2010). Extended employment of stress hormones not only results in maladaptation of this activity, but also contributes to the acceleration of the biological aging process, leading to early deterioration of biological systems, and to poorer physiological outcomes at younger ages (McEwen, 2018). Hormones play a vital part in regulating brain structure and function. As such, circulating hormones can contribute to cognitive dysfunction when their normal functions go awry (McEwen & Rasgon, 2018). Several hormones are involved in managing stress, such as: adrenaline and noradrenaline, glucocorticoids like cortisol, and pro- and anti-inflammatory cytokines. These entities affect one another and target other important cognitive structures like the hippocampus and hypothalamus, which regulate motivation, emotion, learning, and memory. They also manage hormone production and the biological systems necessary for homeostasis (Baek et al., 2016; Charney, 2004; Gaspersz et al., 2017; Gold & Chrousos, 2002; Halaris, 2013; Schulkin, 2011; Shim et al., 2016).

The dysregulation of these horomones results in allostasis or the continuing physiological adjustment to environmental challenges (McEwen, 2000). Allostasis is a complex system of

regulation wherein it: (1) regulates ongoing evaluation of the balance between internal resources and external demands; (2) leverages anticipatory arousal to elicit physiological adjustments in advance of immediate need; (3) allows for an individual to adapt to circumstances over time in the presence of an ongoing stressor; and (4) anticipates the physiological demand of a stressor in response to a changing environment. In the presence of a current stressor, the physiological stress system accommodates by adjusting its functioning parameters, a process deemed *allostatic accommodation* (Ganzel et al., 2010). The cost of chronic allostatic accommodation is called *allostatic load* and in its more severe form, allostatic overload. More specifically, *allostatic load* refers to the cumulative burden of the engagement of the stress adaption process (McEwen, 2000).

Description of Model Pathways

Figure 1 is a visual depiction of the relationship among the model constructs described above. Here we describe the model from top to bottom and left to right. Social structures and context directly influence racial discrimination **[A]**, maternal racial worries **[B]**, chronic stressors **[C]**, and maternal role strain **[D]**. Racial discrimination directly influences maternal racial worries **[E]**. Chronic stressors directly influence maternal role strain **[F]** and allostatic load **[G]**. Maternal racial worries directly influence depressive symptoms **[I]** and allostatic load **[J]**. Gender of child moderates the relationship between maternal racial worries and depressive symptoms **[H]**. Maternal role strain directly influences allostatic load **[K]** and depressive symptoms **[L]**. Perceived emotional and instrumental support moderates the relationship between maternal racial worries and depressive symptoms **[M(a)]**, the relationship between maternal racial worries and allostatic load **[M(b)]**, the relationship between maternal role strain and allostatic load **[N(a)]**, and the relationship between maternal role strain and depressive symptoms

[N(b)]. Life stressors moderate the relationship between maternal racial worries and depressive symptoms **[O(a)]**, the relationship between maternal racial worries and allostatic load **[O(b)]**, the relationship between maternal role strain and allostatic load **[P(a)]**, and the relationship between maternal role strain and depressive symptoms **[P(b)]**.

Dissertation Purpose and Specific Aims

The objective of this dissertation was to examine the effects of maternal role strain and maternal racial worries on maternal depressive symptoms and allostatic load, in accordance with the theoretical framework outlined above. More specifically, the purpose of this dissertation was threefold: (1) to better understand the impact of maternal role strain on outcomes of depressive symptoms and allostatic load; (2) to examine the impact of maternal racial worries on depressive symptoms; and (3) to test some of the pathways in the presented conceptual model. Each chapter tests a portion of the conceptual model (Figure 1). Not all pathways in the conceptual model are tested, however. Those pathways that are represented by a dotted line are not tested. At the end of each chapter are study specific conceptual models with the pathways tested represented by a bolded line and the represented constructs greyed.

This dissertation was completed in the three-paper format, with Chapters 2, 3, and 4 representing each of the studies. Details on the samples, measures, and methods for each study are described in each of their individual chapters, though Chapters 2 and 3 follow nearly similar analysis plans. All three studies used secondary data analyses; the first two studies drew on data from the Study of Women Across the Nation (SWAN) the last drew on data from the Racial Socialization Competency (RaSC) dataset. This current chapter introduced key concepts, terms, and a review of literature relevant to this dissertation. We described the racial landscape in which Black mother's mother, their experience with racism and racial discrimination, and how the

stress response comes into play. We ended with a presentation on the theoretical framework and the conceptual model at the center of this dissertation. Below, we conclude with an overview and the purpose of each study included in this dissertation.

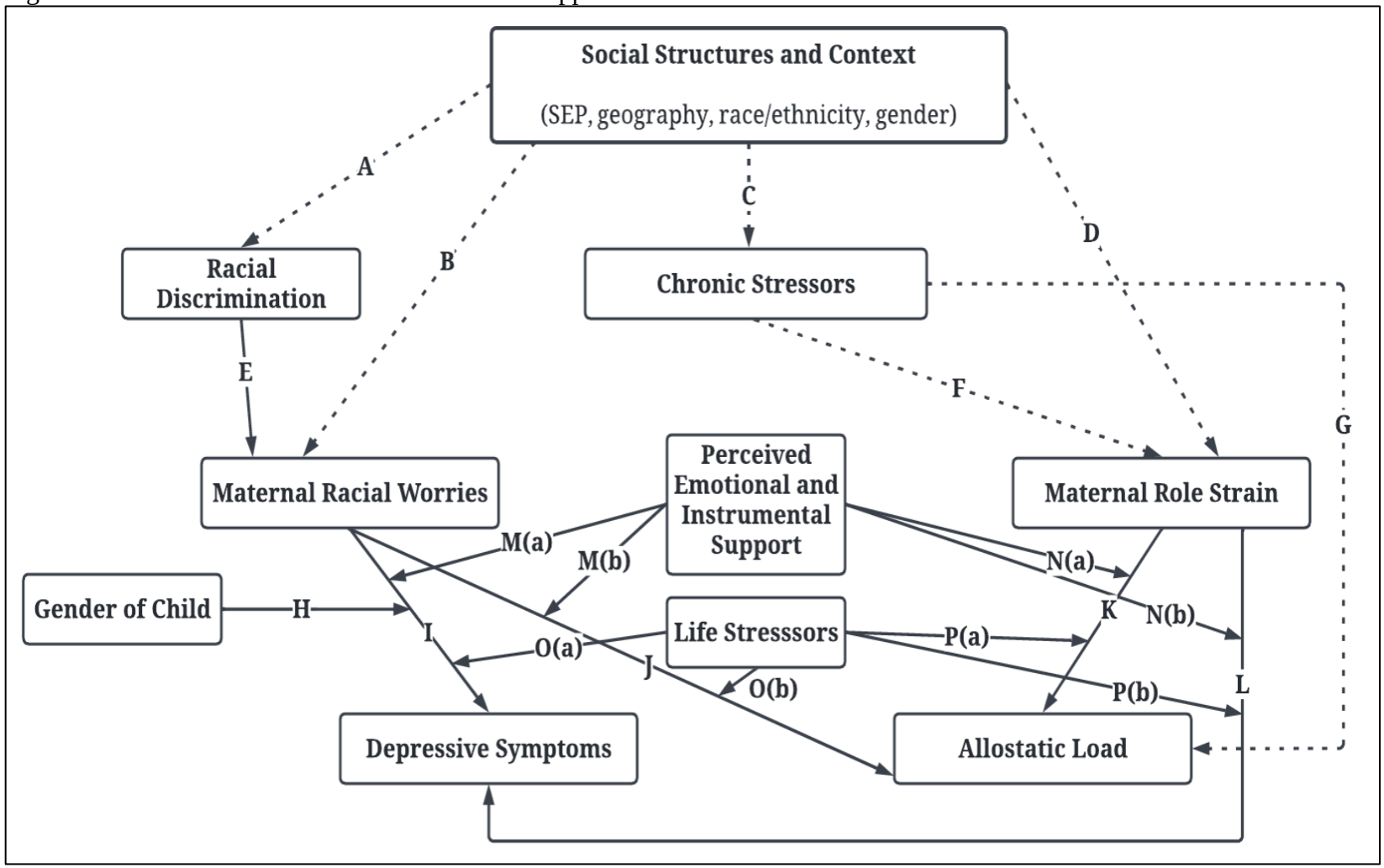
Chapter 2 had three specific aims. First, we documented differences in depressive symptoms among Black and white mothers in the Study of Women Across the Nation. Next, we examined the association between maternal role strain and depressive symptoms. Then, we determined whether life events or social support operate as moderators on the pathway between mothering stress and depressive symptoms.

Chapter 3 had three similar aims to Chapter 2 and drew from the same sample. First, we documented differences in allostatic load among Black and white mothers in the Study of Women Across the Nation. Next, we examined the association between mothering stress and allostatic load. Then, we determined whether life events or social support operate as moderators on the pathway between mothering stress and allostatic load.

Chapter 4 had four specific aims. First, we examined whether experiencing racial discrimination affects severe depressive symptoms among Black mothers, thereby testing this relationship, which previously yielded mixed results. Next, we explored whether maternal racial worries affect the mental health of Black mothers independent of racial discrimination. Then, we examined whether the impact of racial discrimination and maternal racial worries on severe depressive symptoms varies by gender of child. For instance, we hypothesized that the effect of maternal racial worries on severe depression will be greater for mothers of boys; this will be explained, in detail, in Chapter 4.

Chapter 5 summarizes the key findings from this dissertation. This chapter also discusses the implication of this research and these findings for public health research, practice, and policy.

Figure 1. The Environmental Affordances Model Applied to the Dissertation



Chapter 2
Maternal Role Strain and Depressive Symptoms: Testing the Moderating Effect of Race, Life Events, and Social Support

In most families, caregiving becomes the woman's responsibility. While caregiving can enrich you, it can also deplete you if you don't have support or make time for self-care.
— Kathleen A. Kendall-Tackett, PhD

Abstract

Background: As women's educational attainment and labor force participation continues to rise, there is an expectation that "*good*" mothers strive to parent with an approach that is labor-intensive and emotionally absorbing. This expectation can invite maternal role strain as women continue to juggle paid employment, household duties and caregiving with mothering that is exhaustive. **Methods:** With a series of models of repeated measures linear regressions with fixed effects we investigated relationships between maternal role strain with the presence of high depressive symptoms (Center for Epidemiologic Studies Depression Scale [CES-D ≥16]) in 1,363 Black and white mothers participating in the baseline through sixth follow-up visits of the Study of Women's Health Across the Nation (SWAN), a longitudinal population-based study of midlife. We also examine whether life events or social support act as moderators along the pathway between maternal role strain and high depressive symptoms. **Results:** While no differences based on race were observed, we find maternal role strain to be significantly associated with depressive symptoms. Although life events and social support do not moderate the relationship between maternal role strain and high depressive symptoms, their main effects were particularly significant. **Conclusion:** Maternal role strain has a direct relationship with high depressive symptoms. Life events exacerbate the likelihood of experiencing high depressive

symptoms and social support buffers the effect of maternal role strain on high depressive symptoms.

Introduction

Motherhood is a meaningful social role for women. Motherhood is a responsibility that culturally shapes women's identity, value, and place in society (Glenn et al., 2016). While motherhood imbues significant positives such as a sense of purpose and social respect, there are several stressors that mothers face, namely rumination and worry for their children, stretching the gambit of domains (Arendell, 2000; Collins, 2005; Dow, 2019; Nomaguchi & Brown, 2011; Nomaguchi & Milkie, 2003). As women's educational attainment and labor force participation continues to rise, there is an expectation that "*good*" mothers strive to parent with an approach that is labor-intensive and emotionally absorbing. This expectation can invite maternal role strain as women continue to juggle paid employment, household duties and caregiving with mothering that is at the expense of personal free time, their social networks, and potentially greater success in their careers (Glynn et al., 2009; Nomaguchi & Brown, 2011).

There is evidence that suggests that engagement in multiple social roles is beneficial for mothers. For example, mothers can buffer the stress associated with their motherhood role, with the rewarding aspects of another, such as their careers or within their marital relationship (Lanza di Scalea et al., 2012). Motherhood, however, does not confer mental wellbeing advantages in the same way as other roles, such as when one finds satisfaction in their career or as a partner. While findings are somewhat inconsistent, most research finds that mothers are either experiencing as much or more emotional distress as their childless peers (Evenson & Simon, 2005). Relatedly, Evenson and Simon (2005) report that amongst their study sample, parents report significantly higher levels of depression than nonparents.

The connection between the maternal role strain experienced by mothers and psychological well-being is established (Erdwins et al., 2001). Explorations of motherhood have

illuminated the distress mothers feel when managing the demands of their role obligations (Hibel et al., 2012; Hochschild & Machung, 2003; Kunz-Ebrecht et al., 2004). Role strain is the concept of strain among one's social roles, when there is an incompatibility between the demands placed on the individual and the resources, they have to keep up with them. Interestingly, research finds that conflict between what one has and what one needs, in regard to managing roles, has more of an impact on the life satisfaction of women than men (Ahrens & Ryff, 2006; Barnett, 2004; Creary & Gordon, 2016; Erdwins et al., 2001; Glynn et al., 2009; Goode, 1960). Existing evidence puts forth the assumption that every increase in role obligation is associated with an increase in emotional distress (Evenson & Simon, 2005; Lanza di Scalea et al., 2012). Much of this literature focuses on young adults, given their likelihood to have young children who require more attention to complete their daily needs. Less is known about mothers at midlife.

Mothers at Midlife

Midlife represents a time of change where children are more likely to be older and have changing emotional needs, shifting from general life support to complex relational and emotive circumstances, such as dating or body image concerns, and one's elderly parents may have a greater caregiving need (Silverberg & Steinberg, 1990). Research indicates that, internally at midlife, mothers are contending with feelings of stress related to the dual need from both children and parents, life reappraisal and increased reflexivity about their physical and psychological selves (Silverberg & Steinberg, 1990). Mothers at midlife may have greater confidence in navigating societal expectations around their mothering; potentially due to comfort in having seen benefits yielded from parenting practices applied when their children were younger or because they can apply a critical lens on societal narratives around mothering due to their mothering experiences (Gunderson & Barrett, 2017). However, findings from Gunderson

and Barrett (2017) suggest that the cost of emotionally intense mothering can span the course of motherhood. This cost may be felt especially intensely at midlife, given mothers are experiencing heightened concerns, stressors, and introspection about themselves and their emotional capacity may be spread thin between caring for their children and their parents (Gunderson & Barrett, 2017; Silverberg & Steinberg, 1990).

Authors Peterson and Duncan (2007) find that mothers at midlife, who have greater generativity, are more likely to tie their own development and evaluation of themselves to the success of their children. Generative mothers are those who are concerned with establishing and guiding future generations, and in particular, one's own children, towards well-being. It is believed that generative efforts reach a catalyst at midlife, as mothers broaden the focus of their gaze, after negotiating concerns with their identity and intimacy (Peterson & Duncan, 2007). Contextualizing these efforts in the knowledge that mothers at midlife are also contending with added demands from a caretaking perspective, stress related to caregiving, life reappraisal and introspection related to their physical and psychological selves, role strain related to mothering may be a consequence (Gunderson & Barrett, 2017).

Much evidence exists that examines maternal role strain and the dimensions that can influence the likelihood of its experience among younger mothers, but there is a dearth of evidence related to mothers at midlife. This study contributes to the literature base by examining the impact of maternal role strain on the experience of depressive symptoms among mothers at midlife (Lanza di Scalea et al., 2012). Lanza et al. (2012) conducted a cross-sectional study of women at midlife, examining their multiple roles, role stress and role reward and their association with the outcomes of depression and social functioning. Authors found that role reward was protective against depressive symptoms for those with the employed or mothering

role designation. Conversely, caregiving was associated with greater risk for reporting depression and low social functioning. Authors report that high reward in the mother role buffers the impact of stress on depressive symptoms. Finally, racial and ethnic differences were reported for Black mothers; where Black mothers were less likely to report depressive symptoms than their white counterparts. (Lanza di Scalea et al., 2012). This work specifically furthers the work conducted by Lanza di Scalea et al. (2012) by examining the data at multiple time points, using repeated measures to provide more insight into these relationships, as we increase statistical power, using more recent data, and generating data specific to the maternal perspective (Lanza di Scalea et al., 2012).

Background

Gender is a salient social category that has implications for how society interacts with individuals and influences how individuals see themselves (Davis et al., 2011). Societal rules impose a system of social norms that dictate appropriate behaviors for women and men. These social rules and expectations also pattern access to resources and freedoms, which determine exposure to stressors and play a role in the stress experience (Cislaghi & Heise, 2019; Davis et al., 2011; Eagly, 1987). Gender is considered to affect stress through its influence on psychosocial stressors; impacting through two channels: social roles and person-situation interactions (Davis et al., 2011)

Multiple Roles, Role Strain, and the Stress Experience

The multitude of social roles that women embody today (e.g., being a mother, caregiver, wife, careerwoman) can eclipse their internal capacity for addressing stress resulting from these identities. Considering women are still expected to shoulder much of the domestic household chores and caregiving duties – whether to their children or older relatives – managing multiple

roles can be stressful (Barnett, 2004; Marks, 1977; Sumra & Schillaci, 2015). The experience of overload, or role strain, describes the extent to which an individual feels '*overloaded*' or overwhelmed by the totality of their responsibilities.

Role strain can occur due to time-based, strain-based, or behavior-based conflicts. Women may experience role strain if they have time-demands that make fulfilling all their roles difficult. If a specific role is particularly stressful, it can leave women feeling that they have inadequate energy to fulfill role expectation for each social role they inhabit; or if certain roles require intensive behavioral input, women may feel diminished when engaging in their other roles (Creary & Gordon, 2016; Glynn et al., 2009). The view of an event or circumstance as stressful is always mediated by personal appraisal of that stressor, as individuals may vary on their valuation of the significance of the same stimuli. The evaluation of the stressor includes whether it is a potential threat or harmful to individual wellbeing – the primary appraisal – and the consideration of individual ability to address the situation and manage resulting emotional reactions – the secondary appraisal. Coping occurs with the engagement of tangible, psychological, social, or cultural resources available to each person (Lazarus & Folkman, 1984; Mezuk et al., 2013a).

Stress and Depression

Extant evidence establishes significant associations between the experience of prior stressors and depression or the experience of depressive symptoms. The literature base finds a generally linear relationship between the two, wherein the severity and number of negative/stressful events in an individual's life correlate with the probability of depressive symptom onset (Hammen, 2005). Current understandings of the link between stress and vulnerability to depression are based on the stress field guided diathesis-stress model, or a

heredity predisposition towards depressive disorder. There are two main camps – cognitive or biological models – that emphasize ultimately, the provocation of the underlying diathesis by an encountered stressor. It is not enough to have an underlying vulnerability to cause depression. However, when contending with a stressor, such as maternal role strain, if the stressor is catalogued as severe, and enough to solely overload an individual, or a stressor contributes to the overall overloading impact of the conjunction of numerous stressors to strain an individual, is when an individual may find themselves to be at a uniquely greater risk for developing depressive symptoms, if they have unique vulnerability given their predisposition for improperly regulated biological stress functions (Hammen, 2003).

