The Dynamic Role of Racial-Ethnic Identity in the Link Between Interpersonal Racism and Ambulatory Blood Pressure among U.S. Blacks

by

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Abstract

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Blacks in the U.S. not only report experiencing more racism than other racial and ethnic groups, but also have a higher prevalence of hypertension, with subsequent greater hypertension-related mortality, compared to Whites (Healthy People 2010, 2001). Racism can occur on multiple levels, including cultural, institutional, and interpersonal (C.P. Jones, 2000; J. M. Jones, 1997; Krieger, 1999). Membership in a stigmatized racial or ethnic (minority) group may contribute to the higher prevalence of hypertension among U.S. Blacks (Brondolo, Rieppi, Kelly, & Gerin, 2003). To explain this potential relationship, researchers have posited that perceived racism is a chronic, stressful stimulus that negatively influences health outcomes by chronic overactivity of cardiovascular regulatory systems (R. Clark, Anderson, Clark, & Williams, 1999; Mays, Cochran, & Barnes, 2007; McEwen, 2002). Researchers have suggested that racial identity may influence the relationship of racism to blood pressure. However, most research on racial or ethnic identity has examined the ways in which it acts as an antecedent or correlate of mental health, or how it moderates or mediates the relationship between perceived racism and mental health. A subsample (n = 214)

of U.S. born, adult Black participants from a larger study of *Racism, Coping, and Ambulatory Blood Pressure*. Participants completed the Lifetime and Past Week Perceived Racism scales of the Perceived Ethnic Discrimination-Community Version Questionnaire (Brondolo et al., 2005), the Multigroup Ethnic Identity Measure (Phinney, 1992), and they were also outfitted with an ambulatory blood pressure monitor (ABP) and electronic diary to assess blood pressure for a 24 hr period. Three models of racial-ethnic identity were compared to understand how it is related to the association between perceived racism and ABP. Lifetime perceived racism was related to nighttime systolic blood pressure. However, there was no relationship of perceived racism to ethnic identity and no relationship of ethnic identity to ABP. Ethnic identity did not moderate the relationship of perceived racism to ABP. This study highlights the need for further research using ecological momentary assessment and specifically, real-time measures of perceived racism and ethnic identity using repeated measures sampling.

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First and foremost I am grateful to God for this challenging, but rewarding and memorable experience -- from *Ph.D. student* to **Danielle Lathel Beatty, Ph.D.** I am certain there were and remain many pitfalls seen and even more that were unseen that I have been protected from. I will always remember whose I am and that to whom much is given, much is expected.

My Parents – Deborah and Howard Beatty. I remember when I was in 11th grade (back in 1994) and my Mom said to me – "so, you are graduating next year – what are you going to do next?.....I'd prefer you go to college…..make a decision about the schools you want to apply to and let me know….." There was no real dialogue around this topic, it was not up for discussion….it was more like a directive where the only options were choosing the schools I would apply for (not whether or not I would be going). My Dad has also been supportive providing a healthy dose of reality about how being cautious and mindful about the decisions that I make, no matter how small.

These three guides – God, my Mother, and my Dad have worked quite well together. Like the saying about the horse…you all lead me to the water…and, I chose to drink. And, so since 1995 I have pursued a higher education and for the last five years, I have worked non-stop toward completing this degree – the last leg of a long journey.

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Dedication

I would like to dedicate this dissertation to my little brother DeVaughn Rogers Beatty. You have been an inspiration to me and have really influenced how I face adversity and pain. Just three years ago, I was at a cross-road and at that time, you were also approaching a cross-road. You were in a life-changing car accident that could have changed you for the worst, but that was not the choice you made. You decided to forge ahead, and with great strides you continue to realize a brighter future for yourself.

I am very proud of you and I want you to always remember that you are never alone. There will always be others to guide you and impart knowledge to you. But, it is important that you always seek answers and that you continue to focus on your future. This mindset is one that has brought me to this day. But, seeing how you persevered has also pushed me to think more critically about how we use the gifts we are given. You have helped me to be more mindful that there is more than one road to our successes in life.

As a result of your cross-road, I completed my Ph.D. at the Graduate Center, City University of New York. The last few years here have been a tremendous success. I don't think I could have made a better decision. But, it was through your willpower that I gained the strength to go forward. For these reasons, I am dedicating this paper to you. Continue to push and to focus on your goals and you will realize them.

Love, Danielle

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"Little murders" is the term an 80-year old African American woman uses to refer to the daily, recurring racial maltreatment that she has experienced throughout her life (Feagin, 1991, p. 108). She may use this phrase metaphorically to illustrate the harmful, emotional and psychological impact of these events, but this phrase may have a literal meaning when one considers the potential physical health cost of these "little murders" in the Black community.

Blacks in the U.S. not only report experiencing more racism than other racial and ethnic groups, but also have a higher prevalence of hypertension, with subsequent greater hypertension-related mortality, compared to Whites (Healthy People 2010, 2001). High blood pressure, or essential hypertension, is defined as persistent elevated blood pressure that does not result from a specific medical cause or condition (O'Callahan, Andrews, & Krantz, 2004). Hypertension is the single most important risk factor for coronary heart disease, and is also a risk factor for stroke, heart attack, heart failure, arterial aneurysm, and chronic renal failure (American Heart Association [AHA], 2005). The prevalence of hypertension among Blacks in the U.S. is among the highest in the world (AHA, 2005). Racial disparities in the rates of hypertension are well-documented and Blacks experience higher morbidity and mortality associated with this chronic health condition in comparison to other racial or ethnic groups (Douglas et al.,

2003; Macera, Armstead, & Anderson, 2001; National Heart, Lung, & Blood Institute [NHLBI], 2000; Williams, 1999). Compared with Whites, Blacks experience earlier onset of this condition, have a higher average blood pressure, and experience more secondary illnesses as a result of hypertension (AHA, 2005). Nearly twice as many Blacks (41%) than Whites (27%) have hypertension (AHA, 2005), and hypertension-related mortality rates per 100,000 of the U.S. population were 14.4 for White males, 49.6 for Black males, 13.7 for White females, and 40.5 for Black females in 2002 (AHA, 2005).

One factor that may contribute to the higher prevalence of hypertension among U.S. Blacks is membership in a stigmatized racial or ethnic (minority) group (Brondolo, Rieppi, Kelly, & Gerin, 2003). Membership in a racial or ethnic minority group increases exposure to specific types of social stressors, primarily racism. Racism has been defined as "the beliefs, attitudes, institutional arrangements, and acts that tend to denigrate individuals or groups because of phenotypic characteristics or ethnic group affiliation" (R. Clark et al., 1999, p. 805). The suggestion that racism is a social stressor has led to the development of a theory of race-related stress, defined as "the 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" (Harrell, 2000, p. 45).

Racism can occur on multiple levels, including cultural, institutional, and interpersonal (C.P. Jones, 2000; J. M. Jones, 1997; Krieger, 1999). This study focused on the effects of directly perceived discrimination in interactions between

individuals, or *interpersonal racism* (Krieger, 1999, p. 301). Interpersonal racism can occur between individuals from different racial and ethnic groups (i.e., inter-group racism) or between individuals of the same racial or ethnic group (i.e., intra-group racism), and across different settings. Research has also demonstrated that past experiences of perceived racism may impact the relationship between current perceived racism and health (R. Clark, 2000). In sum, interpersonal racism is a complex phenomenon.

Recently, psychologists have juxtaposed theories of stress and coping with basic physiology to argue that race-related stress may have its clearest effects on the cardiovascular system (R. Clark et al., 1999). Over the past decade, a number of studies have begun to investigate the relationship of perceived racism to cardiovascular-related health outcomes, including cardiovascular reactivity, heart rate variability, clinic or resting blood pressure, and ambulatory blood pressure. Although the findings are mixed overall, cardiovascular reactivity studies have provided more consistent evidence for this relationship than resting blood pressure studies. It has been suggested that the differential effects may be methodological artifacts, including the ways that perceived racism and cardiovascular-related variables are assessed (Brondolo et al., 2003; Williams, Neighbors, & Jackson, 2003; Wyatt et al., 2003).

At this time the psychological and physiological mechanisms linking perceived racism to cardiovascular health are not fully understood. One major theoretical approach suggests that perceived racism is a chronic, stressful stimulus that negatively influences health outcomes by chronic overactivity of

cardiovascular regulatory systems (R. Clark et al., 1999; Mays, Cochran, & Barnes, 2007; McEwen, 2002). If this cycle is repeated over a period of time, bodily systems attempt to adjust. However, the chronic overactivity of some physiologic systems leads to excess wear and tear as they are unable to meet such enduring physiological challenge to ongoing stressful stimuli (McEwen, 1998; Selye, 1946, 1952). This process is said to contribute to the higher rates of hypertension and hypertension-related conditions among racial and ethnic minorities.

Most studies that document this process have examined only resting blood pressure or cardiovascular reactivity. Recent studies, however, have begun to examine ambulatory blood pressure, which, unlike resting blood pressure and cardiovascular reactivity, assesses blood pressure more frequently and within the natural environment. Thus, ambulatory blood pressure provides a more reliable measure that is more closely related to blood pressure changes over time than either resting blood pressure or cardiovascular reactivity (Mancia et al., 1997; Pickering et al., 2002).

Racism might also affect cardiovascular health because it is relevant to identity processes (Cross, 1991; Sellers et al., 1998; Thoits, 1991). Ethnic identity has been defined as "the feeling of belonging to one's group, a clear understanding of the meaning of one's [group] membership, positive attitudes towards the group, familiarity with its history and culture, and involvement in its practices" (Phinney et al., 1994, p. 169). Most research on racial or ethnic identity has examined the ways in which it acts as an antecedent or correlate of mental

health, or how it moderates or mediates the relationship between perceived racism and mental health.

I propose that racial or ethnic identity may affect cardiovascular health in other ways as well. It may impact the perception of interpersonal racism, or it may positively influence the stress appraisal and coping responses to these events, or it may be strengthened by encounters with racism. Thus, it may serve to buffer the effects of perceived racism on health. To date, only six published studies have examined the relationship of ethnic identity to perceived racism and blood pressure. However, this study is the first to explicitly examine the role of personal experiences with discrimination or self-reported perceived racism in relation to ethnic identity and ambulatory blood pressure.

The current study used a mixed-method, cross-sectional design to examine the dynamic role of ethnic identity on the relationship between perceived racism and ambulatory blood pressure among urban-dwelling, adult, U.S. born Blacks. Women and men participating in an ongoing study of racism, coping, and ambulatory blood pressure (Brondolo, 2003) were drawn for the sample. Participants were assessed over the course of three visits. At Visit 1, study eligibility was determined and preliminary demographic information was collected. At Visit 2, past and current experiences of perceived racism were assessed and participants were outfitted with an ambulatory blood pressure monitor and electronic diary to assess blood pressure in daily living situations. During the next 24 hr period, ambulatory blood pressure was taken automatically every 20 min from morning to bedtime and every hour after bedtime. At the time

of every waking reading, respondents completed an electronic diary which assessed relevant covariates including caffeine and alcohol use, smoking, talking, and posture at the time of each reading. At Visit 3, the following day, the measure of racial-ethnic identity was administered and was embedded in a set of self-report measures.

The study examined the following research questions:

1. Is perceived racism related to ambulatory blood pressure among U.S. Blacks, and does the timeframe of racism matter?
2. Is the strength of racial-ethnic identity related to experiences of perceived racism?
3. Does racial-ethnic identity act as a moderator, mediator, or antecedent of the relationship between perceived racism and ambulatory blood pressure?

Background and Literature Review

In the following section, I review literature relevant to the specific research questions of the study. First, I discuss the use of the terms “race,” “racism,” “ethnicity,” and “ethnic discrimination” in the current study. Then, I review the existing literature on the complex nature of racism, with an emphasis on the experience of interpersonal racism among Blacks. Next, I review the general and race-related stress theories which shed light on the conceptualization of racism as a stressor and how the perception of racism may impact changes in blood pressure and hypertension. This theoretical overview is supplemented by a brief review of empirical research published in peer-reviewed journals and conducted in the U.S. that has focused on the relationship of perceived racism to hypertension and hypertension-related risk factors. Finally, research that has conceptualized racial-ethnic identity as an antecedent or correlate of mental health, or as a moderator or mediator of the relationship between perceived racism and mental health is reviewed.

Defining “Race,” “Racism,” “Ethnicity,” and “Ethnic Discrimination”

Before exploring the literature on racism and health, it is critical to define some of the relevant terms.

> Historically, racial categorization has been rooted in racism, and racial classification schemes have had an implicit or explicit relative ranking of various racial groups. Within the U.S. context, whites have always been at the top, blacks at the bottom, and other

> groups in between. The construct of racism can enhance our understanding of racial inequalities in health (Williams, 1999, p. 176).

From this perspective, the use of race is understood as a social phenomenon rather than the biological construct that has historically been used to demarcate ancestral, cultural, and innate inferiority based on phenotypical differences (American Psychological Association [APA], 2001; Smedley & Smedley, 2005). The term, race, is a meaningful way of grouping individuals as it reflects specific forms of maltreatment (e.g., racism) associated with membership in a stigmatized racial group. However, with regard to Blacks, there has been some confusion about whether the term "race" or "ethnicity" is more applicable and whether these terms can be used interchangeably (Helms 1996; Helms, Jernigan, & Mascher, 2005; Jackson, 2001; Phinney, 1996). This confusion also extends to the use of the terms "Black" and "African American."

I take the position that "race" is an important social construct that represents involuntary ascribed group membership based primarily on phenotypic characteristics associated with a particular group. Such a perspective allows us to understand what types of social experiences (e.g., racial discrimination) may be more relevant to individuals based on their membership in a particular racial group. Further, use of the term race retains the sociohistorical context whereas the term ethnicity does not.

The terms "race" and "ethnicity" are often used interchangeably when referring to Blacks and African Americans. For some, the term African American

refers to individuals of African heritage born in the U.S. who are also descendants of slaves brought to this country. From this perspective, not all individuals of African descent in the U.S. would be considered African American. The term “Black” is used to refer to all individuals of African descent, who reside in the U.S., and who are of African ancestry but have roots in other countries and cultures as a consequence of slavery. Blacks or people of African ancestry can be classified into subgroups or ethnic groups such as West Indians, African Americans, and Haitians. Thus, the term African American is not synonymous with the term Black as Black refers to all individuals who are of African ancestry in the U.S. As this study focuses on U.S. Blacks, the term ethnicity is utilized to capture the within-group variability that is a function of the differences associated with the ethnic groups that comprise this particular racial group.

Race and the experience of racism are intrinsically linked (APA, 2001). Racism has been defined as “the beliefs, attitudes, institutional arrangements, and acts that tend to denigrate individuals or groups because of phenotypic characteristics or ethnic group affiliation” (R. Clark et al., 1999, p. 805). The term “racism” also has been used to describe attitudinal and behavioral phenomena known as prejudice, bias, maltreatment, or discrimination (Brondolo et al., 2003; R. Clark et al., 1999; Krieger, 1999; Taylor & Grundy, 1996).

Some researchers (Brondolo et al., 2003; Contrada et al., 2000, 2001) have used the term “ethnic discrimination” to describe experiences of unfair treatment associated with one’s ethnicity, where “ethnicity” refers to various groupings of individuals based on culture of origin or race. For instance, a Black person may

be treated unfairly because of they are of Haitian lineage. However, as discussed earlier, because individuals of African ancestry in the U.S. may comprise sub-ethnic groups, but are considered to have membership in the Black racial group the terms racism, racial discrimination, race-related bias, and race-related maltreatment will be used interchangeably to describe the experiences of U.S. Blacks.

Conceptualizing Interpersonal Racism

Racism is conceptualized as a multilevel phenomenon including institutional, structural, cultural, environmental, and interpersonal levels (S. P. Harrell, 2000; C. P. Jones, 2000 & J. M. Jones, 1997; Krieger, 1999). Depending upon the level of analysis, racism has been shown to have both indirect and direct effects on the psychological and physical health of racial and ethnic minority individuals (e.g., Landrine, Klonoff, Corral, Fernandez, & Roesch, 2006). For instance, racism indirectly impacts the health of Blacks through socioeconomic position and residential segregation (Landrine & Klonoff, 2000; Williams, 1999) or through the lack of access to health care in Black neighborhoods (Williams, Neighbors, & Jackson, 2003).

This study will focus on the direct health effects of interpersonal racism. Interpersonal racism is defined as “directly perceived discriminatory interactions between individuals whether in their institutional roles or as public and private individuals” (Krieger, 1999, p. 301). Such experiences often traverse the other levels of racism (J. M. Jones, 1997; Krieger, 1999). That is, interpersonal racism can occur in any setting where the targets of racism interact with others.

Dependent on the level of racism, different assessment strategies are used. For instance, to assess racism at the institutional level, objective measures such as audit studies (Fix & Struyk, 1993; Quillian, 2006), redlining data (Gee, 2002), or health care statistics (Krieger, 1999) are often used. These methods typically rely on aggregate-level data and, thus, the occurrence of racism is inferred through systematic review of race-related bias indicators. To assess racism at the interpersonal level, subjective self-report measures are the primary assessment tool (Utsey, 1998). An individual's assessment of interpersonal racism is linked to a process of cognitive appraisal, and is not inferred from its outcomes or from aggregate-level data.

The Prevalence of Interpersonal Racism in the U.S.

Interpersonal racism is a multidimensional phenomenon (Brondolo et al., 2005; Krieger et al., 2005). Most studies have found that Blacks experience interpersonal racism on a regular basis across their lifetimes (Landrine et al., 2006). For instance, across four studies of Blacks with varying demographic characteristics, 80 to 100% of participants reported some experience of racism in their lifetime (Klonoff & Landrine, 1999; Krieger & Sidney, 1996; Landrine & Klonoff, 1996; Peters, 2004). These figures do not drop significantly within a shorter time span.

One study that utilized random-digit dial telephone surveying to contact 495 community-dwelling Black adults (≥ 18 years old) found that 60% reported at least one experience of racial discrimination within the past three years (Broman, Mavaddat, & Hsu, 2000). Another study of 153 Black adults approached on a

California university campus found that nearly all respondents – 98% – reported at least one racist event within the past year (Landrine & Klonoff, 1996). The most commonly reported experiences were discrimination from a stranger and being discriminated against by a store clerk or waiter (both reported by 83% of the sample). Other common experiences included discrimination from health and helping professionals (55%), being called a racist name (50%), and being subjected to physical violence or verbal threats (33%). In a study of 361 first-year students attending a northeastern university, however, Contrada et al. (2001) found that few Black students reported physical threats and harm related to racial bias; however, this study included a small number of Black respondents (n = 34). It is possible that the older Blacks in the Landrine and Klonoff (1996) study had more experiences with physical threats and harm related to racial bias because of their age; this difference notwithstanding, it is hard to discount the frequency of racism-related events reported overall.

In a study of 200 Black adults residing in St. Louis with lower annual incomes ($22,500) and limited formal education (i.e., 20% completed high school & 37% had some college), one-third – 34% – reported experiencing racism during the past six months (Thompson Sanders, 1996). Events were classified by the investigator as minor (e.g., name calling, slurs, and insults), moderate (e.g., refusal of services or unfair job assignments), and severe (e.g., salary and promotion inequities, denial of housing, and police mistreatment). One-third of the reported events were classified as minor, 44% were classified as moderate, and 17% were classified as severe.

Another study (Brondolo et al., 2005), investigated lifetime racial and ethnic discrimination as well as racist events during the past week among 173 Black and 82 Latino(a) adults recruited from three primary care centers in New York City. Two-thirds of the respondents were medical patients and one-third were staff members. Only three Black participants said they never experienced racial discrimination, while 98% reported that they had experienced racial discrimination *at least occasionally* across their lifetime. Further, 80% of the Black participants reported at least one racial incident in the past week, with 70% reporting three or more incidents in the past week. Thus, racial and ethnic minority individuals are not only likely to experience racism in their lifetimes, but these experiences can recur on a monthly or even weekly basis.

Where does racial discrimination occur? In the Broman et al. (2000) study, community dwelling adults experienced most discrimination while shopping (40%), at work (29%), or while looking for a job (23%), and surprisingly, the least from interactions with the police (15%). In the Brondolo et al. (2005) study, most participants (85%) reported experiencing at least some racial or ethnic discrimination in one of nine settings, including the criminal justice system, looking for housing, medical services, in school, at work, at a religious institution, in public places, on the street or in a park, and at a private function. These experiences were characterized by the investigator as social exclusion and rejection (e.g., being ignored or called a bad name), discrimination in the workplace or at school (e.g., treated unfairly by a boss, supervisor, or teacher), stigmatization (e.g., someone hinted the respondent was unclean, untrustworthy,

lazy, or dishonest), or physical threat and aggression (e.g., threat of physical or property damage or actual hurt to the respondent or their property). Thus, Black experiences with racism cross multiple settings and are of multiple types. Although some research has suggested that experiences of interpersonal racism vary by demographic factors, including gender and socioeconomic status, these experiences are not solely a function of these factors (Krieger, Smith, Naishadham, Hartman, & Barbeau, 2005; Williams, Yu, Jackson, & Anderson, 1997).

Blacks not only experience race-related bias from Whites and other racial and ethnic groups (inter-group racism), but also from other Blacks (intra-group racism). In the Brondolo et al. (2005) study, Blacks and Latinos reported that most discrimination came from Whites (53%), followed by Blacks (27%), Latinos (10%), Asians (5%), and Native Americans (4%). In terms of intra-group perceived racism among Black participants, 28% reported that other Blacks gave them the most difficulty. Similarly, in a study of 269 Black university students (53% female; $M = 26$ years old), over a third reported that racism had impacted their lives (R. Clark et al., 2004). Although the students attributed 65% of their negative life experiences to non-race related sources, they attributed 20% of these experiences to inter-group racism and the remaining 15% to intra-group racism. These findings are indicative of the potentially important role of intra-group racism in the lives of Blacks as they may also experience interpersonal racism from other Blacks in addition to their experiences of racial-bias with Whites and other non-minority racial and ethnic individuals.

The empirical findings on the frequent nature of interpersonal racism among Blacks are consistent with data from qualitative studies (Essed, 1990, 1991; Feagin, 1991; Feagin & Sikes, 1994). The ubiquity of interpersonal racism has led to the depiction of these events as "everyday racism," "day-to-day discrimination," and even "chronic discrimination" (Essed, 1990, 1991; Kessler, Mickelson, & Williams, 1999; Lewis et al., 2006; Swim et al., 2003). Both Essed (1990, 1991) and Pierce (1995) have argued that traditional (blatant) racial discrimination is no longer the "substance of today's racism" (Pierce, 1970, p. 516). Instead, the more routine and subtle forms of discrimination that are embedded in everyday life reflect contemporary racism (Williams & Williams-Morris, 2000), also called the "third wave" (Dovidio, 2001).

Racism as a Chronic Stressor

Psychologists have likened the experience of contemporary racism to a chronic stressor. In contrast to a major life event, a chronic stressor is a pervasive, ongoing experience that has no known or set endpoint and results in psychological stress reactions (Pearlin, 1989; Wheaton, 1997). In the racism literature it is unclear, however, as to whether the application of the term "chronic stressor" is used to indicate the duration of a single, racist experience, its magnitude, both the duration and magnitude of its impact, or the cumulative nature of racist events across one's lifetime. For instance, Outlaw (1993) conceptualizes racism as a chronic stressor based on the pervasive and unavoidable nature of racist events, but does not articulate the magnitude of various racist experiences as a function of their chronic nature.

Drawing on the general stress literature, one can conceptualize interpersonal racism in other ways as well. Stress researchers tend to classify stressors – as major life events, chronic stressors, or daily hassles. Major life events significantly impact and change an individual's life (e.g., loss of a loved one), and may cause chronic stressors. Daily hassles are the repeated or chronic strains of everyday life (e.g., misplacing or losing things, unexpected company, not getting enough rest; DeLongis, Coyne, Dakof, Folkman, & Lazarus, 1982). Chronic stressors and daily hassles are both considered ubiquitous forms of stressors as they can be ongoing or recurring events. Some have distinguished between these two types of stressors based on the exact nature of the specific events that comprise these two forms of stressors (Serido, Almeida, & Wethington, 2004). Serido et al. (2004) suggest that chronic stressors present an ongoing threat, whereas daily hassles are the "vast array of minor *disruptions*..." that occur in day-to-day life (p. 30). From this perspective, the term chronic stressor is used to reflect a specific event that is ongoing, whereas, the term daily hassles is used to reflect specific events that occur occasionally across one's lifetime, but may become a chronic source of stress (Grzywacz, Almeida, Neupert, & Ettner, 2004; Wheaton, 1997). For instance, air pollution, crowding, and ambient noise are considered chronic stressors (as they do not cease and are ever-present sources of stress), whereas losing one's keys, a flat tire, or a stained shirt are considered types of daily hassles. The exact event may occur infrequently, but overall such events may occur frequently in any given day (Grzywacz et al., 2004). Moreover, although these three forms of stressors can

be distinguished by their duration and magnitude, these distinctions are not always clear. For instance, the loss of one's home (major life event) can spur the onset of other stressors such as crowding (chronic stressor) and parking tickets (daily hassles) as one relocates to a more urban living environment.

Although racism has been conceptualized as a chronic stressor, the exact application of this term is unclear. Many investigations of interpersonal perceived racism do not distinguish among racist events as major life events, chronic stressors, or daily hassles, nor do they delineate the various ways in which the specific forms of racism may overlap or contribute to other racist events. This delineation may be critical for understanding the relationship of race-related stress to health outcomes. For example, most measures of self-reported racism do not disentangle the various forms of interpersonal racism that may be experienced.

The Perceived Racism Scale (PRS; McNeilly et al., 1996) can serve as an example. The PRS is a well used measure that inquires about the frequency of events such as physical harm, denial of a loan, or denial of hospitalization or medical care that are deemed by the respondent to be race-related. Such experiences have the potential to significantly impact an individual's life, and in turn, could be considered major life events. For instance, experiencing physical harm could well impact ones' long-term physical health if the injuries were severe. The denial of medical care could well increase the risk for morbidity or mortality associated with some conditions (e.g., a stroke) without immediate medical care. Thus, while the frequency of race-related events is assessed in an effort to

understand the chronic nature of these events, attention is not given to the specific nature of the events themselves. Unfortunately, such conceptualizations of race-related stressors may obscure the relationship between interpersonal racism and health outcomes by confounding the frequency of various race-related events with their magnitude and psychological impact and in turn, refer to all race-related events as chronic stressors.

In a recent study of perceived ethnic discrimination and daily mood among Blacks and Latinos (Broudy et al., 2007), interpersonal racism was conceptualized as a chronic stressor that could influence health in two ways. First, events of a race-related nature may occur repeatedly, including racial-related bias such as social rejection or exclusion (Contrada et al., 2001; Feagin, 1991; Swim et al., 1995). The investigators argue that these events alone may sufficiently warrant the use of the term chronic discrimination. Second, experiences of past discrimination may impact the way individuals perceive current and future experiences with racism. Specifically, past racial discrimination may make people more likely to appraise new situations as potentially threatening and harmful (see also, Brondolo et al., 2005b). Broudy et al. suggest that such events may change future appraisals of ambiguous events. In both instances the issue of confounding the frequency of such events with the magnitude of these specific events still remains.

Most stressors have their most potent effects on health when they are chronic, persistent, and pervasive (Pearlin, 1989). Chronic stressors are better predictors of a host of mental and physical health outcomes compared to major

life events (Bolger, DeLongis, Kessler, & Schilling, 1989; Chamberlain & Zika, 1990; Eckenrode, 1984; Kanner, Coyne, Schaefer, & Lazarus, 1981; Wolf, Elston, & Kissling, 1989) or daily hassles (Delongis et al., 1982).

Thus, it is important to consider (at least) these two ways in which racism can be conceptualized as a stressor: as a function of the frequent and pervasive nature of racism in the lives of racial and ethnic minorities and as a function of the magnitude, duration, and frequency of specific racist events.

Drawing on Outlaw's (1993) conceptualization of racism as a chronic stress, the current study will examine the ways in which the repeated and lasting impact of interpersonal racism affects health. This study draws attention to interpersonal racism as a multidimensional phenomenon which can be intra- or inter-group, can occur across multiple settings (e.g., on the street or at work), is conveyed through various means (e.g., stigmatization), and across one's lifetime. From this perspective, interpersonal racism is conceptualized as a chronic stressor because it is ubiquitous in the daily lives of Blacks.

Race-Related Stress and the Stress Process

The conceptualization of racism as a stressor has guided much of the theoretical analysis of how racist events affect health among Blacks (J. P., Harrell, Merritt, & Kalu, 1998; Jackson et al., 1996; Krieger & Sidney, 1996; McNeilly, Anderson, Armstead et al., 1996; Outlaw, 1993). Research on racism and discrimination has emphasized the importance of perception (Outlaw, 1993; Slavin et al., 1991). Of interest here is the role of cognitive appraisal in the interpretation of a racist event as stressful and how this perceived racism impacts

the health of African Americans. I will draw on the general stress and coping model proposed by Lazarus and Folkman (1984) and expansions of this theory that are specific to racism (Outlaw, 1993) and its health sequelae (R. Clark et al., 1999).

The stress process is comprised of at least three components: the experiential event, individual perception of the event as stressful, and the stress response (Cohen, Kessler, & Gordon, 1995). In the classic stress and coping paradigm (Lazarus & Folkman, 1984), psychological stress is defined as, "a particular relationship between the person and the environment that is appraised by the person as taxing or exceeding his or her resources and endangering his or her well-being" (p. 19). Once an individual perceives that an event is stressful, psychological and physiological stress responses can result (Lazarus & Folkman, 1984). Thus, the stress process emerges as a result of an individuals' appraisal of particular environmental stimuli that they encounter; stimuli aren't stressful *per se*.

In 2000, Harrell proposed a race-related stress theory, which extended Lazarus and Folkman's (1984) stress theory to focus on the role of race in the stress process. In her adaptation of Lazarus and Folkman's (1984) paradigm, Harrell focuses on the relation between the first two components – the event and the individual perception of the event as stressful. She defines race-related stress as "the 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" (2000, p. 45). Specifically, individual perceptions of racism constitute a unique stressor that poses a threat to racial and ethnic minority individuals. R. Clark et al. (1999) expand this theory to suggest that these "threats" lead to the third component of the stress process: negative effects on psychological and physiological health.

For racism to act as a stressor it must be perceived by the targeted individual as relevant to his or her well-being. This requires a process of cognitive appraisal, or "the process of categorizing an encounter, and its various facets, with respect to its significance for well-being…it is largely evaluative, focused on meaning or significance, and takes place continuously during waking life" (Lazarus & Folkman, 1984, p. 31).

According to Lazarus and Folkman (1984), cognitive appraisal consists of primary and secondary appraisal processes. Primary appraisal is the cognitive process of evaluating an event to determine its relevance to the individual. Three types of primary appraisals are possible: irrelevant, benign-positive, and stressful. An event is appraised as irrelevant if the individual determines that it has no impact or meaning for them – good or bad. In this instance, there is no need for additional responses to the event. Benign-positive appraisals occur when the perceiver thinks the event is positive or may have a positive outcome. Stress appraisals occur when an individual perceives that an environmental stimulus is linked to past harm or loss, or poses a threat or challenge. When an individual perceives an event as a threat or a challenge they begin marshalling coping resources that may enable them to more effectively respond to the event; the

secondary appraisal process is activated.

Outlaw's (1993) adaptation of Lazarus and Folkman's framework (1984) to racism posited that the stress appraisal of threat was the only applicable cognitive response that Blacks would have when they perceive a potentially racist event. Once a Black person has perceived an event as racism, they are likely to consider it as relevant to their well-being and are aware that negative outcomes may occur. Based on Outlaw's theory, the two other primary appraisal responses, irrelevant and benign-positive appraisals – are not relevant to Blacks' experiences with racism. She posits that the perception of an event or experience as racism results in a stress appraisal as racism is inherently stressful.

Experiences of perceived racism may serve as a unique source of chronic stress that disproportionately impacts the health of racial and ethnic minority individuals (Myers & Hwang, 2004). Experiences of perceived racism are stressful to most individuals regardless of their race or ethnicity; however Blacks have been found to experience more distress from these events in comparison to other racial and ethnic minority groups (Klonoff & Landrine, 1999; Landrine & Klonoff, 1996; Utsey, 1998; Williams, 2000). In the studies by Klonoff and Landrine (1999) and Landrine and Klonoff (1996), most (95% and 99%, respectively) of the Black participants who reported experiencing racism characterized these experiences as stressful. Utsey, Chae, Brown, and Kelly (2002) also found that community samples of African Americans experienced more race-related stress from experiences of interpersonal racism in comparison

to Asians or Latinos.

Much of the research on the effects of perceived racism has focused on negative psychological outcomes (for reviews see Paradies, 2006; Williams, Neighbors, & Jackson, 2003; Williams & Williams-Morris, 2000). There is strong evidence that perceived racism is associated with greater emotional distress, depressive symptoms, anxiety, and negative affect (Broudy et al., 2007; Paradies, 2006). In comparison to the research on the effects of perceived racism on mental health, the research on physical health is less substantial and the findings more equivocal (Williams, Neighbors, & Jackson, 2003). However, the effects of interpersonal racism on physical health may have long-term consequences and be responsible, in part, for the Black-White differentials in morbidity and mortality. Thus, it is critical to further our understanding of mechanisms that link perceived racism and negative health outcomes among Blacks.

A Model of the Effects of Interpersonal Racism as a Chronic Stressor on Cardiovascular Functioning

Theoretical arguments regarding the mechanisms by which perceived racism affects physical health among Blacks have been articulated by several researchers (J. Harrell et al., 2003; Mays et al., 2007; J. Harrell, Merritt, & Kalu, 1998; Myers, 1982; Outlaw, 1993; Williams, Spencer, & Jackson, 1999). To date, the most recognized conceptualization was forwarded by R. Clark and colleagues (1999) in their biopsychosocial model of racism as a stressor. This seminal paper suggested that the effects of racism on health could be fit within a stress and coping paradigm: If racist events are cognitively appraised as stressful,

they will have negative physiological and psychological sequelae. Moreover, these stress responses may account for inter-group differences in health. The principal tenet of this model is that the perception of an environmental stimulus as racist results in exaggerated psychological and physiological stress responses. The model highlights chronic, repetitive, physiological arousal responses as a potential mechanism linking perceived racism and poor health outcomes (R. Clark et al., 1999). However, this framework provides only a broad conceptualization of the relationship between perceived racism and health outcomes. It does not specifically elucidate how racism becomes a chronic stressor, or which physiological systems it might effect.

A plausible mechanism linking chronic stress (race-related or non-race-related) to hypertension and hypertension-related risk factors is the effect of cumulative, recurrent stress on multiple physiological systems (Seeman, McEwen, Singer, & Burton, 2001). Specifically, repeated and excess physiological arousal over time may contribute to the poor functioning of organs such as the vascular system and the heart (Brosschot, Gerin, & Thayer, 2006). Recent theoretical developments provide further explanation of the pathophysiological pathway linking chronic stress to these physical health outcomes.

Allostatis, Allostatic Load, and Race-Related Stress

One of the most comprehensive models of the relationship between chronic stress and physical health focuses on the construct of allostatic load (McEwen, 1998, 2002). Allostatic load is a measure of cumulative physiological

risk that emphasizes the interplay between chronic stressful stimuli and arousal habituation. As with earlier theories of physiological responses to stressful stimuli such as Cannon's fight-or-flight response theory (1915/1929) and Selye's General Adaptation Syndrome (1946, 1952), McEwen's theory of allostatic load posits that the long-term effect of physiological responses to stress may damage bodily systems. However, instead of suggesting that when the body is faced with a stressor, it seeks to return to its pre-stress state (homeostasis), McEwen's theory emphasizes constant readjustments (allostasis). Most adjustments are beneficial, but the constant need to readjust in the face of chronic stress can damage organ systems.

The theory of allostatic load posits that the repeated attempts to habituate to the physiological arousal responses associated with chronic stress are adaptive in the *short-term*, but lead to physiological dysregulation (i.e., chronic overactivity or underactivity) in the long-term. The stress response cannot help one reach a quick resolution in a stressful situation. As a result, physiological arousal occurs as the individual attempts to manage the event. However, because the organism cannot flee these situations, the allostatic response begins to cause wear and tear on physiological systems, including the cardiovascular system. The result is allostatic load – *too much dysregulation for too long a time* – which leads to illness.

Four Conditions Under Which Allostatic Load Occurs. There are at least four conditions under which allostatic load can occur (McEwen, 1998). The first three conditions are a result of attempts to manage a stressful situation: 1)

frequent stress exposure, 2) the inability to adjust to a familiar environmental stimulus, and 3) the inability for the stress response to cease once the stressor is no longer present. In each of these conditions, there is some level of chronic reactivity occurring whether the stressor itself is chronic (condition # 1) or because the body is unable to stop the stress response either after it should have acclimated to the presence of the stressor (condition # 2) or the stressor itself has ceased (condition # 3). Eventually allostastis results in allostatic load as the stress response shifts from enabling a person to meet a challenge to becoming a process of wear and tear on the body. The fourth condition under which allostatic load occurs is when there is a system dysfunction or fatigue of a particular component that then contributes to maladaptive compensatory responses in the other components of the systems (McEwen, 1998). The fourth condition represents an inadequate stress response.

Race-Related Stress and Allostatic Load. Although it is not clear exactly how hypertension develops and the evidence linking perceived racism to the onset of hypertension is tentative, the relationship between allostasis and allostatic load may represent one potential theory of this relationship. Although multiple factors are associated with the onset of hypertension (including physical inactivity, weight, genetics, and risk behaviors), it ultimately results from dysregulation of blood pressure due to persistent and pathological autonomic hyperactivity to stress. Drawing on the first three conditions under which allostatic load can occur, several possible pathways through which race-related stress might lead to prolonged increases in allostatic load can be articulated. For

instance, if an individual works in a racially hostile environment they may experience prolonged periods of physiological arousal during their work hours (condition # 1). Prolonged exposure to such a stressful environment for several months or even years may lead to poor health functioning.

Alternatively, if one works in an environment where colleagues are always making racially insensitive comments or jokes one to expect that he or she will eventually adjust to these comments and might even anticipate them. However, even though these experiences no longer are unexpected or novel, some individuals may not adjust to them. As a result, such individuals may continue to experience arousal when these events happen in this environment (condition # 2). In other words, racial and ethnic minorities do not adjust to the experience of racism (Brondolo et al, 2006). Given that it does not appear that individuals habituate to racist events, frequent new events may create ongoing demands.

The third condition, where the stress response is unable to cease although the stressor is no longer present, may also elucidate the relationship between perceived racism and allostatic load. Using the work environment scenario again, imagine an individual who has been working in an environment that they have experienced as racially hostile. A recent change in management eliminates the factors that made this a hostile environment. However, the individual continues to ruminate and feel upset by the past experiences. One explanation for this ongoing physiological arousal is that these events change appraisals, such that there may be sustained levels of physiological arousal even in the absence of a specific race-related event.

Stress is a significant risk factor for the onset and progression of hypertension (Krantz & McCeney, 2002.) It is plausible that a chronic, social condition, such as racism, could impact physiological functioning through the four allostatic load conditions just described. In response to a psychosocial stressor, the body releases hormones such as epinephrine (or adrenaline) that can increase blood pressure by narrowing the blood vessels and increasing the heart rate (Sheps, 2002). This physiological response is intended to prepare the body to cope with the stressor. However, prolonged, frequent stress causes exhaustion, and wear and tear on physiological functioning (Whitaker, 2000). Although the four premises proposed here represent potential pathways for the relationship between perceived racism and the onset of hypertension, it is still important to consider that the evidence linking perceived racism with hypertension is not consistent.

The literature on chronic stress related to job strain provides the most consistent evidence of how frequent exposure to stress may lead to increased blood pressure and hypertension. For example, one study investigated job strain in a sample of 213 men who had been employed for a long time (Landsbergis, Schnall, Pickering, Warren, & Schwartz, 2003). Those men, who reported high job strain during at least 50% of their employment, had higher systolic blood pressure (measured at work and at home) in comparison to men who did not report high job strain. Other research has shown that individuals in highly stressful jobs develop hypertension at a higher rate than individuals with less stressful jobs; for example air traffic controllers tend to develop hypertension at

almost six times the rate of people in lower stress jobs (Ming et al., 2004). In a 20-year follow-up a sample of air traffic controllers who were originally classified as normotensive or Stage I hypertensives, increases in systolic blood pressure reactivity to work stress across the 20-years were associated with greater risk for developing hypertension. Thus, cardiovascular reactivity to chronic work-related stressors may be a risk factor for incident hypertension. Moreover, this research demonstrates that greater exposure to a stressor may contribute to the onset of hypertension. Extrapolating from this research, one can see how racism – a long-standing and persistent stressor – may contribute to the onset and progression of hypertension and other hypertension-related conditions. Although this relationship is not established, the role of perceived racism may account for some of the disparities associated with hypertension among Blacks and non-minority racial and ethnic groups in the U.S.

In summary, the conceptualization of racism as a chronic and frequently experienced stressor that may create allostatic load and subsequently impact cardiovascular functioning is an important tenet in the study of interpersonal racism. Current models of the relationship between racism and health have not specified the exact pathways that enable this link. The current study integrates and builds on the existing conceptualizations of stress and adaptation proposed by Lazarus and Folkman (1984), Outlaw (1993), R. Clark et al. (1999), and McEwen (1998). An integration of these four models allows us to understand that once an environmental stimulus (a race-related event) is perceived as having the potential for harm or threat, the mind and body respond through psychological

and physiological arousal stress responses. Over time, the repeated activation and adaptation of these psychological and physiological systems, coupled with ineffective coping responses, lead to allostatic load, which taxes the systems and leads to the disease process. For this model to operate, a number of assumptions must be met: 1) the race-related events are perceived as stressful, 2) these appraisals evoke psychological and physiological responses, and 3) coping responses are not able to regulate these responses. Recently, behavioral medicine research has begun to provide evidence for these mechanisms. This literature will be reviewed next.

Evidence Linking Interpersonal Racism to Blood Pressure among U.S. Blacks

Although there is a strong theoretical rationale for a relationship between perceived racism and cardiovascular health, there has been relatively little empirical research examining this relationship. Three types of research on perceived racism and cardiovascular outcomes predominate, based largely on how cardiovascular outcomes are measured. The first type consists of observational, correlational studies where blood pressure is measured while the participant is seated. These measures are commonly referred to as measures of clinic blood pressure or resting blood pressure. Other studies examine self-reported hypertensive status. The second type involves laboratory analogues of stress and measures cardiovascular reactivity to the laboratory stressor. Most often, changes in blood pressure are created from the difference between baseline and post-stressor blood pressure readings, and serve as the indicator of cardiovascular reactivity. The third type uses ambulatory blood pressure

monitoring to capture repeated “real-time” measures of blood pressure. This approach allows for assessment of the causal relationship between naturally occurring interactions and blood pressure in daily life. In comparison to studies where resting blood pressure or cardiovascular reactivity are assessed, ambulatory blood pressure monitoring captures multiple blood pressure readings across a longer time span in the participant’s natural setting. As such, it may be more uniquely suited to capture the cardiovascular effects of a chronic stressor, such as racism.

In 2003, four review articles were published that addressed the relationship between perceived racism and cardiovascular outcomes (Brondolo et al., 2003; Hall et al., 2003, Williams et al., 2003; Wyatt et al., 2003). Together, these reviews provide a comprehensive state of the science and offer critical suggestions on how research could be improved. Rather than replicating these reviews, I will draw on their conclusions and highlight the methodological and conceptual issues most relevant to this dissertation. Specifically, I will examine the evidence for the role of perceived racism as a risk factor in the development of hypertension and hypertension-related conditions among Blacks by assessing studies in which blood pressure or hypertension status was an outcome. In doing this I will discuss research published before and since the four reviews, thus bringing the overall “state of the science” up to date.

The relationship between interpersonal racism and resting blood pressure or hypertension status. Findings on the relationship of perceived racism to resting blood pressure and hypertension status are mixed. Of 13 studies that

explicitly investigated the relationship of perceived racism or racial discrimination to resting blood pressure or hypertension status, six found no relationship (Broman, 1996; Brown, 2004; Davis et al., 2005; Din-Dzietham et al., 2004; Dressler, 1990; Poston et al., 2001), three found indirect relationships (R. Clark, 2006b; R. Clark & Gochett, 2006; Peters, 2004), three studies found weak to modest, direct relationships (Cozier et al., 2006; K. James, Lovato, & Khoo, 1994; S. A. James, LaCroix, Kleinbaum, & Strogatz, 1984), and two found inverse relationships (Krieger, 1990; Krieger & Sidney, 1996).

Two of the studies which offered indirect evidence of a relationship between perceived racism and blood pressure looked at the ways in which "person-centered" factors might moderate this relationship. Specifically, R. Clark (2006) and R. Clark and Gochett (2006) examined the respective influences of trait anger and coping style on the relationship of perceived racism to resting blood pressure among Black adolescents. In the first of two studies, R. Clark (2006) found that perceived racism was inversely related to resting blood pressure among individuals low in trait anger. He suggested that these individuals may avoid potentially stressful interactions or that they may not experience anger when they are faced with racial discrimination. In the second study, R. Clark and Gochett (2006) found that coping style buffered the effects of high levels of perceived racism on resting blood pressure. Those who experienced a great deal of discrimination but accepted perceived racism as a fact of life, had lower resting blood pressure than those who did not.

A study by Peters (2004) found that age moderated the relationship

between perceived racism and resting blood pressure. In an urban sample of Black adults, older participants (i.e., $\geq$ 40 years of age) who reported lower levels of racism had the highest levels of diastolic blood pressure. It is plausible that older individuals downplay their past experiences with racism such that they underestimate the frequency of these events in their lives.

Across the five studies that found a direct relationship between perceived racism and resting blood pressure, two focused on work-related racial discrimination (K. James et al., 1994; S. A. James et al., 1984). K. James et al. (1994) conducted a study of 89 minority individuals. The majority were Mexican American (64%), but the study also included African Americans (18%), Native Americans (10%), Mixed Race/Ethnicity Americans (4.5%), and Asian Americans (3.4%). Work-related prejudice and discrimination was significantly, though weakly related to resting blood pressure.

A study by S. A. James and his colleagues (1984) examined the role of job-related racial discrimination in a sample of Black men. The single item on racial discrimination asked participants if they felt their race had been a hindrance to their job success. Men who believed that there race was a hindrance had higher diastolic blood pressure than those who did not.

In two studies by Krieger (Krieger, 1990; Krieger & Sidney, 1996), racial discrimination was inversely related to resting blood pressure. Using data from the CARDIA study, Krieger and Sidney (1996) examined unfair treatment and racial discrimination in a large sample (n = 1,974) of young, working class Blacks between the ages of 25 and 37. Those individuals who reported no experiences

of racial discrimination had higher resting blood pressure than those who reported experiencing at least 1 to 2 incidents of racial discrimination. This finding replicated an earlier study (Krieger, 1990) which assessed between- and within-group differences in the effects of racial and gender discrimination among Black and White women. Among Black women, those who reported they had not experienced racial discrimination had higher resting blood pressure than those who reported they had. Additionally, the risk for hypertension was 2 - 3 times greater among those individuals who reported no racial discrimination in comparison to those who reported any racial discrimination. Women who report no experiences with discrimination may be suppressing experiences of maltreatment as race-related or may not have perceived these experiences as race-related, thus, they may not be prepared to cope with these events. Taken together, these studies (Broman, 1996; Brown, 2004; Davis et al., 2005; Din-Dzietham et al., 2004; Dressler, 1990; Poston et al., 2001) do not provide consistent evidence about the association between perceived racism and resting blood pressure.

Recently, the first prospective study of racism and the onset of a new hypertension case (i.e., incident hypertension) was published on 30,330 Black women using data from the Black Women's Health Study (Cozier et al., 2006). Racial discrimination was associated with the occurrence of hypertension among two particular subgroups of Black women -- those who were foreign-born or had grown up in predominantly White neighborhoods. The findings from this prospective study are provocative and suggest that perceived racism is a salient

predictor of high blood pressure. However, across the 13 studies conducted on perceived racism and resting blood pressure the relationship between perceived racism and blood pressure was inconsistent.

What accounts for the variations in the findings across studies? Some variability may be accounted for by the methods used to assess interpersonal racism, which may influence estimates of the prevalence and severity of exposure and affect estimates of the relationship of perceived racism to resting blood pressure. Many measures do not adequately capture the full spectrum of race-related discrimination. As discussed earlier large percentages of Blacks have reported experiences of physical threat and harm, stigmatization, and social exclusion in survey studies, but few measures of self-reported racism comprehensively address these specific aspects of interpersonal racism.

Moreover, many studies assessed only the presence or absence of *exposure* to racial discrimination, which limits the ability to investigate the effects of chronic stress. Some studies used a “yes” or “no” response format, or administer a single item to ask whether or not respondents had *ever* experienced racial discrimination (e.g., Davis et al., 2005; Din-Dzietham et al., 2004). Although some studies have extended this approach by assessing exposure across various settings, this still does not capture the frequency or chronicity of these events (Krieger, 1990; Krieger & Sidney, 1996).

The formatting used in some measures may limit the focus to more common experiences of racism versus more major life events. For instance, in the studies by R. Clark (2006) and R. Clark and Gochett (2006) respondents are

asked to report their experiences with “everyday discrimination.” Questions inquiring about day-to-day experiences of racial discrimination may be interpreted by participants to refer only to minor or typical events and not major episodes of maltreatment, and thus participants may discount their exposure to major life experiences of racial discrimination. Finally, Klonoff and Landrine (2000) indicate that the time frame in which the racism was experienced (i.e., past week, past year, or lifetime exposure) also appears to influence the relationship of racism to psychosocial outcomes.

Most of studies in this area have focused solely on perceived racism as an intergroup phenomenon. Although not as widely discussed, intra-group racism is a significant problem, particularly among Blacks (Brondolo et al., 2005; R. Clark et al., 1999; R. Clark, 2004). Taken together, the assessment of interpersonal racism as a multidimensional phenomenon must consider exposure and frequency of inter- and intra-group experiences of race-related maltreatment that may occur over the lifetime as well as in day-to-day life.

Interpersonal racism and cardiovascular reactivity. The evidence linking perceived racism to cardiovascular reactivity in laboratory stress analogue experiments is more consistent than the observational studies, perhaps because the methodologies are more consistent across studies and have greater internal validity. Some studies use self-report measures of racism while others use laboratory analogues to predict changes in with psychophysiological outcomes (Harrell et al., 2003). Cardiovascular reactivity is typically measured by subtracting baseline blood pressure from blood pressure taken during and after

exposure to stressful stimuli.

Overall, this body of research has suggested that perceived racism is related to blood pressure increases among Blacks in response to laboratory stressors that mirror or elicit racism. At least three specific conclusions have emerged: 1) exposure to racist stimuli produces larger blood pressure responses when compared with neutral, non-racist stimuli, or anger-provoking stimuli, (Armstead, Lawler, Gorden, & Cross et al., 1989; R. Clark & Anderson, 2001; Fang & Meyers, 2001; McNeilly et al., 1995) 2) the perception of racism is related to the relationship between a laboratory analogue stressor and blood pressure reactivity (Lepore et al., 2006; Merritt et al., 2006), and 3) past exposure to perceived racism may impact blood pressure reactivity (R. Clark & Adams, 2004; R. Clark, 2000, 2003b, 2006). The fact that perceived racism leads to increased cardiovascular reactivity among Blacks is important because blood pressure reactivity to stressors may forecast the onset of high blood pressure and related cardiovascular diseases (Carroll et al., 2001).

Eleven studies have explicitly tested the relationship between perceived racism and blood pressure reactivity among Blacks. Of these, six compared the effects of racist and non-racist stimuli on blood pressure reactivity (Armstead, Lawler, Gorden, & Cross et al., 1989; R. Clark & Anderson, 2001; Fang & Meyers, 2001; Lepore et al., 2006; McNeilly et al., 1995; Merritt et al., 2006). Five examined the effects of past exposure to perceived racism on blood pressure reactivity during a race-related stressor task (R. Clark & Adams, 2004), a non-race related stressor task (R. Clark, 2000, 2003b, 2006), or both (Guyll et al.,

2001).

Across the six studies that compared the impact of racist versus non-racist stimuli on blood pressure reactivity among Blacks, the findings have demonstrated that Blacks exhibit significantly higher blood pressure reactivity in response to racist stimuli than to non-racist stimuli. Both McNeilly et al. (1995) and Armstead et al. (1989) found that racial stressors elicited greater blood pressure reactivity than anger-provoking, race-neutral stressors in college student samples. McNeilly et al. reported that participants showed greater blood pressure reactivity to the racist stressor compared with a non-racist stressor, whereas Armstead et al. (1989) reported that blood pressure was significantly increased during exposure to racist stimuli, but not in response to anger-provoking or neutral stimuli. Using racist and neutral film clips, Fang and Myers (2001) found that Black adult males exhibited higher diastolic blood pressure after exposure to the racist clip as compared to the neutral clip.