Stress Exposure and Life Stress for Women

Differences in stress exposure are theoretically ground in gendered distinctions of social roles and psychological attributes, which elicit differences in how gendered norms, behaviors and roles become associated with 'maleness' or 'femaleness'. In turn, they pattern one's behaviors and one's belief in their capacity to cope with life circumstances and stressors. Women typically report experiencing more of an impact from stress than men (Matud, 2004). This pattern is consistent with traditional psychological attributes that gender compassion towards emotional cues and expressivity for women (Davis et al., 2011).

Aside from dueling perspectives on the diathesis-stress model, the stress field also considers there to be two general classes of viewpoints on stress exposure in the broader landscape of gendered stress experiences: major life events and resulting chronic stress and acute stress in daily life (Davis et al., 2011). Life stressors are defined as routine challenges occurring during day-to-day living (Lazarus, 2006; Zautra, 2003). These stressors have separate, immediate and direct effects. Concurrent and persistent, these frustrations can result in the gradual overload

of emotional and physical functioning (Anderson et al., 2019). Life stressors are consistently demonstrated to have a negative influence on mental health outcomes; with reviews on life stress and mental health unanimously concluding life stressors precede the onset of symptoms (Paradies, 2006a; Paradies et al., 2015; Williams, 2018). At their most extreme, shifts in emotional states or mood can result in psychopathy, where stress contributes to the development of conditions such as depression and/or the experience of depressive symptoms (Andrews & Wilding, 2004; Monroe et al., 2001, 2009; Monroe & Reid, 2009; Nugent et al., 2011).

Major life events generally include stressors from key life domains, including familial problems, economic hardship, and work strain. Commonly, major life events are reported as those circumstances occurring in the past several months to up to a year prior. Empirical findings suggest that women typically indicate experiencing greater exposure to major life stressors and chronic stresses and that those stressors are rated as more intense as compared to men. In addition, while stressful events related to work are equally common in men and women who are employed, stressful events related to interpersonal relations are more common among women. Implications of these findings suggest that women experience more life stressors than men; and regard them as more salient (Dalgard et al., 2006; Davis et al., 1999; Kendler et al., 2001; Matud, 2004; Turner & Avison, 2003).

Acute stressors in daily life are commonly assessed with the help of diary reporting; wherein accounts of daily stressors are taken either via an everyday self-report or interview-based recording. Types of acute stressors range from small disagreements, stressful circumstances resulting from familial or work events and, discrimination. Acute life stressors are events that have occurred within the last 24 hours (Davis et al., 2011). Data drawn from these reports indicate women report more acute life stressors generally and are also more likely to

report stressors related to their parenting (e.g., arguments with children) (Almeida et al., 2002; Davis et al., 2011). Taken together, the empirical evidence suggests that women encounter more major interpersonal events and acute familial and network events, greater stressfulness related to these events, and more job-related stress than men (Davis et al., 2011).

Social Support and Depression

Social support refers to the perception that an individual is cared for by others and seen as part of a larger network where the individual is loved, supported, held with esteem, and valued. This network operates as part of a mutually assistive series of ties. This network is made up of relatives, friends, romantic partners, and other social and community ties (Taylor, 2011). There are four main sources of support: emotional support (i.e., the expression of empathetic understanding and encouragement of expressivity of one's emotions), instrumental/tangible support (e.g., the provision of material aid or supportive assistance), informational support (e.g., the offering of advice, information, guidance), and appraisal support (e.g., the provision of information garnered for self-evaluative purposes, constructive feedback, and affirmation) (Heaney & Israel, 2008).

Robust evidence has established the protective effect of social support on depressive symptoms, during times of stress. Social support is considered of significant importance in the support of well-being and emotional and mental health. Social support works as a buffer against depressive symptoms, by allowing individuals to draw on network resources, as an extension of their own, to help cope with stressful circumstances. Thus, high levels of social support decrease risk for experiencing depressive symptoms (Taylor, 2011).

Study Purpose

We examine constructs from the conceptual model presented in the last chapter: maternal role strain, life stressors, perceived emotional and instrumental social support operationalized as social support, and depressive symptoms. We hypothesized that (1) Black mothers at midlife would have lower levels of depressive symptoms as compared to their white counterparts and (2) maternal role strain at midlife would be significantly positively associated with depressive symptoms at midlife. We hypothesize that (3) the detrimental effect of life events on depressive symptoms at midlife will exacerbate the detrimental effect of maternal role strain on depressive symptoms at midlife, as outlined by the literature (Guidi et al., 2021; Pearlin, 2010; Thoits, 2010). Relatedly, we hypothesize that (4) the protective effect of social support on depressive symptoms at midlife will reduce the detrimental effect of maternal role strain on depressive symptoms at midlife, as outlined by the literature (Heaney & Israel, 2008; Taylor, 2011). A figure representing the conceptual pathways tested in this chapter can be found at the end of this chapter.

Methods

Data Source

This study used data from the Study of Women Across the Nation (SWAN) cohort. SWAN is a large, multi-site, multi-ethnic longitudinal study focused on the health of women during at midlife middle age to address knowledge deficits about the menopausal transition and its effects on age-related chronic disease. Its purpose was to examine the physical, biological, psychological, and social changes experienced by women across the life course. Eligibility criteria for the cohort study was as follows: (1) between 42-52 years of age, (2) the presence of at least one ovary and an intact uterus, (3) not currently using exogenous hormones, (4) experience of at least one menstrual period in the past 3 months, and (5) self-identification with a site's designated racial/ethnic group. Black women were recruit at the Boston, MA, Chicago, IL,

Detroit, MI, Pittsburgh, PA locations along with white women. Chinese women were recruited at the Oakland, CA location, Japanese women were recruited at the Los Angeles, CA location and Hispanic women were recruited at the Newark, NJ location (Sowers et al., 2000). Of the 3,306 that were recruited into the longitudinal cohort (Sowers et al., 2000), 2,870 (or approximately 87% of the original sample) completed the first full review.

Sample.

Eligibility for this analysis required that women be Black or white mothers and that they participated in follow up visit 1. Baseline data was collected from 1996 – 1997 with approximate annual follow up visits. The data presented in this study are from follow-up visit 1 and follow-up visits 3 through visit 6. Follow-up visit 6 occurred from 2002-2004. The analytic sample included 1,363 participants, 678 Black mothers and 685 white mothers, who had complete data for the maternal role strain measure at follow-up visit 1. This analysis uses information from baseline through to follow up visit 6 to evaluate maternal role strain and depressive symptoms among Black and white mothers.

Measures

Depressive symptoms. Depressive symptoms were measured using the Center for Epidemiologic Studies Depression Scale (CES-D) which indicate whether a respondent had clinically significant level of depressive symptoms (Radloff, 1977). CES-D is a twenty-item ordinal measure. The CES-D scale measures the frequency of depressive symptoms within the past week. Depressive symptoms were operationalized as a dichotomous measure wherein high depressive symptoms were determined by scoring at or above 16. Scores range from 20 to 80 with higher scores indicating greater symptomatology. Participants responded on a 1 (*rarely or none of the time – less than 1 day*) to 4 (*most or all of the time – 5-7 days*) scale to 20 items

corresponding with the depression assessment, wherein higher scores indicate more experiences of depressive symptoms. Sample items include: “I was bothered by things that usually don’t bother me:”; “I did not feel like eating; my appetite was poor”; and “I felt that I could not shake off the blues, even with help from my family or friends”. If data for more than four items were missing, the entire score was set to missing. Missing item responses were set to the mean score of the non-missing items for participants with fewer than four items missing (Radloff, 1977). This measure has previously demonstrated excellent full-scale internal validity in a range or racial/ethnic groups (α range: .85-.87) in study samples of white (α=.85), Black (α=.85) and Mexican (α=.87) participants (Roberts, 1980).

Maternal Role Strain. Maternal role strain was measured using an adaption of the Multiple Roles Questionnaire (Stephens et al., 1994). Participants were asked to indicate their status of mother with a yes/no response to: “Do you have any children or stepchildren?” Participants then reported on the degree of stress associated with this role by responding to the following: “How stressful is your role as a mother?” Response options ranged from 1 (not at all) to 5 (extremely) (Lanza di Scalea et al., 2012; Stephens et al., 1994).

Life Events. The composite life event score is calculated by adding up all possible life events. These life events are adapted from the Psychiatric Epidemiology Research Interview (PERI) scale (Dohrenwend et al., 1978) to include elements more relevant to women in the parent study. The life events scale included 34 possible events at baseline, 20 questions for follow-up visits 1- 3 and then shortened further to 18 items for follow up visits after visit 4. The composite score was a count based the number of “very upsetting”/stressful life events that participants reported that they had had (Dohrenwend et al., 1978). There were no missing items as life events are a composite built from responses to life events deemed ‘very upsetting’ only.

Social Support. Social support was measured using four items selected from the 20-item Medical Outcomes Study Support Survey (MOS) that assesses instrumental and emotional support. Participants were asked how often each of the four types of support were available to them, with 5-level response choices ranging from "none of the time" to "all of the time". The individual questions were rescaled from 0 to 4 and summed. Possible scores range from 0 to 16 for the most social support (Sherbourne & Stewart, 1991). Across the 6 waves of follow-up there were a total of 287 missing responses which represented 2.71% of respondents. At baseline, there were 2 missing responses representing 0.12% and at follow-up visit 1, there were 9 missing responses representing 0.66%.

Sociodemographic variables. Sociodemographic variables were chosen given their previously documented associations with depression and life events in SWAN (Chyu & Upchurch, 2018; Lanza di Scalea et al., 2012; Upchurch et al., 2015). The following variables were controlled for in analyses: mother's age, site, marital status, education, children, and vasomotor symptoms. ***Mother's age*** reflected participant age, calculated by subtracting year of birth reported at baseline from the year of data collection. Across the 6 waves of follow-up there were a total of 45 missing responses which represented 0.43% of respondents. At baseline, there was 1 missing response representing 0.06%, and at follow-up visit 1 there were 9 missing responses, representing 0.66%. ***Site*** references the site at which participants had their data collected. There were no missing responses. ***Marital status*** was measured at baseline and marital status was carried forward to subsequent visits. Across the 6 waves of follow-up there were a total of 73 missing responses which represented 0.69% of respondents. At baseline, there were 14 missing responses representing 0.87%, and at follow-up visit 1, there were 10 missing responses, representing 0.73%.

Education was also observed at baseline and carried forward, unchanged, through subsequent follow up visits. Across the 6 waves of follow-up there were a total of 83 missing responses which represented 0.78% of respondents. At baseline, there were 13 missing responses representing 0.81% and at follow-up visit 1 there were 12 missing responses representing 0.88%. Number of ***children*** were assessed as a continuous measure; however, this variable was dichotomized in this study (4 or less children and 5 or more children). Across the 6 waves of follow-up there were a total of 12 missing responses which represented 0.09% of respondents. At baseline, there were 2 missing responses, representing 0.10% and at follow-up visit 1 there was 1 missing response, representing 0.12%. ***Vasomotor symptoms*** were assessed by asking participants the frequency of which they had hot flashes or night sweats in the past two weeks. Frequency was determined by response values ranging from 1 (not at all) to 5 (daily). Across the 6 waves of follow-up there were a total of 400 missing responses which represented 3.78% of respondents. At baseline, there were 12 missing responses representing 0.75% and at follow-up visit 1 there were 20 missing responses representing 1.47%.

Missing data. All variables were assessed for missingness. For categorical variables, marital status, education, children, we filled missing data with the sample mode for each variable at each follow-up visit. For continuous variables, mother's age, social support, and life events, we filled missing data with the sample mode for each variable at each follow-up visit (Sinharay et al., 2001; Zhang, 2016).

Data Analysis

Exploratory data analyses were conducted with all study variables. Variable frequencies were examined and graphed to observe distributions. We then conducted a series of t-tests and chi-squared analyses to identify whether there were significant statistical differences between

Black and white mothers. This is reported in Table 1. Then we plotted the distribution of depressive symptoms, maternal role strain, social support, and life events to assess normality. A series of repeated measures linear regressions with fixed effects models were constructed to examine associations between all sociodemographic covariates, maternal role strain, life events and social support with depressive symptoms. They are reported in Table 2. All regression analyses control for site. We assessed potential interactions of maternal role strain, life events and social support race. All statistical analyses were conducted in STATA version 17.

Results

Sample Characteristics

Table 1 describes the sociodemographic characteristics for the total sample and by race at follow up visit 1. Participants ranged in age from 42.8 years of age to 54 years of age at with a mean of 47 years of age. Most of the participants (65%) were married or living as if married. A little over a third had more than a high school education. Almost all the participants had four or less children and 17% experienced vasomotor symptoms on six days or more a month. About a third of participants rated the strain of being a mother as somewhat stressful. Participants reported an average of 1.17 life events, ranging from 0 to 11 events. The mean social support score was 12.67 (SD = 3.06). Twenty-one percent of the sample reported a high level of depressive symptoms. About 12% of the sample reported feeling ‘not at all’ strained by their role as a mother compared to 34.48% who reported feeling ‘somewhat’ strained and 8% who reported feeling ‘extremely’ strained.

Sample Characteristics by Race

Black and white mothers were both an average of 50 years old. White mothers were more likely to be currently married or living as if married, as 81% of white mothers were currently

married or living as if married, whereas approximately only 50% of Black mothers were married or living as if married. Both Black and white mothers were most likely to report their education attainment as ‘more than high school. Black mothers were more likely to have five or more children, experience six or more days of vasomotor symptoms and experience higher levels of depressive symptoms. Black mothers were more likely to report feeling ‘not at all’ strained by their role as a mother and ‘extremely’ strained by their role as a mother. White mothers were more likely to report feeling ‘a little’, ‘somewhat’, or ‘quite a bit’ strained by their role as a mother. We control for these differences.

High Depressive Symptoms, Maternal Role Strain, Social Support, and Life Events

Model 1 examines the association between maternal role strain and high depressive symptoms. High depressive symptoms increased significantly with increasing maternal role strain (‘somewhat’ (*b*=0.06, SE= 0.01, p= 0.00), ‘quite a bit’ (*b*= 0.11, SE= 0.18, p= 0.00), and ‘extremely’ (*b*=0.20, SE= 0.02, p= 0.00)). That is, women reporting each level of maternal role strain greater than ‘not at all’ had a higher likelihood of reporting high depressive symptoms. Maternal role strain remained significantly positively associated with high depressive symptoms after adding race to the model (Mode 2). Race was not associated with the risk of high depressive symptoms. No interaction was present between race and maternal role strain (Model 3). This model is not presented in the truncated Table 2. After further controlling for the covariates mother’s age, marital status, number of children, education, and vasomotor symptoms (night sweats and hot flashes), maternal role strain remained significant (Model 4).

The next two models added life events and social support and evaluated interactions between these variables and maternal role strain, respectively. These models are presented here in a truncated way, as they did not yield any significant findings in relationship to their

interaction terms. Worth noting, in Model 5a, the main effect of life events was positive and significant (*b*= 0.06, SE= 0.01, p= 0.00), that is, having greater life events increases the likelihood of high depressive symptoms. In Model 5b, the main effect of social support was negative and significant (*b*= -0.02, SE= 0.01, p= 0.05). Given the main effect of social support was negative, this suggests that having greater social support decreases the likelihood of experiencing high depressive symptoms. Model 6 adds life events and social support to Model 4 and does not include any interaction terms. Here, almost all the variables are significant. Somewhat' (*b*=0.03, SE= 0.01, p= 0.02), 'quite a bit' (*b*= 0.06, SE= 0.01, p= 0.00), and 'extremely' (*b*= 0.13, SE= 0.02, p= 0.00). Life events (*b*= 0.04, SE= 0.00, p= 0.00) and social support (*b*= -0.02, SE= 0.00, p= 0.00) were highly significant, with life events increasing the likelihood of depressive symptoms and social support decreasing the likelihood of high depressive symptoms.

Discussion

This study provides key evidence in understanding the impact of maternal role strain on high depressive symptoms among Black and white mothers at midlife. In agreement with previous SWAN studies, Black women reported greater prevalence of high depressive symptoms as compared to white women (Bromberger et al., 2004, 2007), contrary to our hypothesis. While we did not see significant race differences in our models on high depressive symptoms, there were significant associations between maternal role strain and high depressive symptoms. These results align with prior work in SWAN. Brown, Matthew and Bromberger (2005) examined perceptions of self among Black and white women at midlife. Consistent with our data, authors found that there were no significant differences in the experience of high depressive symptoms between Black and white women (C. Brown et al., 2005). Lanza di Scalea et al. (2012) explored

role occupancy, role stress and role reward among women at midlife to understand their unique contributions to mental health. For mothers, Lanza di Scalea et al. (2012) report that role stress significantly increased the odds of experiencing high depressive symptoms, as with our data.

The main effects of life events and social support were also highly significant. In this case, life events exasperated the experience of high depressive symptoms while social support acted as a protective factor in the development of high depressive symptoms. The relationships identified in this work are congruent with other findings from SWAN. Bromberger et al. (2004) report that increases in very stressful events correlated with increases in the incidence of high depressive symptoms. In that same study, authors find that social support and depressive symptoms had an inverse relationship, where increases in social support led to decreases in the incidence of high depressive symptoms.

A distinct contribution of this work is that it further contextualizes the impact of motherhood and maternal role strain at midlife. Mothers at midlife are experiencing a psychosocial transition and a rise in caregiving responsibilities. Role strain theory posits that with increasing strain and role demands, the likelihood of experiencing role overload increases. This work provides credence of that supposition; with each level increase of maternal role strain, the strength of the association between maternal role strain and the experience of high depressive symptoms increased. Suggesting that at midlife, mother may be experiencing higher stress burdens at midlife where the needs of their children and elderly parents may make them more susceptible to experiencing high depressive symptoms.

Limitations

Although the current study provides valuable insights, several limitations should be considered. The first is that the measure for role strain is based on a single response item. While

shorter instruments tend to have a lower response burden on the participant and allow for an ease of interpretation, in this case, it is at the expense of detail (Bowling, 2005). While single item measures may be adequate for one-dimensional constructs, it is likely that motherhood stress is multidimensional (Mclver & Carmines, 1981). Second, we did not account for other possible variables that could impact the direction and strength of the association between role strain and depressive symptoms, such as coping styles, working conditions or role reward (Lanza di Scalea et al., 2012). We also did not examine role combinations or racial discrimination. For instance, motherhood strain in combination with spousal strain, caregiving strain or work-related strain and including a measure of racial discrimination may provide a more nuanced understanding of potential underlying race-related differences (Lanza di Scalea et al., 2012). Methodologically, we could expand on this work by conducting a longitudinal analysis to assess changes over time rather than relying on a repeated measures design.