A study by R. Clark and Anderson (2001) used the recall of personal experiences of perceived racism to assess its effects on blood pressure reactivity in a sample of African American females. Participants exhibited greater systolic and diastolic blood pressure reactivity during the past perceived racism race-speaking task when compared to the race-neutral speaking task. Taken together, these findings provide support for the assertion that the *perception* of racism may be related to the relationship between racism and blood pressure reactivity.

Situations in which the perception of racism is subtle also are linked to greater blood pressure reactivity. In the study by Lepore et al. (2006) the

perception of racism in a *potentially* racial speech task predicted differences among Black women on systolic blood pressure: Among the Black participants, women who attributed the mistreatment to race or racism showed significantly greater systolic and diastolic blood pressure reactivity and slower systolic blood pressure recovery than those who did not make this attribution.

Merritt et al. (2006) reported similar findings in a sample of Black men. Participants were assigned to either a blatantly racist or non-racist condition, with both conditions depicting the same incident of maltreatment. Participants in both conditions also rated how racist the scenario was. Participants in the non-racist condition demonstrated greater cardiovascular reactivity in comparison to those in the blatantly racist condition. However, within group analyses demonstrated that those in the non-racist condition who perceived that the incident was highly racist experienced greater systolic and diastolic blood pressure reactivity in comparison to individuals in the non-racist condition who perceived no racism or those in the blatantly racist condition.

These findings provide further evidence that cognitive appraisals are central to the experience of racism. Several of the studies reviewed here suggest that race-related events and racist stimuli that are blatantly racist (e.g., the racist clip used by Fang & Myers, 2001) influence blood pressure. However, some of these studies suggest that the perception of racism in the absence of what might be deemed an *objectively* racist event still may impact reactivity (Lepore et al., 2006; Merritt et al., 2006). Taken together, individual perception of social stimuli may be a component of how racism affects blood pressure changes.

Past exposure to perceived racism also may impact blood pressure reactivity in response to both race-related and non-race related stressors (R. Clark, 2000, 2003, 2004; 2006; Guyll et al., 2001). Specifically, some research demonstrates that past exposure to perceived racism is associated with increases blood pressure reactivity in individuals who are currently exposed to a racist stressor. For instance, in an investigation of Black and White women, Guyll et al. (2001) compared reactivity to mirror tracing (i.e., non-racial task) and a potentially race-related speaking task but failed to find between-group differences in reactivity. However, Black women who attributed past maltreatment to race (vs. other demographic indicators such as gender or age) experienced greater diastolic blood pressure reactivity to the racist speech stressor task than those who did not attribute past maltreatment to race. Moreover, the two groups did not differ in reactivity to the non-racial task.

Of the three studies which examined the effects of past exposure to racism on only a non-racial stressor task, two found that individuals who reported past exposure had higher diastolic blood pressure reactivity in comparison to those who reported no past perceived racism (R. Clark, 2000, 2006). Using a within group design, participants in both studies responded to a self-report measure of perceived racism – which assessed past exposure – and were asked to speak about their feelings concerning animal rights (i.e., non-racial stressor). In one study past exposure to racism was related to systolic blood pressure reactivity (R. Clark, 2006) and in the other it was related to diastolic blood pressure reactivity (R. Clark, 2000). The third study (Clark, 2003b) provided

evidence of an indirect effect of past exposure to perceived racism on blood pressure reactivity: Individuals with high social support who reported low perceived racism showed less marked changes in blood pressure, while those with high social support who reported high perceived racism had exaggerated blood pressure.

Another study conducted by R. Clark and Adams (2004) utilized a race-related stressor task to assess the impact of past perceived racism on blood pressure reactivity during a speaking task in which participants recalled a personally, relevant experience of ethnicity-related maltreatment. Black women who reported lower levels of past perceived racism and lower levels of John Henryism exhibited higher systolic and diastolic blood pressure reactivity during the speaking task, than those who reported lower levels of past perceived racism but had high levels of John Henryism. This finding suggests that individual characteristics or coping styles may buffer the effects of personal experiences with racism on blood pressure.

What do laboratory studies of blood pressure reactivity add to the literature? First, they provide evidence of an association between perceived racism and cardiovascular health among Blacks. Second, the few studies that compare reactivity among Blacks and Whites, provide limited evidence that there are differential effects as a function of race. Third, the experimental paradigm permits the investigation of changes in cardiovascular functioning in a controlled environment and thus, allows researchers to make statements about the causal relationship between race-related maltreatment and cardiovascular health.

At the same time, the generalizability of laboratory-based findings to real-world race-related chronic stress may be limited (Brondolo et al., 2003; Harrell et al., 2003). Acute, laboratory stressors may not well approximate the impact of chronic stressors in everyday life. Most cardiovascular reactivity studies have only focused on particular dimensions of racism, primarily the level of intensity and clarity to the targeted individual. By considering the effects of acute exposure to racism on blood pressure or the influence of past racism on blood pressure reactivity or resting blood pressure these studies lend some support to the proposition that chronic exposure to racism has a negative impact on blood pressure. Thus, although experimental studies of perceived racism and cardiovascular reactivity provide a basis for understanding that racism can affect blood pressure among Blacks, there is limited research testing the effects of racism on cardiovascular functioning in everyday life.

Studies using varied methodologies provide mixed support for the assertion that racism may impact cardiovascular functioning through its influence on blood pressure reactivity. By demonstrating that exposure to racist stimuli is associated with greater increases in blood pressure reactivity than exposure to non-race related stimuli, or that the perception of racism is associated with greater reactivity across conditions where participants are exposed to racist and non-racist stimuli, these studies further suggest that racism may operate as a unique stressor among Blacks.

Drawing on stress and coping theory, these studies also suggest that individual perception is central to explaining the impact of racial stressors on

blood pressure reactivity. For instance, Lepore et al. (2006) included racist stimuli that reflect the more subtle or ambiguous types of race-related experiences that minority individuals are more likely to experience in today's society (Dovidio, 2001). Further, their finding that Black women who attributed subtle maltreatment to racism had higher blood pressure reactivity in comparison to those who did not make this attribution provides additional evidence for the importance of cognitive appraisal processes. Other studies (e.g., R. Clark, 2000, 2006) point to the additive effect of past exposure to racism on future reactivity, particularly for race-related stressors. Racism may function as a chronic stressor by heightening one's sensitivity to future experiences that may or may not be race-related (Broudy et al., 2007).

To date, only three studies have examined the between-racial or ethnic group differences in the effects of racist and non-racist stimuli (Fang & Myers, 2001; Guyll, Matthews, & Bromberger, 2001; Lepore et al., 2006). Two of the three studies found that Black women experienced greater blood pressure reactivity in response to mistreatment or racist stimuli in comparison to White women (Guyll et al., 2001; Lepore et al., 2006), while the other study did not find the expected racial differences in blood pressure reactivity (Fang & Meyers, 2001).

Lepore et al. (2006) exposed Black and White female participants to three stimuli; a racial stressor, non-racial stressor, and a control condition. During the racial stressor participants were asked to imagine that they had been accused of shoplifting in an upscale department store and asked to talk for three minutes

about how they felt and appraised the situation. Compared to the White women, the Black women had greater diastolic blood pressure reactivity to the racist stressor (shoplifting) than to the non-racist stressor.

Guyll et al. (2001) also examined racial differences in a sample of White and Black females. The authors examined subtle and blatant mistreatment. Respondents were asked to specify the particular form of discrimination they attributed most of their mistreatment to (e.g., age, gender, race/ethnicity). Subtle mistreatment was positively related to diastolic blood pressure reactivity for Black women but not White women. However, this finding is not specific to racial discrimination as subtle mistreatment was operationalized in a generic fashion in this study.

In the study by Fang and Meyers (2001), Black and White men were exposed to two different racist stimuli and no racial differences were found. Some have suggested that using different group-specific racial stimuli may have contributed to the null finding (Lepore et al., 2006)

Taken together, these data provide fairly consistent support for the assertion that Blacks experience greater reactivity in response to racism in comparison to Whites. However, to date only three studies have been conducted to address this particular question. More studies have focused on elucidating with-in group variations in cardiovascular reactivity to perceived racism.

Interpersonal racism and ambulatory blood pressure. A number of recent studies have focused on ambulatory blood pressure as a better indicator of the physiological response to racism. Unlike laboratory studies of cardiovascular

reactivity, ambulatory blood pressure monitoring permits the frequent, non-invasive repeated measurement of blood pressure and can provide measures of both waking and nighttime blood pressure under “real world” conditions (Carels, Sherwood, & Blumenthal, 1998). Through continuous monitoring of blood pressure, ambulatory blood pressure monitoring can be used to capture the influence of normal, day-to-day activities and naturally occurring interactions on cardiovascular functioning (Carels et al., 1998). Moreover, ambulatory blood pressure monitoring has been more closely associated with cardiovascular morbidity and mortality, and is a stronger predictor of these outcomes, than is resting blood pressure or cardiovascular reactivity assessed in a laboratory setting (Fagard, Staessen, & Thijs, 1997; Mancia et al., 1997; Pickering, Davidson, Gerin, & Schwartz, 2002; Staessen et al., 1999).

Despite the superiority of ambulatory blood pressure monitoring, only two studies have been published on the relationship of racial discrimination to ABP monitoring, one on urban Black adolescents in Pittsburgh (Matthews, Salomon, Kenyon, & Zhou, 2005) and the other on young middle-aged African Americans in North Carolina who had normal or slightly elevated blood pressure (Steffen, McNeilly, Anderson, & Sherwood, 2003). Matthews et al. (2005) did not find a relationship of perceived racial discrimination to ambulatory blood pressure, perhaps because of the measurement of racial discrimination. They used a measure of general interpersonal maltreatment that allowed respondents to attribute the maltreatment to one of ten causes, including racism, thus racism is assessed only indirectly. Given that this was an adolescent sample, it is not

surprising that most respondents attributed these experiences to their age.

In contrast, Steffen et al. (2003) found relationship between perceived racism and increased ambulatory blood pressure during waking hours, but not during sleep. The 69 African Americans (aged 25 – 44) in the study were asked to wear an ambulatory blood pressure monitor for a 24 hr period that included a typical work day. Blood pressure measurements were taken four times per hour during the day and twice per hour during sleep. Lifetime past exposure to perceived racism and over the past year were measured using the Perceived Racism Scale (McNeilly et al., 1995). Most (94%) of the sample reported some occurrence of perceived racism during their lifetime and at least 40% reported having such experiences on average several times a week or more. Perceived racism was related to higher resting blood pressure and higher ambulatory blood pressure during waking hours. After controlling for known covariates, including age, sex, income, and body mass index, perceived racism accounted for 7% of the variance in waking systolic blood pressure and 4% of the variance in waking diastolic blood pressure. Perceived racism was not related to sleep blood pressure nor was it related to decreases in blood pressure from waking to sleep.

The studies by Matthews et al. (2005) and Steffen et al. (2003) leave open the question of whether more recent experiences of perceived racism and blood pressure during everyday interpersonal interactions would have yielded different findings. Racism was assessed “in the past” – lifetime exposure and past year exposure, but they did not assess more recent experiences of racial discrimination (e.g., past week). This is a question that the proposed study will

address.

Summary. Although few studies have been conducted and the data are mixed, the research on perceived racism and cardiovascular functioning cautiously suggests that perceived racism is associated with increased blood pressure. However, at least three limitations of the studies reviewed here suggest unanswered questions for future work.

First, assessments of perceived racism must consider the complexity of race-related experiences (Brondolo et al., 2003; Brown, 2001). Much of the research has been hampered by a limited investigation of the ways in which racism is experienced, in that many studies have focused only on the frequency of racist experiences (across one's lifetime or the past year), where it occurs (e.g., at work, school, or on the street), types (e.g., rejection vs. stigmatization), and by whom (e.g., inter- vs. intra-group racism). Instead, a more comprehensive approach to assessing perceived racism is needed where all of these aspects are considered together. Such an approach would capture past experiences of racism as well as more recent perceived racism. The ability to explore the potentially additive effect of lifetime perceived racism on more recent experiences with racial discrimination current may allow us to understand whether past perceived racism acts as a chronic background stressor which negatively influences future interpersonal interactions and in turn, has an additive impact on health outcomes, or whether it operates independently.

Second and related to the previous point, ambulatory blood pressure allows us to better understand changes in blood pressure that are associated

with daily living situations. It is important to capture real-world changes in blood pressure as they more accurately reflect one's overall blood pressure. Studies that utilize ambulatory blood pressure monitoring may build on previous methodologies by elucidating what and when changes in blood pressure occur in response to environmental conditions and social situations. The study of perceived racism and ambulatory blood pressure monitoring by Steffen et al. (2003) provides an initial glimpse into how fluctuations in blood pressure across a typical day might be associated with past perceived racism. However, it is plausible that blood pressure changes over a 24 hr period are influenced by multiple dimensions of perceived racism, including interpersonal interactions with individuals that have occurred across one's lifetime and more recently. Specifically, past experiences might influence the perception of future negative interpersonal interactions as race-related, or by strengthening the cognitive and physiological response one has to these chronic incidents of maltreatment.

Third, individual difference variables increase vulnerability to experiences of interpersonal racism or buffer individuals from its effects. For example, several studies have focused on trait anger, John Henryism, coping style, or social support as moderators of this relationship (R. Clark, 2003; R. Clark & Adams, 2004; Jorgensen, Johnson, Kolodziej, & Schreer, 1996; Steffen et al., 2003). Little attention has been given to other resilience factors that may be particularly relevant. I propose that racial-ethnic identity is related to experiences of perceived racism and blood pressure among Blacks. Racial-ethnic identity may influence the perception, appraisal, and coping, and subsequent physiological

arousal associated with these experiences, and thus serves as a particular stress-buffer.

Racial-Ethnic Identity Among U.S. Blacks

In research on the relationship of perceived racism to mental health among Blacks, a substantial body of work has investigated the role of racial identity and ethnic identity. In this study, "racial-ethnic identity" is considered an individual-difference factor that may account for variations in perception, appraisal, and coping responses to perceived racism and their subsequent health effects. It is important to consider the distinctions and overlap between racial identity and ethnic identity. Although a combined term is used in this study, these are two complex constructs. Researchers differ in their definitions of these constructs and their identification of the components that comprise these constructs.

What is Ethnic Identity? Ethnic identity is defined as "a dynamic, multidimensional construct that refers to one's identity, or sense of self, in ethnic terms, that is in terms of a subgroup within a larger context that claims a common ancestry and shares one or more of the following elements: culture, race, religion, language, kinship, or place of origin" (Phinney, 2000, p. 254). It has been posited that when an individual self-identifies as a member of an ethnic group, that ethnic identity provides information specific to one's racial or ethnic group in relation to the larger society, offers a sense of belongingness, a reference group, shared values, commonality based on group-related experiences, and an understanding of and access to behaviors and practices akin to membership in

that group (Phinney, 1992).

What is Racial Identity? Racial identity is defined as "a sense of group or collective identity based on one's perception that he or she shares a common racial heritage with a particular racial group" (Helms, 1990, p.3). Drawing on the Nigrescence paradigm which means "the process of becoming Black," (Cross, 1995, p. 94) racial identity has been considered a combination of individual reference group orientation and personal identity (Cross, 1995). Reference group orientation refers to how Blacks come to understand themselves as members of a socially ascribed group. Cross et al. (2002) consider Black identity as "the passing down from one generation to the next the learned experiences and identity activities that facilitate Black adjustment and humanity under conditions often framed by race, racism, and the proactive dimensions of Black culture" (p. 94).

Clearly, the two definitions are centered on shared history, values, and a common heritage. Even though the definitions of ethnic identity and racial identity overlap, their research applications have diverged as proponents of the two terms have emphasized the conceptualization of "race" and "ethnicity," and in turn, the measurement of racial identity and ethnic identity have taken on different meanings (Cokely, 2005, 2007; Phinney & Ong, 2007; Quintana, 2007).

Arguably, one of the main points on which the application and use of the two terms and the related measurement approaches diverge is on their emphasis on race-related historical oppression and the consequences of this shared past among some racial groups, particularly African Americans. Researchers who use

racial identity to understand identity among Blacks give considerable attention to the ways in which experiences associated with membership in a stigmatized racial group may influence a minority group, whereas ethnic identity does not explicitly address race- or ethnicity-related oppression that is associated with sociohistorical events particular to Blacks in the U.S. In fact, some have argued that the use of the term ethnicity does not well capture what group membership means to Blacks in the U.S. as it is void of the historical and contemporary meanings of membership in a stigmatized group in the U.S. (Helms & Talleyrand, 1997). Helms and colleagues (Helms, 1996; Helms & Talleyrand, 1997) have argued that the term "race" captures these critical aspects of group membership for U.S. Blacks and, in turn, the term "racial identity" speaks to how these events shape the way Blacks understand their experiences as a group and as members of a stigmatized group, and the ways in which they see themselves in the U.S.

Alternatively, it is possible that the wide variation of ethnicity within the U.S. Black racial group would not be captured by more specific measures of racial identity as these measures may be more relevant to the African American experience. Even when assessing identity specifically among U.S. born Blacks, within-group ethnic heterogeneity may be important, as all members of the Black racial group do not share the same group experiences, histories, and values (Hall & Carter, 2006). Individuals who may be considered Black based on phenotypical characteristics may self-identify as Black, but may also have membership in specific ethnic groups that may result in differential experiences of culture and related practices as well as oppression and discrimination (Cokely,

2007).

Measures of Racial Identity and Ethnic Identity. To illustrate these two points about the ways in which ethnic identity and racial identity diverge, I will highlight three measures that have been used to examine racial and ethnic identity among Blacks in the U.S.: The Multidimensional Inventory of Black Identity (MIBI; Sellers, Rowley, Chavous, Shelton, & Smith, 1997), the Cross Racial Identity Scale (CRIS; Vandiver et al., 2000), and the Multidimensional Ethnic Identity Measure (MEIM; Phinney, 1992).

The MIBI draws on the Multidimensional Model of Racial Identity (MMRI) which posits that race is one of a number of hierarchically ordered identities that Blacks have (Sellers et al., 1997), and that racial identity has stable and situationally specific properties. Sellers et al. (1997, p. 805) write "these situational and dynamic properties interact to provide a mechanism for explaining how racial identity can influence behavior at the level of the situation (molecular level) and exhibit consistency across situations (molar level)." On this theoretical basis, the MIBI assesses how individuals define themselves in terms of race and the qualitative meaning they ascribe to membership in that particular racial group.

Although the MMRI includes four dimensions: salience, centrality, ideology, and regard, the MIBI measures only three – centrality; ideology, and regard. Centrality refers to "the extent to which a person normatively defines her or himself with regard to race...whether race is a core part of an individual's self-concept" (p. 806), (a sample item reads: "*I have a strong sense of belonging to Blacks people*". Ideology refers to "the individuals beliefs, opinions, and attitudes

with regard to the way she or he feels members of the race should act" (p. 806), and regard refers to "a person's affective and evaluative judgment of her or his race" (p. 806). The MIBI measures four different types of ideologies: nationalism (a sample item reads: "*Blacks would be better off if they adopted Afrocentric values*"), minority (a sample item reads: "*There are other people who experience racial injustices and indignities similar to Black Americans*"), assimilation (a sample item reads: "*Blacks who espouse separatism are as racist as White people who also espouse separatism*"), and humanist ("*Black people should not consider race when buying art or selecting a book to read*").The MIBI also assesses regard which refers to " a person's affective and evaluative judgment of her or his race...it is the extent to which an individual feels positively or negatively towards African Americans and their membership in that group" (p. 806 -807). Two dimensions of regard are measured: private regard (a sample item reads: "*I feel that Blacks have made major accomplishments and advancements*"), and public regard (a sample item reads: "*In general, other groups view Blacks in a positive manner*"). Higher scores across these subscales reflect a stronger endorsement of the dimensions that are assessed by the subscales.

The CRIS is the operationalization of the expanded Nigrescence model (Cross, 1991) which posits that all Blacks have Pre-Encounter, Immersion-Emersion, and Internalization attitudes that are best characterized as multidimensional attitudes. Some researchers that use the CRIS (Vandiver et al., 2002) have described these as "racial identity profiles" to indicate that these are attitudes and not invariant sequences as once suggested by the original

Nigrescence model which posited that individuals moved from one identity stage to the next. The model consists of three racial identity themes which consist of a total of three eight Black racial identities (i.e., three Pre-encounter, two Immersion-Emersion, and three Internalization). However, only six are included in the CRIS (Worrell, Vandiver, Schaefer, Cross, & Fhagen-Smith, 2006).

The first theme is Pre-Encounter which refers to "identities that accord low or even negative salience to race and Black culture" (p. 521). The CRIS measures three different types of Pre-Encounter: Assimilation (sample item reads: *"If I had to put a label on my identity, it would be "American ," and not African American"*), Miseducation (sample item reads: *"Many African Americans are too lazy to see opportunities that are right in front of them"),* and Self-Hatred (sample item reads: *"When I look in the mirror at my Black image, sometimes I do not feel good about what I see").* The second theme, Immersion-Emersion refers to "a state of limbo representing identity volatility and flux (p. 522). The CRIS measures one form of Immersion-Emersion, Anti-White (sample item reads: *"White people should be destroyed").* The third theme, Internalization refers to a "sense of reconciliation with being Black in a multicultural world." The authors note that all identities considered under this heading "accord a moderate to high level of importance to race and Black cultural issues" (p. 522). This theme includes Afrocentric (sample item reads: *"Black people cannot truly be free until our daily lives our guided by Afrocentric values and principles"*) and multiculturalist inclusive (sample item reads: *"I embrace my own Black identity, but I also respect and celebrate the cultural identities of other groups e.g., Native*

Americans, Whites, Latinos, Jews, Asian Americans, gays & lesbians, etc.") identities. Similar to the MIBI, higher scores across these subscales reflect a stronger endorsement of the attitudes that are assessed by the subscales.

The Multigroup Ethnic Identity Measure (MEIM; 1992) was developed to operationalize Phinney's conceptualization of ethnic identity. It is considered applicable across ethnic groups and as such has garnered substantial attention. The MEIM assesses ethnic behaviors and practices, feelings of belonging and affirming one's relationship to the group, and ethnic identity achievement through exploration and commitment to one's ethnic group membership. The MEIM also has a scale that measures attitudes toward other groups which Phinney suggest is a separate construct that may be important for understanding ethnic identity.

The 14-item measure includes the following three subscales: affirmation and belonging (sample item reads: "*I am happy that I am a member of the group I belong to*"), ethnic identity achievement (sample item reads: "*I have spent time trying to find out more about my own ethnic group, such as its history, traditions, and customs*)," and ethnic behaviors and practices (sample item reads: "*I participate in cultural practices in my own group, such as special food, music, and customs*"; Phinney, 1992, p. 172). Overall this measure of ethnic identity allows us to understand whether and to what degree through self-exploration as well as involvement in behaviors and practices related to their group one has explored the meaning of their identity and developed a sense of commitment to his or her heritage (Phinney, 1992).

It seems important to consider that culture-specific measures such as the

CRIS and the MIBI which tend to emphasize the Black experience in the U.S. as it pertains to African Americans may not be general enough to capture ethnic variations across all U.S. born Blacks. In other words, these measures emphasize the experiences of African Americans and take into consideration this groups' experience of oppression as well as social practices and cultural norms common to U.S. Blacks who are more likely to identify as African American. As noted recently by Phinney and Ong (2007), the failure to distinguish between general and group specific issues related to ethnic or racial identity have been a source of confusion in the measurement of these constructs. However, if we are to understand the more general processes that may be common across the various ethnic groups that comprise the Black community in the U.S., it may be more appropriate to use a generic measure that is applicable to all of these ethnic groups.

In short, while racial identity has been linked to the experience of oppression, this emphasis has not often considered the role of ethnic identity, particularly among U.S. born Blacks. Researchers have tended to focus on racial identity and ethnic identity as separate and distinct constructs in relation to Blacks (Helms & Talleyrand, 1997; Phinney & Ong, 2007). However, as described earlier race and ethnicity can be seen as related and overlapping constructs among Blacks as these individuals often share membership in both groups and in turn, their sense of self may not be well-captured simply by a racial identity. Thus, in this study the label "Racial-Ethnic Identity" (REI) will be utilized to describe an individual's orientation to their racial and ethnic group

memberships.

Another difference between the MEIM as compared to the MIBI and the CRIS is that it captures the *strength* of the identity (i.e., the degree to which individuals have explored and accepted their membership in an ethnic group). In contrast, the MIBI and CRIS measures capture the *content* or *meaning* of the racial identity. A recent study (Yip et al., 2006), suggested that the MEIM assesses the extent to which one has developed their identity, whereas other measures of racial identity (e.g., Multidimensional Identity of Black Identity; Sellers et al., 1998) assess the content or meaning of that identity to the individual (Yip et al., 2006). In regard to race-related experiences, this distinction may be important as the MEIM provides information about the strength of the identity by assessing three interrelated aspects of ethnic identity. In contrast to this approach, traditional measures of black identity have emphasized multidimensional approaches to the assessment of racial identity. As indicated earlier, these measures tend to include subscales which assess specific ideologies and feelings about one's self as a member of a racial group.

This argument is related to Phinney's distinction between a process approach and a content approach to the study of ethnic identity development (Phinney, 1990). The process approach focuses on how individuals come to develop an integrated sense of the role of ethnicity in their lives, whereas the content approach focuses on the qualitative meaning of one's identity and how important the identity is to the individual. Although an individual may achieve a racial identity (i.e., strength of racial identity) it is not clear what role racial identity

plays in an individual's self-concept (i.e., content of racial identity). For example, as noted by Phinney (1990), "achievement does not necessarily imply a high degree of ethnic involvement; one could presumably be clear about and confident of one's ethnicity without wanting to maintain one's ethnic language or customs" (p. 503). The use of the MEIM allows us to understand the strength of ethnic identity in terms of participant's general understanding of their group across the various ethnicities which comprise membership in the Black racial group.

A common problem in investigating ethnic identity is determining whether there are different dimensions or whether it may be best to think about ethnic identity as a single dimension. Phinney has argued that while ethnic identity may consist of three interrelated components, it may be best understood as a unified construct (Phinney, 1992; Phinney & Ong, 2007). However, among researchers who have used the MEIM (Phinney, 1992) this application has not been consistent. At least two approaches have been applied. Some researchers have used the entire 14-item scale, while others have only used 12-items (e.g., Roberts et al., 1999), or specific subscales of the MEIM such as the ethnic identity achievement scale (e.g., Yasui, Dorham, & Dishion, 2004; Yip & Fuligni, 2002; Yip, Seaton, & Sellers, 2006) after conducting factor analyses. Based on these applications of the MEIM, it remains unclear whether ethnic identity should be assessed as a whole scale or if the subscales should be used, it is important to determine whether the subscales emerge as independent factors.