Conclusion

Understanding how maternal role strain shapes women's experience of high depressive symptoms and some of its associated factors, life events and social support, is important. Given the rising age of the US population, there will continue to be an increased focus on midlife and how to best meet the needs of aging adults with children. Here, we find that high depressive symptoms have a strong association with maternal role strain, regardless of the controls used in the models. Social support was found to be a significant factor in dampening the overall impact of maternal role strain on high depressive symptoms. Life events were identified as a factor that can exacerbate the experience of maternal role strain. Thus, we might recommend that interventions aimed at reducing stress and depressive symptoms among mothers at midlife,

utilize the social networks of these women and aim to reduce the weight of their chronic stressors to ultimately build their capacity to help manage their stress burdens.

Table 1. Participant Sociodemographic Characteristics and Key Study Variables (N = 1363 mothers)

	Total Sample (*n* = 1,363)				Black (*n* =678)				White (*n* = 685)				
Characteristics	M (SD)	%(N)	Min	Max	M (SD)	%(N)	Min	Max	M (SD)	%(N)	Min	Max	*p*†
Race													
Black		49.74 (678)				49.74 (678)							
White		50.26 (685)								50.26 (685)			
Mother's Age	47.40 (2.65)		42.8	54	47.41 (2.68)		42.8	54	47.39 (2.61)		43	53.9	0.927
Site													**<0.001**
11.Detroit, MI		28.10 (383)				34.51 (234)				21.75 (149)			
12: Boston, MA		19.88 (271)				19.62 (133)				20.15 (138)			
13: Chicago, IL		26.56 (362)				28.76 (195)				24.38 (167)			
17: Pittsburgh, PA		25.46 (347)				17.11 (116)				33.72 (231)			
Marital Status													**<0.001**
Currently Married or Living as if Married		65.30 (890)				49.41 (335)				81.02 (555)			
Single, Never Married		10.12 (138)				17.55 (119)				2.77 (10)			
Post-Married: Separated, Divorced or Widowed		24.58 (335)				33.04 (224)				16.20 (111)			
Education													**<0.001**
Less than High School		3.30 (45)				4.72 (32)				1.90 (13)			
High School Diploma		19.30 (263)				20.94 (142)				17.66 (121)			
More than High School		36.98 (504)				41.59 (282)				32.41 (222)			
College		18.27 (249)				16.52 (112)				20.00 (137)			
Post-College		22.16 (302)				16.22 (110)				28.03 (192)			

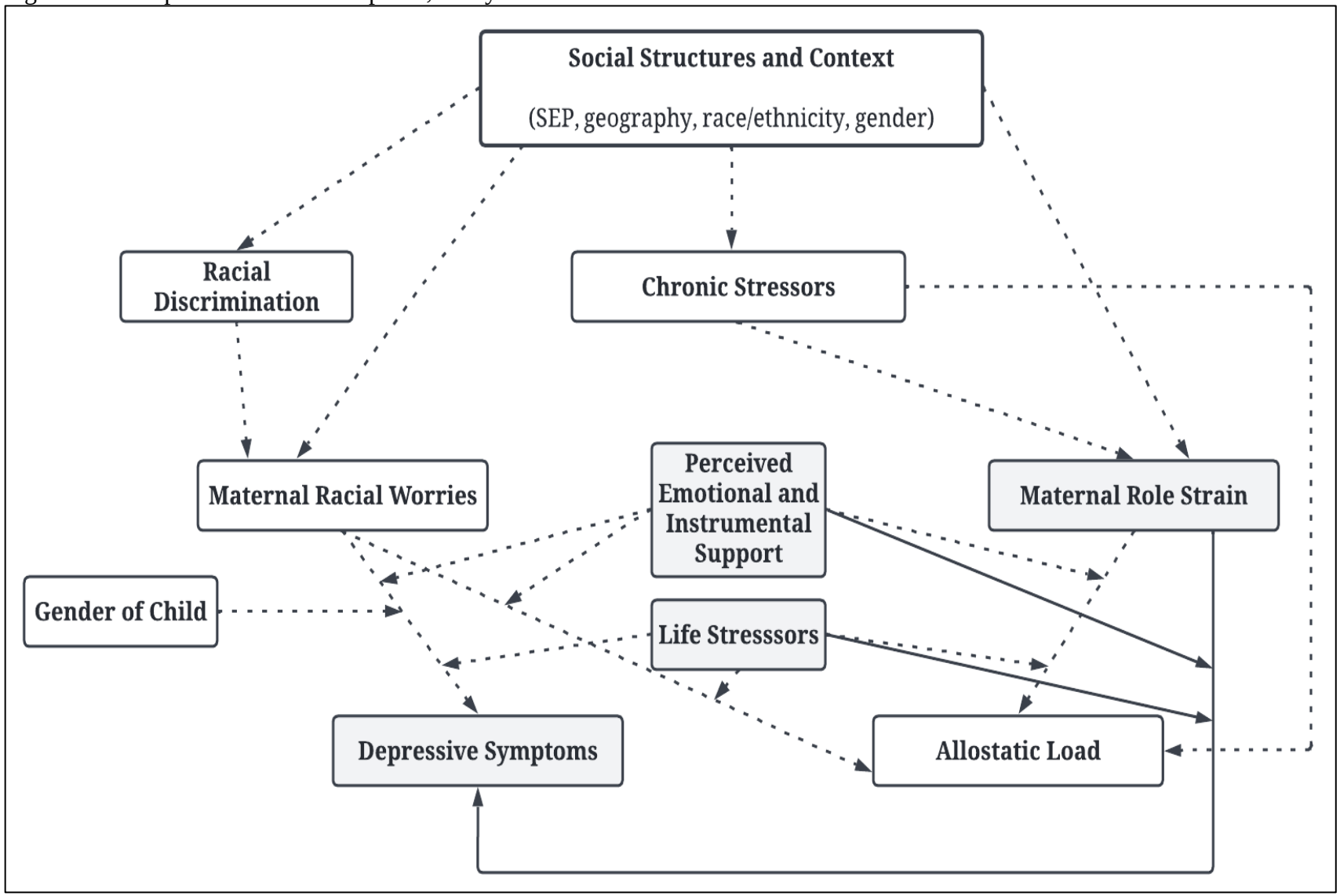
Children														**<0.050**
4 or less		94.57 (1,289)				93.07 (631)					96.06 (658)			
5 or more		5.43 (74)				6.93 (47)					3.94 (27)			
Vasomotor Symptoms														**<0.001**
5 or Less Symptoms		83.57 (1,139)				78.91 (535)					88.18 (604)			
6 or more Symptoms		16.43 (224)				21.09 (143)					11.82 (81)			
Key Outcome Variables of Interest														
Role Strain														**<0.001**
Not at all		12.03 (164)				16.67 (113)					7.45 (51)			
A little		27.66 (377)				25.22 (171)					30.07 (206)			
Somewhat		34.48 (470)				32.01 (217)					36.93 (253)			
Quite a bit		17.83 (243)				17.11 (116)					18.54 (127)			
Extremely		8.00 (109)				9.00 (61)					7.01 (48)			
Role Strain Score	2.82 (1.10)		1	5	2.76 (1.18)		1	5			2.87 (1.02)	1	5	0.065
Depressive Symptoms														0.059
Not Depressed		78.94 (1, 076)				76.84 (521)					81.02 (555)			
Depressed		21.06 (287)				23.16 (157)					18.98 (130)			
Life Events	1.17 (1.63)		0	11	1.22 (1.70)		0	11	1.13 (1.55)			0	11	0.118
Social Support	12.67 (3.06)		0	16	12.54 (3.14)				12.80 (2.98)			0	16	0.059

Table 2. Adjusted linear regression models of depressive symptoms as a function of race, role strain, social support, and life events

	Model 1		Model 2		Model 4		Model 6	
Characteristics	*b* (SE)	*p* value	*b* (SE)	*p* value	*b* (SE)	*p* value	*b* (SE)	*p* value
Black			0.02 (.01)	0.193	-0.01 (.01)	0.358	-0.02 (.01)	0.133
Role Strain								
Not at all	(base outcome)		(base outcome)		(base outcome)		(base outcome)	
A little	0.016 (.15)	0.270	0.01 (.01)	0.230	0.01 (.01)	0.319	0.00 (.01)	0.784
Somewhat	0.06 (.01)	**<0.001**	0.06 (.01)	**<0.001**	0.06 (.01)	**<0.001**	0.03 (.01)	**<0.050**
Quite a bit	0.11 (.18)	**<0.001**	0.11 (.01)	**<0.001**	0.10 (.01)	**<0.001**	0.06 (.01)	**<0.001**
Extremely	0.20 (.02)	**<0.001**	0.20 (.02)	**<0.001**	0.20 (.02)	**<0.001**	0.13 (.02)	**<0.001**
Life Events							0.04 (.00)	**<0.001**
Social Support							-0.02 (.00)	**<0.001**

*Note: Race includes Black and white women, where Black=1 and white=0. Models 4-6 control for age, site, marital status, children, education, and vasomotor symptoms

Figure 2. Conceptual Model for Chapter 2, Study 1



Chapter 3
Maternal Role Strain and Allostatic Load: Testing the Moderating Effect of Race, Life Events, and Social Support

We carry our history in our bodies. How can we not?
— Nancy Krieger, In Sickness and in Wealth

Abstract

Background: Our understanding of biosocial interactions within the motherhood context is advancing with the ability to examine physiological processes. Stressors that arise as a result of motherhood or motherhood stress that may compound with stress from other domains, can result in chronic stress that can affect physiological stress processes. **Methods:** Using a series of models of repeated measures linear regressions with fixed effects, we investigated relationships between maternal role strain and allostatic load scores in 1,363 Black and white mothers participating in the baseline through sixth follow-up visits of the Study of Women's Health Across the Nation (SWAN). We also examine whether life events or social support act as moderators along the pathway between maternal role strain and allostatic load scores. **Results:** While there was not a direct relationship between maternal role strain and allostatic load, we find allostatic load scores to be significantly associated with mother's race. Although life events and social support do not moderate the relationship between maternal role strain and allostatic load scores, the main effect of social support on allostatic load was particularly significant. **Conclusion:** We find mother's race has a direct relationship with allostatic load scores. Social support buffers the effect of maternal role strain on allostatic load scores.

Introduction

The stress process can be used to derive hypotheses about the impact of social factors on physiological functioning (George, 2011). Its theoretical framework, as described by Pearlin et al. (1989), in his seminal work, posits that the stress process considers the following concepts: sources of stress, mediators and/or moderators of stress and the manifestations of stress. Sources of stress can be parsed into categories of either acute, eventful experiences or a chronic strain. When these stressors arise, they can create independent experiences of strain or exacerbate and intensify preexisting strain (Pearlin, 1989; Pearlin et al., 1981).

Racial differences exist in stress burdens and conceptualizations of stress. While racial and ethnic minorities typically have larger stress burdens and are more likely to have greater interactions with social stressors, as compared to their white counterparts, extant evidence indicates that racial and ethnic minorities report lower instances of stress and stress-related disorders (L. L. Brown et al., 2020; Mezuk et al., 2013a; Thoits, 2010; Williams, 2018). Black women are of particular concern as they consistently rank higher on biological measures of stress, regardless of their self-reported health status. This phenomenon holds true when compared to Black men, white men, white women, and other women of color (Chyu & Upchurch, 2011, 2018; Deuster et al., 2011; Geronimus et al., 2006; M. D. Thomas et al., 2019; Upchurch et al., 2015). Evidence indicates that stress is not equally distributed. Black women bear a larger stress burden as they contend not only with daily life stressors, but also discrimination stress related to their woman-ness, Blackness, and their Black womanhood (Clark et al., 1999; Davis et al., 2011; Geronimus et al., 2010; King, 2005; Williams, 2018). As such, they are a particularly vulnerable group to explore.

Black mothers are of unique concern as they contend with stress stemming from their identities, in addition to, the worries and fear they have for their children, a stressor that never ceases. The theory of role strain is important to consider here. Role strain describes the difficulty associated in meeting the requirements of each role or the difficulty of meeting the totality of role obligations, when involved in multiple roles. In short, it is the result of role obligations that exceed internal capacity to meet demands (Goode, 1960). The act of balancing time management, household labor, caregiving, career decisions, work obligations and individual pursuits is difficult. This difficulty may be further exacerbated in single female headed households. Single moms are more than twice as likely to be Black as compared to cohabitating moms (30% vs. 12%) and Black mothers are almost four times more likely to be single as compared to married mothers (30% vs 7%) (Livingston, 2018).

While mothers may desire to fulfill all their role obligations, there are limits to their capacity. Whether due to reasons of capability or circumstance, mothers may experience stress, as it relates to their role obligations, a phenomenon known as maternal role strain (Goode, 1960). Examinations of social roles suggest that while there are many joys to motherhood, there also significant strains (i.e., stress) (Barnett, 2004; Nomaguchi & Brown, 2011; Nomaguchi & Milkie, 2003). Maternal role strain can be exacerbated by role obligations elsewhere, in other life domains. Explorations of motherhood have highlighted the stress mothers feel when juggling the demands of work, caregiving, and family obligations (Hibel et al., 2012; Hochschild & Machung, 2003; Nomaguchi & House, 2013; Nomaguchi & Milkie, 2003).

Mothers at Midlife

Midlife represents a time of change where children are aging and have changing emotional needs, evolving from general caretaking to more complicated relational and emotive

needs. At this same time, one's elderly parents are also experiencing evolving demands for caregiving. Caregiving that is more frequent and more hands-on (Silverberg & Steinberg, 1990). Research indicates that, internally at midlife, mothers are also contending with a changing internal landscape at the pace of the changing caregiving needs of children and their elderly parents. As such, there is an increase in feelings of stress related to the dual need to be present for their children and their parents, while also experiencing emotions around their own life reappraisal and increased reflexivity about their physical and psychological selves as they age (Silverberg & Steinberg, 1990).

However, mothers at midlife may have greater confidence in navigating societal expectations around their mothering, as they've now potentially seen benefits from their parenting practices, as their children age or because with age comes experience; they can apply a critical lens on societal narratives around mothering due to their mothering experiences (Gunderson & Barrett, 2017). Findings from Gunderson & Barrett (2017) show that the impact of socially promoted "*good*" mothering – mothering that is emotionally intense - can span the course of motherhood. This impact may be felt especially intensely at midlife, given mothers are experiencing heightened caregiving responsibilities, stressors, and introspection about themselves. As such, their emotional capacity may be spread thin between caring for their children, their parents and themselves (Gunderson & Barrett, 2017; Silverberg & Steinberg, 1990).

Authors Peterson and Duncan (2007) find that mothers at midlife, who have greater generativity, are more likely to tie their own development and evaluation of themselves to the success of their children. Generative mothers are those who are concerned with establishing and guiding future generations, and in particular, one's own children, towards well-being. It is

believed that generative efforts reach a catalyst at midlife, as mothers broaden the focus of their gaze, after negotiating concerns with their identity and intimacy (Peterson & Duncan, 2007). Contextualizing these efforts in the knowledge that mothers at midlife are also contending with added demands from a caretaking perspective, stress related to caregiving, life reappraisal and introspection related to their physical and psychological selves, role strain related to mothering may be a consequence (Gunderson & Barrett, 2017).

Much evidence exists examining maternal role strain and the dimensions that can influence the likelihood of its experience among young mothers. For mothers at midlife, there is a dearth of evidence examining their experience with maternal role strain. This study looks to fill that gap and examine the impact of maternal role strain on allostatic load among mothers at midlife (Lanza di Scalea et al., 2012). This work is a companion and advancement to that of Lanza di Scalea et al. (2012) by including repeated measures analyses rather than relying on a single timepoint, using more recent data, using an exclusive sample of mothers, and moving beyond the self-report of psychological symptoms to include a biological investigation that leverages allostatic load scores as an indicator of psychophysiological impact (Lanza di Scalea et al., 2012).

Background

Those with lower social statuses (e.g., related to race, class, or gender) have greater stress burdens, given the unequal distribution of negative events, strains and trauma patterned within our society (Thoits, 2010). Stress process frameworks identify heavier stress burdens and therefore greater stress exposure as a foundational driver of social inequalities in health (Folkman et al., 1986; Pearlin et al., 1981; Thoits, 2010). Chronic stressors and the experience of

cumulative stressors maintain enduring theoretical roles because their experience is prolonged, which forces experiencers to adapt over a sustained period (Gibson, 2014; Pearlin, 2010).

Maternal Role Strain

As women's educational attainment and labor force participation continues to rise, its implications for maternal psychophysiological functioning have become of great interest to researchers, as it indicates a rise in multiple role obligations for US women more broadly (Barnett, 2004). Maternal role strain refers to the extent to which mothers perceive the demands associated with their role as mother as difficult, and whether it extends beyond the scope of their current resources (Abidin, 1992; Belsky, 1984; Pearlin, 1989). Whether due to reasons of individuality or circumstance, when individuals experience an inability to fulfill all their role obligations, it is known as experiencing role strain (Goode, 1960). Mothers notably face an additional number of stressors as compared to their childless counterparts. They must balance these demands with the demands of more conventional stressors resulting from other domains (e.g., occupation, marital and financial) (Goode, 1960).

Stressors and Physiological Functioning

Our understanding of biosocial interactions within the motherhood context is advancing with the ability to examine physiological processes (Booth et al., 2000). Stressors that arise as a result of motherhood or motherhood stress that may compound with stress from other domains, can result in chronic stress that can affect physiological stress processes (Deater-Deckard & Deater-Deckard, 2014). Internal responses to stress, continuing physiological adjustments to environmental challenges, has been termed allostasis (McEwen, 2000). Allostasis is a complex system of regulation wherein it: (1) regulates ongoing evaluation of the balance between internal resources and external demands; (2) leverages anticipatory arousal to elicit physiological

adjustments in advance of immediate need; (3) allows for an individual to adapt to circumstances over time in the presence of an ongoing stressor; and (4) anticipates the physiological demand of a stressor in response to a changing environment. In the presence of a current stressor, the physiological stress system accommodates by adjusting its functioning parameters, a process deemed *allostatic accommodation*. Stressors require varying demands with different physiologic "set points", as different circumstances beget different demands (Ganzel et al., 2010).

Adjustments as part of the stress process have cascading impacts on other systems, wherein individuals experience body-wide accommodations to environmental demands. This response occurs so that individuals are not struggling to achieve allostatic balance (i.e., homeostasis); but can instead find a *new* homeostasis that better fits the circumstances of their lived experiences and environmental contexts (McEwen, 2002). Evidence suggests that these physiological adjustments rarely reverse, even when the stressor is resolved or removed from the environment (Sterling, 2004). Allostatic accommodation, over time, results in biological *wear and tear* of the systems adapting to meet the demands of environmental changes (McEwen, 2000, 2007).

The cost of chronic allostatic accommodation is called *allostatic load* (McEwen, 2000). Once the threat of a stressor has passed, physiological changes that do not revert with the passing of a stressful challenge, can result in negative long-term consequences despite their short-term advantage (Ganzel et al., 2010). For example, under distress, blood pressure increases as to provide more blood to the muscles, heart, and other vital organs. However, chronic levels of high blood pressure result in the thickening of arteriolar smooth muscle amongst other adaptions, so that higher levels of blood pressure can be maintained through vascular resistance (Boulos & Rosenwasser, 2004). Overtime, this can result in the *wear and tear* of the heart. Load can

accumulate from everyday life stressors, distinct events, or sources of chronic strain (Ganzel et al., 2010).

Racial Differences in Maternal Role Strain

Previous empirical analyses have examined the impact of multiple roles (e.g., mother, caregiver, wife, careerwoman) on stress outcomes (Hochschild & Machung, 2003; Lanza di Scalea et al., 2012; Nomaguchi & Brown, 2011; Nomaguchi & Milkie, 2003; Perrig-Chiello et al., 2008; Plaisier, Beekman, et al., 2008; Plaisier, de Bruijn, et al., 2008; Reid & Hardy, 1999; Williford et al., 2007), but few have examined the impact of maternal role strain in mothers at midlife (Lanza di Scalea et al., 2012). Lanza et al. (2012) conducted a cross-sectional study of women at midlife, examining their multiple roles, role stress and role reward and their association with the outcomes of depression and social functioning. Authors find that caregiving was associated with greater risk for reporting depression and low social functioning. We improve upon this study by examining the data at multiple time points, using repeated measures to provide more insight into these relationships, as we increase statistical power (Lanza di Scalea et al., 2012), and expand our investigation out from just psychological implications (i.e., Chapter 2) to speak to physiological consequences.

Black mothers are more likely to have children at younger ages (T. E. Mathews & Hamilton, 2009), have more children (Hummer & Hamilton, 2010), be unmarried (Hummer & Hamilton, 2010), and have lower incomes (Aud et al., 2010) – all factors associated with higher parenting stress (Nomaguchi & House, 2013) that may lead to maternal role strain through the overload of role demands (Goode, 1960). Life circumstances and support structures play a substantial role in a mother's ability to cope with maternal parenting stress (Williford et al., 2007). The accumulation of maternal parenting stress, familial frustrations, economic pressures,

and job-related strain over time may exhaust a mother's capacity to address her role responsibilities, as her time and energy may be depleted (Murry et al., 2008) and cause maternal role strain (Goode, 1960).

Racial Differences in Life Stressors

Here, life stressors refer to stressful life events that occur from daily circumstances (e.g., increased workload, financial strain, or marital problems) to major life events (e.g., death of a parent or child, a new baby or loss of a job) (Almeida, 2005; Lazarus, 2006; Zautra, 2003). Life stressors may be situational (e.g., work-related public speaking) or relevant to a particular role (e.g., wife) (Pearlin, 1989). These stressors can have separate, concurrent, ruminative, immediate, indirect and/or direct effects. These frustrations can result in the gradual overload of emotional and physical functioning (Pearlin, 2010; Thoits, 2010).

Our emotions represent sensitive, adaptive responses to these daily demands, accomplishments, and challenges. Experiences of stress are elicited as a result of being stretched beyond internal capacity to address, mitigate or cope with a particular environmental demand or life stressor (Goode, 1960; Lazarus, 1966; McEwen, 2012). Racial differences in life stressors can be attributed to the experience of racism and racial discrimination, which shapes the environmental surround and experience of social roles for Black and white Americans (Clark et al., 1999; C. J. P. Harrell et al., 2011; S. C. T. Jones et al., 2020). Black Americans are more likely to have fewer resources due to the historical and present distribution of wealth, employment, and educational opportunities and the resulting social patterning of trauma. Overtime, this has generated neighborhood-specific and population-wide experiences of concentrated disadvantage (House & Williams, 2000; Williams & Collins, 2001), leaving Black

Americans more likely to experience stress and stressors, over time, in their everyday life (S. P. Harrell, 2000).

Racial Differences in Social Support

Empirical explorations of social support identify it as a mechanism that aids in the reduction of psychological outcomes while under stress (Black et al., 2005; Taylor, 2011). Social support also operates as a promoter of psychological adjustment to chronically stressful conditions such as racism (Brondolo et al., 2009; Seawell et al., 2014; Thompson, 2006) and motherhood (Cairney et al., 2003). Black Americans are often perceived as having stronger support networks as a response to the limited number of institutional supports available to them, as compared to their white counterparts (Griffin et al., 2006). Black Americans also have roots in collectivist/interdependent cultural practice, where there is a larger emphasis on the importance of close relationships and reflections on self as inherently connected to the whole (Clark et al., 1999; Griffin et al., 2006; C. J. P. Harrell et al., 2011). This is illustrated by the Nigerian Igbo cultural proverb: 'Oran a azu nwa', which means *it takes a community or village to raise a child* and the South African Zulu cultural proverb: 'Ubuntu', which means *I am because we are*. However, Black Americans face more hardships, and therefore may have less capacity to support others (Clark et al., 1999; C. J. P. Harrell et al., 2011).

Even still, Black Americans may be more likely to look to each other as sources of support (Plant & Sachs-Ericsson, 2004) out of a shared sense of empathy for one another. These network ties function as a means to face obstacles resulting from economic strain, political disenfranchisement and racial discrimination, even if one's support network can only offer emotional support (McAdoo, 2002). Consistent with this, empirical evidence suggests Black Americans have more supportive family and social networks (McAdoo, 2002) and tend to have

larger household sizes, with extended family members (Domínguez & Watkins, 2003; Gerstel, 2011; Sarkisian & Gerstel, 2004). However, Black Americans' networks may be less likely to provide instrumental and informational support which may be vital to reduce stress burdens, as these sources of support are more tangible and problem solving-focused (McAdoo, 2002; Plant & Sachs-Ericsson, 2004).

Study Purpose

The purpose of the current study is to examine biological stress indicators/reactions among Black and white mothers who are experiencing maternal role strain. This study seeks to better understand the implications of maternal role strain on allostatic load. A conceptual model of this study's theoretical underpinning and conceptual framing can be found at the end of this chapter. We hypothesized that (1) Black mothers at midlife would have higher allostatic load scores as compared to their white counterparts and (2) maternal role strain at midlife would be significantly positively associated with allostatic load scores at midlife. We hypothesized that (3) the detrimental effect of life events on allostatic load scores at midlife will exacerbate the detrimental effect of maternal role strain on allostatic load scores at midlife, as outlined by the literature (Guidi et al., 2021; Pearlin, 2010; Thoits, 2010). Relatedly, we hypothesized that (4) the protective effect of social support on allostatic load scores at midlife will reduce the detrimental effect of maternal role strain on allostatic load scores at midlife, as outlined by the literature (Heaney & Israel, 2008; Taylor, 2011).

Methods

Data Source

This study used data from the Study of Women Across the Nation (SWAN) cohort. SWAN is a large, multi-site, multi-ethnic longitudinal study focused on the health of women

during at midlife middle age to address knowledge deficits about the menopausal transition and its effects on age-related chronic disease. Its purpose was to examine the physical, biological, psychological, and social changes experienced by women across the life course. Eligibility criteria for the cohort study was as follows: (1) between 42-52 years of age, (2) the presence of at least one ovary and an intact uterus, (3) not currently using exogenous hormones, (4) experience of at least one menstrual period in the past 3 months, and (5) self-identification with a site's designated racial/ethnic group. Black women were recruit at the Boston, MA, Chicago, IL, Detroit, MI, Pittsburgh, PA locations along with white women. Chinese women were recruited at the Oakland, CA location, Japanese women were recruited at the Los Angeles, CA location and Hispanic women were recruited at the Newark, NJ location (Sowers et al., 2000). Of the 3,306 that were recruited into the longitudinal cohort (Sowers et al., 2000), 2,870 (or approximately 87% of the original sample) completed the first full review.

Sample

Eligibility for this analysis required that women be Black or white mothers and that they participated in follow up visit 1. Baseline data was collected from 1996 – 1997 with approximate annual follow up visits. The data presented in this study are from follow-up visit 1 and follow-up visits 3 through visit 6. Follow-up visit 6 occurred from 2002-2004. The analytic sample included 1,363 participants, 678 Black mothers and 685 white mothers, who had complete data for the maternal role strain measure at follow-up visit 1. This analysis uses information from baseline through to follow up visit 6 to evaluate maternal role strain and depressive symptoms among Black and white mothers.

Measures

Allostatic Load Score. The composite allostatic load score is based on the Seeman and colleagues (1997) algorithm, which has been utilized widely in the literature and by SWAN researchers (Chyu & Upchurch, 2018; Upchurch et al., 2015). Biomarkers were selected because of their representation of multiple physiological systems salient to disease risk. This composite draws on cardiovascular, metabolic, inflammatory, and neuroendocrine markers. The eleven biomarkers used were: systolic blood pressure, diastolic blood pressure, total cholesterol, high-density lipoprotein cholesterol, triglycerides, body mass index, waist-to-hip ratio, fasting serum glucose, C-reactive protein and fibrinogen, and dehydroepiandrosterone sulfate. Load scores were calculated using high-risk cutoff values based on the highest risk quartile within the baseline distribution – 75th percentile for all biomarkers except for HDL and DHEA-S. HDL and DHEA-S used the 25th quartile to define high risk. Allostatic load scores are derived from a count-based summation wherein each biomarker in the high-risk quartiles is summed (Upchurch et al., 2015).

Blood was draw annually at each follow up visit beginning at baseline. Blood was drawn, typically, on a day that fell between day 2 and day 5 of the follicular phase of a woman's menstrual cycle, and after a 12 hour fast, usually before 10 am. The assay that was used for the SWAN study was the DPC Coat-A Count Insulin. The assay was provided by the Diagnostic Products Corporation, located in Los Angeles, CA (*Standard Wording*, 2002).

Maternal Role Strain. Maternal role strain was measured using an adaption of the Multiple Roles Questionnaire (Stephens et al., 1994). Participants were asked to indicate their status of mother with a yes/no response to: "Do you have any children or stepchildren?" Participants then reported on the degree of stress associated with this role by responding to the

following: “How stressful is your role as a mother?” Response options ranged from 1 (not at all) to 5 (extremely) (Lanza di Scalea et al., 2012; Stephens et al., 1994).

Life Events. The composite life event score is calculated by adding up all possible life events. These life events are adapted from the Psychiatric Epidemiology Research Interview (PERI) scale (Dohrenwend et al., 1978) to include elements more relevant to women in the parent study. The life events scale included 34 possible events at baseline, 20 questions for follow-up visits 1- 3 and then shortened further to 18 items for follow up visits after visit 4. The composite score was a count based the number of “very upsetting”/stressful life events that participants reported that they had had (Dohrenwend et al., 1978). There were no missing items as life events are a composite built from responses to life events deemed ‘very upsetting’ only.

Social Support. Social support was measured using four items selected from the 20-item Medical Outcomes Study Support Survey (MOS) that assesses instrumental and emotional support. Participants were asked how often each of the four types of support were available to them, with 5-level response choices ranging from “none of the time” to “all of the time”. The individual questions were rescaled from 0 to 4 and summed. Possible scores range from 0 to 16 for the most social support (Sherbourne & Stewart, 1991). Across the 6 waves of follow-up there were a total of 287 missing responses which represented 2.71% of respondents. At baseline, there were 2 missing responses representing 0.12% and at follow-up visit 1, there were 9 missing responses representing 0.66%.

Sociodemographic variables. Sociodemographic variables were chosen given their previously documented associations with depression and life events in SWAN (Chyu & Upchurch, 2018; Lanza di Scalea et al., 2012; Upchurch et al., 2015). The following variables were controlled for in analyses: mother’s age, site, marital status, education, children, and

vasomotor symptoms. ***Mother's age*** reflected participant age, calculated by subtracting year of birth reported at baseline from the year of data collection. Across the 6 waves of follow-up there were a total of 45 missing responses which represented 0.43% of respondents. At baseline, there was 1 missing response representing 0.06%, and at follow-up visit 1 there were 9 missing responses, representing 0.66%. ***Site*** references the site at which participants had their data collected. There were no missing responses. ***Marital status*** was measured at baseline and marital status was carried forward to subsequent visits. Across the 6 waves of follow-up there were a total of 73 missing responses which represented 0.69% of respondents. At baseline, there were 14 missing responses representing 0.87%, and at follow-up visit 1, there were 10 missing responses, representing 0.73%.

Education was also observed at baseline and carried forward, unchanged, through subsequent follow up visits. Across the 6 waves of follow-up there were a total of 83 missing responses which represented 0.78% of respondents. At baseline, there were 13 missing responses representing 0.81% and at follow-up visit 1 there were 12 missing responses representing 0.88%. Number of ***children*** were assessed as a continuous measure; however, this variable was dichotomized in this study (4 or less children and 5 or more children). Across the 6 waves of follow-up there were a total of 12 missing responses which represented 0.09% of respondents. At baseline, there were 2 missing responses, representing 0.10% and at follow-up visit 1 there was 1 missing response, representing 0.12%. ***Vasomotor symptoms*** were assessed by asking participants the frequency of which they had hot flashes or night sweats in the past two weeks. Frequency was determined by response values ranging from 1 (not at all) to 5 (daily). Across the 6 waves of follow-up there were a total of 400 missing responses which represented 3.78% of

respondents. At baseline, there were 12 missing responses representing 0.75% and at follow-up visit 1 there were 20 missing responses representing 1.47%.

Missing data. All variables were assessed for missingness. For categorical variables, marital status, education, children, we filled missing data with the sample mode for each variable at each follow-up visit. For continuous variables, mother's age, social support, and life events, we filled missing data with the sample mode for each variable at each follow-up visit (Sinharay et al., 2001; Zhang, 2016).

Data Analysis

Exploratory data analyses were conducted with all study variables. Variable frequencies were examined and graphed to observe distributions. We then conducted a series of t-tests and chi-squared analyses to identify whether there were significant statistical differences between Black and white mothers. These findings are located in Table 3. The distribution of allostatic load scores, maternal role strain, social support, life events and potential confounders. A series of models of repeated measures linear regressions with fixed effects were constructed to examine associations between all sociodemographic covariates, maternal role strain, life events, social support, with allostatic load. These findings are located in Table 4. All regression analyses mechanistically control for site, with multiple linear regression interactions by race. All statistical analyses were conducted in STATA version 17.

Repeated Measures Analysis

A repeated measures analysis design is one in which measurements are made at multiple time-points or under different conditions. These repeated assessments occur serially. In SWAN they are measured annually. At its simplest, repeated measures can be thought of as an extension of a paired t-test that involves at least 3 or more assessments within the same unit. At its most

complex, repeated measures can handle both, within-participant components and between-participant components on multiple factors. Repeated measure analyses can be used to assess changes over time, but also to test for differences in 1 or more assessment outcomes on the same participants. Here we use repeated measures analysis for this latter objective (Sullivan, 2008). The advantages of this design are that: (1) participants act as their own control so experimental error is reduced; (2) this design is more efficient in drawing comparisons as compared to independent measure designs because part of the variability in the assessment measure is explained by the participants, thereby reducing experimental error and greater statistical power; (3) as there is greater statistical lower in a repeated measures design, fewer participants are needed to detect effect size; and (4) these analyses are more sensitive as they allow researchers to measure how the assessment measure impacted each participant individually (Singh et al., 2013; Verma, 2015).

Results

Sample Characteristics

Table 1 describes the sociodemographic characteristics for the total sample and by race at follow up visit 1. Participants ranged in age from 42.8 years of age to 54 years of age at with a mean of 47 years of age. Most of the participants (65%) were married or living as if married. A little over a third had more than a high school education. Almost all the participants had four or less children and 17% experienced vasomotor symptoms on six days or more a month. About a third of participants rated the strain of being a mother as somewhat stressful. Participants reported an average of 1.17 life events, ranging from 0 to 11 events. The mean social support score was 12.67 (SD = 3.06). Allostatic load scores averaged 2.67 out of a possible 10. About 12% of the sample reported feeling ‘not at all’ strained by their role as a mother compared to

34.48% who reported feeling ‘somewhat’ strained and 8% who reported feeling ‘extremely’ strained.

Sample Characteristics by Race

Black and white mothers were both an average of 50 years old. White mothers were more likely to be currently married or living as if married, as 81% of white mothers were currently married or living as if married, whereas approximately only 50% of Black mothers were married or living as if married. Both Black and white mothers were most likely to report their education attainment as ‘more than high school. Black mothers were more likely to have five or more children, experience six or more days of vasomotor symptoms and have higher allostatic load scores. Black mothers were more likely to report feeling ‘not at all’ strained by their role as a mother and ‘extremely’ strained by their role as a mother. White mothers were more likely to report feeling ‘a little’, ‘somewhat’, or ‘quite a bit’ strained by their role as a mother. We control for these differences.

Allostatic Load Score, Maternal Role Strain, Social Support and Life Events

Next, I conducted a series of linear regressions. Model 1 represents maternal role strain predicting allostatic load, controlling for site. Here, only ‘somewhat’ for maternal role strain is significant (*b*= -0.18, SE= 0.07, p= 0.01) Model 2 represents maternal role strain and race predicting allostatic load, controlling for site. Relatedly, ‘somewhat’ is still significant (*b*= -0.15, SE= 0.07, p= 0.03), and race is a strong predictor (*b*= 0.56, SE= 0.08, p= 0.00). Model 3 represents maternal role strain, race, and the interaction between maternal role strain and Black on allostatic load, controlling for site. Race maintains its significance (*b*= 0.55, SE= 0.14, p=

0.00). However, the interaction is not significant suggesting that the effect of maternal role strain on allostatic load is similar for Black and white women. This model is not presented in Table 4.

Model 4 represents maternal role strain and race predicting allostatic load, controlling for site and age, marital status, children, education, and vasomotor symptoms: night sweats and hot flashes, hereafter referred to covariates. Race is still significant (*b*= 0.40, SE= 0.08, p= 0.00). Model 5a includes maternal role strain, race, and an interaction between maternal role strain and life events predicting allostatic load, controlling for site and covariates. Model 5b includes maternal role strain, race, and an interaction between maternal role strain and social support predicting allostatic load, controlling for site and covariates. While allostatic maintains its significance in both models, neither of the interaction terms are significant. Additionally, there is no main effect of life events or social support, when including the interaction. As such, a truncated table that does not include Model 5a or 5b is presented in Table 4. Model 6 includes life events and social support without an interaction with maternal role strain and social support is significant (*b*= -0.02, SE= 0.00, p= 0.01). Here, social support decreases the likelihood of a higher allostatic load score.