Why Might Racial-Ethnic Identity Buffer the Effects of Racism? Identities

are self-cognitions that vary in their salience and are based on an individual's commitment to the racial or ethnic group associated with the identity. Researchers who posit that ethnic identity may have a stress-buffering effect have suggested that identity can serve as a coping resource, such that commitment to ethnic relationships and knowledge about the sociohistorical experiences of one's group may buffer the stress of discrimination related to one's racial or ethnic group membership by preventing these negative experiences from penetrating one's self-concept (Mossakowski, 2003; Sellers, 1997; Sellers & Shelton, 2003). In other words, a strong sense of self can be beneficial to health by providing a sense of understanding about the nature of mistreatment. Additionally, it may serve as a buffer against the negative impact of discrimination.

Although the MEIM does not refer to the sociohistorical issues related to membership in the Black racial group, it assesses overall ethnic identity achievement. Specifically, it considers the ways in which belongingness and commitment to one's ethnic group along with one's involvement in behaviors and practices that are reflective of ethnic identity exploration. These components may also provide individuals with some sense of commitment to their group which buffers negative experiences associated with their group membership.

At the same time, some have hypothesized that a strong identity may intensify the effects of stress associated with racial discrimination (Phinney, 1991). Specifically, it is possible that the experiences of these events emphasizes the ways in which one is different from the dominant or mainstream

culture and in turn, reinforces one's sense of minority status. From this perspective, a strong ethnic identity may be detrimental to the well-being of racial and ethnic minorities.

Drawing on both theories, it seems that the appraisal of these events is shaped through an understanding of the way in which one feels about what these events means for their ethnic group membership. In the stress-buffering hypothesis, minorities may understand that although they have positive feelings about their group and about themselves as a member of their group, that others may not feel the same way and that these negative perceptions of their group are steeped in denigrating historical events. On the other hand, some individuals who experience harmful effects of discrimination are likely to see these events as confirmations that their membership in a minority group is negative and limits their ability to be treated like members of the dominant culture. Although these two theories offer some direction about the ways in which ethnic identity may be related to the experience of racial discrimination and health outcomes, it is important to understand more explicitly the direct links between these three variables as well as the ways in which the relationship between perceived racism and health may be influenced by racial-ethnic identity.

The impact of racial-ethnic identity on mental health. Research has demonstrated that both racial identity and ethnic identity are associated with mental health outcomes among minorities. Several studies have demonstrated that a stronger racial or ethnic identity is associated with better mental health among Blacks (for review see Greig, 2003). For example, a longitudinal study by

Seaton, Scottham, and Sellers (2006) revealed that stronger ethnic identity in terms of ethnic identity achievement as measured by this subscale of the MEIM predicted higher overall psychological well-being among Black adolescents a year later. Greene et al. (2005) conducted a longitudinal study of and found that across four of the five time points, higher scores on ethnic identity achievement and ethnic identity affirmation as measured by the MEIM (Phinney, 1992) were associated with fewer depressive symptoms and stronger self-esteem in a sample of Black, Latino, and Asian American adolescents..

Pillay (2005) used the Racial Identity Attitude Scale (RIAS; Parham & Helms, 1981) which was based on the earlier version of Cross' Nigrescence identity model (1971). She assessed the relationship of racial identity to mental health in a sample of African American college students. She found that higher scores on the Pre-encounter and Encounter racial identity subscales of the RIAS – which both indicated less sophisticated racial identities statuses – were associated with poorer psychological well-being.

Although most of these studies have not included adults or full samples of Blacks a recent study by Yip et al (2006) included Black adolescents, young adults, and adults. Yip et al. (2006) used the ethnic identity exploration and commitment items from the MEIM and did not find an overall relationship of these variables to depressive symptoms in a full sample. However, they did find an effect by age group as college students with weak ethnic identity as indicated by low exploration scores reported more depressive symptoms. Drawing on these studies it is plausible that similar effects may be found in a Black adult sample,

but this relationship is unclear as most of these have either included mixed-race or ethnicity adolescent samples.

In a recent study of African American adolescents that used the MIBI-T (Scottham, Sellers, & Nguyen, 2005), which is based on the MIBI (Sellers et al., 1997) but, was constructed for use with adolescents Sellers et al. (2005) assessed three subscales from this measure: centrality, regard (which includes private and public regard), and ideology. They found that of the three racial identity variables assessed in this study only private regard was related to the measures of psychological functioning. Specifically, more positive attitudes about other African Americans was associated with lower levels depressive symptoms, lower levels of perceived stress and higher levels of psychological well-being.

Based on these studies, it appears that various aspects of racial and ethnic identity as measured by these racial identity and ethnic identity measures are related to mental health outcomes among racial and ethnic minorities. However, the inconsistent use of scales, subscales, and in some cases, the use of specific items from subscales, makes it somewhat difficult to fully understand how consistent the findings are across studies.

Establishing a link between perceived racism and racial-ethnic identity. Racial-ethnic identity has been directly and indirectly linked to perceived racism and health outcomes among Blacks; however the causal direction of these associations remains unclear. A wealth of literature has demonstrated a direct association between racial-ethnic identity and perceived racism (Caldwell et al., 2003; Greene, Way, & Pahl, 2006; Neblett, Shelton, & Sellers, 2004; Shelton &

Sellers, 2000; Sellers & Shelton, 2003; Hall & Carter, 2006). For instance, in one study of 188 Black first year college students, Neblett, Shelton, and Sellers (2004) found that individuals for whom race was more central (i.e., racial centrality) tended to report experiencing more daily racial hassles in the past year than those for whom race was less central. Hall and Carter (2006) found a significant positive relationship between the full score on the ethnic identity measure and lifetime perceived racism among 82 Afro-Caribbean adults, leading the authors to suggest that individuals with greater ethnic identity may report more experiences with discrimination.

Other researchers have suggested the opposite -- that experiences of perceived racism influence racial-ethnic identity. In a cross-sectional study, Romero and Roberts (2003) hypothesized that the more discrimination one perceives, the stronger their ethnic identity. In a sample of 881 Mexican American youth, greater discrimination was associated with a weaker ethnic identity. Similarly, in a 3-year longitudinal study of Black, Latino, and Asian American adolescents, Greene, Way, and Pahl (2006) found that ethnic affirmation was inversely related to perceived discrimination from adults and peers at each of the six time points. Taken together, these studies suggest that the more participants felt proud of their ethnic identity, the less discrimination they experienced. One might expect that higher levels of racism would erode positive attitudes towards one ethnic group, as demonstrated by the Romero and Roberts study (2003). On the other hand, the Greene et al. (2006) suggests that the stronger one's commitment to their ethnic identity, the less the discrimination

they may experience these events.

In one of a few studies with an adult sample (100 Black adults recruited from a large, public urban hospital), Sherry et al. (2006) reported a positive association between these two variables. Those who reported experiences of racist events (i.e., lifetime and recent) also demonstrated an increased identification with their racial background. In a canonical correlation analysis, while lifetime and recent racist events both significantly predicted a stronger ethnic identity, lifetime racist events was the stronger predictor.

Overall, these studies provide mixed support for the association between ethnic identity and perceived racism. Two studies suggest that discrimination and identity are negatively related; whereas one study suggests that they are positively related, as greater ethnic identity is associated with more discrimination. While the only prospective study suggests that racism predicts ethnic identity among Black adults.

Establishing a link between perceived racism and mental health. In a recent epidemiological review of studies on self-reported racism and negative mental health, 148 out of 206 (71%) demonstrated an association between these two variables (Paradies, 2006). The negative mental health outcomes included somatization, anxiety, negative affect, depression, depressive symptoms, emotional distress, and psychiatric complaints. This review also found that most studies of positive mental health outcomes (e.g., work satisfaction, self-esteem, and quality of life) demonstrated an inverse relationship, as almost half of the 108 studies that assessed positive outcomes (48%) reported an inverse association

with self-reported racism. Most of these studies included a subsample if not a full sample of Black participants (e.g., Klonoff, Landrine, & Ullman, 1999; Williams & Chung, 2003).

How does racial-ethnic identity influence the relationship of perceived racism to health outcomes? Given the prevalence of perceived racism and its demonstrated negative impact on mental health among Blacks, researchers have given increasing attention to the ways in which racial-ethnic identity may influence this relationship (e.g., Cross, 1991; Sellers et al., 1998). Some have hypothesized that racial-ethnic identity may moderate the link of perceived racism to mental health whereas, others have suggested that it may mediate this relationship. Additionally, although the nature of the relationship has not been explicitly tested, some evidence suggests that racial-ethnic identity may also act as an antecedent of the link between perceived racism and health. Although these studies suggest that racial-ethnic identity may influence the relationship of perceived racism to mental health outcomes in at least three ways by serving as a moderator, a mediator, or an antecedent these relationships no studies have reported testing this relationship simultaneously. Although the moderator model is the primary model of interest in this study, the other two are alternative hypotheses that will be tested. However, in the following sections I will draw on the literature to illustrate and provide support for all three models.

Racial-ethnic identity as a moderator of perceived racism and mental health. Racial-ethnic identity may act as a stress-buffer between perceived racism and mental health. Stress-buffering occurs when a resilience resource

attenuates or decreases the effects of a risk factor on a particular outcome (Lepore, Evans, & Schneider, 1991). Drawing on risk and resilience frameworks, Sellers et al. (2006) and other racial identity researchers have argued that a strong racial identity may act as a resilience factor among Blacks by moderating the relationship between exposure to risk (i.e., perceived racism) and negative mental health outcomes associated with these risks. In this way, racial-ethnic identity may buffer the effects of perceived racism on mental health outcomes. In the case of racial-ethnic identity, it is thought that one's connectedness to their group and their awareness of the types of experiences likely to befall them because of their group membership may lessen the impact of perceived racism on health outcomes (Helms, 1996; Sellers, Caldwell, Schmeelk-Cone, & Zimmerman, 2003).

At least 10 studies have explicitly investigated the potentially moderating effects of racial-ethnic identity on the relationship of perceived racism to mental health, of which six provide evidence of a stress-buffering effect. Some have focused on individuals of Asian descent (e.g., Lee, 2005; Mossakowski, 2003), whereas others (e.g., Greene et al., 2006; Neblett et al., 2004; Sellers & Shelton, 2003; Sellers et al., 2003; Sellers, Copeland-Linder, Martin, & Lewis, 2006; Wong, Eccles, & Sameroff, 2003) have studied Black samples or mixed-race samples that included Black subsamples of a moderate size.

At least five studies in this area have used longitudinal samples, providing stronger evidence of causal effects. For instance, Greene et al. (2006) conducted a 3-year longitudinal study that included a racially and ethnically diverse sample

of urban adolescents (39% Chinese American, 33% Puerto Rican, 10% Black, 7% Dominican American, 5% other Latino, 3% non-Chinese Asian American, and 2% West Indian). Although they failed to find a moderating effect of ethnic identity on the relationship of perceived racism from adults to psychological functioning. However, there was a buffering effect of ethnic identity on the relationship of perceived racism from peers to psychological functioning. Individuals with a stronger ethnic identity (as measured by the ethnic identity achievement and affirmation subscales of the MEIM; Phinney, 1992) were buffered from the effects of perceived discrimination from their peers on psychological functioning.

A series of longitudinal studies by Sellers and colleagues (Neblett et al., 2004; Sellers & Shelton, 2003; Sellers et al., 2003; Sellers et al., 2006) also examined these relationships in adolescents and young adults. In a sample of 267 Black college students, Sellers and Shelton (2003) found that the qualitative meaning of one's racial identity (i.e., racial public regard and nationalist ideology) moderated the positive relationship between perceived racism and psychological distress. That is, individuals who believed that other groups perceived Blacks negatively or believed that their group membership was unique were buffered from the negative impact of perceived racism on psychological distress. Additionally, the authors found that past perceived racism interacted with current perceived racism to predict psychological distress. Specifically, the more discrimination one had experienced in the past the greater their perception of current experiences of racism and their level of distress. The finding suggests

that past experiences of perceived racism may act as a chronic stressor by influencing the relationship of future experiences with interpersonal maltreatment.

In a sample of Black undergraduates, Neblett et al. (2004) demonstrated that the relationship between daily racial hassles and psychological well-being, depression, and anxiety was moderated by racial centrality. Specifically, among those who experienced greater racial hassles, those with a weaker race identity had more depressive symptoms and anxiety than those who were highly identified. Another study by Sellers et al. (2003) found that both racial centrality and public regard were protective factors. Specifically, when individuals for whom race was highly salient experienced racism, they reported significantly less psychological distress than those for whom race was less salient.

Perhaps individuals with a stronger racial-ethnic identity may appraise events as threatening but are able to cope with them in a more effective manner than individuals with a weaker racial-ethnic identity (Sellers & Shelton, 2003). For instance, they may be able to draw on their knowledge of prior experiences and the reason for such maltreatment to limit the psychological threat posed by these events. This, in turn, may decrease physiological arousal. Individuals with a strong racial-ethnic identity may also have ample support systems that they can draw on when they experience these events. Thus, the ability of those with membership in a devalued or stigmatized group to determine the importance of that group membership and attach emotional meaning may be important to their ability to perceive and respond to group-related experiences.

While there is growing evidence that racial identity may buffer the

deleterious effects of experiencing racial discrimination on mental health, other pathways may be plausible. It is possible that racial identification encourages individuals to perceive interpersonal interactions in a certain way. At the same time, it is also possible that experiences with racism may contribute to increased identification with one's racial group.

Racial-ethnic identity as an antecedent of perceived racism and mental health. The first alternative hypothesis suggests that racial-ethnic identity may impact the perception of racism in interpersonal interactions. Drawing on stress and coping theory, this proposition would suggest that the perception of one's social environment may be shaped by their racial-ethnic identity. Some research has demonstrated that racial-ethnic identity may increase the perception of racism in interpersonal interactions. Thus, racial-ethnic identity may act as an antecedent of the race-related stress process.

At least one study has depicted racial-ethnic identity as a "risk" factor for experiencing racial discrimination (Sellers et al., 2003). In a longitudinal study of Black college students, Sellers et al. (2003) found that racial centrality acted as both a stress-buffer *and* a risk factor for experiencing racial discrimination. Specifically, in comparison to individuals with low racial identity those for whom their race was highly salient reported experiencing more racism. Thus, it is possible that what makes some individuals appear to be hypersensitive for racial discrimination may also buffer them from the adverse effects of these events (Sellers & Shelton, 2003). Similar findings were reported by Neblett et al. (2006) and Sellers et al. (2003). Taken together, these findings suggest that individuals

with stronger racial identities may be more likely to use information provided to them through their racial identity to interpret maltreatment.

Several studies have demonstrated that racial identity is related to attributions of racial discrimination in ambiguous situations (Neblett et al., 2006; Operario & Fiske, 2001; Shelton & Sellers, 2000). That is, individuals with a stronger racial identity are more likely to perceive racism in ambiguous interpersonal interactions than individuals with weaker racial identity. For instance, when individuals with a stronger racial identity are exposed to ambiguous situations in which race may be the cause for maltreatment, they make racial attributions more often in comparison to those with weaker racial identity (Shelton & Seller, 2000).

Operario and Fiske (2001) reported similar findings in an experimental study. In a low ambiguous racial condition, college students with stronger ethnic identity were more likely to attribute maltreatment to racial discrimination than those with weaker ethnic identity. Additionally, those individuals with low-ethnic identity in the high-ambiguous condition had extremely low ratings of the situation as racial discrimination in comparison to those with higher ethnic identity. Perhaps those individuals with weaker ethnic identity may be unable to detect and distinguish between race-related and non-race related maltreatment whereas those with stronger ethnic identity can. This difference in the ability to perceive racism in interpersonal situations – which may be a function of the level of racial-ethnic identity – may account for differences in subsequent poor health outcomes.

A possible explanation for these findings is that some individuals may possess a heightened sensitivity to racial cues or triggers in interpersonal situations. Some individuals may be more aware of racial discrimination as a result of racial socialization and others may have significant past experiences with racism. For instance, Sellers et al. (2006) found that past exposure to racial discrimination had an additive effect on current experiences with racial discrimination. This finding echoes research on stigma and race-rejection sensitivity. In race-rejection sensitivity theory, past experiences of stigmatization or rejection based on membership in a socially ascribed minority group contribute to a vigilant attitude toward consciously and unconsciously presented cues that are related to their group identity regardless of the context or situation (Kaiser, Vick, & Major, 2006; Major & O'Brien, 2005; Mendoza-Denton, Purdie, Downey, Davis, & Pietrzak, 2002). At the same time, some have argued that targets with a strong racial identity may elicit racially biased behavior from majority group members which in turn, leads to an increase perception of racial discrimination (V. R. Clark, Cobb, Hopkins, & Smith, 2006).

Perhaps the way that certain social interactions are perceived might explain how racial-ethnic identity acts as an antecedent of perceived racism. An increased sensitivity to racial cues in ambiguous situations may lead to attributing interpersonal maltreatment to racism. At the same time, individuals with a strong racial-ethnic identity might trigger increased racial discrimination in others or may trigger maltreatment in others that the individual perceives as race-related. Thus, a greater number of perceived racist experiences may in fact be related to a

stronger racial-ethnic identity in some individuals. It is important to note that the data on the prevalence of interpersonal racism suggests that these events are pervasive in the lives of racial and ethnic minorities.

Although these studies have not explicitly examined the impact of racial-ethnic identity as an antecedent of the relationship between perceived racism and health outcomes, they may help link these constructs to the stress process. For instance, if some individuals are sensitive to race-related triggers or cues in interpersonal interactions and then appraise these events as stressful, they may be more likely to experience greater physiological arousal than those individuals who are not hypersensitive to racial cues (as they perceive less racial discrimination in interpersonal situations). Perhaps the stigmatization associated with membership in a minority racial or ethnic group and the racial socialization that some individuals experience contributes to a stronger racial-ethnic identity which, in turn, negatively impact health outcomes in some individuals.

Racial-ethnic identity as a mediator of the link of perceived racism to mental health. The second alternative hypothesis posits that racial-ethnic identity may be strengthened through exposure to perceived racism and, in turn, protects ones' health from the negative impact of these experiences. For instance, the rejection-identification model proposed by Branscombe et al. (1999) suggests that exposure to perceived racism increases group identification among low-status group members (i.e., racial and ethnic minorities), providing a means of coping with these experiences. This hypothesis conceptualizes racial-ethnic identity as a mediator of the relationship between perceived racism and health.

Although limited, there is some support for this hypothesis (Branscombe, Schmitt, & Harvey, 1999; Romero & Roberts, 2003).

Although most studies of racial-ethnic identity as a mediator have only examined its impact on perceived racism, two studies have examined how this relationship influences psychological well-being and mental health outcomes. In an experimental study, Branscombe et al. conducted a bidirectional test of the relationship between willingness to attribute maltreatment to discrimination and ethnic identity and the effect of this relationship on well-being. They found that minority group identification did not predict individuals' willingness to attribute maltreatment to discrimination. In contrast, a willingness to make attributions to prejudice predicted greater minority group identification, and resulted in a greater psychological well-being. In other words, the direct negative health consequences of perceiving oneself as a target of racial discrimination may be decreased through identification with one's minority group. Although the tendency to attribute maltreatment to racism is different from actual experiences of perceived racism, this finding provides some tentative evidence that racial-ethnic identity may act as a mediator of the relationship between perceived racism and health outcomes.

In a sample of 881 Mexican American adolescents, Romero and Roberts (2003) explicitly examined perceived racial discrimination and found a similar relationship. Those individuals with a stronger sense of pride and belongingness to their ethnic group (i.e., ethnic affirmation) who reported experiencing more discrimination still reported higher self-esteem in comparison to those with lower

ethnic affirmation. Similar to Branscombe et al. (1999), they also tested the impact of ethnic identity on perceived racism in this sample, but found limited support for this model.

Drawing on the findings from these two studies, it is plausible that perceived racism not only directly impacts health outcomes, but may also impact racial-ethnic identity. That is, perceived racism may work in at least two ways. It may have a direct negative impact on one's health, but these experiences may also reinforce and/or increase one's connection to their racial-ethnic group. The strengthening of racial-ethnic identity may diminish the direct effect of perceived racism on health as the direct effect of perceived racism on one's identity increases. Thus, an increased racial-ethnic identity may explain why some individuals' experiences with perceived racism do not contribute to poor health outcomes.

Drawing on the stress and coping framework, this hypothesis would suggest that racial-ethnic identity influences the coping responses. This formulation is similar to the hypothesis of racial-ethnic identity as a moderator of the relationship between perceived racism and mental health. If experiences of racial discrimination lead one to identify more with their particular group, it is possible that when they have these experiences they are able to obtain support from other group members. Branscombe et al. (1999) posited that when individuals are able to attribute maltreatment to group membership it protects their individual identity and thus, protects their well-being. Other researchers have also found evidence for this proposition (Crocker & Major, 1989; Ruggiero &

Taylor, 1997).

Some researchers have critiqued the conceptualization of racial-ethnic identity as a mediator of the relationship of perceived racism to health (Sellers & Shelton, 2003). However, there has been limited empirical research conducted to assess this relationship. Additionally, some researchers have agreed that perhaps a cyclical relationship exists between these factors such that racial-ethnic identity and perceived racism influence each other in a reciprocal manner and more specifically, in some cases racial-ethnic identity may act as a risk factor and a moderating factor (Branscombe et al., 1999; Neblett et al., 2004; Romero & Roberts, 2003; Sellers et al., 2006).

Conclusion. Most of the research that has examined the impact of racial-ethnic identity on perceived racism among Blacks has focused on how these factors influence psychological well-being in this population. The research largely demonstrates that individuals with weaker or low racial-ethnic identity status tend to report higher levels of poor mental health and fewer experiences of perceived racism, while individuals with stronger racial-ethnic identity are likely to report greater well-being but report more racial discrimination. However, individuals that have a stronger racial-ethnic identity are likely to be buffered from the negative mental health effects of these experiences. Alternative hypotheses suggest that racial-ethnic identity may operate as an antecedent or a mediator of the relationship between perceived racism and mental health, but the empirical evidence is very limited. Although these studies further our knowledge about the various ways in which racial-ethnic identity may influence the relationship

between perceived racism and mental health, more research is warranted on the potentially ameliorative role of racial-ethnic identity in the lived experiences of Blacks.

At least two concerns are directly relevant to the current study. First, most of these studies have not examined the overall role of racial-ethnic identity in relation to the outcomes of interests, but have, instead, focused on a single aspect or dimension of this variable (e.g., racial centrality). Although some researchers have argued that racial and ethnic identity are multidimensional constructs with different components (Sellers et al., 1998) that may be differentially linked to other variables of interest, most of these studies have not examined the "gestalt" of racial-ethnic identity.

Second, the disproportionate rates of hypertension and other cardiovascular conditions among Blacks warrant research on the ways in which racial-ethnic identity may impact the relationship between perceived racism and blood pressure in this population. The links between racial-ethnic identity, perceived racism, and blood pressure may yield critical information about the ways in which some individuals perceive and respond to race-related maltreatment. Given the research which demonstrates that perceived racism negatively influences blood pressure among Blacks, it seems important to consider the ways in which this relationship might be buffered or explained across individuals.

Putting it All Together: Self-Reported Racism, Racial-Ethnic Identity, and Cardiovascular Functioning among Blacks

The potential role of racial-ethnic identity in the relationship between perceived racism and hypertension and its related outcomes, including ambulatory blood pressure, among Blacks is, at best, in its infancy. To date, only six studies have investigated this relationship, yielding mixed findings (V. R. Clark et al., 2006; Dressler, 1996; Jones, Harrell, Morris-Prather, Thomas, & Omowale, 1996; Scribner, Hohn, & Dwyer, 1995; Thompson, Kamarck, & Manuck, 2002; Torres & Bowens, 2000). Similar to the studies of perceived racism and blood pressure outcomes discussed earlier, studies have examined resting blood pressure, cardiovascular reactivity, and ambulatory blood pressure as health outcomes. Given the need to understand the influence of racial-ethnic identity on the relationship of perceived racism to blood pressure and the limited research in this area, studies which examined other cardiovascular outcomes (e.g., heart rate, cardiac output) are also reviewed.

Racial-ethnic identity, perceived racism, and resting blood pressure. Two early studies of the relationship between perceived racism, racial-ethnic identity, and blood pressure examined resting blood pressure. Both reported relationships among these variables. However, the extent to which these findings indicate that racial-ethnic identity influences the relationship of perceived racism to blood pressure is unclear. For instance, in a sample of 333 Black adolescents Scribner et al. (1995) developed a measure of “African American Self-Concept” that included three factors; historical allegiance, cultural importance, and ethnic identity. They posited that the experience of racial discrimination is assumed among Blacks and if they posses a strong African American Self-Concept they

would be able to manage race-related experiences more effectively thereby, leading to decreased blood pressure. Indeed, they found an inverse relationship between African American Self-Concept and blood pressure among Black males. They noted that individuals with a "strong AASC are less likely to be frustrated by racial discrimination… because their expectations with regard to situations in which discrimination occurs are more realistic given their understanding of being African American in the context of a dominant American culture" (p. 420). Thus, they imply (but do not test) that racial-ethnic identity may serve as a stress-buffer of the relationship between perceived racism and blood pressure.

Dressler (1996) used four items to measure work-place racial discrimination in a sample of 186 Black adults (aged 22-55) living in Alabama. He found an inverse relationship between perceived racism and three variables that influence social identity (identity accumulation, lifestyle incongruity, and stressful life events). Greater identity accumulation, or a higher number of role-identities, was related to fewer experiences of perceived racism in the workplace, but was not associated with blood pressure. However, socioeconomic status moderated the relationship between identity accumulation and blood pressure: Individuals with higher socioeconomic status and fewer role identities had lower blood pressure, while those with lower socioeconomic status and higher identity accumulation had higher blood pressure. Thus, there was a main effect of the number of role identities one had on perceived racism and an interaction effect of role identities and socioeconomic status on blood pressure.

The studies by Dressler (1996) and Scribner et al. (1995) provide some

initial indications of a relationship between perceived racism, racial-ethnic identity, and blood pressure. However, because they do not explicitly or independently measure race-ethnic identity or perceived racism, the exact association of these factors to blood pressure is speculative at best.

Racial-ethnic identity, perceived racism, and cardiovascular reactivity. Three studies examined the relationship of perceived racism and racial-ethnic identity on cardiovascular reactivity (V. R. Clark et al., 2006; Jones et al., 1996; Torres & Bowens, 2000). Two of these studies provided evidence that race-related or racist stimuli are associated with greater cardiovascular reactivity in comparison to neutral and non-race related tasks (Jones et al., 1996; Torres & Bowens, 2000); the other study reported that reactivity was significantly associated with exposure to both racist and neutral stimuli (V. Clark et al., 2006).

Torres and Bowens (2000) and Jones et al. (1996) assessed whether racial-ethnic identity would mediate the relationship between exposure to a racist stimuli and cardiovascular reactivity. Torres and Bowens (2000) used race-related, non-race-related, and neutral laboratory speech tasks. During the race-related speaking task, participants recalled a personal past experience that they believed was race-related. A higher level of comfort with one's racial group membership and with other racial and ethnic heritages (i.e., internalization racial identity) was associated with an increase in systolic blood pressure during the recall of a past experience with perceived racism in comparison to the other speaking tasks. Thus, in this study the internalization aspect of racial-ethnic identity mediated cardiovascular reactivity to race-related stressor among Blacks

respondents.

In a study conducted by Jones et al. (1996), 30 participants were randomized to a video vignette condition, and the other 30 to an imagery condition. All 60 participants were exposed to a blatantly racial stimulus (i.e., disparaging racial remarks made about a Black shopper); a less blatantly racial stimulus (i.e., a White apartment manager steers Black customers toward lower quality apartments); and, a neutral stimulus – all via a video excerpt or imagery as dictated by the condition. A stronger sense of African culture and history (i.e., Afrocentric perspective) was positively correlated with heart rate among those respondents who imagined they were the target of the less blatant condition.

Findings by V. R. Clark et al. (2006) suggest that the relationship between exposure to race-related and neutral stimuli and cardiovascular reactivity is mediated by two forms of racial identity: a racial and a non-racial identity. Blood pressure reactivity was assessed while Black males attending a Southeastern university viewed racist (stressor) and non-race related (neutral) video vignettes. Both individuals with more positive feelings toward other Blacks (i.e., private regard) and those individuals with strong non-Black racial identities (i.e., humanist and assimilationalist) exhibited increased reactivity (as measured by cardiac output and stroke volume) in response to the racist and neutral stimuli in comparison to those men with lower scores on private regard and a non-racial identity.

The authors speculated that individuals with a stronger racial identity experienced greater reactivity because they attributed their perceptions to racism

whereas individuals with a stronger non-Black identity were unable to cope with the stress of the race-related vignette that, in turn, may have increased their reactivity. However, the fact that there was no significant difference in reactivity as a function of the study condition makes it difficult to interpret the exact relationship of racial-ethnic identity to perceived racism and cardiovascular reactivity.

The authors imply that racial identity may contribute to a heightened sensitivity to race in social interactions and may also lead to the occurrence of racial discrimination. Blacks with a high level of private regard may perceive more racism, in part, because they are more sensitive to negative maltreatment. Alternatively, they may possess characteristics that contribute to their experiences of racial discrimination in interactions with other racial groups. Thus, racial-ethnic identity may influence the perception of interpersonal interactions and the extent to which such experiences are interpreted as racial discrimination.

The findings from the three studies of racism, racial identity, and cardiovascular reactivity suggest that individuals who feel positively about their racial group may experience greater reactivity when they reflect on past experiences with racism or are exposed to racist stimuli. This finding is congruent with those from the mental health literature discusser earlier, in which individuals with a stronger racial-ethnic identity reported more perceived racism and greater health problems. Because race, culture, and history are more salient to these individuals when they face discrimination, they may feel more psychological distress. Perhaps having a stronger connection to one's group and knowledge

about the group's history and culture lead some people to feel more strongly about attacks on the group.

At the same time, racial-ethnic identity may also have a buffering effect on health. The ability to orient oneself to the nature of race-related events may be associated with greater perceived racism, but in some individuals it also may buffer the negative effects of racism on mental health. Unfortunately, current cardiovascular research does not clearly demonstrate support for racial identity as a stress-buffer or as a stress amplifying factor in the relationship of perceived racism to physiological arousal.

Perhaps one reason for the equivocal findings is the use of laboratory stress analogues of racist stimuli and perceived racism recall. These methods may not be optimal ways to test how racial-ethnic identity influences perceived racism and blood pressure as an outcome. Exposure to racist stimuli in a laboratory setting may not activate racial-ethnic identity as real-life experiences of perceived racism might. These experiments may not well capture the complex interplay between racial-ethnic identity and perceived racism as they focus on one aspect of the race-related stress process and not the ways in which the entire process may be shaped by racial-ethnic identity.

Racial-ethnic identity, perceived racism, and ambulatory blood pressure. To date, only one study has assessed ambulatory blood pressure as an outcome. Thompson et al. (2002) examined both resting blood pressure and ambulatory blood pressure in a sample of 126 Black adults (M = 54 years), of which 52 were hypertensive. Participants were outfitted with an ambulatory blood pressure

monitor for a 24 hr period and blood pressure was recorded every 30 min during wake hours and every 60 min during sleep. They were asked to assess seven ambiguous social scenarios to determine the extent to which race/ethnic group membership was the cause of maltreatment. A sample item described a situation where a Black person goes into a gift shop and a saleswoman asks if she can assist the customer; when the customer replies that he or she is just browsing and they continue to look around the store, the saleswoman seems to be following them and two minutes later she asks again if the customer needs help.

Although no relationship was found between attributions to race-related maltreatment appraisals, racial-ethnic identity, and either of the blood pressure outcomes, racial identity was associated with resting and ambulatory blood pressure, and to race-related maltreatment appraisals. Specifically, Blacks who felt positively about their racial group and negatively about Whites (i.e., transitional racial identity) tended to have higher resting and ambulatory blood pressure and were also more likely to perceive the scenarios as race-related incidents of maltreatment in comparison to those with weaker transitional identities. These findings were consistent across normo- and hypertensive participants. In interpreting the findings, the authors note that “racial identity may serve as an organizational schema discerning greater racial and social discord due to increased awareness and sensitivity to racial and cultural conflict” (p. 26).

This study is important as the first attempt at understanding the synergistic relationship between racism-related appraisals and racial-ethnic identity on

ambulatory blood pressure among Blacks. At the same time, it is important to note that because this study assessed perceptions of hypothetical race-related situations, the relationship of actual perceived racism to racial-ethnic identity and ambulatory blood pressure remains unclear.

Framing the Current Study

Taken together, these studies suggest that there is an association of racial-ethnic identity with blood pressure (Dressler, 1996; Scribner et al., 1995; Thompson et al., 2002), and provide some limited evidence for racial-ethnic identity as a mediating factor in the relationship between perceived racism, and indicators of cardiovascular functioning (V. R. Clark et al., 2006; Torres & Bowens, 2000). However, the findings for a relationship between perceived racism, racial-ethnic identity, and blood pressure are not strong, and the nature of the relationship between perceived racism and racial-ethnic identity as it effects ambulatory blood pressure is equivocal, raising at least three questions. First, which part of the race-related stress process does racial-ethnic identity influence? Some of the findings suggest that it impacts the perception of racial discrimination, perhaps by increasing individual sensitivity to the role of race in interpersonal interactions where maltreatment occurs. In this way, racial-ethnic identity would serve as an antecedent factor as it proceeds the experience of race-related events and shapes one's perception of their interactions with others, and, in turn, their ability to determine when they have in fact been a target of racial discrimination. In short, an increased racial identity may contribute to an increased awareness of social interactions and the possibility of maltreatment

that could be linked to race, and in turn, lead to increased perceived racism.

The dissertation is titled, “The Dynamic Role of Racial-Ethnic Identity in the Link Between Interpersonal Racism and Ambulatory Blood Pressure among U.S. Blacks.” Many of the terms in the title -- “race,” “perceived racism,” “racial-ethnic identity”, and “dynamic” -- are broad, with multiple conceptualizations appearing in the literature. In the current study, I frame these constructs in specific ways that may influence the ways in which they interact.

First, I take the position that “race” is an important social construct that represents involuntary ascribed group membership based primarily on phenotypic characteristics associated with a particular group. It is important to note that this standpoint is based on an American-centric viewpoint of race, as race can take on different meanings in different cultures. My study aims to understand the ways in which skin color serves as a cue for mistreatment in the U.S. What is “raced” in other societies or cultures around the world may have a very different emphasis from religion to income. However, in the U.S. a great deal of emphasis has always been placed on skin color as a way of deciding how individuals should be treated (Jones, 1997). Thus, the use of the term “race” in this paper draws on the sociohistorical context of race as used in the U.S.

Second, because this study conceptualizes racism as a stressor among Blacks, the notion of *perceived* racism is central to my thesis. Using a stress and coping framework (Clark et al., 1999; Lazarus & Folkman, 1984), one’s appraisal of an event or experience is a critical component of the stress process. The modifier *perceived* is important in specifying events that participants appraise as

racist. However, this application does not capture those events about which targeted individuals may be unsure or other indirect experiences for which the racist intent is not revealed. This distinction is critical as various forms of discrimination and race-related experiences (both direct and indirect) may impact the health of targeted individuals. In this study, perceived racism is defined as the appraisal of an interpersonal experience as maltreatment that has occurred because of racial or ethnic group membership.

The term racial-ethnic identity (instead of either racial identity or ethnic identity) is used to indicate that race and ethnicity are inter-related constructs for which the related identities also are related. Recently, researchers have begin a serious discussion about the ways in which these two constructs overlap and the importance of more carefully considering how racial and ethnic minorities, particularly Blacks, may have a sense of themselves as both racial and ethnic beings (e.g., APA 2007, Symposium titled, *Conversation on Racial and Ethnic Identity---Where Do We Go From Here?*, Chair, Hall; Cross & Cross, under review). For example, individuals of African descent may consider themselves as Black, but may also identify with a particular ethnic group, e.g., Haitian or African American. The term racial-ethnic identity embodies the notion that the two constructs are related among Blacks and that race and ethnicity are not separate, distinct aspects of the self. Thus, racial-ethnic identity is a multidimensional construct that refers to one's sense of self, as related to one's ethnicity (i.e., culture and ancestry) and race and sociohistorical meanings associated with their racial and ethnic group membership including oppression and social movements.

Racial-ethnic identity also reflects a commonality of language and kinship that provides a sense of group belongingness and an understanding of one's individual experiences past and present as well as the groups past and present experiences in the U.S.

Finally, I have chosen to use the term "dynamic" not in the traditional sense -- to indicate change over time -- but to indicate that there is more than one way to assess the way in which racial-ethnic identity may be related to perceived racism and blood pressure. Specifically, three models of this relationship are considered that depict very different causal processes.

Statement of the Problem

Two stress related events are central to the lives of Blacks living in the U.S: the experience of racism and a significant chance of developing hypertension. Given the frequency of interpersonal racism and the alarming rates at which hypertension affects Blacks, it is important to examine whether or not these two factors are related and what factors moderate this relationship.

Much of the research on the relationship of perceived racism to hypertension and related outcomes has focused on resting blood pressure or cardiovascular reactivity as outcomes; these studies have yielded mixed findings. The experience of racism is diverse and is characterized by physical threat and harm, social exclusion and rejection, stigmatization, and racial statements and epithets. Moreover, racist events can occur with varying frequency across ones' lifetime, across various settings in which racial and ethnic minorities interact with other individuals, and can be expressed as intra- or intergroup racism. However,

research to date has not used comprehensive measures of perceived racism that assess multiple dimensions.

Ambulatory blood pressure monitoring captures a fuller snapshot of blood pressure in ones' daily life and in turn, is a stronger predictor of long-term risk for hypertension and other elated outcomes. Unlike studies which utilize resting blood pressure and cardiovascular reactivity, ambulatory blood pressure monitoring can gauge fluctuations in blood pressure over a period of time of at least 12 to 24 hr, providing more data on which to base generalizations about the role of stress in blood pressure changes.

Although consistent evidence exist that racial identity moderates the relationship between perceived racism and psychological health among Blacks, limited research has examined the role of racial identity in the link between perceived racism and indicators of hypertension. Additionally, the influence of racial or ethnic identity as an antecedent, mediator, or moderator on the relationship of perceived racism to cardiovascular health has been studied even less.

The goal of this study was to investigate the moderating role of racial-ethnic identity on the relationship of perceived racism to waking and nighttime ambulatory blood pressure in a sample of U.S. born Blacks. This study addresses several methodological issues that have been raised in the literature, including the measurement of perceived racism and use of ambulatory blood pressure monitoring (Brondolo et al., 2003; Broudy et al., 2007; Brown, 2001).

Research Questions and Hypotheses

The specific research questions and related hypotheses are as follows:

1. Is perceived racism related to ambulatory blood pressure among U.S. Blacks, and does the timeframe of racism matter?

Hypothesis 1: Greater lifetime racism and greater racism experienced during the past week will be independently associated with higher ambulatory blood pressure. Several studies have reported a relationship between perceived racism and indicators of cardiovascular functioning such as resting blood pressure, cardiovascular reactivity (Brondolo et al., 2003b; Neighbors & Williams, 2003; Wyatt et al., 2003), and most recently ambulatory blood pressure (Steffen et al., 2003). However, the specific relationship between perceived racism and ambulatory blood pressure remains unclear. Additionally, it is unknown whether lifetime perceived racism and past week perceived racism are uniquely associated with ABP; therefore the independent relationship of these two variables with ABP will be tested.

Hypothesis 2: Lifetime perceived racism will interact with past week perceived racism, such that greater lifetime perceived racism will strengthen the relationship between past week perceived racism and ambulatory blood pressure (i.e., waking and sleep systolic blood pressure and diastolic blood pressure) readings. Emerging research suggests that past experiences of perceived racism may influence the relationship of new or more recent experiences with interpersonal interactions and health outcomes (Broudy et al., 2007). Specifically, individuals may be more likely to perceive new experiences of maltreatment as race-related and may also experience more stress from repeated experiences

with racism.

2. Is the strength or salience of racial-ethnic identity related to experiences of perceived racism?

Hypothesis 3: Racial-ethnic identity will be independently and significantly related to lifetime racism and past week perceived racism. Specifically, individuals with stronger identities will report more lifetime perceived racism and past week perceived racism in comparison to individuals with weaker racial-ethnic identities. The literature on the relationship of perceived racism to racial and ethnic identity has suggested a direct association between perceived racism and racial-ethnic identity (Greig, 2003). Although the nature and direction of this relationship is not fully established; findings by several researchers (Greene et al., 2006; Neblett et al., 2004; Sellers & Shelton, 2003; Sellers et al., 2003; Sellers et al., 2006), suggest a strong racial identity is associated with more perceived racism among Blacks.

3. Does racial-ethnic identity act as a moderator, mediator, or antecedent of the relationship between perceived racism and ambulatory blood pressure?

Hypothesis 4: Racial-ethnic identity will moderate the relationship between perceived racism and ambulatory blood pressure. Specifically, the effects of perceived racism on ambulatory blood pressure will be weaker among individuals with a stronger racial-ethnic identity than those with a weaker racial-ethnic identity. Most recent research in this area has focused on racial-ethnic identity as a buffer of the effects of perceived racism on health (Sellers et al., 2006). However, other research has demonstrated that racial-ethnic identity may act as

an antecedent of perceived racism, or as a mediator of the relationship between racial-ethnicity identity and health. Two alternative models were tested as well.

Hypothesis 5: The relationship between perceived racism and ambulatory blood pressure will be mediated by greater racial-ethnic identity. That is, perceived racism has its effect on ambulatory blood pressure through racial-ethnic identity. In this model, perceived racism not only exerts a negative impact on health, but also reinforces or strengthens one's in-group commitment and identity. This particular relationship may weaken the negative relationship between perceived racism and health as individuals draw on their strengthened racial-ethnic identity to manage the deleterious effects of these experiences.

Hypothesis 6: Racial-ethnic identity increases perceived racism which, in turn may negatively impact health (i.e., increase reactivity). Predicted associations between perceived racism and ambulatory blood pressure will be mediated by greater racial-ethnic identity. Although this is referred to as an antecedent hypothesis, it also could be conceptualized as a mediational model, but here perceived racism is mediating the relationship between racial-ethnic identity and health.

Method

Overview

This dissertation uses data from an ongoing project entitled, *Racism, Coping, and Ambulatory Blood Pressure* (hereafter referred to as the Parent Study; Principal Investigator: Elizabeth Brondolo, Ph.D.). The Parent Study utilizes a cross-sectional design to assess relationships among racial and ethnic discrimination, coping, and ambulatory blood pressure. Its primary aim is to determine whether perceived past exposure to ethnic discrimination is positively associated with ambulatory blood pressure and with the magnitude and duration of acute blood pressure and heart rate responses to current negative interpersonal interactions. The Parent Study sampled 720 U.S. born, English-speaking, Black and Latino women and men drawn from urban primary care medical practices throughout New York City.

This study was interested in how perceived racism and racial-ethnic identity are related to ABP among Blacks. Thus, this dissertation analyzes the subsample Black participants (n = 214) from the Parent Study. Because the dissertation was embedded in the Parent Study, the design, procedures, and measures are the same; therefore, I will describe the Parent Study's methodology in detail before describing the specific variables used and the analyses conducted in this study.

Sample Recruitment

Participants were recruited and tested at primary care practices affiliated

with the Clinical Director's Network (CDN) and other community sites throughout New York City. CDN is a not-for-profit network of primary care clinicians located at community health centers which provide health care services for poor, minority, and underserved populations (CDN, 2007). Participants were recruited from waiting rooms, through word of mouth from enrolled participants, or from flyers advertising the project in targeted neighborhoods.

Inclusion criteria included self-reported Black or African American racial or ethnic group membership, U.S. born, and age 18 or older. Exclusion criteria included major medical conditions that would affect ambulatory blood pressure monitoring (i.e., kidney disease, known active cardiovascular disease, orthopedic conditions affecting balance, major mental illness, or current drug addiction), and use of any medications that affect blood pressure. If participants were taking allergy medicine or any other blood pressure lowering medication temporarily, they were rescheduled when medication use had been discontinued. Participants were required to obtain physician permission to participate in the study if they met any of the following conditions: diabetic; Visit 1 resting systolic blood pressure was greater than 160 mmHg; Visit 1 diastolic blood pressure was greater than 100 mmHg.

At the time of data analysis for this dissertation, cleaned data were available for 253 Black women and men. However, 39 participants were missing data on the central variables of interest (age, body mass index, education level, employment status, income, place of birth, perceived racism, or ethnic identity) and 41 were missing ambulatory blood pressure data. Thus, 214 participants will

constitute the sample for all analyses of perceived racism and racial-ethnic identity and 212 participants constituted the sample for all analyses of ambulatory blood pressure.

Table 1 presents data on the characteristics of the sample of 214 participants. Slightly over half of the participants were women (57%) and 44.1% were married. The sample ranged in age from 24 – 65 years (M = 40.81, SD = 9.53). The sample had a wide income range, but included many people living in poverty: Almost 40% were living at or below the poverty level and another 25% at less than twice the poverty level. Almost 2/3 of the sample had completed high school (63%); 20% (n = 42) had less than a high school degree (or GED), and about 17% had at least a college degree. Slightly more than half of the sample (57%) reported being employed.

Procedures

Participants were tested over the course of three visits at the designated community site. At Visit 1, eligibility was determined and preliminary demographic information was assessed (gender, age, self-reported race and ethnicity, educational background, income, place of birth, and employment status). Measures of past and current exposure to racial and ethnic discrimination were administered at this time. If participants met the eligibility criteria, they were scheduled for Visit 2 within two weeks.

At Visit 2, which was scheduled for a morning, participants were outfitted with the ambulatory blood pressure monitor. The monitor was programmed such that ambulatory blood pressure readings were taken automatically every 20 min

from morning to bedtime and every hour after bedtime (i.e., the time participants reported they were likely to go to sleep). Participants were provided with instructions on methods for terminating or initiating an ambulatory blood pressure reading and provided with 24 hr contact information for the study research staff in the event they experienced any difficulties or had any concerns about the monitor.

During Visit 2, participants were also trained in the use of an electronic diary to assess posture, smoking, and caffeine and alcohol consumption during the monitoring period which they completed at the time of every waking reading. The diary time- and date-stamped each entry and only those entries occurring within 5 min of a blood pressure reading were included in the analyses.

Participants returned for Visit 3 the next day and completed an in-person, semi-structured interview to review their ambulatory blood pressure readings. They were asked to provide information about their actual bedtime and the time they awoke, so that the ambulatory blood pressure readings could be classified as awake or nighttime for data analyses. The measure of racial-ethnic identity was administered at this time and was embedded in a set of self-report measures.

Self-report data from Visits 1 and 3 were collected using an Audio Computer-Assisted Self-Interviewing program. Each item was presented on the computer screen accompanied by an audiotaped presentation by a female actress. For the questions about racial and ethnic discrimination, the audio was made by an actress of the same race or ethnicity as the participant. For the remainder of the measures, the voice presentation was randomized by measure so that participants heard half of the recordings with the voice of a Black actress

and half with a Latina actress.

This study has been approved by the Institutional Review Boards of St. John's University, the Clinical Director's Network, The Graduate Center, The City University of New York, and the Jamaica Hospital Medical Center. Informed consent forms were reviewed and signed at the beginning of Visit 1. Participants received a total of $165 in gifts and cash for their participation across the three visits.

Measures

Racial-ethnic identity was assessed at Visit 3 using the Multigroup Ethnic Identity Measure (MEIM; Phinney, 1992). The MEIM is a widely used 14-item measure that can be used with any self-named racial and ethnic group. It assesses three aspects of racial-ethnic identity: ethnic identity achievement (7 items), ethnic group affirmation and sense of belonging (5 items), and ethnic behaviors and practices (2 items). Items are answered with a 4-point Likert-type scale (1 = *strongly disagree*, 4 = *strongly agree*). A total scale score is derived by reverse coding the two negatively worded items and computing a mean for the 14 items. Thus, a score of 1 indicates low ethnic identity and a score of 4 indicates high ethnic identity. As shown in Table 2, the MEIM had good internal consistency reliability, with a Cronbach's alpha coefficient of .81.

Perceived racism was assessed *at* Visit 1 using the Perceived Ethnic Discrimination Questionnaire-Community Version (PEDQ-CV; Brondolo et al., 2005). Although the 74-item PEDQ-CV questionnaire is comprised of five scales, only two were included in this study: *Lifetime Discrimination* and *Past Week*

Discrimination.

The *Lifetime Discrimination* scale consists of 34 items that assess lifetime exposure to ethnic discrimination. Each item begins with the phrase "Because of your ethnicity/race..." and ends with a description of a specific event or interaction involving race or ethnicity-related maltreatment. Respondents indicate how often they have "ever had these experiences during their lifetime" on a 5-point Likert-type scale (1 = *never happened,* 5 = *happened very often*). The Lifetime Discrimination scale includes four subscales: *Social Exclusion* (sample item: "How often have you been kept out of a public place or group?"), *Workplace Discrimination* (sample item: "How often has your boss or supervisor been unfair to you?"), *Stigmatization* (sample item: "How often have others hinted that you must be violent or dangerous?"), and *Threat and Harassment* (sample item "How often have others threatened to damage your property?"). The alpha coefficient for the Lifetime Discrimination scale in this sample was .95, and ranged from.67 (Workplace Discrimination) to .85 (Stigmatization) across the four subscales (see Table 2).

The *Past Week Discrimination* scale consists of 10 items that adapt questions from three of the four Lifetime Discrimination subscales (social exclusion, stigmatization, and threat and harassment) to assess everyday experiences of racism during the past week across all settings. Items are rated on a 4-point scale (0 = *never in the past week*, 1 = *once*, 2 = *twice*, 3 = *3 or more times in the past week*). All items began with the phrase, "During the past week, how often did any of these occur because of your ethnicity/race…" The alpha

coefficient for this scale was .91 in this sample (see Table 2).

Ambulatory blood pressure was assessed by outfitting participants with the Suntech Accutracker II (Suntech Medical Instruments, Raleigh, North Carolina) which monitored their systolic blood pressure (SBP) and diastolic blood pressure (DBP) across the following 24 hours. This instrument has well-documented reliability and validity in adult samples (White & Morganroth, 1989). Blood pressure was assessed every 20 min during the day and once every hour at nighttime. At Visit 2, the nighttime monitoring period was set based on the estimated sleep time provided by each participant. However, at Visit 3 participants provided their actual sleep time for the previous night and the estimated sleep time (provided at Visit 2) used to set the blood pressure monitor was readjusted to accurately assign blood pressure readings to "awake" and "nighttime". Specifically, each participant had four blood pressure scores: awake SBP, awake DBP, nighttime SBP, and nighttime DBP.

Potential Covariates. A set of demographic variables (gender, age, and socioeconomic status) and physiologic variables (body mass index [BMI], posture, smoking, and caffeine and alcohol consumption) were considered as potential covariates. Socioeconomic status was assessed with measures of educational level, employment status, and income. A three-group categorical variable of *education level* was created based on degree attainment: less than a high school diploma; high school diploma/GED (including those with technical school or some college); and, at least a college degree. An estimate of gross household income was created based on total income (i.e., wages, commissions or bonuses, self-

employment income, interest, social security disability or supplemental income, retirement income or alimony, and investments) for each participant and other contributing members of their household. Employment status was a dichotomous variable, currently employed (full- or part-time) or unemployed. The physiologic covariates in this study included body mass index (BMI), posture, smoking, caffeine, and alcohol consumption.

In the psychophysiology literature, it is established that BMI and posture along with two demographic variables, gender and age, must be included in analyses of blood pressure as standard covariates (Pickering, 1991). Therefore, gender, age, BMI, and posture will be included in all blood pressure analyses as standard covariates. Although smoking and caffeine and alcohol consumption are associated with blood pressure (James, 1991, 1997), their inclusion as standard covariates in analyses of blood pressure has not been established. Statistical analyses, described in the Results section, were used to determine whether smoking and caffeine and alcohol consumption should be included as covariates of awake SBP and awake DBP.

Data Analysis

Data analysis was conducted in four stages. First, assumptions of normality, linearity, and homoscedasticity were assessed and a factor analyses of the MEIM were conducted to determine if the subscales or the full scale score should be used. Second, descriptive statistics for the primary variables of interests were computed. Third, preliminary analyses were conducted to examine relationships of potential demographic and physiologic covariates to the

independent variables (i.e., racial-ethnic identity and perceived racism) and to the dependent variable (ambulatory blood pressure). Fourth, study hypotheses 1 – 6 were tested. Because the three central measures – perceived racism, racial-ethnic identity, and ambulatory blood pressure – were continuous variables, multiple regression analysis was used to test hypotheses in which perceived racism or racial-ethnic identity was the outcome variable and mixed linear modeling was used in all analyses where ambulatory blood pressure was the outcome variable. All analyses were conducted using SAS 9.1 software (2004).