Discussion

This study provides key evidence in understanding the interaction between race, maternal role strain and allostatic load among mothers at midlife. While maternal role strain was not significantly associated with allostatic load, racial differences were highly significant in every model. We also find support for the protective nature of social support on allostatic load. A distinctive contribution of this work is that it contributes to the conversation centering on maternal role strain and allostasis and allostatic load (McEwen & Wingfield, 2007). Previous work has highlighted the process of allostatic load as a model for understanding women's health.

Drawing inferences from the allostatic adaption process that precedes allostatic load and the inflammation that occurs as part of the response of perceptions of threat; Groër (2010) relates the unique stressors related to womanhood (e.g., gender, social status, role, and development), gender-specific responses to stress, and gender-specific coping processes, with primary mediators of this processes.

Authors compare the everyday stressors embedded into the lived experiences that accompany womanhood with the processes that pushes the body into allostatic load and overload (e.g., repeated experiences of *fight or flight* or the overload of stress or strain in one's life). For example, women contend frequently with threats to their physical and sociopolitical safety and often carry heavier emotional and caregiving burdens than men, which can initiate the stress response (Groër, 2010). This work contributes to this dialogue by moving from theoretic inferences to testing. While not significant, once accounting for covariates, the relationship is generally positive with increases in maternal role strain yielding increases in allostatic load scores.

As expected, Black mothers had higher allostatic load scores. In studies drawing on participants at midlife, researchers frequently find higher allostatic load scores among Black participants as compared to their white counterparts (Chyu & Upchurch, 2011; Duru et al., 2012; Tobin et al., 2021; Tomfohr et al., 2016). There is less literature specifically examining motherhood and few highlighting mothers at midlife. Much of the evidence is centered on postpartum mothers or those experiencing psychological distress. This work provides further evidentiary support of this pattern. Aligned with our hypotheses, the unique circumstances at midlife, that call for greater caregiving and emotional support responsibilities for mothers, may

play a role in the experience of higher allostatic load scores. Our work represents important steps in more clearly understanding this relationship.

Although there were no significant interactive effects, social support was highly significant as a main effect. Here, social support represented a protective factor against higher allostatic load scores. This finding nestles well into extant evidence (Wiley et al., 2017). In a systematic review, Wiley et a. (2017) finds that in those studies using repeated measures analyses or who had larger sample sizes, authors were more likely to report significant relationships between social support and allostatic load. Contrary to our expectations, life events were not significant, although existing evidence suggests others. For example, seminal authors on allostatic load, McEwen and Seeman (1999), report that the impacts of impactful negative life events or the cumulative *wear and tea*r of negative life events over the life course are detrimental to allostatic load.

Limitations

Although the current study provides valuable insights, there are some limitations worth noting. The first is that the measure for role strain is based on a single response item. Recall that participants are asked how stressful their role as a mother is and then asked to respond to a 5-category Likert scale going from ‘not at all’ to ‘extremely’. While shorter instruments tend to have a lower response burden on the participant and allow for an ease of interpretation, in this case, it is at the expense of detail (Bowling, 2005). While single item measures may be adequate for one-dimensional constructs, it is likely that motherhood stress is multidimensional (Mclver & Carmines, 1981). Second, we did not consider all the previously identified variables associated with allostatic load and stress, such as neighborhood quality, cognitive or physical functioning or adverse childhood experiences (Guidi et al., 2021). We also did not examine role combinations

or racial discrimination. For instance, motherhood strain in combination with spousal strain, caregiving strain or work-related strain and including a measure of racial discrimination to further get at nuances potentially underlying race-related differences.

Future studies could expand on this work by utilizing a longitudinal analysis design rather than relying on repeated measures strategies. Future studies could also integrate measures with more depth, such as with maternal role strain. More stress could also be given to the midlife experience by including measures that seek to better understand the state of motherhood at midlife. More specifically, including a larger age range of women and asking about the types of emotional and caregiving demands of their children and of their parents and what being at the nexus of those two entities feels like at different age categories, so that consideration could be given to the changing landscape of responsibility and the stress unique to midlife. Similarly, exploration of the changing internal landscape facing mothers at midlife in regards to how they view themselves and their perceptions on their mothering as this internal appraisal may also impact the experience of maternal role strain and allostatic load.

Despite the identified limitations, this study has numerous strengths. First, we draw our sample from a large, multi-site longitudinal cohort which gives strength to its external validity and to its overall statistical power (Carlson & Morrison, 2009). This design also allows understandings around motherhood stress in this sample at multiple timepoints beginning at midlife. We also included midlife specific factors – the presence of vasomotor symptoms – in our analyses along with sociodemographic covariates that have been previously associated with role strain. Finally, we improve upon prior examinations of role strain to assess stress through both a self-rated and a biological measure and we consider differences in allostatic load, life

events and social support (Lanza di Scalea et al., 2012; Plaisier, Beekman, et al., 2008; Plaisier, de Bruijn, et al., 2008; Reid & Hardy, 1999).

Conclusion

Understanding how race shapes women's experience of role strain and some of its associated factors, allostatic load, life events and social support, is important. Given the rising age of the US population, there will continue to be an increased focus on midlife and how to best meet the needs of aging adults with children. Here, we find that allostatic load has a strong association with race, with Black mothers experiencing significantly higher allostatic load scores than white mothers. Social support was found to be a significant factor in dampening the overall impact of maternal role strain on allostatic load scores. Thus, we might recommend that interventions aimed at reducing stress and allostatic load scores among Black mothers capitalize on their social networks to help mitigate the impact of their stress burdens.

Table 3. Participant Sociodemographic Characteristics and Key Study Variables (N = 1363 mothers)

	Total Sample (*n* = 1,363)				Black (*n* =678)				White (*n* = 685)				
Characteristics	M (SD)	%(N)	Min	Max	M (SD)	%(N)	Min	Max	M (SD)	%(N)	Min	Max	*p*†
Race													
Black		49.74 (678)				49.74 (678)							
White		50.26 (685)								50.26 (685)			
Mother's Age	47.40 (2.65)		42.8	54	47.41 (2.68)		42.8	54	47.39 (2.61)		43	53.9	0.927
Site													**<0.001**
11.Detroit, MI		28.10 (383)				34.51 (234)				21.75 (149)			
12: Boston, MA		19.88 (271)				19.62 (133)				20.15 (138)			
13: Chicago, IL		26.56 (362)				28.76 (195)				24.38 (167)			
17: Pittsburgh, PA		25.46 (347)				17.11 (116)				33.72 (231)			
Marital Status													**<0.001**
Currently Married or Living as if Married		65.30 (890)				49.41 (335)				81.02 (555)			
Single, Never Married		10.12 (138)				17.55 (119)				2.77 (10)			
Post-Married: Separated, Divorced or Widowed		24.58 (335)				33.04 (224)				16.20 (111)			
Education													**<0.001**
Less than High School		3.30 (45)				4.72 (32)				1.90 (13)			
High School Diploma		19.30 (263)				20.94 (142)				17.66 (121)			
More than High School		36.98 (504)				41.59 (282)				32.41 (222)			
College		18.27 (249)				16.52 (112)				20.00 (137)			
Post-College		22.16 (302)				16.22 (110)				28.03 (192)			
Children													**<0.050**
4 or less		94.57 (1,289)				93.07 (631)				96.06 (658)			

		5.43			6.93				3.94				
5 or more		(74)			(47)				(27)				
Vasomotor Symptoms													**<0.001**
		83.57			78.91				88.18				
5 or Less Symptoms		(1,139)			(535)				(604)				
		16.43			21.09				11.82				
6 or more Symptoms		(224)			(143)				(81)				
Key Outcome Variables of Interest													
Role Strain													**<0.001**
		12.03			16.67				7.45				
Not at all		(164)			(113)				(51)				
		27.66			25.22				30.07				
A little		(377)			(171)				(206)				
		34.48			32.01				36.93				
Somewhat		(470)			(217)				(253)				
		17.83			17.11				18.54				
Quite a bit		(243)			(116)				(127)				
		8.00			9.00				7.01				
Extremely		(109)			(61)				(48)				
	2.82				2.76				2.87				
Role Strain Score	(1.10)		1	5	(1.18)		1	5	(1.02)		1	5	0.065
	2.67				3.13				2.23				
Allostatic Load	(2.15)		0	10	(2.07)		0	9	(2.13)		0	10	0.341
	1.17				1.22				1.13				
Life Events	(1.63)		0	11	(1.70)		0	11	(1.55)		0	11	0.118
	12.67				12.54				12.80				
Social Support	(3.06)		0	16	(3.14)				(2.98)		0	16	0.059

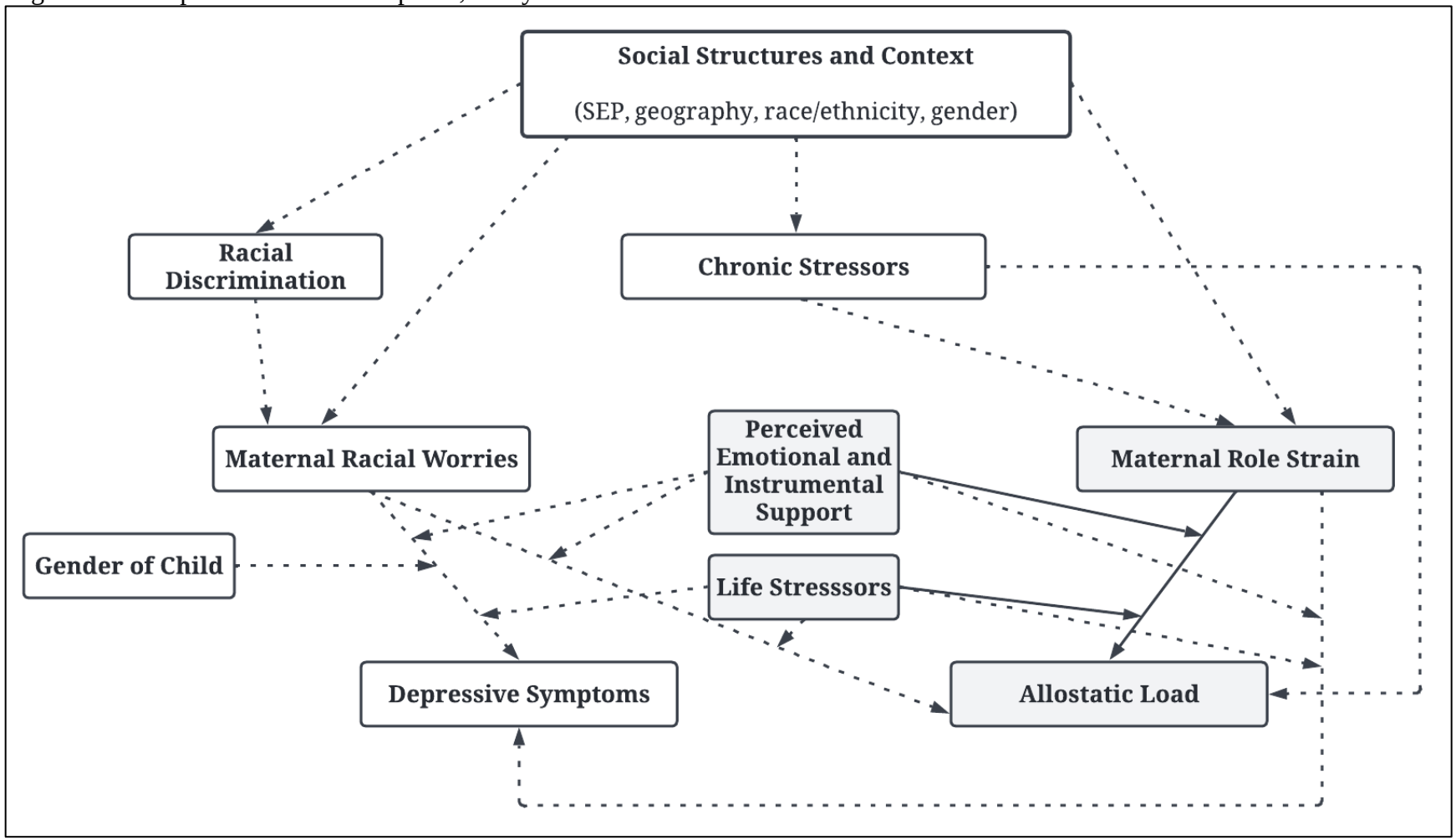
*Note: Race includes black and white women, where Black=1 and White=0. Adjusted models control for age, site, marital status, children, education, and vasomotor symptoms

Table 4. Adjusted linear regression models of allostatic load as a function of race, role strain, social support, and life events

	Model 1		Model 2		Model 4		Model 6	
Characteristics	*b* (SE)	*p* value	*b* (SE)	*p* value	*b* (SE)	*p* value	*b* (SE)	*p* value
Black			0.56 (.08)	**<0.001**	0.40 (.08)	**<0.001**	0.42 (.08)	**<0.001**
Role Strain								
Not at all	(base outcome)		(base outcome)		(base outcome)		(base outcome)	
A little	0.00 (.06)	0.895	0.03 (.06)	0.569	0.05 (.06)	0.398	0.04 (.06)	0.475
Somewhat	-0.18 (.07)	**<0.050**	-0.15 (.07)	**0.039**	0.00 (.07)	0.914	-0.01 (.07)	0.886
Quite a bit	-0.14 (.08)	0.079	-0.10 (.08)	0.189	0.07 (.08)	0.351	0.04 (.08)	0.607
Extremely	-0.05 (.10)	0.573	-0.02 (.10)	0.782	0.18 (.10)	0.075	0.14 (.10)	0.171
Life Events							0.02 (.01)	0.098
Social Support							-0.02 (.00)	**<0.050**

*Note: Race includes black and white women, where Black=1 and White=0. Adjusted models control for age, site, marital status, children, education, and vasomotor symptoms

Figure 3. Conceptual Model for Chapter 3, Study 2



Chapter 4
Examination of Maternal Racial Worries and Racial Discrimination on Maternal Mental Health Among Black Mothers

It was the Lord who knew of the impossibility every parent in that room faced: how to prepare the child for the day when the child would be despised and how to create in the child – by what means? – a stronger antidote to this poison than one had found for oneself.
— James Baldwin, Native Son, p. 106

Abstract

Background: For Black mothers, the influence of racism plays an indelible role in mothering. The sociocultural, political, and environmental landscapes that Black mothers navigate, while rearing their children, are marked by the legacy of racism in America. Racism greatly influences Black mothers' perception of their social realities and as such, their perceptions affect childrearing, the strategies they employ to navigate motherhood, and their tactics to combat the racialized stereotypes of Black children. The chronic stress associated with the anticipation of or experience with a racially charged event in real time has been associated with psychological distress and the experience of depressive symptoms. **Methods:** This study uses a series of linear regressions to examine the influence of maternal racial worries on the likelihood of experiencing severe depressive symptoms and the extent to which this association is greater for mothers with male children. Data were drawn from the Racial Socialization Competency (RaSC) study, which surveyed a sample of mothers who identified as Black or African American. **Results:** As hypothesized, a higher level of maternal racial worries is associated with greater odds of experiencing severe depressive symptoms for Black mothers, independent of their own individual experiences of racial discrimination. Contrary to expectations, the association between

maternal racial worries and severe depressive symptoms was similar for Black mothers with a male or female eldest child. **Conclusion:** Maternal racial worries present as a significant threat towards the development of severe depressive symptoms for Black mothers.

Introduction

Encounters with racism can have direct and indirect psychological consequences for Black women. A large body of research establishes the psychological ramifications of exclusion from and discrimination within economic, social, and educational structures in America (Williams, 2018). Similarly, robust, empirical examinations of everyday racism detail the consequences of daily interactions in a society where racism is persistent and insidious (Cross Jr & Frost, 2016). The chronic stress associated with racial discrimination has been associated with psychological distress and the development of mental disorders (Barnes & Lightsey, 2005), lowered self-esteem (Brondolo et al., 2011; Mwendwa et al., 2011), and lower levels of life satisfaction (Brosschot et al., 2006; Carter & Forsyth, 2010; Hicken et al., 2013, 2018; T. T. Lewis et al., 2019).

Black American women, as compared to other American women, have disproportionately higher rates of stress-related diseases. Chronic stress due to racism has been attributed to the disparate development of these disorders, independent of other life stressors (Brosschot et al., 2006; C. J. P. Harrell et al., 2011; Peacock & Wong, 1990). It is theorized that given the omnipresence of racism, Black Americans are required to live in a state of sustained vigilance and worry (L. M. West et al., 2010). Researchers find clinical reactions to racism to be anxiety, guilt/shame, and hypervigilance (Davis et al., 2011; J. A. Lewis et al., 2017; Moody & Lewis, 2019). Although empirical evidence sheds light on racism's physiological implications and biological mechanistic consequences, it focuses more broadly on the Black community, whereas the influences of gender and motherhood, as a literature focus, are still growing in depth (Tallis & Eysenck, 1994). Much of the work is centered on racial socialization practices towards children rather than concentrated on the implications of a mother's worry and her mental health.

To be understood, the experiences of Black mothers must be contextualized in the larger sociohistorical landscape, wherein the persistence of racism is recognized as a force that requires continued navigation of ongoing oppressive cultural and structural factors (Collins, 2005; Dow, 2016, 2019). Black mothers operate in a social context framed by the intersectionality of race, class and gender while contending with societal perceptions of their motherhood. Black mothers face distinct social and psychosocial stressors as a direct result of racism and childrearing in a racially hostile environment (Collins, 1987, 1994, 2005).

Black Motherhood and the Role of Racial Stress

For Black mothers, the implication of race on motherhood is the added burden of racial stress to their mothering stress – operating not only as it relates to themselves but extending outwardly, to their children. Racial stress that emerges from everyday encounters with racism, whether through direct interaction or through vicarious exposure by way of contact with systematic/institutional mechanisms of structural racism, can initiate what Pearlin and colleagues (1989) refer to as the stress proliferation process (Forrest-Bank & Jenson, 2015; S. P. Harrell, 2000). Stress proliferation is the process by which an initial stressor can exacerbate other stressors and their effect bleeds into other domains in one's life. The omnipresent nature of racism sustains living and working conditions that create differential exposure to social, political, and economic stressors for Black people (e.g., neighborhood conditions and financial stress) (Forrest-Bank & Jenson, 2015; Pearlin, 1989; Williams, 2018).

The racial meaning of motherhood for Black women, can be understood, in part, as the eternal practice of fortifying oneself against the ways in which racism disadvantages and devalues their womanhood and mothering (Hayes & Casstevens, 2017). The adaptive strength by which Black women have to approach their lives also extends to their mothering. The enduring

presence of and engagement with racism is an inheritable legacy for Black children (Greene, 1990). The anticipation and communication of this lived reality to one's children must too, then be an omnipresent worry to accompany the acknowledgment of racism's perennial significance.

Growing evidence documents the additional cognitive labor undertaken by Black people in anticipation of exposure to a racially stressful event (Brosschot et al., 2006; Hicken et al., 2013). Distress from racism occurs not only with the onset of an encounter but also beforehand given the threat of exposure and after when recalling the experience. When encountering or recalling racially stressful events, the weight of the experience or its retelling, potentially place those impacted in the challenging position of explaining situational significance, while concurrently dealing with its implications for physical and/or emotional wellbeing. Having to defend one's perception from accusations of paranoia or oversensitivity can lead to a significant amount of stress. Replaying and repeatedly describing an event, to identify and explain perceived or explicit racial undertones, in order to combat the possible resistance of others to validating the actuality of the encounter, can be especially distressing (Essed, 1991; S. P. Harrell, 2000; Paradies et al., 2015; Pierce, 1995).

Further, racism presents a unique challenge, in regard to an individual's perception of control. Racial events can make people feel they lack control of their own environment, as an experience may occur unexpectedly, and that they will not be able to feasibly remedy their situation given power dynamics (e.g., being alone or facing racist actors in positions of power, such as police officers or store owners) (S. P. Harrell, 2000; Paradies et al., 2015). As a response to chronic encounters with racism, Black people engage in racism-related vigilance in order to mentally prepare for the possibility of exposure to racially stressful events (Clark et al., 2006).

This process has long been documented empirically, including studies that date back over 100 years (DuBois, 1899; Feagin & Sikes, 1994).

Worry and Vigilance in Context of Black Mothering

Worry is a response to impending stressful events. It is the act of negatively ruminating on a chain of thoughts and/or images in an attempt to engage in mental problem solving on an uncertain outcome that has a strong likelihood of being deleterious (Brosschot et al., 2006; C. J. P. Harrell et al., 2011; Tallis & Eysenck, 1994). Worry serves as an alarm function in order to direct cognitive resources toward issues of immediate consequence. This *prompting* function is believed to maintain awareness of potentially threatening circumstances and cognitively prepare an individual for the anticipating threat, in order to prep oneself for an impending situation in which significant motor function may be needed (i.e., fight or flight) (Clark et al., 2006; Lazarus, 1991). Acting on instincts to fight or flee is rare. Given this, the individual is left in a sustained state of psychophysiological *action preparation.* Researchers have determined that operating in this prolonged state has consequences for physiological function and dysfunction (Feagin, 1991).

Extant evidence has documented experiences of racial discrimination and their impact on rumination for Black mothers. As part of an exploratory study to understand the complexity of childbearing for Black women, Nuru-Jeter et al (2009) reported reflections of Black women as it relates to racial discrimination and how they prepare for it (Nuru-Jeter et al., 2009). One Black woman described the visceral reactions she experiences – feeling tense, increased heart rate, oscillating between sadness and anger, holding back tears – noting that she must prepare her body for, not if, but when, she's met with some level of racist conversation (Nuru-Jeter et al., 2009).

This racism-related vigilance or worry operates as a prompt for individuals to prime themselves to prepare for potentially malignant, racially discriminatory experiences. The action operating almost like a figurative *shield* against racial stimuli regardless of whether something occurs (Bailey-Fakhoury & Mitchell, 2018). For Black mothers, this may be especially stressful. Not only are they contending with worries about their own everyday experiences, but they are concerned with the survival and safety of their children. They worry their children will be met with many or more of the same discriminatory situations they have experienced; without support and strategies to mitigate their effect (Collins, 2005).

For Black mothers, racism plays an indelible role in mothering (Collins, 1994). The sociocultural, political, and environmental landscapes that Black mothers navigate while rearing their children are greatly marked by the legacy of racism in America. Racism greatly influences Black mothers' perception of their social realities and as such, their perceptions affect childrearing and the strategies they employ to navigate motherhood. Black mothers must undertake the responsibility of helping their children mediate the hostile certainties of their social environments (Collins, 1990, 1994, 2005). Thus, Black mothers engage in a delicate balance of preparation and communication, while instilling pride and confidence in cultural identity; in an effort to offset the negative reflections present in dominant cultural narratives (Neblett et al., 2012). A mother's failure to mitigate these reflections can result in negative consequences for both mother and child (Smith et al., 2007). Nuru-Jeter et al (2009) highlights this, a mother reflects, "But you have kids coming home every day, oh he called me a nigger or black. That affects you as a parent... I go through the hurt when they go through the hurt." (Nuru-Jeter et al, 2008 p.33).

The Practice of Racial Socialization

For Black mothers, racism-related vigilance can most overtly be recognized in the practice of racial socialization. Racial socialization is the process of teaching children about their race. In Black families this looks like the sharing of messages about the meaning of their race, the existence of racism, what to do when facing racial discrimination and how to navigate the world as a Black person in a landscape patterned by white supremist thought and behavior. Generally, this looks like direct and explicit messages about how the world sees them and how to effectively cope with inevitable racial discrimination. Parents teach their children to have a positive sense of self and sense of their community, in an attempt to battle the negative messages in the sociohistorical and political landscape in which they exist. This includes exposure to Black sociocultural practices, behaviors, perceptions, values, and attitudes (Bentley et al., 2008).

In a study of the implications of the Trayvon Martin shooting, Thomas et al. (2015) found that Black parents' fears were ignited by the shooting and spurred race-related conversations focusing on strategies to deal with racism, racial profiling, race-related violence, and racial discrimination. The authors' intent was to examine whether parents were concerned enough by the public shooting of Trayvon Martin that they were catalyzed to act, spurred on by their own worry as a form of racism-related vigilance. Authors specifically ask, "What are you most worried about for your African American child or children since hearing about the Trayvon Martin shooting?". The responses generated by parents mostly reflected concerns about their children's safety and their wearied agitation at the thought that their children would have to endure the same racial discrimination that they have had patterned into their own lived experiences (A. J. Thomas et al., 2015).

An exploration of parental experiences of racism, racial socialization and race-related stress found that there was a strong association between race-related stress and racial

socialization. Thomas et al. (2010) report that those parents that had high levels of race-related stress were more likely to actively share racial socialization messages. Suggesting that these parents may be more likely to engage their children about race out of the belief that they may better *weather* race-related incidents by being prepared (with strategies) for them (A. J. Thomas et al., 2010). While this work highlights the pathway between racial stress and racial socialization, we must consider if there is a feedback loop wherein the practice of racial socialization may also impact the experience of racial stress. Given increased public awareness of police killings through traditional media and social media campaigns, chronic engagement with these images and repeated conversations grounded in the death of these victims may also conjure feelings of racial stress (Bor et al., 2018).

An examination of the spillover effects of police killings highlight the facts that Black Americans are almost three times more likely to be killed by police and five times more likely to be unarmed when killed (Bor et al., 2018). Authors go on to note that while Black Americans account for just 14% of the population, they represent more than 40% of all police killings (Bor et al., 2018). Bor et al. (2018) find that respondents were exposed to an average of at least one unarmed police killing within the last 3 months and an average of at least 4 per year. This resulted in an average of 4 poor mental health days in the month prior to the interview, while 13% of the sample reported frequent experiences with mental distress (Bor et al., 2018). Taken together, these findings suggest that negative race-related stimuli and the initiation of racial socialization may be catalysts of experiences of racial stress as they are unique to Black parenting.

Maternal Racial Worries and Black Motherhood

Black women's experiences with racism and racism-related vigilance or worry were aptly captured by Feagin (1991), in his seminal ethnographic study, on the racial experiences of Black Americans. One interviewee describes racial encounters as, "little murders", that she must endure (Feagin, 1991, p. 108). Another adds that they carry a burden white people don't, in that, they spend so much of their time worrying because, "[they] are not free to ignore it, (Feagin, 1991, p. 114).

Black mothers who participated in a study exploring the impact of everyday racism on Black mothers, highlight one of the more difficult aspects of mothering in a racially hostile environment: communicating to their children about the legacy of racism inherent in the lived experience of Blackness. Hayes and Casstevens (2017) offer the following quotes from Black mothers on the process of teaching their children about the racial discrimination they will undoubtedly encounter: "I think it's not hard to contemplate issues of racism as a woman of color [and] as an African-American woman, and certainly as a mother you look out for your kids; you are trying to protect and at the same time educate them about what this power structure will do to them without stealing their childhood" (Hayes & Casstevens, 2017, p.22). Another mother continued, thinking through the difficulty of the conversation, "...for people of color the limits that people impose upon you are much more restrictive, more painful, more insidious, and more confining, so I don't have a strategy for that yet except to talk about it" (Hayes & Casstevens, 2017, p.21-22).

As children age, they spend more time away from the protection of their parents and their problems become more complex. The issues described by these mothers are an echoed sentiment experienced by Black mothers everywhere; especially, in the context of

mitigating harm and a loss of control in racially stressful situations (F. M. Jackson et al., 2017; Whitaker & Snell, 2016). Unfortunately, there are limited studies of this phenomenon, and the majority of these studies rely on qualitative data.

Racial Stress: Maternal Racial Worries as Motherhood Specific Racism-Related Vigilance

The added burden of racial stress specific to Black motherhood and mothering has been referred to as maternal racial worries by Stevenson and Winn (2019). Maternal racial worries refer to the race-related stressors that linger as worry experienced by mothers that are a direct result of racism (e.g., children being followed around a store, children receiving unjust discipline by police, the court system or in school, children being assaulted with a racial slur). These differ from general parenting stressors, given the nature of racism. For example, maternal racial worries provoke feelings of a lack of control and instill fear that no matter her resources, a mother has no ability to remedy a racially stressful situation because of differential treatment in America, based on her race. Moreover, parenting stressors are commonly dictated by child age and change overtime (e.g., daily hassles like getting a child to an after-school sports practice, children being accepted into high performing schools from kindergarten to college, a child's troublemaking behaviors). The presence of maternal racial worries would not waiver over a mother's life course. This is best illustrated by the murders of Tamir Rice (12 years old), Michael Brown (18 years old) and Eric Garner (44 years old) at the hands of police. All three were taken from their mothers, and assuredly, their deaths represent the greatest worry held broadly by Black mothers in America (Bor et al., 2018). One that ceases to waiver, regardless of age or time.

Racism is stressful. Notably, evidence presented in these studies highlight the accompaniment of physiological reactions as a biopsychological response in the presence of racially stressful encounters, whether directly experienced or vicariously experienced, impacting

a mother through the recounted experience by her child. Maternal racial worries may cause similar experiences of anticipatory stress and subsequent biopsychological responses in Black mothers that racism-related vigilance evokes. Previous research identifies links between experiences of racism and depression (Williams, 2018; Williams et al., 1997; Williams & Mohammed, 2013; Williams & Williams-Morris, 2000). In the current investigation, we examine the notion that for Black mothers, racism-related vigilance manifests itself in the mothering process through maternal racial worries for their children and that those worries have psychological implications for maternal depressive symptoms.

The Impact of a Child's Gender

Few studies have also considered whether Black mothers may be more vigilant when it comes to their male children (Joe et al., 2019). Socialization literature indicates Black boys receive more messages about racial barriers and vigilance to discrimination than do girls from their parents (Hall et al., 2016; Nellis, 2016; Nowicki, 2018). The American social landscape largely paints Black males as violent, aggressive, and anti-intellectual (Nellis, 2016). Black male stereotypes and the consequent hyper-surveillance and control efforts that are generated because of them, may be an additive stressor for mothers of Black boys. We know that Black boys are most likely to be suspended and referred to law enforcement in disciplinary actions at school; young Black males are 21 times more likely to be killed by police than their White counterparts; and, in eleven states, at least 1 in 20 Black adult males are imprisoned (Bryan et al., 2014).

Thomas et al. (2015) report on the influence of Trayvon Martin shootings on racial socialization practices. Roughly 87% of parents indicated that they used different messages for their sons and daughters, reporting heightened concerns for their sons. Parents felt that their sons were more at risk for racism-related targeting and threat from negative stereotyping. In

particular, the belief that their sons might be viewed as criminals, gang members or thugs and that these viewpoints would elicit fear in those around them (A. J. Thomas et al., 2015). These findings suggest that parents are aware of the pervasive belief that Black males, regardless of age, are inherently criminal and have a propensity for violence, and that that shapes their parenting practices and their worries for their children.

Todd et al. (2016) confirmed these fears, as authors find that racial bias was present for adults and children, as young as 5, in a study of faces and participant categorization of threatening stimuli. In a series of experiments, authors tested whether white participants, after being shown pictures of Black and white male faces, that they would be primed enough to perceive the presentation of objects and words shown directly after Black males as compared to white males, as threatening. Todd et al. (2016) found that when asked to (1) categorize weapons and non-weapons or (2) categorize words as threatening or safe, after seeing Black faces, participants were most likely to perceive the categorization object or word as threatening regardless of if it was threatening. Specifically, that participants reported seeing a gun where there was none and misidentifying the following words as threatening: innocent, harmless, friendly, trustworthy, peaceful, and safe. Further, that these categorizations were a result of unintentional racial bias (Todd et al., 2016). Thus, we hypothesize that the positive associations between racism and maternal racial worries on depressive symptoms are greater for mothers with a male child.

Study Purpose

The purpose of this study is to examine the role of racial discrimination and maternal racial worries on depressive symptoms. The aims are fourfold. First, we examined the role of racial discrimination on maternal racial worries. The relationship between the two concepts,

while supported by a few empirically similar examinations (J. A. Lewis et al., 2017; Moradi & Subich, 2004; A. J. Thomas et al., 2008), are largely absent in the quantitative literature, given maternal racial worries as a concept has only recently emerged. Second, we investigated the role of racial discrimination on depressive symptoms, thereby confirming that the work of previous findings looking at Black Americans more broadly does translate the association between racial discrimination and depressive symptoms.

We hypothesized that Black mothers experiencing higher levels of racial discrimination will report greater depressive symptoms than Black mothers experiencing lower levels of racial discrimination. Third, we analyzed the role of maternal racial worries on depressive symptoms, thereby identifying whether the impact on depressive symptoms held similar directionality and influence as racism-related vigilance, the conceptual counterpart as put forth by this author and others (J. A. Lewis et al., 2017; Moradi & Subich, 2004; A. J. Thomas et al., 2008). Finally, we explored the extent to which the associations between racial discrimination and maternal racial worries on depressive symptoms vary by the gender of the child. While supported theoretically (Hall et al., 2016; Nellis, 2016; Nowicki, 2018), there is a dearth of evidence, and thus, this study can serve to provide a greater understanding on the potentially differential impact of having male children on Black maternal experiences of racial discrimination, maternal racial worries, and depressive symptoms.

Findings from this study may provide clarity as it relates to the impact of racial discrimination on Black mothers and provide an examination of the omnipresent nature of maternal racial worries (based on racial discrimination experimentation) and their effect on depressive symptoms among Black mothers. Findings would also indicate whether differences in depressive symptoms are the result of racial discrimination potentially operating through the

mechanism of maternal racial worries for children. This has important implications for interventions to reduce depressive symptoms among Black women who are mothers, as it will inform the focus of practice and give greater insight into the unique stressors in the lives of Black mothers. This possibility suggests that one of the stressors underlying experience of racial discrimination, is maternal worry related to their children undergoing the same experience, and therefore, worry could be a potential mechanism of therapeutical intervention.

Methods

Data Source

The current study used data from the Racial Socialization Competency (RaSC) study, which surveyed a nonrandom sample of caregivers who identified as Black or African American. Participants were defined as caregivers if they were the primary caregiver for a child under the age of 18. Participants were asked to respond to the survey for their eldest child only. The RaSC sample was identified using a convenience sampling approach with a cross-sectional design. Participants were recruited through Amazon's Mechanical Turk (n=113), Qualtrics' Panel Management (n=272) and Black identity or childrearing focused listservs (n=48). Participants completed an online self-administered questionnaire that assessed sociodemographic characteristics, a series of racial socialization assessments at both the caregiver and child levels, psychological constructs, and health outcomes aa(Anderson et al., 2019).

Sample

RaSC included 433 Black or African American, henceforth Black American, who were caregivers of at least one child under age 18. Of the 433, the original RaSC study team (Anderson et al., 2019) permanently excluded 72 respondents who provided inconsistent responses to two questions in the Multidimensional Inventory of Black Identity (MIBI; i.e.,

Overall, being Black has very little to do with how I feel about myself and *Being Black is an important reflection of who I am*) in the same direction, with the most extreme response options (i.e., either "Strongly Disagree" or "Strongly Agree"). This was used as an attention check for further analyses. This resulted in a sample of 361 respondents eligible for the current study.

Given the current study's focus on female mothers, 100 participants who identified as male and 22 participants who did not identify as a mother, were excluded. Therefore, the final analytic sample is 239 Black American mothers. Sensitivity analyses showed that compared to females, males were more likely to be cohabiting or married compared to being single and reporting on a male child compared to a female child, and compared to female mother caregivers, female non-mother caregivers were more likely to be older and single compared to married or cohabiting (results not shown).

Measures

Depressive symptoms. Depressive symptoms were measured with the ten-item BHM-10 scale, a shortened version of the original Behavioral Health Measure (Kopta & Lowry, 2002). This is a psychological systems scale that measures specific symptoms including depressive thinking, within the last two weeks (Kopta & Lowry, 2002). Depressive symptoms were operationalized as scoring at or below twelve, with lower scores indicating greater severity and outcomes being either severely depressed or not. Participants responded on a (*almost always*) to (*never*) scale to 6 items corresponding with the depression assessment, wherein lower scores indicate more experiences of depressive symptoms. This measure has previously demonstrated excellent full-scale internal validity (α range: .72-.93) in study samples of three primary care clinics (Kopta & Lowry, 2002). In the current sample, the depressive symptom items demonstrated strong internal validity (α = .89). Composite scores were created by summing

individual response scores. Initial investigations of responses to the Behavioral Health Measure-10 revealed a left skew for depressive symptoms. Given these findings, analysis was restricted to severe depressive symptoms (defined as values between 0 and 10), with lower scores indicated more severe depressive symptoms. Roughly 15% of the sample report experiencing severe depressive symptoms.

Racial discrimination. Racial discrimination was measured using multiple 5-item Likert scale options to nine items from the established Racism and Life Experience Scale-Brief Version (RaLES-B); ranging from: (*not at all*) to (*extremely*), (*very negatively*) to (*very positively*), (*everyday*) to (*once a year or less*), (*rarely or never*) to (*very often*) and (*none*) to (*extreme*). (S. P. Harrell et al., 1997). RaLES-B assesses the perception of racism experienced by respondents. Authors reported a very good internal reliability ($\alpha = .79$) when tested in its original sample of Black participants (S. P. Harrell et al., 1997). It also achieved high internal reliability in the current sample ($\alpha = .82$). Sample items include "in general, how do you think people from your racial/ethnic group are regarded in the United States" and "in general, how much stress has racism caused you during the past year?" Scores were summed to create a composite score. Higher scores indicated greater racial discrimination.