Procedures for the detection and deletion of blood pressure readings considered outliers and potentially artifactual readings were drawn from Clark, Denby, and Pregibone (1989; see Brondolo et al., 2003; Brondolo, Karlin, Alexander, Bobrow, & Schwartz, 1999; Karlin, Brondolo, & Schwartz, 2003). Across all blood pressure readings, if differences between SBP and DBP were less than 20 or exceeded 90 mmHg, then SBP and DBP readings were deleted from the analysis. If any blood pressure readings were accompanied by error codes indicating a problem with the equipment (i.e., electrocardiogram leads, cuff, or cables) then both readings (i.e., SBP and DBP) were deleted. Once error readings were deleted, blood pressure readings in the following ranges were included: SBP greater than 85 and less than 196 and DBP greater than 41 but less than 130. Following the suggestion of Jamner, Shapiro, Goldstein, and Hug (1991), if either SBP or DBP was considered to be erroneous, then both BP readings were removed from subsequent analyses.

The total number of blood pressure readings obtained during the 24 hr

monitoring was 12,152, of which 8,737 readings were kept for analyses based on the detection and deletion procedures used. Within the total sample of 214, 212 participants had awake ABP data, and of these, 149 also had nighttime ABP data. Therefore, while 214 participants were available for analyses of racial-ethnic identity and perceived racism, 212 were available for analyses of ABP data.

Results

Testing Assumptions of Normality

The assumptions of normality, linearity, and homoscedasticity were assessed using normal probability and stem-and-leaf plots to check for normal sample distribution, skewness, and kurtosis for the independent (i.e., racial-ethnic identity and perceived racism) and dependent (i.e., ambulatory blood pressure) variables, as well as for potential covariates. All central variables, except gross household income (GHI) met assumptions of normality, linearity, and homoscedasticity.

Because GHI was not normally distributed, individuals were categorized into poverty level groups based on the United States Department of Health and Human Services Federal Poverty Guidelines (USD HHS, 2004). Participants were divided into income level groups based on the ratio of their GHI to the poverty level income for households with equivalent numbers of members, senior citizens, and children (18 and under). Four levels of this variable were created: income at or below poverty level for households of their size and composition; income more than the poverty level, but less than twice the poverty level; income more than twice the poverty level, but less than three times the poverty level, and income more than three times the poverty level.

MEIM Factor Analysis.

I conducted a factor analysis of the MEIM (Phinney, 1992) to determine if the subscales or the full scale score of this measure should be used in testing the

primary study hypotheses. Phinney (1992) suggests that there are at least three unique components of ethnic identity captured by the MEIM. However, in her original study of adolescents and young adults, a factor analysis did not support this structure as she found only one factor for the 14 items. Despite this, a number of studies have used one or more of the three subscales to assess ethnic identity (Yasui, Dorham, & Dishion, 2004; Yip & Fuligni, 2002; Yip, Seaton, & Sellers, 2006). Thus, I conducted an exploratory factor analyses to determine whether the three components (ethnic identity achievement, ethnic group affirmation and sense of belonging, and ethnic behaviors and practices) emerge as separate factors in the data and should be used as subscales in this study.

Replicating Phinney's procedures, a Principal Axis Factor Analysis was conducted using squared multiple correlations as estimates of commonalities; the number of factors to be extracted was not specified. The proportion criterion, Kaiser's criterion, and the scree test were all used to determine the number of factors to be retained. (The proportion criterion extracts the number of factors that account for 100% of the common variance. Kaiser's criterion retains factors with eigenvalues $\geq$ 1.0, and the scree test plots eigenvalues and looks for a significant change in values.)

Based on the proportion test, the factor analysis retained two factors, the first accounting for 84% of the variance and the second for 17%. The scree plot also suggested there may be two factors. Using Kaiser's criterion, however, only one factor was extracted. Because two of the three criteria suggested a two-factor solution, two factors were rotated using oblique (PROMAX) rotation,

and .40 was used as the cutoff for factor loadings.

As shown in Table 3, all 14 items loaded above .40 on at least one factor and were retained in the solution. Factor 1 consisted of 10 items: four of the seven ethnic identity achievement items, four of the five ethnic group affirmation and sense of belonging items, and the two ethnic behaviors and practices items. Factor 2 consisted of the remaining four items; the three remaining ethnic identity achievement items and the one remaining ethnic group affirmation and sense of belonging item. It is important to note that two of the four items on Factor 2 were reverse-coded items, suggesting that this factor represented a variation of the method of asking questions rather than an underlying construct. In addition, the two factors that emerged from the current analyses did not fit or match the structure hypothesized by Phinney (1992) nor did the items which comprised them fit together conceptually. Thus, the total MEIM score was used in all analyses.

Physiologic Data on Participants

The average body mass index (BMI) for the sample was 28.54 (*SD* = 5.66). Based on NHLBI BMI categories (NHLBI, 2007), most (72 %) participants were at least in the “overweight” range (i.e., BMI = 25 – 29.9), with 32% in the “obese” range (i.e., BMI = 30 or greater).

Reports of smoking, caffeine, and alcohol consumption in the 20 min period before blood pressure readings, were extremely low. Only 18% (1058) of readings were accompanied by a report of smoking, 9.3% (549) by a report of caffeine consumption and 4.2% (246) by a report of alcohol consumption.

Experiences of Perceived Racism. Lifetime Discrimination was strongly related to Past Week Discrimination, r (214) = .59, p < .0001. Inter-correlations among the four lifetime discrimination subscales were also strong, ranging from .44 to .67 (all p < .0001; see Table 2). Because it was not clear that lifetime racism and past week racism have similar effects on ambulatory blood pressure, the two scales were included as separate predictors in analyses examining perceived racism. However, given that these two measures were strongly correlated, appropriate statistical tests will be used to control for their shared variance in analyses examining their effect on ambulatory blood pressure (e.g., they will be entered as a set when they are independent variables and MANOVAs when they are dependent variables).[1]

Given that the main study analyses focused on how racism affects health, it was important to first document the extent to which participants experienced racism in their lives. Of 214 participants, only three people (1.4%) reported that they had *never* experienced racial or ethnic discrimination across their lifetimes. The mean response to the four point Lifetime Discrimination scale was a 2.21 (*SD* = 0.66; see Table 4), meaning that on average participants reported experiencing racism *occasionally* across their lifetimes. Looking at the specific types of racism that participants may have experienced across their lifetimes,

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[1] Please note that although the results presented on the relationship of lifetime and past week perceived racism are based on analyses where both were included, that separate analyses were conducted for each as well. The findings indicate no significant relationships of lifetime and past week perceived racism to the outcomes of interest when they are analyzed separately. Therefore, only the analyses where both variables are included are presented.

most had experienced social exclusion (98%), discrimination in the workplace (92%), and stigmatization (83%). A smaller but still substantial proportion (65%) had experienced racial and ethnic discrimination that was characterized by threats and harassment.

Participants also were asked to report their experiences of racial and ethnic discrimination *in the past week*. About 80% of the sample had experienced at least one racial incident in the past week. Slightly over half of the sample (53%) reported three or more incidents in the past week and 30% reported seven or more events during the past week.

Ambulatory Blood Pressure.

As shown in Table 5, the intercorrelations among the four blood pressure variables, awake and nighttime systolic and diastolic blood pressure, were all significant at $p < .0001$, ranging from .68 to .87.

The average number of SBP and DBP readings obtained per participant across the 24 hour period was 39.37 (*SD* = 11.12), of these, an average of 28.64 (*SD* = 10.31) were awake readings and 4.66 (*SD* = 2.71) were nighttime readings.

The descriptive statistics for ambulatory blood pressure are shown in Table 1. The mean SBP was 131.72 (*SD* = 15.19) and DBP was 80.45 (*SD* = 10.10). During waking hours the average individual mean for SBP was 134.84 mmHg (*SD* = 16.80) and for DBP, 81.17 mmHg (*SD* = 10.78). During nighttime hours the average individual mean for SBP was 124.31 (*SD* = 20.37) and for DBP, 73.26 (*SD* = 14.50).

Determination of Covariates: Relationships of Demographic, Socioeconomic

Status, and Physiologic Variables to Perceived Racism, Racial-Ethnic Identity, and Ambulatory Blood Pressure.

Preliminary analyses were conducted to examine relationships of potential demographic, socioeconomic status, and physiologic covariates to the independent (i.e., racial-ethnic identity and perceived racism) and dependent (ambulatory blood pressure) variables. The analyses used to identify covariates of the central constructs of interests are described. The physiological variables were only considered as covariates for the measures of ambulatory blood pressure. Additionally, procedures used to address multicollinearity among variables of interest are discussed.

Interrelations among SES measures. Chi square analyses revealed significant relationships among the three socioeconomic status variables (i.e., education level, poverty group, and employment status). Education level was strongly related to poverty group, χ^2 (6, $N = 214$) = 66.77, $p < .0001$, and to employment status, χ^2 (2, $N = 214$) = 15.36, $p < .0005$, and poverty group was strongly related to employment status, χ^2 (3, $N = 214$) = 79.10, $p, < .0001$. Although these findings reveal that these variables are associated, it is not clear whether education level, poverty level, and employment status have similar effects on the primary variables of interest in this study. Therefore, all three will be assessed as potential covariates for the primary analyses.

Associations of Demographic Variables to Racial-Ethnic Identity

First, most participants reported a fairly strong racial-ethnic identity, with a mean score of 3.26 on a 1 – 4 scale and limited variability in the measure (*SD*

= .46; see Table 4). As shown in Table 6, the relationship between gender and ethnic identity was marginally significant, F (1, 212) = 3.00, p = .08, with men showing slightly stronger ethnic identity in comparison to women. Age was significantly related to ethnic identity, F (1, 212) = 4.83, p = .03, with older participants showing stronger ethnic identity than younger participants.

Only one of the three SES variables, education, was related to ethnic identity. Individuals with more education had stronger ethnic identities, F (2, 211) = 12.23, $p < .0001$. Based on these findings, gender, age, and education level will serve as covariates when ethnic identity is the outcome variable (Hypotheses 1 and 2).

Association of Demographic Variables to Perceived Racism. A series of analyses of variance (ANOVAs) were conducted to assess the relationships of the demographic (i.e., gender & age) and socioeconomic status variables (i.e., education, poverty group, & employment status) to Lifetime Discrimination and Past Week discrimination. Of the demographic variables, poverty group level was found to be significantly related to past week discrimination, F (3, 210) = 2.67, p = .05, such that individuals living closer to poverty level experienced more discrimination in the past week than other participants. Based on these findings, poverty group level will serve as a covariate in all analyses where Past Week Discrimination is an outcome of interest.

Association of Demographic and Physiologic Variables to Ambulatory Blood Pressure. Multilevel (mixed) models were used to analyze the relationship of perceived racism to mean awake and sleep ambulatory systolic and diastolic

blood pressure, adjusting for several covariates. Specifically, the fitted model implicitly adjusted individual readings for the effects of four situational factors: posture (i.e., lying down, sitting, standing, walking, or running), consumption of caffeine and alcohol, and smoking in the 20 min period prior to the blood pressure reading (caffeine, alcohol, and smoking were controlled where applicable). The mean of these adjusted blood pressure readings was treated as a latent variable (i.e., the "true" mean for the entire awake [or sleep] period), and the relationship of this latent variable to the perceived racism variable, adjusted for gender, age and BMI was estimated. The estimates and significance testing adjusted for serial autocorrelation of residuals, under the premise that readings that were taken closer in time to each other were expected to be more highly correlated with each other than readings separated by a longer time interval.

The relationships of gender, age, BMI, posture, smoking, caffeine and alcohol consumption, and SES to ABP were assessed using mixed linear modeling. First, based on the physiologic literature, only gender, age, BMI, and posture were entered (as a set) to assess their relationship to both awake and nighttime SBP and DBP. In the analyses of awake blood pressure, as shown in Table 7, all four variables were significantly related to both SBP and DBP. When smoking and caffeine and alcohol consumption were added to the model, only smoking was significantly related to awake SBP, $F(1, 97) = 3.41$, $p = .0009$ and DBP, $F(1, 97) = 4.29$, $p < .0001$. When the three socioeconomic status variables were added to the model, none were related to awake SBP and DBP.

In analyses of nighttime SBP and DBP, when gender, age, BMI, and posture were entered into the model, only age and posture were significant predictors of blood pressure: Age was related to both nighttime SBP, F (1, 145) = 9.75, p = .002 and DBP, F (1, 145) = 15.04, p = .0002 , and the overall posture variable was related to nighttime SBP, F (3, 31) = 2.84, p = .05, and DBP, F (3, 31) = 5.26, p = .05. None of the socioeconomic status variables were related to nighttime SBP or DBP, and when these variables were entered into the model only age remained significant across all analyses.

Thus, in all analyses where ABP is the outcome variable, a set of four variables – gender, age, BMI, and posture will be included as covariates. Additionally, in analyses of awake SBP and DBP, smoking will be added to the set. Based on these preliminary analyses, no additional covariates will be used in analyses of nighttime SBP or DBP.

A summary of the covariates to be used in the primary analyses are included in Tables 6 and 7.

Testing the Study Hypotheses

The next analyses are the primary ones, which test the ways in which racism is associated with ambulatory blood pressure and the role of racial-ethnic identity in this relationship among U.S. born Blacks.

Relationship of Perceived Racism to Ambulatory Blood Pressure

Hypothesis 1: Greater lifetime racism and greater racism experienced during the past week will be independently associated with higher ambulatory blood pressure.

A series of eight mixed linear models were used to separately test the effects of the two perceived racism variables on the four ABP outcomes. After entering the covariates into the model, the perceived racism variable of interest was entered and its effects evaluated. In order to examine the effects of one type of racism with the effects of the other controlled, a second set of mixed linear models were tested in which the alternate perceived racism variable was controlled as well as the covariates.

As shown in Table 8, lifetime perceived racism was related to only one of the four ABP variables, nighttime SBP, $F(1, 144) = 3.86$, $p = .05$. Specifically, for every one unit increase in lifetime discrimination, there was a 5.20 mmHg increase in nighttime SBP. However, when past week discrimination was controlled for, the association became marginally significant, $F(1, 143) = 3.69$, $p = .06$. Past week discrimination was not related to any of the four ABP outcomes, whether or not lifetime discrimination was controlled (the *p*-values ranged from .58 to .91).

Hypothesis 2: Lifetime perceived racism will interact with past week perceived racism, such that greater lifetime perceived racism will strengthen the relationship between past week perceived racism and ambulatory blood pressure (i.e., awake and nighttime systolic blood pressure and diastolic blood pressure) readings.

This hypothesis tested the potential effect of an interaction between lifetime discrimination and past week discrimination on ABP. As shown in Table 9 the interaction effect was not significant for any of the four ABP variables (*p*-

values ranged from .58 to .96).

Relationship of Ethnic Identity to Perceived Racism

The previous two analyses tested the main effects and interactive effects of lifetime and past week perceived racism on ABP. The findings suggested that lifetime perceived racism was positively, but weakly related to nighttime SBP in this sample. However, there may be other factors that influence the relationship between perceived racism and ABP. Specifically, racial-ethnic identity was hypothesized to affect the relationship of perceived racism to ABP. In the following hypothesis, the relationship of racial-ethnic identity to perceived racism is tested as an initial step in understanding how racial-ethnic identity might be related to the association between perceived racism and ABP.

*Hypothesis 3. Racial-ethnic identity will be independently and significantly related to lifetime racism and past week perceived racism. Specifically, individuals with stronger identities will report more lifetime perceived racism and past week perceived racism in comparison to individuals with weaker racial-ethnic identities***.**

This hypothesis was tested using a multivariate analysis of variance (MANOVA) in which racial-ethnic identity was entered as an independent variable and lifetime discrimination and past week racism were entered into the model as dependent variables after all covariates were entered. The analyses revealed that the overall equation was not significant, Wilk's λ .98, F (3, 210) = 1.56, p = .20. As shown in Table 10, neither of the two univariate ANOVAs were significant.

Association of Racial-Ethnic Identity to Perceived Racism and Ambulatory Blood

Pressure

The previous analysis tested the main effect of racial-ethnic identity on perceived racism to determine whether these two variables were associated. The findings revealed that these two variables are not related. However, the next three sets of analyses test the hypothesized role of racial-ethnic identity as a moderator, mediator, or antecedent of the relationship between perceived racism and ABP. Specifically, these hypotheses test the relationships among lifetime racism, racial-ethnic identity, and ABP.

Hypothesis 4. Racial-ethnic identity will moderate the relationship between perceived racism and ambulatory blood pressure.

Using mixed linear modeling, four models were created to test the combined effects of racial-ethnic identity and lifetime perceived racism, on ABP. The covariates, and the centered racial-ethnic identity and lifetime perceived racism variables were entered into the model prior to testing the interaction, *Racial-Ethnic Identity x Lifetime Perceived Racism*. None of the models were significant for any of the four ABP outcomes (*p*-values ranged from .38 to .95; see Table 11).

Hypothesis 5: The relationship between perceived racism and ambulatory blood pressure will be mediated by greater racial-ethnic identity.

To determine whether racial-ethnic identity mediated the relationship between lifetime racism and ABP, three steps had to be conducted to assess each of the four ABP outcomes. First, the main effect of lifetime discrimination on the four ABP outcomes was tested using mixed linear modeling. As noted above,

lifetime discrimination was only marginally significantly related to nighttime SBP, after controlling for past week perceived racism, F (1, 144) = 3.86, p = .05 (see Table 8).

Second, the main effect of lifetime discrimination on racial-ethnic identity was tested using a regression analysis. While the overall model was significant, F (3, 210) = 9.64, p = < .0001, as shown in Table 12, the relationship of lifetime racism to racial-ethnic identity was not significant, t (1, 210) = -.13, p = .90. (This finding remained with or without past week discrimination in the model.) Therefore, the third step could not be conducted, and a mediational model was not supported.

H*ypothesis 6: Racial-ethnic identity increases perceived racism which, in turn may negatively impact health (e.g., increase reactivity).*

Hypothesis six tested the alternative role of racial-ethnic identity as an antecedent of the relationship between perceived racism and ABP. The same procedure used to test Hypothesis 5 was used to test this hypothesis. First, the main effect of racial-ethnic identity on ABP was tested using mixed linear modeling. Racial-ethnic identity was not related to any of the four ABP outcomes, the *p*-values ranged from .22 to .38 (see Table 13). Second, the main effect of racial-ethnic identity on lifetime discrimination was tested using a regression analysis; this relationship was not significant, t (1, 212) = -.21, p = .83 (see Table 10). As a result of the lack of support for a main effect of racial-ethnic identity on lifetime discrimination, this hypothesis was aborted.

Summary. The findings indicate that of the six hypotheses that were

tested only *Hypothesis 1* was partially supported; one racism measure -- lifetime perceived racism was positively associated with one of the four ABP variables -- nighttime SBP. Racial-ethnic identity was not related to either perceived racism or ambulatory blood pressure, and did not moderate, mediate, or serve as an antecedent of the association between perceived racism and ambulatory blood pressure.

Discussion

The purpose of this study was to examine the relationships among perceived racism, racial-ethnic identity, and ambulatory blood pressure (ABP). These effects were examined in a community sample of 214 U.S. born Black adults who wore ABP monitors for 24 hr. This study adds to a small body of literature examining the potential effects of racial-ethnic identity on cardiovascular risk and a growing literature on the potential role of racial-ethnic identity as a buffer of the effects of perceived racism on cardiovascular risk.

This study makes a unique contribution in that it is one of the first studies to examine the effects of racial-ethnic identity on ABP, a clinically useful and reliable measure of blood pressure obtained during real life circumstances. Additionally, it is the first study to examine the moderating role of racial-ethnic identity on the relationship of perceived racism to ABP. This study also is the first to use a measure of ethnic identity that evaluated racial-ethnic identity achievement and belonging rather than racial identity alone.

Previously, in the Parent Study, using the full sample of Blacks and Latinos, our group found a significant relationship of perceived racism to nighttime systolic and diastolic blood pressure (Brondolo et al., under review). In this dissertation, which examines this relationship in the subsample of Blacks, perceived racism was related to nighttime systolic blood pressure. A specific goal of this study was to investigate the ways in which racial identity might influence the relationship of perceived racism to ABP.

Specifically, we examined whether racial-ethnic identity served as a moderator, mediator, or antecedent of the relationship between perceived racism and nighttime ABP. In this sample, racial-ethnic identity did not have an independent effect on ABP and did not moderate the relationship of perceived racism to nighttime ABP (or awake ABP). Analyses also indicated that racial-ethnic identity was unrelated to perceived racism. Therefore, it could not serve as a mediator or antecedent of the relationship of perceived racism to ABP and, specifically, nighttime systolic blood pressure.

Relationships of Racial-Ethnic Identity to Perceived Racism and Ambulatory Blood Pressure

Previous research had demonstrated that ethnic identity, as measured by the MEIM (Phinney, 1992), moderated the effects of perceived racism on mental health outcomes. There were no published studies which tested racial-ethnic identity as a moderator of perceived racism on blood pressure. In addition, no prior studies used a general measure of ethnic identity to evaluate the effects of racial-ethnic identity on blood pressure.

Instead, the limited literature on racial identity and cardiovascular risks indicated that racial-ethnic identity may act as a mediator of perceived racism on blood pressure reactivity (V. R. Clark et al., 2006; Jones et al., 1996; Torres & Bowens, 2000). Therefore, in this project I compared different pathways through which racial-ethnic identity might affect the relationship of racism to blood pressure.

I tested the hypothesis that racial-ethnic identity may serve as a moderator,

buffering the effects of racism on health. I also tested two alternative hypotheses which posited that it might serve as a mediator or antecedent of the relationship of perceived racism to mental health among Blacks. None of these hypotheses was supported.

A few methodological differences may account for the differences in these findings. First, the three studies (V. R. Clark et al., 2006; Jones et al., 1996; Torres & Bowens, 2000) assessed cardiovascular reactivity in a laboratory setting while the current study assessed ambulatory blood pressure across a 24 hr period in the natural setting. This difference in methodology may account for these differences as in the laboratory the experimenter can manipulate the stressors and capture a more acute response to the stressor.

Another possible explanation for the difference in their findings and the current study is the assessment of racial-ethnic identity. This was the first study to use a measure of ethnic identity to assess the role of racial-ethnic identity on perceived racism and ABP. However, as noted by Phinney (1992) who developed the MEIM, it does not assess sociohistorical experiences, cultural practices, customs, and behaviors which are uniquely associated with a particular racial or ethnic group (Phinney & Ong, 2007). The goal of the MEIM is to serve as a universal or global measure of ethnic identity across all racial and ethnic groups (Phinney, 1992). In this sense, the MEIM does not assess behaviors and issues related to group membership that may be specific to Blacks but not other groups. While there are similarities across racial and ethnic groups, it is important to understand how the interplay between sociohistorical contexts

and individual-level characteristics within the Black community may shape particular customs and feelings about group membership.

For instance, the experience of racism among African Americans is largely embedded in the sociohistorical origins of enslavement, Jim Crow, and the Civil Rights Movement in the U.S. (Jones, 1992). For this group, the enactment of a racial identity may need to embody this history whereas for other racial groups and even for Blacks of other ethnic backgrounds, these historical events may not be salient to their racial identity because it is not a part of their groups' experience and there may be other events that should be measured. Therefore, the assessment of racial-ethnic identity among Blacks should consider how this group's experiences might influence individual practices and behaviors as related to their racial group membership and give particular attention to how members of this group would respond to racism which is a vestige of this groups' past.

Another explanation is that the measure of racial-ethnic identity used in this study may have only captured the *strength* of the identity and not the *content* or *meaning* of the racial-ethnic identity. More specifically, the MEIM seeks to assess the degree to one has explored their ethnic group membership and committed to this group. However, although an individual may achieve a strong ethnic identity, it is unclear what role specific aspects of ethnic identity play in an individual's self-concept (i.e., content of racial identity). As noted by Phinney (1990), "achievement does not necessarily imply a high degree of ethnic involvement; one could presumably be clear about and confident of one's ethnicity without wanting to maintain one's ethnic language or customs" (p. 503).

This distinction between a process and a content approach is important to the measurement of racial-ethnic identity. The current study used the MEIM which assessed the strength of ethnic identity achievement, not the content or the enactments of identity as related to the culture-specific events.

Using the MEIM may have allowed us to understand the strength of ethnic identity in terms of participant's general understanding of their group. However, the various aspects of one's identity which may be useful in daily social interactions, particularly as related to experiences of racism, could not be revealed through this measure. For instance, is it important how others see you and your group (public regard)? Are you proud of yourself as a member of your group (private regard)? Do you understand the history of your particular racial group? What is your racial group ideology, are you interested in learning about other groups (multiculturalists), or are you interested only interested in your groups' history or culture (pro-Black)? How do you respond to adversity related to membership in your racial group (e.g., experiences of discrimination)? These are questions that are central to understanding the role of racial identity in the daily lives of Blacks. These questions assess the *content* of one's racial-ethnic identity; what it actually means to that person.

In assessing the content of racial identity, researchers have conceptualized racial identity as a multidimensional construct which is comprised of various aspects which may be differentially linked to particular contexts (Sellers et al., 1998). The unique role of these components should be assessed as they may be differentially linked to various outcomes including perceived

racism (Sellers et al., 1998). For instance, Thompson et al. (2002) reported that transitional racial identity, which is characterized by an intense focus on Blacks as a group and rejecting Whites, was positively related to ambulatory SBP and DBP.

In another study, V. R. Clark et al. (2006) found that both a private regard racial identity (which is characterized by more positive feelings toward other Blacks) and humanist and assimilationalist identities (characterized by a non-Black racial identity) were both associated with an increased reactivity (as measured by cardiac output and stroke volume) in response to racist stimuli. These findings suggest that racial identity may have a complex role in the lives of Blacks as related to perceived racism and blood pressure.

At the same time, another difference between the current and past studies is the use of multiple subscales versus a full measure of racial identity. Some of the other studies assessed several subscales of racial identity measures which may have increased their chances of finding an effect (e.g., V. R. Clark, 2006) or only reported the assessment of one specific subscale which makes it unclear whether they assessed several other subscales or the entire measure and did not find an effect (e.g., Thompson et al., 2002; Torres & Bowen, 2000). In the current study, the data did not support the use of the MEIM as a multidimensional construct. Therefore, the full scale score was used. However, the other studies did not use the MEIM (Phinney, 1992). They used measures of racial identity which are specific to Blacks.