Maternal racial worries. Maternal racial worries were assessed using 17 items from the 22-item Worries About Racial Profiling Scale, developed to understand the racially specific worries encountered by parents while rearing children in the domains of school, law enforcement and social perception (Stevenson & Winn, 2019). In this sample, the internal reliability is excellent ($\alpha = .95$). Respondents were asked to indicate how worried they were regarding their child's encounters with others in public spaces when they are not around them. Sample items include, 'that your child will be racially mistreated by peers at school' and 'that your child will

be falsely accused of a crime because of their race'. Participants responded on a 1 (*not at all worried*) to 5 (*extremely worried*), where higher scores indicate greater maternal racial worries. Scores were summed to create a composite score.

The Worries About Racial Profiling scale has not yet been published and thus I explored underlying factors. The exploratory factor analysis determined two underlying factors: factor1 with an eigenvalue of 10.93 and factor2 with an eigenvalue of 2.01. Factor 1 conceptualized parental worry, corresponding to questions related to parental worries about how their children are perceived by others (e.g., police, schoolteachers, and society). Factor 2 conceptualized parental worry, corresponding to questions related to parental worries about their child mistreating others (e.g., behaving in a discriminatory manner towards others). Table 5 contains findings from the conducted factor analysis.

The subscale for parental worry: factor 1, labeled "worries related to perceptions of child", contained seventeen items and had the highest alpha score at 0.95. The second subscale, labeled "worries related to mistreatment by child", consisted of five items and had an alpha score of 0.88. The full scale had an alpha score of 0.95, indicating a high overall reliability, and 77% of the variation in the responses was explained by the 22 items. The rotating factor loading value identifies the weight that each item brings to the factor; specifying how correlated each question item is to the factor. Larger values indicate stronger items for each factor. For each subscale, means were calculated for Black mothers in the final sample. Mean scores for worries about perception was 2.68, values ranging from 1-5. Mean scores for worries about mistreatment was 1.86, values ranging from 1-5. Given the research questions presented in this study, I seek to examine parental worries related to children interacting with a racially hostile environment based on the perception of others, parental worry: factor 1 was decidedly utilized in all analyses.

Sociodemographic control variables. The following variables were controlled for in analyses: mother age, income, education, marital status, age, and gender of their eldest child under the age of 18 (C. M. West, 2008). ***Mother's age*** reflected participant age, calculated by subtracting year of birth reported on the survey from the year of data collection. ***Income*** was measured using five categories based on participant report of their income: $0-$24,999 (1), $25,000-$49,000 (2), $50,000-$74,999 (3), $75,000-$124,999 (4), and $125,000 and Up (5). ***Marital status*** was assessed as single (1), cohabitating (2), married (3) and separated/divorced/widowed (4). ***Child age*** was determined by participants reporting on the numeric age of their eldest child under the age of 18. ***Gender of child*** was determined by participant report of child gender as either female (1) or male (2). Additionally, participants' perception of their ***neighborhood safety*** was assessed. Participants responded on a scale of 1 (*not at all safe*) to 5 (*very safe)* to the question 'How safe do you feel living on your block?'. This variable was included as to control for any maternal racial worries that were related to perceptions of one's personal physical safety within their neighborhood.

Missing data. Missing data may present serious challenges to data analysis (Zhang, 2016). Given this, as a standard procedure, covariates in the model were examined to identify missing observations. There was very little missing among the variables of interest – between 0% and 2.51%. For categorical covariates, the single imputation of mode was utilized to address missing data. For continuous variables, the single imputation of mean was substituted for missing values. These approaches to handling missing data observations have been considered a sound analytic approach and improve the validity of the results (Sinharay et al., 2001; Zhang, 2016). As such, I used mode imputation for income, education, marital status, child age. I used mean imputation for mother age. Two participants did not complete depressive symptoms

measures and were therefore removed from the sample. This brought the final analytic sample to 237.

Data Analysis

Exploratory data analyses were conducted with all study variables. Then an examination of missing data, variable distributions and the conduct of any appropriate variable or scale transformations were performed. Graphically, we examined the potential for biasing influences of multicollinearity, heteroskedasticity, and outliers. Next data reduction including checks for Cronbach's alpha and a factor analysis of the Worries About Racial Profiling Scale were completed to ensure that the scales were the most psychometrically sound. Data analyses included descriptive statistics and inter-correlations between study instruments. Initial investigations of responses to the BHM-10 revealed a left skew for depressive and anxious symptoms. Given these findings, analyses were restricted to severe depressive symptoms (defined as values between 0 and 10). We then estimated a series of linear regressions to examine the role of maternal racial worries on racial discrimination; severe depressive symptoms on racial discrimination; severe depressive symptoms on maternal racial worries and; severe depressive symptoms on racial discrimination. Additional regression models were estimated controlling for sociodemographic control variables. To test whether gender of the child moderated the relationship between racial discrimination and severe depressive symptoms and maternal racial worries and severe depressive symptoms, interaction terms were added. All statistical analyses were conducted in STATA version 17.

Repeated Measures Analysis

A repeated measures analysis design is one in which measurements are made at multiple time-points or under different conditions. These repeated assessments occur serially. In SWAN

they are measured annually. At its simplest, repeated measures can be thought of as an extension of a paired t-test that involves at least 3 or more assessments within the same unit. At its most complex, repeated measures can handle both, within-participant components and between-participant components on multiple factors. Repeated measure analyses can be used to assess changes over time, but also to test for differences in 1 or more assessment outcomes on the same participants. Here we use repeated measures analysis for this latter objective (Sullivan, 2008). The advantages of this design are that: (1) participants act as their own control so experimental error is reduced; (2) this design is more efficient in drawing comparisons as compared to independent measure designs because part of the variability in the assessment measure is explained by the participants, thereby reducing experimental error and greater statistical power; (3) as there is greater statistical lower in a repeated measures design, fewer participants are needed to detect effect size; and (4) these analyses are more sensitive as they allow researchers to measure how the assessment measure impacted each participant individually (Singh et al., 2013; Verma, 2015).

Results

Sample Characteristics

Table 6 describes the sociodemographic and key study variable characteristics for the total sample. The analytic sample included 239 Black mothers. Participants ranged from 19 to 67 years old and were, on average, in their mid-30s. A little more than half of the sample reported incomes between $25,000 - $49,000 and $50,000 - $74,000. A third of the sample reported obtaining a high school education or less. Approximately half of the sample reported obtaining some college or a bachelor's degree. Close to half of the sample reported being married and a third of the sample reported being single. Respondents reported feeling "mostly safe" in their neighborhoods. About half of the children in the sample were between ages 1-4 and 5-8 years of

age. The distribution of male to female children was roughly 50/50. Respondents reported a moderately high frequency of racial discrimination, a moderate frequency of maternal racial worry and nearly 15% of the sample was experiencing severe depressive symptoms.

Maternal Racial Worries and Severe Depressive Symptoms among Black Mothers

In Table 7 Model 1, we regressed maternal racial worries on racial discrimination and sociodemographic control variables. Racial discrimination was strongly associated with maternal racial worries *(b*= 0.555, SE= 0.083, p= 0.000). None of the sociodemographic control variables was associated with maternal racial worries. In Table 8 Model 2 regressed severe depressive symptoms on racial discrimination, while carrying forward the same sociodemographic control variables. Racial discrimination was significantly associated with severe depressive symptoms (OR= 1.992, CI= 0.083, p= 0.014). Then, we regressed severe depressive symptoms on maternal racial worries, including the sociodemographic control variables, in Table 8 Model 3. Maternal racial worries were strongly associated with severe depressive symptoms (OR= 1.848, CI= 1.150 - 3.450, p= 0.014). Table 8 Model 4 is the full model, regressing severe depressive symptoms on racial discrimination and maternal racial worries. None of the sociodemographic control variables were associated; however, maternal racial worries was significantly associated with severe depressive symptoms (OR= 1.629, CI= 1.032 - 2.579, p= 0.036).

Gender of Child Moderation

The moderation analysis results are located in Table 3, under Model 5. I added the interactions between racial discrimination and male child and between maternal racial worry and male child to the regression displayed under Model 4, including the sociodemographic control variables. Having a male child was also strongly associated with severe depressive symptoms (OR= 0.002, CI= 0.000 - .235, p= 0.010). The interaction between racial discrimination and male

child was strongly associated with severe depressive symptoms (OR= 5.160, CI= 1.323 - 20.130, p= 0.018), suggesting that the effect of racial discrimination on severe depressive symptoms is greater for Black mothers with a male eldest child. The interaction between maternal racial worries and male child on severe depressive symptoms was not significant (OR= 0.933, CI= 0.311 - 2.797, p= 0.902), suggesting that the effect of maternal racial worries on severe depressive symptoms was similar for Black mothers with a male or female eldest child.

Discussion

Consistent with previous research, maternal racial worries emerge as a salient stressor that can increase susceptibility to severe depressive symptoms. I find that experiencing racial discrimination is significantly associated with greater maternal racial worries (Himmelstein et al., 2014)and that maternal racial worries are significantly associated with greater levels of severe depressive symptoms (Laveist et al., 2014; Watson-Singleton et al., 2019). Importantly, upon accounting for maternal racial worries, there is no longer a significant direct association between racial discrimination and severe depressive symptoms. This may suggest that the experience of racism shapes the experience of maternal racial worries for Black mothers. These findings are important, as few studies exist that examine racism-related vigilance and less have identified maternal racial worries as a key variable for analysis. These results extend past theoretical examinations of Black motherhood, to provide initial evidence on the psychological consequences of racism for Black women in the context of mothering.

The moderation analysis provides new insight into how gender interacts with racial discrimination and maternal racial worries to influence the likelihood of experiencing severe depressive symptoms. The potential impact of maleness on these two variables is well supported theoretically (Hall et al., 2016; Joe et al., 2019; Nellis, 2016; Nowicki, 2018); however, few

empirical studies exist that consider its influence. While I did not find significance when considering gender as a moderator on the pathway between maternal racial worries and depressive symptoms, I did find that maleness was a significant moderator on the pathway between racial discrimination and maternal racial worries. Black mothers with boys are ~5 times more likely to experience severe depressive symptoms than Black mothers with girls.

Limitations

Although the current study advances our understanding of how experiencing racial discrimination and maternal racial worries work conjunctly to adversely affect maternal mental health, a few limitations exist. First, as a cross-sectional dataset, causal inferences cannot be drawn from the data. Given the major threat to validity (e.g., temporal precedence) mediation analyses could not be reliably conducted, instead indirect effects were estimated. Future research should seek to build on the current study with a longitudinal study design to corroborate these associations. Second, analyses did not include other stress related measurement controls that may lend greater confidence to the independent impact of maternal racial worries. Inclusion of additional variables, such as perceived stress, the identification of multiple roles (e.g., caregiver and career), gender of all children and number of children, should be considered in future analyses. Finally, having the opportunity to report on additional children, outside of the eldest, could provide a greater understanding as to the multiplicative effect of maternal racial worries and its implications for maternal mental health. Remember that mothers could be included in the study as long as they had a child under the age of 18 but were only allowed to report on their eldest within the age range. Future iterations of this survey could give respondents the opportunity to respond for multiple children.

Conclusions

Notwithstanding these limitations, these results provide support for the harmful effects of racially stressful experiences and maternal racial worries on Black mothers' severe depressive symptomology. Beyond theoretical and empirical contributions, there secondary and tertiary prevention implications of these findings. It may be important in clinical spaces for providers to better understand the racial stressors present in lives of Black mothers that may be absent for other clients. The additional labor Black mothers must engage in and sensitivities they must be attuned to represent a differential stress burden that should be noted, considered, and discussed with care in mental health settings.

At the level of primary prevention, these findings provide evidence that support the need for systemic change. To prevent exposure to racially stressful events and the manifestation of race-related worries among Black mothers, large-scale changes for racial justice must occur. Findings here also show the insufficiency of current screening materials that examine depressive symptoms or stress. Modifications of these tools to ask questions pertaining to race-related distress could reveal new populations of people to treatment who may not meet the current screening guidelines for depression. This may also change practitioner views on how to coach their clients with children through life events and parenting stressors. While these approaches aim to reduce the impact of race-related worries at the secondary level, tertiary prevention efforts intervene with the goal to address the longer-term impacts. There are programs such as the Engaging, Managing, and Bonding through Race (EMBRace) intervention that targets racial coping behaviors to build self-efficacy and reduce the stress burden for Black youth and families (Anderson & Stevenson, 2019).

Table 5. Survey items and their corresponding factor loadings across the two subscales of Worries About Racial Profiling Scale

Subscale	**Question Stem:** Please indicate how worried you are regarding your child's encounters with others in public spaces when you are not around them. **Item**	**Rotated factor loading**[±]
Worries related to perceptions of child [†]	1. that your child will be racially mistreated by peers at school?	0.6681
Alpha = .951	2. that your child will be perceived as not smart enough because of their race?	0.6696
Mean = 2.678	3. that your child will experience random acts of violence walking through your neighborhood because of their race?	0.7061
Range = 1-5	4. that teachers will hold low expectations of your child because of their race?	0.7528
	5. that your child will be falsely accused of a crime because of their race?	0.7421
	6. that if your child is stopped by the police that they will be physically harmed?	0.6161
	7. that your child will be excessively disciplined for misbehavior at school?	0.7660
	8. that your fears about racial injustice toward your child will interrupt your sleep or concentration?	0.7602
	9. that teachers will underestimate your child's commitment to learning because of their race?	0.8166
	10. that strangers will misperceive your child's behavior as criminal?	0.7698
	11. that you might be wrong about others misjudging your child because of their race?	0.6875
	12. that your child will not develop a positive appreciation of their racial background?	0.6668
	13. that other people will negatively judge your parenting based on a racial stereotype?	0.6722
	14. that teachers will withhold instruction from your child because of their race?	0.7969
	15. that police officers will withhold protection from your child because of their race?	0.7351
	16. that teachers out of ignorance will mishandle an encounter with your child because of their race?	0.8249
	17. that your child will receive low expectations and not challenged to do their best by teachers?	0.8098
Worries related to mistreatment by child [†]	1. that your child will be called or thought of as a racist?	0.4958
Alpha = .879	2. that your child will racially mistreat others when you are not around?	0.5553
Mean = 1.856	3. that your child will use a racial slur against a person of color?	0.6018
Range = 1-5	4. that your child will use a racial slur against someone of their own racial background?	0.5419
	5. that your child will behave in ways that support a negative racial stereotype of them?	0.3623
Full Scale		
Alpha = .952		
Explained variance: 76.67%		

[±]Rotated factor loading represents how the item is weighted for each factor and the correlation between the item and the factor.
[†]Response choices were "not at all worried", "not very worried", "somewhat worried", "very worried" and "extremely worried".

Table 6. Participant Sociodemographic Characteristics and Key Study Variables

Characteristics	M (SD)	% (N)	Min	Max
Sociodemographic				
Mother's Age	36.32 (8.96)		19	67
Income				
$0-24,999		17.57 (42)		
$25,000-$49,000		33.89 (81)		
$50,000 -$74,999		21.76 (52)		
$75,000-$124,999		12.55 (30)		
$125,000 or more		14.23 (34)		
Education				
High school or less		33.47 (80)		
Some college		23.43 (56)		
Bachelor's degree		25.52 (61)		
Graduate degree		17.57 (42)		
Marital Status				
Single		32.64 (78)		
Cohabitating		15.06 (36)		
Married		43.10 (103)		
Separated/divorced/widowed		9.21 (22)		
Neighborhood Safety	3.70 (1.12)		1	5
Child Age				
1 – 4 years		24.69 (59)		
5-8 years		24.27 (58)		
9-12 years		19.67 (47)		
13-15 years		17.57 (42)		
16-18 years		13.81 (33)		
Child Sex				
Male		48.95 (116)		
Female		51.05 (121)		
Key Study Variables				
Racial Discrimination	3.142 (.736)		1.6	4.777
Maternal Racial Worries	2.678 (.959)		1	5
Severe Depression		14.64 (35)		
Total N		N = 239		

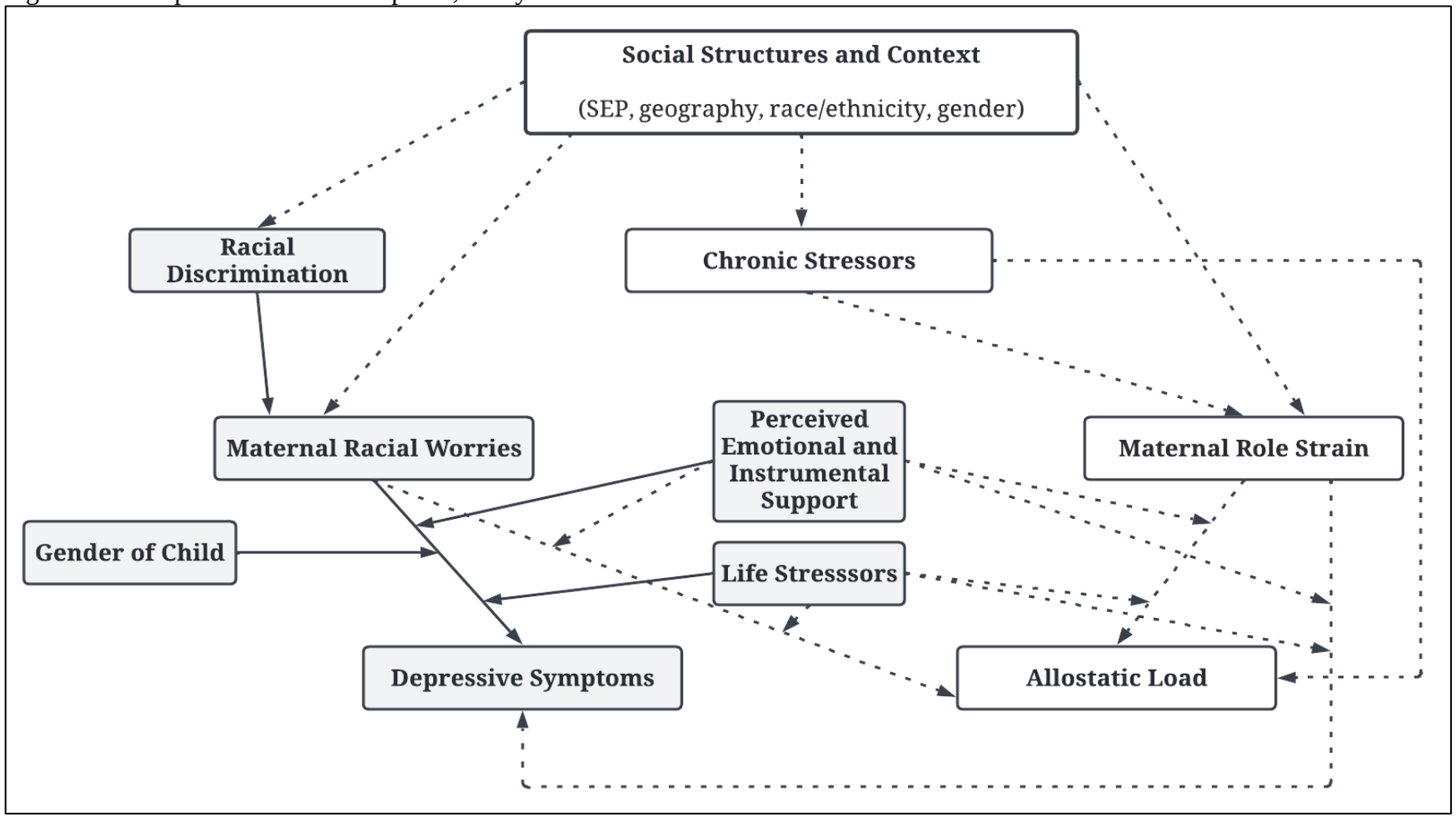
Table 7. Examination of Racial Discrimination on Maternal Racial Worries

	Maternal Racial Worries		
Variables	Model 1		
	b	SE	p†
Predictor			
Racial Discrimination	0.55	0.08	**0.00**
Maternal Racial Worries			
Interactions			
Racial Discrimination X Gender			
Maternal Racial Worries X Gender			
Sociodemographic			
Male	0.15	0.11	0.17
Mother's Age	-0.00	0.00	0.88
Income			
$0-$24,999 (reference)			
$25,000-$49,000	-0.06	0.18	0.72
$50,000-$74,999	0.01	0.20	0.92
$75,000-$124,999	0.04	0.23	0.85
$125,000 or more	0.06	0.25	0.80
Education			
High school or less (reference)			
Some college	-0.14	0.16	0.37
Bachelors' degree	-0.09	0.16	0.57
Graduate degree	-0.09	0.20	0.65
Marital Status			
Single (reference)			
Cohabitating	-0.21	0.18	0.23
Married	-0.08	0.14	0.56
Separated/divorced/widowed	-0.12	0.22	0.56
Neighborhood Safety	0.02	0.05	0.59
Child Age			
1 – 4 years (reference)			
5-8 years	-0.17	0.17	0.30
9-12 years	0.03	0.19	0.86
13-15 years	-0.32	0.20	0.11
16-18 years	-0.29	0.25	0.24
Intercept	1.09	0.42	0.01
R^2		0.23	
χ^2			
F		3.68 (0.00)	

Table 8. Examination of Racial Discrimination and Maternal Racial Worries on Severe Depressive Symptoms

	Severe Depression			Severe Depression			Severe Depression			Severe Depression		
Variables	Model 2			Model 3			Model 4			Model 5		
	OR	CI	p†	OR	CI	p†	OR	CI	p†	OR	CI	p†
Predictor												
Racial Discrimination	1.99	1.15 - 3.45	**0.01**				1.51	0.83 - 2.76	0.17	0.83	0.38 - 1.78	0.63
Maternal Racial Worries				1.84	1.21 - 2.80	**0.00**	1.62	1.03 - 2.57	**0.03**	1.68	0.98 - 2.89	0.05
Interactions												
Racial Discrimination X Gender										5.16	1.32 - 20.13	**0.01**
Maternal Racial Worries X Gender										0.93	0.31 - 2.79	0.90
Sociodemographic												
Male	0.51	0.22 - 1.14		0.45	0.20 - 1.02	0.05	0.47	0.20 - 1.07	0.07	0.00	0.00 - 0.23	**0.01**
Mother's Age	0.95	0.89 - 1.02	0.18	0.96	0.90 - 1.03	0.28	0.95	0.89 - 1.02	0.21	0.95	0.89 - 1.02	0.22
Income												
$0-$24,999 (reference)												
$25,000-$49,000	0.46	0.14 - 1.43	0.18	0.53	0.17 - 1.64	0.27	0.48	0.15 - 1.51	0.21	0.42	0.12 - 1.40	0.15
$50,000-$74,999	0.72	0.20 - 2.64	0.63	0.72	0.19 - 2.61	0.61	0.70	0.19 - 2.58	0.59	0.79	0.21 - 3.01	0.74
$75,000-$124,999	0.74	0.16 - 3.38	0.70	0.67	0.14 - 3.09	0.61	0.70	0.15 - 3.24	0.65	0.62	0.13 - 2.97	0.55
$125,000 or more	0.32	0.05 - 1.82	0.20	0.32	0.05 - 1.81	0.20	0.29	0.05 - 1.68	0.17	0.27	0.04 - 1.59	0.15
Education												
High school or less (reference)												
Some college	0.48	0.15 - 1.50	0.21	0.49	0.16 - 1.52	0.22	0.51	0.16 - 1.59	0.24	0.54	0.16 - 1.72	0.29
Bachelors' degree	0.69	0.22 - 2.10	0.51	0.72	0.23 - 2.19	0.56	0.70	0.23 - 2.13	0.53	0.80	0.25 - 2.54	0.71
Graduate degree	0.44	0.10 - 1.87	0.27	0.46	0.11 - 1.94	0.29	0.44	0.10 - 1.88	0.27	0.51	0.11 - 2.21	0.37
Marital Status												
Single (reference)												
Cohabitating	0.90	0.27 - 2.96	0.87	1.06	0.32 - 3.49	0.91	1.01	0.30 - 3.37	0.97	0.88	0.25 - 3.08	0.84
Married	0.95	0.35 - 2.57	0.93	1.12	0.41 - 2.99	0.82	1.02	0.37 - 2.78	0.96	0.82	0.28 - 2.32	0.70
Separated/divorced/widowed	0.31	0.03 - 2.78	0.29	0.37	0.04 - 3.34	0.37	0.38	0.04 - 3.47	0.39	0.32	0.03 - 3.07	0.32
Neighborhood Safety	0.94	0.66 - 1.35	0.76	0.92	0.64 - 1.32	0.65	0.92	0.63 - 1.32	0.65	0.85	0.58 - 1.23	0.39
Child Age												
1 – 4 years (reference)												
5-8 years	0.42	0.13 - 1.34	0.14	0.40	0.12 - 1.30	0.12	0.43	0.13 - 1.42	0.16	0.38	0.11 - 1.28	0.12
9-12 years	0.87	0.24 - 3.15	0.83	0.76	0.20 - 2.84	0.68	0.85	0.22 - 3.21	0.81	0.84	0.21 - 3.31	0.80
13-15 years	1.21	0.32 - 4.50	0.77	1.38	0.36 - 5.20	0.63	1.41	0.37 - 5.36	0.61	1.50	0.38 - 5.91	0.55
16-18 years	0.60	0.09 - 3.75	0.58	0.69	0.11 - 4.45	0.70	0.73	0.11 - 4.77	0.74	0.86	0.12 - 5.93	0.88
Intercept	0.46	0.02 - 7.42	0.58	0.56	0.04 - 7.55	0.66	0.26	0.01 - 4.53	0.36	2.46	0.08 - 68.10	0.59
R^2												
$\chi 2$		25.11 (0.12)			27.76 (0.06)			29.61 (0.05)			36.72 (0.01)	
F												

Figure 4. Conceptual Model for Chapter 4, Study 3



Chapter 5
Key Findings and Implications for Black Mothers' Health: Theory, Research, and Interventions

Motherhood for Black women is at the nexus of political, social, and economic contextual factors that have been shaped by the historic legacy of racism, integral to the institutions that define American life (Collins, 1987, 1994, 2005). A well-established literature base links these factors to racial health disparities in the United States (House & Williams, 2000; Paradies, 2006b; Paradies et al., 2015; Williams et al., 2019; Williams & Collins, 1995, 2001). Gathering evidence on the implications of mothering in a racially hostile landscape is important work. Understanding the relationship between chronic stressors associated with the act of mothering and the positionality of being a mother with psychophysiological outcomes related to the stress process can help develop more targeted research, intervention and longer-term policy and advocacy strategies to reduce health disparities (Phelan et al., 2010). Mechanisms associated with the stress process represent a promising field of research for: (1) understanding the relationship between one's role as a mother, a Black mother, and how that might impact an individual's stress burden; and (2) informing the development of clinical tools and intervention strategies to reduce stress related psychopathy and stress physiology among Black mothers. Established evidence on maternal role strain and emerging research on the physiologic ways in which stress gets *under the skin,* can provide guidance on the measurement tools we utilize to examine the link between one's social role and the implications that has for one's stress burden.

While the evidence base linking sources of stress generated from racism to racial health disparities is vast (House & Williams, 2000; Paradies, 2006b; Paradies et al., 2015; Williams et

al., 2019; Williams & Collins, 1995, 2001), many questions remain about the role of motherhood (Arendell, 2000; Glenn et al., 2016; Jenkins, 2005). Several theories and frameworks have offered hypotheses regarding, more generally, the mechanisms that underlie disparities (i.e., the Weathering Hypothesis, Environmental Affordances Model, Sojourner Syndrome, and the Superwoman Schema). However, empirical tests of these findings have not provided a wealth of evidence for important subgroups, including Black mothers and mothers at midlife. Further, much of what we do know is relegated to self-reported measures and restricted to psychological outcomes related to stress, neglecting biological indicators. And while we would anticipate that Black women would be clinically diagnosed with mental health disorders at higher rates than the general population, given their chronic exposure to socially driven stressors, national reports have consistently documented a lower prevalence. This is an added dimension of complexity because it leaves fuzzy the pathways by which social inequities impact health outcomes.

This dissertation was intended to fill gaps in the literature by: (1) documenting racial differences in maternal role strain, depressive symptoms and allostatic load; (2) identifying the nature of the relationship between maternal role strain and depressive symptoms, maternal role strain and allostatic load and maternal racial worries and depressive symptoms; and (3) testing some of the pathways in the Environmental Affordances Model in Black mothers and Black mothers at midlife, two underrepresented subgroups in the stress process literature. We completed three empirical studies using linked data from 678 Black mothers and 685 white mothers at midlife who participated in the Study of Women Across the Nation (SWAN), and for 239 Black mothers from the Racial Socialization Competency (RaSC) study. These studies were informed by our theoretical framework and the Environmental Affordances Model, and test portions of our conceptual model (Figure 1), both (i.e., the framework and model) of which were

described in Chapter 1. In this final chapter, we summarize our key findings from the studies we conducted and discuss their implications for theories related to women's health, research methods and measurement, and interventions to improve the health of Black mothers.

Key Findings and Implications

Theories Related to Black Mother's Health

Although we did not test nuances of the Weathering Hypothesis, it is an important theoretical frame for Black mother's health. The Weathering Hypothesis posits that social disadvantage is biologically embedded. The Weathering Hypothesis describes the process by which racism exacts a physiological toll on Black women over the life course (Geronimus, 1992; Geronimus et al., 2010; Krieger et al., 1993). That the physical manifestation of persistent, effortful coping in the face of racism, biologically *weathers* the body. Consistent with the core premise of the **Weathering Hypothesis**, we documented greater levels of depressive symptoms, though not statistically significantly different than their white counterparts, and greater levels of allostatic load scores among Black mothers. This fills a critical gap in the literature as we are not aware of any published studies that examined differences in depressive symptoms and allostatic load scores in an exclusively maternal sample at midlife. Our allostatic load findings specifically provide evidence to suggest that overtime the disparities we see in stress physiology may be due to *weathering*. When we compared Black and white mothers of the same age, we found that allostatic load scores were significantly higher for Black mothers than for white mothers at the same age. This compares to other evidence generated by examinations of *weathering* pathways (Forde et al., 2019; Geronimus, 1992; Simons et al., 2020). Future analyses that leverage longitudinal designs and follow mothers from earlier age ranges to track trajectories over the life

course may help to further identify factors that link age, race, and the maternal role to disparate stress physiology.

The **Environmental Affordances Model** considers maternal role strain and maternal racial worries to be *maladaptive* or *poor* health behaviors (Mezuk et al., 2013b). More plainly, the experience of role overload, for the sake of attempting to fulfill all the responsibilities associated with their social roles and the initiation of race-related hypervigilance and worry. Given that the racially landscape is not getting friendlier, these are worries they will carry over their children's life course. However, chronic worry has a cost. There is a cost to attempting to fulfill all the requirements of several roles and there is a cost to worrying; however, these are things, we perceive, mothers would not give up, as the element of sacrifice is woven into the fabric of what it means to be a mother. Evaluation of these *maladaptive* or *poor* responses to their role as mother were examined through analyses of the experience of depressive symptoms and allostatic load. Consistent with the **Environmental Affordances Model**, we find that maternal role strain and maternal racial worries were associated with depressive symptoms. The lack of a relationship with allostatic load and maternal role strain did not show corroboration with the **Environmental Affordances Model**.

While we did not test pathways related to **Sojourner Syndrome** or the **Superwoman Schema**, they are also important frames to consider when theorizing coping, self-reported responses around stress and coping, and disparities in health. **Sojourner Syndrome** is a term coined, "to express the combined effects and joint influence of race, class and gender in structuring risk for African American women" (p. 35, Mullings, 2002). Sojourner Truth is considered emblematic in this sense as she personifies what resistance looks like in the face of interlocking systems of oppression. Referred to also as a coping strategy, Mullings (2000) notes

that **Sojourner Syndrome**, is needed in order to cope and carry the weight of the extraordinary responsibilities of Black womanhood and motherhood (Collins, 2005; Mullings, 2002). **Superwoman Schema** is defined as the "obligation to manifest strength, [the] obligation to suppress emotions, resistance to being vulnerable or dependent, [the] determination to succeed despite limited resources, and [the] obligation to help others" (p. 672, Woods-Giscombé, 2010). A response to the sociopolitical context in which Black women operate, the **Superwoman Schema** describes the responsibility of Black women to play mother, nurturer and breadwinner/backbone given the continued financial and emotional intentional disenfranchisement of Black men through policy practice and social narratives (Woods-Giscombé, 2010). Like **Sojourner Syndrome**, the **Superwoman Schema** functions as both a survival mechanism and a cultural phenomenon that has embedded itself in the everyday lives of Black women as a coping strategy for persisting in the racially hostile landscape that is America.

Although we did not specifically test these theoretical pathways, our findings can be contextualized in their collective premises. Self-reported measures are at threat from social perception. While this is standardly viewed as a threat from social desirability, here, responses are a threat from perceptions around coping. Woods-Giscombé (2010) presents a profile of Black women's views on stress, strength, and health through the lens of the **Superwoman Schema**. This included the historical legacy of intersectional discrimination; lessons passed on by foremothers; past personal histories that include disappointment, mistreatment, or abuse at the hands of those who should have been sources of support or guidance; and their spiritual values (Woods-Giscombé, 2010). This may be particularly true for Black mothers if we think about the racial meaning of motherhood, which is, in part, the eternal practice of fortifying oneself and her children against the ways in which racism and racial discrimination disadvantages and devalues

her womanhood, mothering and her children (Collins, 1987, 2005). When we consider the necessity of consistency and reliability to childrearing, and if we think about what it means to be a dutiful mother, showing up regardless of life stressors, Black mothers may be especially at risk for underreporting their level of stress (Collins, 1987, 1994, 2005). As such, our findings that reports of depressive symptoms were not statistically different between Black and white mothers support these theoretical premises. Further, that while there was no difference between Black and white mothers on self-reported depressive symptoms, but a statistically significant difference on a measure of biological indicators of allostatic load, this may be an indication that Black mothers are reporting out of a desire to manifest strength in times of stress, resist the idea of their vulnerability, divorce themselves from their emotionality and ultimately, persevere despite inadequate resources or support (Mullings, 2002; Woods-Giscombé, 2010).

Research Methods and Measurement

In this dissertation, we demonstrated that Black mothers experience measurable stress attributed to their role as a mother. Stress that is physiologically more consequential than their white counterparts, as indicated by their allostatic load scores, and respective of their unique positionality as a Black mother, as indicated by maternal racial worries. We illustrate through theory and evidence that these findings are consistent with their membership in a marginalized racial group, which has utility in future research on racial disparities research. This work, while conducted among Black mothers, may have the ability to provide insights for the impact of motherwork associated with other marginalized groups, and apply to Black women more broadly. Given communal mothering is commonly engaged in with the addition of *other mothers*: grandmothers, aunts, and extended kin networks as central mother figures in the lives of Black children (Collins, 1987, 2005). This work also provides rationale for the use of objective

biomarkers for the reporting of stress. Self-reported measures are under threat from community-driven perceptions on stress, threats to their objectivity that survey researchers had not yet been considered. We advocate for the expansion of biomarker collections in survey research and the advancement of survey materials more responsive to motherwork stress. As an emergent concept, our study of maternal racial worries provides important evidentiary support to its existence as a substantive stressor for Black mothers; another dimension of racial stress, that may work to exasperate other concurrent stressors. Future studies should conduct more complex analyses that can test these assertions in larger, longitudinal datasets.

A notable strength of this dissertation is that it represents some of the few studies to examine depressive symptoms and allostatic load as a result of maternal role strain and maternal racial worries, in an exclusively maternal sample. While we did not compare men to women, we make the case that stress, stress physiology and access to and engagement with coping resources may function differently for men and women. As such, we recommend that future studies attend to this by comparing outcomes, not just across racial lines but gender too. Additionally, more work should be conducted to examine racial worries in paternal samples to see if relationships among the concepts are consistent. General strengths of these studies are: (1) the use of repeated measures to examine relationships between a midlife sample of Black and white mothers; (2) the ability to compare self-report with objective measures as a test of what we know of Black women's likely strategies towards reporting and reflecting on their internal stress burdens; and (3) the test of maternal racial worries' relationship with depressive symptoms among Black mothers. Limitations of these studies are: (1) the lack of longitudinal analyses that address how associations change over time; (2) the usage of a single item measure to determine maternal role strain; and (3) the omission of role satisfaction as a quality measure for the mother role and other

stress measures to rule out stress from other domains influencing the conceptual relationships present.

Interventions to Improve Health among Mothers

The strength of the association between maternal role strain and depressive symptoms and between maternal racial worries and depressive symptoms provide important direction for intervention efforts related to motherhood stress. For example, our findings suggest that when considering the impact of depressive symptoms at midlife, more attention should be paid to one's role as a mother. Regardless of age, she is still a mother, and the weight of her stress related to that role is still with her. Also, our findings suggest that maternal racial worries are a pernicious factor carried throughout the life course and should be considered in clinical diagnoses as another feature of stress that should be tended to by medical doctors and psychologists. Interventions designed to lessen the burden of depressive symptoms should consider, if they are targeting women, notably Black women, the roles of mother and other mother on the psyche (Collins, 1987, 2005).

Conclusion

The original motivation for this dissertation research was to examine maternal role strain and maternal racial worries to better understand the ways in which they got *under the skin* to impact depressive symptoms and allostatic load. Our hope was to provide evidentiary support for the creation of new or adaption of more role specific and race respective measurement tools. Ultimately, however, the findings from this work call for the systematic dismantling of racist systems in the United States. We find evidentiary support for the biological embedding of disadvantage and a significant impact of race-related worry on psychophysiological body systems. There is no intervention or cognitive strategy that can heal internal wounds that are

generated from one's existence in a racially hostile society. And there is nowhere to go that is outside the bounds of this influence.

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