Although these explanations might help to account for the null findings in

this study, it is important to consider the possibility that racial-ethnic identity as measured by the MEIM is not related to perceived racism and ABP. Again, the MEIM provides a generalized assessment of identity and is intended for use across racial and ethnic groups. As a result, it may not capture group-specific aspects of identity that are particularly relevant to experiences of racial discrimination. Additionally, it is important to note that, while previous studies did demonstrate a relationship between racial-ethnic identity, perceived racism, and blood pressure, these relationships were weak and inconsistent. Taken together, these findings may point to the importance of assessing underlying cognitive schemas that may be associated with racial-ethnic identity that perhaps are not tapped by the MEIM and not well assessed by other measures as well or that racial identity is not related to perceived racism or blood pressure.

In theory, racial-ethnic identity is thought to serve as a cognitive schema through which individuals perceive and respond to the world. As a cognitive schema, racial-ethnic identity provides information about the individuals' past as a member of the group as well as information about the collective group's past. This information is used to shape the individual's understanding of themselves as a member of their group as well as their understanding of how others who are in their group and other groups see them and will respond to them. From this perspective, it has been posited that racial-ethnic identity among Blacks helps them to understand that they are likely to be the target of race-related maltreatment and to understand the intent of certain actions or behaviors as race-related malice. Additionally, it has been posited that racial identity provides

Blacks with a repertoire of coping responses to manage and negotiate interactions in which they experience racial discrimination.

For instance, Cross, Smith, and Payne (2002) discuss at least two daily enactments of black identity that may enable Blacks to manage negative interactions in which race-related maltreatment occurs. The first form of daily enactment, *buffering* occurs when aspects of an individual's Black identity "serve as a psychological shield against racist acts of other people and institutions or racist situations…" (p. 96). Buffering allows individuals to not be caught off guard from race-related maltreatment and to allow the individual to filter through those aspects of the interaction which are racist and focus on those aspects which are race-neutral and of benefit to them. The authors provide the example of a Black person dealing with a White professor who at times has exhibited racist behavior but may also be a key expert in the person's field of study. Another example is when a Black person is dealing with a racist police officer or employer, the Black individual must be aware or even expect that racism may occur in the interaction but realize that the end goal in both situations is to remain safe and ultimately meet their own goals (e.g., not get a ticket or be promoted on their job). Through buffering, black identity is able to provide protection to an individual targeted for racism by allowing them to appraise a situation as racist but focus on the aspects of the situation that are to their benefit.

In the second form of daily enactment, Black identity serves as *code-switching* allowing a Black person to switch from his or her own typical way of doing things to a way that is more conducive and thus, acceptable to the

dominant culture as demanded by a given situation. As noted by Cross et al. (2002), “code-switching requires that the Black person learn and even master the ways of the “other” for purposes of gaining and keeping employment; gaining education; receiving service at restaurants, banks, and government agencies; and so on” (p. 97).

Cross et al. (2002) note that while buffering always involves a racist threat, code-switching occurs in non-threatening situations that a Black individual has chosen to be in. However, both may be considered as coping mechanisms relevant to experiences of racial discrimination. In the case of code-switching, even though one may choose to be in a given situation and they are not responding to a racist event, they still must understand that they may be faced with discrimination and may code-switch to avoid the experience of direct or indirect interpersonal racism. Specifically, if the individual does not want to be stereotyped or marginalized because of their racial group membership, they may decide to code-switch to avoid such race-related maltreatment that may be indicated directly or indirectly through social distancing or limited gains particularly in an academic or employment setting. Thus, both buffering and code-switching may serve as important daily enactments that allow Blacks to draw on their Black identities to manage and negotiate the potentially deleterious effects of perceived racism across multiple settings.

While it is unclear how the use of these two daily enactments can be assessed at this time, Cross and colleagues have suggested that, if these daily enactments were to be operationalized and one’s positionality or ideological

stance (e.g., CRIS-Nationalist or CRIS-Multiculturalist; Vandiver et al., 2000) as related to their Black identity were to be assessed, we may be able to determine which of these enactments one is more likely to use (Strauss & Cross, 2002). For example, they suggest that a person with a militantly Black (Immersion-Emersion) profile is likely to use these two daily enactments while a person with a Pre-Encounter (Assimilationist) profile is less likely to make use of these enactments in race-related social interactions.

This approach seems possible with a measure such as the CRIS (Vandiver et al., 2000) because it provides subscales which independently assess multiple aspects of identity. However, it seems a measure such as the MEIM may not allow for the assessment of these kinds of coping strategies that may buffer the impact of racist experiences as the MEIM emphasizes more generic aspects of identity and largely assesses feelings about group membership.

On this basis, it may be important to assess specific beliefs about and typical responses to racial discrimination and to give particular attention to the interplay between particular contexts (e.g., work or a public place) and discrimination as related to racial-ethnic identity. Therefore, in addition to the specific limitations of the MEIM, other measures of racial-ethnic identity may not be well-suited to capture the various ways in which racial-ethnic identity is enacted across contexts because of the limitations of survey methodology. It seems important to capture enactments of racial identity as they unfold in response to race-related social interactions in daily life. Such an approach would

allow us to understand what aspects of racial identity individuals draw on when confronted with discrimination and, in turn, which aspects are most useful as some research has demonstrated that the salience of specific aspects of racial identity are contexts-specific whereas others are stable (Shelton & Sellers, 2000). Perhaps the combined use of survey methodology and real- time methodology may allow us to understand, stable identity-related characteristics and how racial identity influences actual responses to specific racial incidents in daily life.

Prevalence and Frequency of Interpersonal Racism

The findings from this study demonstrate that perceived racism is still a prevalent and frequent occurrence in the lives of U.S. Blacks. Almost everyone (98%) in this study reported experiencing racism during their lifetime. This finding is similar to other studies which have reported that 80 to 100% of Black respondents report racism across their lifetime (Broman, 1996; Brondolo et al., 2005; Klonoff & Landrine, 1999; Krieger & Sidney, 1996; Landrine & Klonoff, 1996; Peters, 2004). Given the variations in sample demographics (e.g., income, age) and geographical locations, the current finding is striking – it suggests that the experience of racism in the U.S. among Blacks is fairly consistent across samples.

Among the 98% who reported experiencing racism across their lifetime, the average level of discrimination was 2.21 on a 5 point scale (ranging from 1 to 5), suggesting that participants either experienced most of the 34 events that were assessed at least occasionally across their lifetime or experienced a smaller number of these events much more often. This finding is identical to that

reported in a recent study (Brondolo et al., 2005) of Black adults living in New York City where, among the 98% who reported that they had experienced racial discrimination, on average, they noted that these events occurred *occasionally* across their lifetime.

In addition to understanding the prevalence and frequency of racism across the lifetime, this study also examined variations in the specific forms of racism Blacks experience. When asked about racism across their lifetime, respondents were asked to report their experiences with four types of racism – social exclusion, stigmatization, threat and harassment, and workplace discrimination. Most reported that these events happened *occasionally* which is similar to a finding reported by Brondolo et al. (2005) in a sample of Blacks and Latinos. Across the four types of lifetime perceived racism, although it was not tested, it seemed there was a trend in that the average report of social exclusion was a little higher than the other three types. This trend was similar to that reported by Brondolo et al. (2005) as well such that social exclusion is more likely to occur than the other forms of discrimination.

Perhaps this particular form of discrimination may be a more routine type. For instance, almost every participant (98%) reported experiencing social exclusion whereas only 65% reported experiencing threats and harassment: which arguably are likely associated with more aggressive and direct forms of maltreatment and not very subtle cues about the intent of the event. These findings are in line with other research which suggests that the common, day-to-day forms of discrimination that racial and ethnic minorities face are not typically

extreme or severe but are more likely to be mundane slights and subtle or indirect forms of rejection (Essed, 1990, 1991; Kessler, Mickelson, & Williams, 1999; Lewis et al., 2006; Swim et al., 2003).

What does it mean to encounter these various forms of perceived racism at least *occasionally* across one's lifetime? In relation to the measure used in this study, it means that most individuals experienced racial discrimination more than *never* but less than *sometimes*. By definition, the term "occasional" means that an event is "encountered, occurring, appearing, or taken at irregular or infrequent intervals" (Merriam-Webster Dictionary online, 2007). Drawing on this definition, for most participants, these events occurred at an irregular rate. However, it is important to consider that the interpretation of the labels offered to depict the frequency of these events was subjective and participants were not asked to report the severity or to assign a numerical value (i.e., assigning a number to the specific number of times an event occurred) to the specific events presented as racial discrimination in this study.

These findings raise questions about how we can more fully assess peoples' experiences with discrimination across their lifetime in a way that helps us to quantify the frequency and intensity of these experiences to better understand how they function as chronic stressors with a cumulative, negative influence on health outcomes. In future research it may be useful to assess lifetime perceived racism at multiple time points to better understand how it is related to health outcomes.

Taken together, these findings about the prevalence and frequency of

perceived racism across the lifetime and past week add to the mounting literature which indicates that the experience of racism is ongoing among Blacks in the U.S. However, the findings raise additional questions about how the assessment of these events translates into poor health outcomes.

Thus, the use of the lifetime perceived racism measure provided us with a broad sense of the overall exposure to racial discrimination. However, the assessment of past week perceived racism provides a snapshot. The need to assess chronic exposure to the social stress of racism through other modalities may further our understanding of what reports of occasional racism across the lifetime mean in terms of their effect on health outcomes.

The prevalence and frequency of race-related events suggest that they are an ever-present stressor in the lives of Blacks. Drawing on the theory of allostatic load (McEwen, 2002), we understand that exposure to chronic stressors can have a detrimental effect as the body makes repeated attempts to habituate to the physiological arousal responses associated with chronic stress. These findings underscore the need to further examine the prevalence and frequency of race-related events to better understand the cumulative effects of these events on health outcomes among Blacks.

Relationships Between Perceived Racism and Ambulatory Blood Pressure

Previous studies have provided mixed support for the hypothesis that greater perceived racism is related to higher blood pressure as measured by laboratory, clinic, and most recently, ambulatory blood pressure methodology in Blacks (Brondolo et al., 2003; Steffen et al., 2003). In the present study, the one

significant analysis of the relationship between perceived racism and ambulatory blood pressure indicated that lifetime racism was positively related to nighttime ambulatory SBP, but not to awake SBP or DBP, or nighttime DBP.

This significant finding adds to a small and inconsistent literature as only three other studies have assessed the relationship of perceived racism to ABP (Matthews et al., 2005 Steffen et al., 2003). Only Steffen et al. (2003) found a relationship between perceived racism and daytime systolic and diastolic blood pressure. Differences in the assessment of perceived racism as well as sample demographics may account for these inconsistent findings.

The study by Matthews et al. (2005) did not find a relationship between perceived racism and ambulatory blood pressure. Matthews et al. (2005) asked about generic experiences of maltreatment and asked participants to rank order their attributions for these experiences. Additionally, this study was conducted in an adolescent sample raising the thought that these two variables may not be related in adolescents due to salient, age-specific issues (e.g., appearance and peer groups). Thus, these differences may explain the discrepancy in findings.

Similar to the current study, Steffen et al. (2003) examined perceived racism using a self-report survey and an adult sample; however, they obtained findings opposite to those of this study: a positive relationship between perceived racism and daytime systolic and diastolic ambulatory blood pressure, but not with nighttime blood pressure. In explaining their findings, Steffen et al. (2003) posited that perceived racism may be a particularly salient stressor during the daytime as race-related events are most likely during this time period to be experienced

directly when Blacks are interacting with other racial and ethnic groups. However, my findings point in the opposite direction as perceived racism was significantly related to nighttime systolic blood pressure in this study.

There are at least two important differences between the adult samples used in the Steffen et al. (2003) study and the current study. First, the participants in the current study were somewhat older than the Steffen et al. sample: The mean age of participants in the current study was 41 (women, 39.76; men, 42.21), whereas the average age of their sample was 34. Second, and possibly related to the age difference, the average waking blood pressure in the current study suggest this sample might be considered borderline hypertensive. This sample had an average waking blood pressure of 135/81, while the Steffen et al. sample had an average of 127/79. This difference suggests that while the current sample may be technically considered a "normotensive" sample they may also be considered "an untreated, but known hypertensive sample."[2] These differences between the two samples may indicate that other factors might be relevant to consider in understanding the findings in the current sample. There may be physiological changes that occur as a function of pre-hypertensive or

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[2] It has been suggested that the more suitable cut-offs for diagnosable hypertensive status when using ABP are 135/85 (Ben-Dov, Ben-Arie, Mekler, & Bursztyn, 2005; Hond et al., 2003) not, 140/90 which is the standard cut-off when using resting or clinic blood pressure to diagnose hypertension (Pannarale et al., 2004).

hypertensive status that potentiate the relationship of racism to ABP.

A possible explanation is that constraints associated with environmental or situational demands may influence the responses of individuals targeted by racial discrimination and delay the physiological response to these events. For instance, experiences of racial discrimination in the workplace or while interacting with public officials (e.g., police or judges) and public service agencies (e.g., social security, bank) may not allow for an immediate behavioral response or cognitive engagement. In these settings, such a response may jeopardize the targeted individuals' job, future employment advances, or other gains that they are seeking. The influence of social distractions and constraints on behavior may be relevant to blood pressure elevations. For instance, during active periods or when one is involved in tasks unrelated to the stressor or in a setting which does not always allow for protected or validated responses to these events (e.g., workplace or interacting with a police officer) without the chance of backlash or further mistreatment. However, there is evidence from laboratory studies that people do respond immediately to these events (e.g., Armstead et al., 1989; R. Clark & Anderson, 2001; Fang & Meyers, 2001; Lepore et al., 2006; McNeilly et al., 1995; Merritt et al., 2006).

Although the cognitive engagement of such stressful events may be delayed, these experiences may still have a negative influence on blood pressure. For instance, Gerin et al. (2006) recently reported that a distraction can attenuate angry thoughts as well as blood pressure elevation in the laboratory; and the natural environment comprises many distractions that may curtail rumination or

even more general cognitive processes. Activities during the day may be too varied both in emotional and physical demands to easily evaluate the effects of racism on daytime blood pressure. Thus, it is possible that the relationship between perceived racism and nighttime SBP is influenced by the ways in which environmental constraints shape individual cognitive engagement of such events.

Alternatively, perceived racism might be related to nighttime SBP through cognitive processes such as rumination. During the nighttime, individuals typically have more time to reflect on negative events from the day which may, in turn, influence their blood pressure. Periods in which they should be relaxing or asleep may serve as opportunities for rumination about events they were unable to address or adequately resolve in other settings throughout the day. Although there is no direct evidence of this relationship, other researchers have proposed this as a potential explanation for this relationship (Brondolo et al., under review). Follow-up analyses might consider investigating blood pressure levels captured at the beginning of the reported nighttime sleep cycle immediately after people are likely to be ruminating or at times during the day when participants may have had unstructured or personal time to reflect on a racial incident.

Another possibility is that anger inhibition as a coping response may influence the relationship of perceived racism to nighttime blood pressure, as anger inhibition is a known risk factor for cardiovascular disease development (Chang, Ford, Meoni, Wang, & Klag, 2004). Steffen et al. (2003) tested this relationship and found support for independent effects of anger inhibition on nighttime DBP and the drop in DBP from awake to sleep.

While the lack of a finding for DBP and specifically, sleep DBP in the current study may be due to the current study being underpowered for DBP, this is unlikely. The *p*-value was .42 and the *t* statistic was .81 suggesting that the relationship between perceived racism and nighttime DBP did not strongly approach significance and thus, may not be related in this sample.

This finding that racism was related to nighttime SBP is important because of the role of sleep blood pressure in cardiovascular disease risk and mortality. It has been suggested that sleep blood pressure is a stronger indicator of cardiovascular disease risk and mortality than daytime blood pressure (Fumo, Teeger, Lang, Bednarz, Sareli, & Murphy, 1992); individuals with higher levels of sleep blood pressure or non-dipping blood pressure are experiencing elevated blood pressure in periods of time in which it should be lower. In other research, it has been demonstrated that U.S. Blacks are more likely to experience higher levels of nighttime blood pressure or less dipping of blood pressure levels than Whites (Thomas et al., 2006a). It has been suggested that psychosocial factors, such as racial discrimination may play an important role in explaining these differences in blood pressure dipping between Blacks and Whites in the U.S. (Thomas, Bardwell, Ancoli-Israel, & Dimsdale, 2006b). Follow-up studies are needed to understand whether environmental settings and social distractions and constraints which individuals face during the day might explain delayed blood pressure arousal to daytime interactions. Additionally, addressing these questions with a larger sample size would provide sufficient power to detect an effect of perceived racism on both SBP and DBP.

The data on nighttime ABP used in this study do not represent an exact measure of sleep blood pressure as measures of movement during sleep or polysomnography were not obtained. Instead, participant's self-reported the time they went to sleep. It is possible that perceived racism is associated with sleep quality and that the higher SBP levels observed in those with higher levels of racism reflect sleep difficulties. That is, participants could have been lying down and resting but unable to sleep during these periods (Steffen & Bowden, 2006). Recent studies have demonstrated that Blacks report difficulties with sleep and that perceived racism is associated with sleep quality (Dimsdale et al., 2006; Steffen & Bowden, 2006; Thomas et al., 2006b). Further research that assesses sleep blood pressure using both subjective and objective indices of sleep quality will be necessary to better understand the relationship of perceived racism to sleep blood pressure.

Study Limitations

It is important to note that, although the two measures of lifetime and past week perceived racism used in this study were highly correlated, there was no relationship of past week perceived racism to racial-ethnic identity or ABP. The use of structural equation modeling (SEM) to assess the role of racial-ethnic identity in this study may have been more appropriate. In future analyses, with a larger sample size, SEM will be used. Due to the relatively small number of participants and homogenous nature of the sample in terms of income, the generalizability of the findings may have been limited. Additionally, the limited variability in racial identity may have contributed to the null effects for racial

identity in this sample as well.

Although this study assessed ABP for a 24 hr period, the assessment of ABP across a longer time frame may have yielded more fluctuations in blood pressure that are relevant to social stress. Additionally, data available on these participants which captures experiences of maltreatment which may be attributed to perceived racism during the ABP monitoring period was not assessed in the current study. It is possible that discrimination affects ABP during social interactions or during conflicts. Thus, it will be important to analyze there data to understand this relationship in future analyses.

As previously discussed, the measure of racial-ethnic identity used in this study may have limited our ability to understand how racial-ethnic identity as a construct is related to perceived racism and ABP in this sample. Finally, although data on mood were collected in the Parent Study, it was not assessed in the current study. This limited our ability to contrast the effects of racial-ethnic identity on mood versus ABP, which might have explained these findings.

Future Directions

This study was one of the first to examine perceived racism and ABP, and the first to test three models of racial-ethnic identity to better understand how it might be related to the relationship of perceived racism to ABP. To extend the current study, future studies should consider the utility of ecological momentary assessment methodology in elucidating the role of perceived racism on blood pressure and, specifically, the potential role of racial-ethnic identity. Specifically, follow-up studies are needed to examine relations among perceived racism,

racial-ethnic identity, and ABP using real-time measures of each of these variables.

Another consideration for future studies is the use of longitudinal data or a repeated measures approach. In combination with the use of ecological momentary assessment, the use of a repeated measures approach would allow for an understanding of the causal associations between these variables. To date, no studies have been conducted using such methodology to explicate the relationship of perceived racism to blood pressure. Theory and a series of laboratory studies have provided some indication that experiences of racism are associated with a heightened blood pressure but the direction of this relationship is not fully established.

The use of ecological momentary assessment methodology with multiple sampling periods would be ideal for several reasons. It would not only capture fluctuations in ambulatory blood pressure but also increase the likelihood that the impact of experiencing racial discrimination on blood pressure in one's natural environment could be captured as it unfolds allowing researchers to assess the relationship between perceived discrimination and blood pressure with greater accuracy.

In addition to survey instruments to capture past exposure to race and ethnicity-related discrimination, the use of real-time assessment tools for detecting current experiences of maltreatment which are attributed to race or ethnicity-related maltreatment is another consideration for future studies. In this study, perceived racism was not assessed in real-time limiting the ability to

understand how real-time experiences in ones' daily life may be related to blood pressure. However, future studies may consider extending the current study by integrating survey and momentary assessment methodology. This would allow for an understanding of how past experiences and current experiences may be related to blood pressure. In addition to the survey methodology used in this study to assess perceived racism, we also collected real-time data on maltreatment and attributions to race-related discrimination. These data will be assessed in future analyses.

To better understand how racial-ethnic identity is enacted in daily life, it may be important to determine how real-time measures could be developed drawing on current survey methodology in this area. This approach may allow us to better understand if racial-ethnic identity is actually related to the association of perceived racism to ABP and what particular dimensions of racial-ethnic identity are related to perceived racism, influencing one's perception of their experiences as race or ethnicity-related maltreatment. Additionally, this approach may allow us to understand how racial-ethnic identity influences cognitive and affective responses to these events which ultimately influences physiological arousal.

The use of a multidimensional assessment of perceived racism and ABP monitoring to detect changes in blood pressure throughout daily life are substantial strengths of this study. Attempting to disentangle experiences of racism by timing, frequency, nature of the event is also an important contribution.

Summary

Overall, the findings add to a growing literature that suggests perceived racism is a chronic stressor among Blacks. Further, this study adds to a burgeoning literature which uses ABP to better assess how psychosocial stressors in daily life may be related to blood pressure. The findings suggest that the association between lifetime perceived racism and ABP may be important in regard to nighttime ABP. Given the link between nighttime blood pressure and cardiovascular morbidity, these results suggest a mechanism that may potentially explain racial disparities in hypertension.

Table 1

Gender Differences in Demographic and Physiologic Study Variables

	Full Sample (*N* = 214)		Women (*n* = 122)	Men (*n* = 92)
	M (SD) or N (%)	Observed Range	*M (SD) or N (%)*	*M (SD) or N (%)*
Demographic Variables				
Age (years)	40.81 (9.53)	24 – 65	39.76 (9.83)	42.21 (8.98)
Education				
Less Than HS Diploma	42 (19.63%)	-	20 (9.35%)	22 (10.28%)
HS Diploma or GED	135 (63.08%)	-	76 (35.51%)	59 (27.57%)
At Least A College Degree	37 (17.29%)	-	26 (12.15%)	11 (5.14%)
Poverty Group Level				
≤ poverty level	85 (39.73%)	-	45 (21.03%)	40 (18.69)
≤ 2x poverty level	53 (24.77%)	-	29 (13.55%)	24 (11.21)
≤ 3x poverty level	25 (11.68%)	-	14 (6.54%)	11 (5.14)
> 3x poverty level	51 (23.83%)	-	34 (15.89%)	17 (7.94)
Currently Employed?				
Yes	115 (53.74%)	-	73 (34.11%)	49 (22.9%)
No	99 (46.26%)	-	42 (19.63%)	50 (23.36%)

Table 1 (*continued*)

	Full Sample (*N* = 214)		Women (*n* = 122)	Men (*n* = 92)
	M (SD) or N (%)	Observed Range	*M (SD) or N (%)*	*M (SD) or N (%)*
Physiologic Variables				
BMI	28.54 *(5.66)*	18.87 – 48.19	28.95 *(5.91)*	28 *(5.30)*
Ambulatory Blood Pressure			(*n* = 120)	(*n* = 92)
Awake SBP (*n* = 212)	133.64 *(16.80)*	105.14 – 169.63	129.11 *(1.41)*	138.78 *(1.60)*
Awake DBP (*n* = 212)	81.17*(10.78)*	61.17 – 114.00	78.90*(.96)*	84.69*(1.09)*
			(*n* = 86)	(*n* = 63)
Nighttime SBP (*n* = 149)	124.31*(20.37)*	90.50 – 176.00	122.48 *(2.20)*	126.70 *(2.52)*
Nighttime DBP (*n* = 149)	73.26 *(14.50)*	50.75 – 130.00	71.09*(1.54)*	75.09*(1.77)*

Note. BMI = Body mass index.

Table 2

Cronbach's Alphas and Intercorrelations Among Perceived Racism Scales and the Multigroup Ethnic Identity Measure ($N = 214$)

	Scale	α^a	1	2	3	4	5	6	7
1.	Ethnic Identity	**.81**							
2.	Past Week Racism	**.91**	-.06						
3.	Lifetime Discrimination	**.95**	- .01	.59					
4.	Social Exclusion	**.84**	.00	.52	.88				
5.	Workplace	**.67**	.03	.40	.77	.63			
6.	Stigmatization	**.85**	-.00	.49	.84	.67	.53		
7.	Threat/Harassment	**.80**	- .10	.50	.70	.58	.44	.50	

Notes. [a]Unstandardized alphas reported. All correlations among Perceived Ethnic Discrimination-CV (PEDQ-CV) Lifetime Scale and subscales and the Past Week Perceived Racism scale were significant at $p < .0001$. Relationships between the MEIM Ethnic Identity scale and PEDQ-CV Lifetime scale and subscales and the Past Week Perceived Racism scale were not significant (*p*-values ranged from .14 to 1.00).

Table 3

Factor Loadings for the Multigroup Ethnic Identity Measure, Oblique (Promax) Solution

($N = 214$)

	Item	Factor	
		1	2
11.	I have a strong sense of belonging to my own ethnic group.	**.74**	- .12
4.	I think a lot about how my life will be affected by my ethnic group membership.	**.65**	- .28
17.	I participate in cultural practices of my own group, such as special food, music, or customs.	**.62**	- .10
6.	I am happy that I am a member of the group I belong to.	**.55**	.10
11.	I understand pretty well what my ethnic group membership means to me, in terms of how to relate to my own group and other groups.	**.51**	.26
1.	I have spent time trying to find out more about my own ethnic group, such as its history, traditions, and customs.	**.50**	.01
18.	I feel a strong attachment towards my own ethnic group.	**.48**	.21
2.	I am active in organizations or social groups that include mostly members of my own ethnic group.	**.48**	- .14
14.	I have a lot of pride in my ethnic group and its accomplishments.	**.48**	.34
13.	In order to learn more about my ethnic background, I have often talked to other people about my ethnic group.	**.46**	.01
3.	I have a clear sense of my ethnic background and what it means for me.	.22	**.59**
10.	I really have not spent much time trying to learn more about the culture and history of my ethnic group.	- .16	**.56**
8.	I am not very clear about the role of my ethnicity in my life.	- .26	**.53**
20.	I feel good about my cultural or ethnic background.	.38	**.43**
	Eigenvalues	4.16	.83
	% of common variance explained	3.96%	2.67%

Note. Boldface indicates factor loadings, ≥ .40.

Table 4

Gender Differences in Ethnic Identity and Perceived Racism

	Full Sample (*n* = 214)		Women (*n* = 122)	Men (*n* = 92)
	M (SD) *or N (%)*	Observed Range	*M (SD)* *or N (%)*	*M (SD)* *or N (%)*
Ethnic Identity	3.26*(.46)*	1.21 – 4.00	3.21(.50)	3.32(.41)
Perceived Racism				
Lifetime Discrimination	2.21*(.66)*	1.00 – 4.20	2.15*(.66)*	2.29*(.65)*
Social Exclusion	2.61*(.76)*	1.00 – 4.75	2.57*(.74)*	2.67*(.78)*
Stigmatization	2.04*(.83)*	1.00 – 4.67	1.93*(.81)*	2.18*(.85)*
Threat / Aggression	2.25*(.83)*	1.00 – 4.75	1.65*(.83)*	1.83*(.79)*
Workplace	2.04*(.78)*	1.00 – 4.50	2.28*(.83)*	2.20*(.72)*
Past Week Discrimination	0.63*(.67)*	0 – 2.80	.63*(.68)*	.66*(.67)*

Note. Possible range for Ethnic Identity scale is 1 – 4. Possible range for PEDQ-CV Lifetime Discrimination scale and its four subscales is 1 – 5. Possible range for Past Week Discrimination is 1 – 3.

Table 5

Intercorrelations Among Awake and Nighttime Ambulatory Systolic and Diastolic Blood Pressure

	Variables	1	2	3	4
1.	Awake SBP				
2.	Awake DBP	.87			
3.	Nighttime SBP	.77	.73		
4.	Nighttime DBP	.68	.74	.83	

Note. All correlations were significant at $p < .0001$. The $n = 212$ for awake systolic and diastolic blood pressure readings and $n = 149$ for nighttime systolic and diastolic blood pressure readings.

Table 6

Analysis of Variance for Covariates of Racial-Ethnic Identity and Perceived Racism Variables

Ethnic Identity

	df	SS	MS	*F*	*P*
Gender	1, 212	.07	.07	.16	.08
Age	1, 212	1.02	1.02	4.83	**.03**
Education Level	2, 211	4.75	2.38	12.23	**< .0001**
Poverty Group	3, 210	1.48	.49	2.34	.07
Employment Status	1, 212	.43	.43	2.01	.16

Lifetime Discrimination

	df	SS	MS	*F*	*P*
Gender	1, 212	.97	.97	2.25	.13
Age	1, 212	.92	.43	.25	.62
Education Level	2, 211	.08	.04	.09	.91
Poverty Group	3, 210	.85	.28	.65	.56
Employment Status	1, 212	.07	.07	.16	.69

Past Week Perceived Racism

	df	SS	MS	*F*	*p*
Gender	1, 212	.13	.13	.29	.59
Age	1, 212	1.60	1.60	3.57	.06
Education Level	2, 211	1.25	.62	1.39	.25
Poverty Group	3, 210	3.54	1.18	2.67	**.05**
Employment Status	1, 212	.57	.57	1.26	.26

Table 7

Analysis of Variance for Covariates of Awake and Nighttime Systolic Blood Pressure and Diastolic Blood Pressure Variables

Awake SBP (*n* = 212)

	B	SE	df	*t*	*P*	Lower	Upper
Gender	-9.56	2.07	199	-4.62	**<.0001**	-13.65	-5.48
Age	.30	.11	199	2.79	**<.006**	.09	.51
BMI	.56	.18	199	3.16	**.002**	.21	.92
Posture							
Lying Down	-15.04	3.70	469	-4.07	**< .0001**	-22.31	-7.77
Sitting	-9.45	3.61	469	-2.61	**.009**	-16.54	-2.35
Standing	-7.70	3.63	469	-2.12	**.03**	-14.84	-.57
Walking	-4.66	3.63	469	-1.28	.20	-11.78	2.47
Smoking?							
Yes	2.19	.64	97	3.42	**.0009**	.91	3.46

Table 7 *(continued)*

Awake DBP (*n* = 212)

	B	SE	df	*t*	*p*	Lower	Upper
Gender							
	-5.72	1.41	199	-4.07	**< .0001**	-8.49	-2.95
Age	.24	.07	199	3.38	**.0009**	.10	.39
BMI	.25	.12	199	2.09	**.04**	.01	.49
Posture							
Lying Down	-8.67	2.92	469	-2.97	**.003**	-14.41	-2.93
Sitting	-1.71	2.86	469	-.60	.55	-7.32	3.91
Standing	.84	2.88	469	.29	.77	-4.81	6.48
Walking	.54	2.87	469	.19	.85	-5.10	6.18
Smoking?							
Yes	2.18	.51	97	4.29	**< .0001**	1.17	3.18

Table 7 *(continued)*

Nighttime SBP (*n* = 189)

	B	SE	df	*t*	*p*	Lower	Upper
Gender	-1.92	2.23	145	-.86	.39	-6.33	2.49
Age	.44	.11	145	3.88	**.0002**	.22	.66
BMI	.30	.21	145	1.48	.14	-.10	.71
Posture							
Lying Down	-8.88	4.33	31	-2.05	.49	-17.71	-.06
Sitting	-2.75	4.67	31	-.59	.56	-12.23	6.77
Standing	-1.30	5.32	31	-.25	.81	-12.15	9.54

Nighttime DBP (*n* =189)

	B	SE	Df	*t*	*p*	Lower	Upper
Gender	-1.92	2.23	145	-.86	.39	-6.33	2.49
Age	.44	.11	145	3.88	**.0002**	.22	.66
BMI	.30	.21	145	1.48	.14	-.10	.71
Posture							
Lying Down	-8.88	4.33	31	-2.05	**.05**	-17.71	-.06
Sitting	-2.75	4.67	31	-.59	.56	-12.23	6.77
Standing	-1.30	5.32	31	-.25	.81	-12.15	9.54

Table 8

Mixed Linear Model of Lifetime and Past Week Perceived Racism to Awake and Nighttime Systolic and Diastolic Blood Pressure

Lifetime Perceived Racism to Awake Systolic Blood Pressure

Variable	*B*	SE	df	*t*	*p*	Lower	Upper
Gender	-9.52	2.07	198	-4.60	**<.0001**	-13.59	-5.44
Age	.29	.11	198	2.69	**.008**	.08	.49
BMI	.58	.18	198	3.27	**.001**	.23	.94
Posture							
Lying Down	-15.24	3.70	469	-4.12	**<.0001**	-22.50	-7.97
Sitting	-9.81	3.61	469	-2.71	**.007**	-16.90	-2.71
Standing	-7.99	3.63	469	-2.20	**.03**	-15.13	-.86
Walking	-5.03	3.63	469	-1.39	.17	-12.15	2.10
Smoking	2.19	.64	97	3.42	**.0009**	.92	3.46
PEDQ-Lifetime	-.85	1.56	198	-.55	.59	-3.93	2.22

Table 8 *(continued)*

Lifetime Perceived Racism to Awake Diastolic Blood Pressure

Variable	*B*	SE	df	*t*	*p*	Lower	Upper
Gender	-5.61	1.40	198	-4.00	**<.0001**	-8.37	-2.85
Age	.24	.07	198	3.27	**.0013**	.09	.38
BMI	.27	.12	198	2.22	**.03**	.03	.51
Posture							
Lying Down	-8.84	2.92	469	-3.03	**.003**	-14.57	-3.11
Sitting	-2.03	2.86	469	-.71	.48	-7.64	3.58
Standing	.60	2.87	469	.21	.83	-5.03	6.24
Walking	.23	2.87	469	.08	.94	-5.40	5.87
Smoking	2.18	.51	97	4.29	**<.0001**	1.17	3.18
PEDQ-Lifetime	-.31	1.06	198	-.29	.77	-2.39	1.77

Table 8 *(continued)*

Lifetime Perceived Racism to Nighttime Systolic Blood Pressure

Variable	*B*	SE	df	*t*	*p*	Lower	Upper
Gender	-1.58	3.26	144	-.48	.63	-8.03	4.88
Age	.53	.16	144	3.23	**.002**	.21	.86
BMI	.37	.30	144	1.22	.22	-.23	.96
Posture							
Lying Down	-8.57	5.41	31	-1.58	.12	-19.61	2.47
Sitting	-3.08	5.85	31	-.53	.60	-15.00	8.84
Standing	-1.09	6.52	31	-.17	.87	-14.39	12.21
PEDQ-Lifetime	5.21	2.65	144	3.86	**.05**	-.03	10.44

Table 8 (continued)

Lifetime Perceived Racism to Nighttime Diastolic Blood Pressure

Variable	*B*	SE	df	*t*	*p*	Lower	Upper
Gender	-1.68	2.25	144	-.74	.46	-6.12	2.77
Age	.44	.11	144	3.91	**.0001**	.22	.67
BMI	.29	.21	144	1.39	.17	-.12	.70
Posture							
Lying Down	-9.04	4.33	31	-2.09	**.05**	-17.87	-.20
Sitting	-2.96	4.68	31	-.63	.53	-12.50	6.58
Standing	-1.46	5.32	31	-.28	.78	-12.32	9.39
Walking	-	-	-	-	-	-	-
Running	-	-	-	-	-	-	-
PEDQ-Lifetime	1.48	1.83	144	.81	**.42**	-2.13	5.09

Table 8 *(continued)*

Past Week Perceived Racism to Awake Systolic Blood Pressure

Variable	*B*	SE	df	*t*	*p*	Lower	Upper
Gender	-9.49	2.07	198	-4.60	**<.0001**	-13.56	-5.43
Age	.28	.11	198	2.61	**.01**	.07	.49
BMI	.57	.18	198	3.18	**.002**	.21	.92
Posture							
Lying Down	-15.23	3.70	469	-4.12	**<.0001**	-22.50	-7.97
Sitting	-9.80	3.61	469	-2.71	**.007**	-16.90	-2.70
Standing	-7.99	3.63	469	-2.20	**.03**	-15.12	-.85
Walking	-5.02	3.63	469	-1.39	.17	-12.15	2.10
Running	-	-	-	-	-	-	-
Smoking	-2.19	.64	4100	-3.43	**.0006**	-3.45	-.94
Past Week Perceived Racism	-.93	1.58	198	-.59	.56	-4.04	2.19

Table 8 *(continued)*

Past Week Perceived Racism to Awake Diastolic Blood Pressure

Variable	*B*	SE	df	*t*	*p*	Lower	Upper
Gender	-5.58	1.40	198	-3.99	**<.0001**	-8.34	-2.82
Age	.24	.07	198	3.24	**.001**	.09	.38
BMI	.26	.12	198	2.18	**.03**	.03	.50
Posture							
Lying Down	-8.83	2.92	469	-3.03	**.003**	-14.56	-3.10
Sitting	-2.01	2.86	469	-.70	.48	-7.62	3.60
Standing	.62	2.87	469	.21	.83	-5.02	6.25
Walking	.26	2.87	469	.09	.93	-5.39	5.88
Running	-	-	-	-	-	-	-
Smoking	-2.18	.51	4100	-4.29	**<.0001**	-3.17	-1.18
Past Week Perceived Racism	-.10	1.07	198	-.09	.93	-2.21	2.01

Table 8 *(continued)*

Past Week Perceived Racism to Nighttime Systolic Blood Pressure

Variable	*B*	SE	df	*t*	*p*	Lower	Upper
Gender	-2.37	3.28	144	-.72	.47	-8.85	4.12
Age	.53	.17	144	3.18	**.002**	.20	.86
BMI	.44	.30	144	1.45	.15	-.16	1.04
Posture							
Lying Down	-8.21	5.42	31	-1.52	.14	-19.26	2.84
Sitting	-2.64	5.85	31	-.45	.65	-14.57	9.29
Standing	-.70	6.53	31	-.11	.92	-14.01	12.61
Walking	-	-	-	-	-	-	-
Running	-	-	-	-	-	-	-
Past Week Perceived Racism	1.70	2.55	144	.67	.51	-3.34	6.74

Table 8 *(continued)*

Past Week Perceived Racism to Nighttime Diastolic Blood Pressure

Variable	*B*	SE	df	*t*	*p*	Lower	Upper
Gender	-1.91	2.24	144	-.85	.40	-6.34	-2.52
Age	.44	.11	144	3.85	**.0002**	.22	.67
BMI	.31	.21	144	1.48	**.14**	-.10	.72
Posture							
Lying Down	-8.90	4.33	31	-2.06	**.05**	-17.73	-.07
Sitting	-2.79	4.68	31	-.60	.56	-12.32	6.75
Standing	-1.32	5.32	31	-.25	.81	-12.17	9.53
Walking	-	-	-	-	-	-	-
Running	-	-	-	-	-	-	-
Past Week Perceived Racism	.29	1.75	144	.17	.87	-3.16	3.75

Table 9

Mixed Linear Model of Interaction Effect of Lifetime and Past Week Perceived Racism on Awake and Nighttime Systolic and Diastolic Blood Pressure

Interaction Effect of Lifetime and Past Week Perceived Racism on Awake Systolic Blood Pressure

Variable	*B*	SE	df	*t*	*p*	Lower	Upper
Gender	-9.52	2.08	196	-4.59	**<.0001**	-13.61	-5.42
Age	.29	.11	196	2.65	**.009**	.07	.50
BMI	.57	.18	196	3.14	**.002**	.21	.93
Posture							
Lying Down	-15.27	3.79	469	-4.13	**<.0001**	-22.53	-7.99
Sitting	-9.84	3.61	469	-2.72	**.007**	-16.94	-2.74
Standing	-8.02	3.63	469	-2.21	**.03**	-15.16	-.89
Walking	-5.06	3.63	469	-1.39	.16	-12.18	2.07
Running	-	-	-	-	-	-	-
Smoking	2.20	.64	97	3.43	**.0009**	.93	3.47
Past Week Perceived Racism	-.06	2.26	196	-.03	.98	-4.52	4.40
PEDQ-Lifetime Racism	-.44	1.99	196	-.22	.82	-4.37	3.48
Lifetime Racism x Past Week Perceived Racism	-1.18	2.11	196	-.56	.58	-5.35	2.98

Table 9 *(continued)*

Interaction Effect of Lifetime and Past Week Perceived Racism on Awake Diastolic Blood Pressure

Variable	*B*	SE	df	*t*	*p*	Lower	Upper
Gender	-5.61	1.41	196	-3.98	**<.0001**	-8.39	-2.83
Age	.24	.07	196	3.22	**.002**	.09	.38
BMI	.27	.12	196	2.19	**.03**	.03	.51
Posture							
Lying Down	-8.84	2.92	469	-3.03	**.03**	-14.57	-3.11
Sitting	-2.03	2.86	469	-.71	.48	-7.64	3.59
Standing	.60	2.87	469	.21	.83	-5.04	6.24
Walking	.23	2.87	469	.08	.94	-5.40	5.87
Running	-	-	-	-	-	-	-
Smoking	2.17	.51	97	4.28	**<.0001**	1.17	3.18
Past Week Perceived Racism	.12	1.54	196	.08	.94	-2.91	3.15
PEDQ-Lifetime Racism	-.40	1.35	196	-.30	.77	-3.07	2.26
Lifetime Racism x Past Week Perceived Racism	.07	1.43	196	.05	.96	-2.76	2.90

Table 9 *(continued)*

Interaction Effect of Lifetime and Past Week Perceived Racism on Nighttime Systolic Blood Pressure

Variable	*B*	SE	df	*t*	*p*	Lower	Upper
Gender	-1.56	3.29	142	-.47	.64	-8.07	4.94
Age	.52	.17	142	3.13	**.00**	.19	.85
BMI	.35	.31	142	1.15	.25	-.25	.96
Posture							
Lying Down	-8.54	5.41	31	-1.58	.13	-19.58	2.51
Sitting	-2.97	5.86	31	-.51	.62	-14.90	8.96
Standing	-1.08	6.52	31	-.17	.87	-14.39	12.22
Walking	-	-	-	-	-	-	-
Running	-	-	-	-	-	-	-
Past Week Perceived Racism	-.80	3.53	142	-.23	.82	-7.78	6.17
PEDQ-Lifetime Racism	6.00	3.28	142	1.83	.70	-.48	12.49
Lifetime Racism x Past Week Perceived Racism	-2.04	3.89	142	-.53	.60	-9.72	5.64

Table 9 *(continued)*

Interaction Effect of Lifetime and Past Week Perceived Racism on Nighttime Diastolic Blood Pressure

Variable	*B*	SE	df	*t*	*p*	Lower	Upper
Gender	-1.59	2.27	142	-.70	.48	-6.09	2.90
Age	.44	.12	142	3.80	**.00**	.21	.67
BMI	.27	.21	142	1.28	**.20**	-.15	.69
Posture							
Lying Down	-9.05	4.34	31	-2.09	**.05**	-17.89	-.21
Sitting	-2.98	4.68	31	-.64	.53	-12.53	6.57
Standing	-1.46	5.32	31	-.27	.79	-12.32	9.40
Walking	-	-	-	-	-	-	-
Running	-	-	-	-	-	-	-
Past Week Perceived Racism	-.1.12	2.44	142	-.46	.65	-5.93	3.70
PEDQ-Lifetime Racism	2.03	2.27	142	.90	.37	-2.45	6.51
Lifetime Racism x Past Week Perceived Racism	.80	2.69	142	.30	.77	-4.51	6.12

Table 10

Analysis of Variance Summary for Racial-Ethnic Identity Predicting Lifetime and Past Week Perceived Racism ($N = 214$)

Outcome Variable

	B	*SE*	*t*	*p*
Lifetime Perceived Racism	-.02	.10	-.21	.83

	B	*SE*	*t*	*p*
Poverty Group	-.07	.04	-1.93	.06
Past Week Perceived Racism	-.05	.10	-.52	.60

Table 11

Mixed Linear Model of Interaction Effect of Racial-Ethnic Identity and Lifetime Perceived Racism on Awake and Nighttime Systolic and Diastolic Blood Pressure

Interaction Effect of Racial-Ethnic Identity and Lifetime Perceived Racism on Awake Systolic Blood Pressure

Variable	*B*	*SE*	df	*t*	*p*	Lower	Upper
Gender	-9.83	2.08	196	-4.73	**<.0001**	-13.93	-5.73
Age	.31	.11	196	2.84	**.005**	.09	.52
BMI	.58	.18	196	3.20	**.002**	.22	.93
Posture							
Lying Down	-15.23	3.70	469	-4.12	**<.0001**	-22.50	-7.97
Sitting	-9.79	3.61	469	-2.71	**.007**	-16.89	-2.69
Standing	-7.99	3.63	469	-2.20	**.03**	-15.12	-.85
Walking	-5.02	3.63	469	-1.38	.17	-12.14	2.11
Running	-	-	-	-	-	-	-
Smoking	-2.18	.64	97	3.40	**.001**	.90	3.44
Racial-Ethnic Identity	-2.87	2.24	196	-1.28	.20	-7.30	1.55
PEDQ-Lifetime Racism	-1.02	1.57	196	-.65	.52	-4.11	2.07
Racial-Ethnic Identity x Lifetime Perceived Racism	3.44	3.90	196	.88	.38	-4.26	11.14

Table 11 *(continued)*

Interaction Effect of Racial-Ethnic Identity and Lifetime Perceived Racism on Awake Diastolic Blood Pressure

Variable	*B*	*SE*	df	*t*	*p*	Lower	Upper
Gender	-5.79	1.41	196	-4.10	**<.0001**	-8.56	-3.00
Age	.25	.07	196	3.41	**.0008**	.10	.39
BMI	.25	.12	196	2.06	**.04**	.01	.49
Posture							
Lying Down	-9.89	2.92	469	-3.05	**.002**	-14.63	-3.16
Sitting	-2.07	2.86	469	-.72	.47	-7.68	3.54
Standing	.55	2.87	469	.19	.85	-5.09	6.19
Walking	.19	2.87	469	.07	.95	-5.45	5.82
Running	-	-	-	-	-	-	-
Smoking	2.16	.51	97	4.26	**<.0001**		
Racial-Ethnic Identity	-1.76	1.53	196	-1.15	.25		
PEDQ-Lifetime Racism	-.31	1.07	196	-.29	.77		
Racial-Ethnic Identity x Lifetime Perceived Racism	-.18	2.65	196	-.07	.95		

Table 11 *(continued)*

Interaction Effect of Racial-Ethnic Identity and Lifetime Perceived Racism on Nighttime Systolic Blood Pressure

Variable	*B*	*SE*	df	*t*	*p*	Lower	Upper
Gender	-1.78	3.29	142	-.54	.59	-8.29	4.73
Age	.55	.17	142	3.29	**.001**	.22	.88
BMI	.34	.30	142	1.14	.26	-.25	.94
Posture							
Lying Down	-8.71	5.42	31	-1.61	.12	-19.76	2.34
Sitting	-3.08	5.85	31	-.53	.60	-15.00	8.84
Standing	-1.16	6.52	31	-.18	.86	-14.47	12.14
Walking	-	-	-	-	-	-	-
Running	-	-	-	-	-	-	-
Racial-Ethnic Identity	-3.05	3.56	142	-.86	.39	-10.08	3.98
PEDQ-Lifetime Racism	5.48	2.72	142	2.02	**.05**	.11	10.85
Racial-Ethnic Identity x Lifetime Perceived Racism	-4.39	6.65	142	-.66	.51	-17.54	8.77

Table 11 *(continued)*

Interaction Effect of Racial-Ethnic Identity and Lifetime Perceived Racism on Nighttime Diastolic Blood Pressure

Variable	*B*	*SE*	df	*t*	*p*	Lower	Upper
Gender	-1.89	2.27	142	-.83	.41	-6.38	2.60
Age	.46	.12	142	3.98	**.0001**	.23	.69
BMI	.28	.21	142	1.33	.19	-.14	.69
Posture							
Lying Down	-9.14	4.33	31	-2.11	**.04**	-17.98	-.29
Sitting	-2.96	4.68	31	-.63	.53	-12.50	6.58
Standing	-1.54	5.32	31	-.29	.77	-12.40	9.32
Walking	-	-	-	-	-	-	-
Running	-	-	-	-	-	-	-
Racial-Ethnic Identity	-2.35	2.45	142	-.96	.34	-7.20	2.49
PEDQ-Lifetime Racism	1.32	1.87	142	.71	.48	-2.38	5.02
Racial-Ethnic Identity x Lifetime Perceived Racism	1.22	4.58	142	.27	.79	-7.83	10.27

Table 12

Regression Analysis Summary for Lifetime and Past Week Perceived Racism Predicting Racial-Ethnic Identity ($N = 214$)

Variable	*B*	*SE*	*t*	*p*
Age	.007	.003	2.35	**.02**
Education Level	.24	.05	4.86	**<.0001**
Lifetime Perceived Racism	-.006	.05	-.13	.90

	B	*SE*	*t*	*p*
Age	.007	.003	2.33	**.02**
Education Level	.24	.05	4.82	**<.0001**
Past Week Perceived Racism	-.003	.05	-.08	.94

Table 13

Mixed Linear Model of Racial-Ethnic Identity on Awake and Nighttime Systolic and Diastolic Blood Pressure

Racial-Ethnic Identity on Awake Systolic Blood Pressure

Variable	*B*	*SE*	df	*t*	*p*	Lower	Upper
Gender	-9.70	2.07	198	-4.69	**<.0001**	-13.78	-5.63
Age	.31	.11	198	2.90	**.004**	.10	.52
BMI	.55	.18	198	3.10	**.002**	.20	.90
Posture							
Lying Down	-15.25	3.70	469	-4.13	**<.0001**	-22.51	-7.99
Sitting	-9.81	3.61	469	-2.72	**.007**	-16.90	-2.71
Standing	-8.00	3.63	469	-2.20	**.03**	-15.13	-.87
Walking	-5.03	3.63	469	-1.39	.17	-12.15	2.09
Running	-	-	-	-	-	-	-
Smoking	2.17	.64	97	3.39	**.001**	.90	3.44
Racial-Ethnic Identity	-2.75	2.24	198	-1.23	.22	-7.16	1.66

Table 13 *(continued)*

Racial-Ethnic Identity on Awake Diastolic Blood Pressure

Variable	*B*	*SE*	df	*t*	*p*	Lower	Upper
Gender	-5.75	1.40	198	-4.11	**<.0001**	-8.52	-2.99
Age	.25	.07	198	3.45	**.0007**	.11	.39
BMI	.25	.12	198	2.07	**.04**	.01	.49
Posture							
Lying Down	-8.87	2.92	469	-3.04	**.002**	-14.60	-3.14
Sitting	-2.04	2.85	469	-.72	.47	-7.65	3.57
Standing	.58	2.87	469	.20	.84	-5.06	6.21
Walking	.21	2.87	469	.07	.94	-5.42	5.85
Running	-	-	-	-	-	-	-
Smoking	2.16	.51	97	4.27	**<.0001**	1.16	3.17
Racial-Ethnic Identity	-1.76	1.52	198	-1.16	.25	-4.75	1.23

Table 13 *(continued)*

Racial-Ethnic Identity on Nighttime Systolic Blood Pressure

Variable	*B*	*SE*	df	*t*	*P*	Lower	Upper
Gender	-2.66	3.29	144	-.81	.42	-9.17	3.84
Age	.54	.17	144	3.21	**.02**	.21	.87
BMI	.41	.30	144	1.34	.18	-.19	1.01
Posture							
Lying Down	-8.25	5.42	31	-1.52	.14	-19.30	2.79
Sitting	-2.51	5.85	31	-.43	.67	-14.43	9.41
Standing	-.71	6.52	31	-.11	.91	-14.01	12.60
Walking	-	-	-	-	-	-	-
Running	-	-	-	-	-	-	-
Racial-Ethnic Identity	-3.16	3.58	144	-.88	.38	-10.24	3.92

Table 13 *(continued)*

Racial-Ethnic Identity on Nighttime Diastolic Blood Pressure

Variable	*B*	*SE*	df	*t*	*P*	Lower	Upper
Gender	-2.11	2.24	144	-.94	.35	-6.54	2.32
Age	.46	.11	144	3.97	**.0001**	.23	.68
BMI	.29	.21	144	1.41	.16	-.12	.70
Posture							
Lying Down	-9.01	4.33	31	-2.08	**.05**	-17.84	-.18
Sitting	-2.77	4.67	31	-.59	.56	-12.29	6.76
Standing	-1.40	5.32	31	-.26	.79	-12.24	9.44
Walking	-	-	-	-	-	-	-
Running	-	-	-	-	-	-	-
Racial-Ethnic Identity	-2.45	2.44	144	-1.00	.32	-7.27	2.37

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