

A Psychophysiological Approach to the Study of the Effects of Racism on the Health of
African American Youth

Ashly Louise Gaskin

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Approved by:

Enrique W. Neblett, Jr., Ph.D.

Deborah Jones, Ph.D.

Eleanor Seaton, Ph.D.

Abstract

ASHLY LOUISE GASKIN: A Psychophysiological Approach to the Study of the Effects of Racism on the Health of African American Youth
(Under the direction of Enrique W. Neblett, Jr., Ph.D)

The current study examined individual, situational, contextual, and methodological factors that may influence the relationship between racism and health outcomes in African American youth. The aims of the current study were: 1) to examine how the type of racism (i.e., subtle versus blatant) and the race of the perpetrator influence mood and psychophysiological responses to racism; 2) to investigate how gender moderates the effects of racism on such responses; and 3) to explore similarities between psychophysiological and self-report mood responses to racism analogues while also considering the role of gender. Both type of racism and perpetrator race influenced mood and physiological responses to racism analogues. Gender moderated mood responses but findings regarding physiological responses were inconclusive. Finally, the data revealed some degree of correspondence between mood and physiological data for males and females. These findings are situated within the racism and health literature and clinical implications are discussed.

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List of Abbreviations

BP	Blood Pressure
HR	Heart Rate
I	Imagination Period
IR	Initial Rest Period
P	Present Period
PEP	Pre-ejection Period
PNS	Parasympathetic Nervous System
R	Recovery Period
RSA	Respiratory Sinus Arrhythmia
SNS	Sympathetic Nervous System

Introduction

A growing body of research links racism with a broad range of health outcomes among African Americans (Borrell, Kiefe, Williams, Roux, & Gordon-Larsen, 2006; Clark, Anderson, Clark, & Williams, 1999; Gaylord-Harden & Cunningham, 2009; see Harrell, Hall, & Taliaferro, 2003 for review; Nyborg & Curry, 2003; see Pachter & García Coll, 2009 for review; Williams & Williams-Morris, 2000; Williams, Neighbors, & Jackson, 2003; see Williams & Mohammed, 2009 for review). For example, increased rates of self-reported racism have been associated with negative mental health outcomes such as depressive symptoms (Banks & Kohn-Wood, 2007; Brody et al., 2006; Seaton, Caldwell, Sellers, & Jackson, 2010) and anxiety (Gaylord-Harden & Cunningham, 2009). Although less studied, racism has also been related to physiological outcomes such as increases in ambulatory blood pressure (Hill, Kobayashi, & Hughes, 2007) and heart rate (Jones, Harrell, Morris-Prather, Thomas, & Omawale, 1996). This research suggests that racism may negatively influence mental and physical health.

Although racism has been related to health, several individual, situational and contextual factors may influence this relationship. One such individual factor is gender. For example, gender was found to moderate the relationship between self-reported racism and conduct disorders in adolescents such that the relationship was more strongly and positively related for adolescent boys than girls (Brody et al., 2006). With regard to situational factors, characteristics of the racism experiences such as how subtle or blatant the racist act is may also influence the relationship. In a study of African American women, Jones et al. (1996) found that participants exhibited stronger physiological responses to blatant as compared to subtle racism analogues. Contextually, the race of the perpetrator may also modulate the relationship between racism and health. Morris-Prather et al. (1996) found that self-reported negative moods (e.g., fear) were

more intense following the presentation of a racially noxious vignette in which the perpetrator was White, but only if the White perpetrator followed the presentation of a Black perpetrator. Together these studies suggest several important factors to consider in understanding the link between racism and health.

In addition to individual, situational, and contextual factors, methodological issues may also impact the observed relationship between racism and health outcomes. The wide reliance on the self-report method (Stone & Broderick, 2007) to measure occurrences of and responses to racism may influence the information that individuals report. Moreover, interactions among individual factors such as gender and methodology may play a role in our understanding of the link between racism and health. Morris-Prather et al. (1996) found that women both reported more negative mood and showed increased heart rate following the presentation of racially noxious vignettes, while men reported less negative mood but higher increases in blood pressure. In light of limitations with self-report measures, the use of psychophysiological methods (Armstead, Lawler, Gorden, Cross, & Gibbons, 1989; Jones et al., 1996; Morris-Prather et al., 1996) may be a useful approach to supplementing self-report data.

The proposed study seeks to examine individual, situational, contextual and methodological factors that play a role in our understanding of the link between the psychological experiences of racism and health outcomes. The three specific aims of the study are: 1) to examine whether the nature of a racist event (i.e., subtle or blatant) as well as the race of the perpetrator impacts responses to racism; 2) to investigate whether gender moderates the relationship between racism and self-reported mood and physiological responses; and 3) to evaluate the extent to which self-report and physiological data regarding responses to racism converge, taking into account differences in gender.

Defining Racism

The literature implicating racism as a significant factor in the health of African Americans has offered varying definitions and ways of conceptualizing racism. In fact, some have even neglected to define racism altogether (see Paradies, 2006 for review). Clark et al. (1999) defined racism as “beliefs, attitudes, institutional arrangements, and acts that tend to denigrate individuals or groups because of phenotypic characteristics or ethnic group affiliation” (p. 805). Similarly, Okazaki (2009) defined racism as not only the individual expressions of negative racial attitudes, but also cultural and institutional systems of social power that can lead to inequitable outcomes for various racial and ethnic groups. Tatum (1997) described racism as a system that consists of “cultural messages and institutional policies and practices” (p. 7), personally-held beliefs and actions that operate to the advantage of Whites and to the disadvantage of racial and ethnic minorities. Tatum (1997) argued that racism can only systematically benefit Whites, though she does acknowledge that acts of racial discrimination can be committed by racial and ethnic minorities. However, the conceptualization provided by Clark et al. (1999) is a more encompassing definition which recognizes both inter- and intra-group racism. Although scholars disagree on who benefits from racism, they each acknowledge that racism is preserved through attitudes, beliefs, acts, institutions, and culture.

Inherent in the different ways that scholars have defined racism is its multidimensional nature. Jones (1997) described three forms of racism. *Individual racism* refers to the personally-held belief in the inferiority of one group of people compared to another (Jones, 1997). For example, an individual who believes that African American college students are not admitted to college by merit holds a personal belief that African Americans have not earned the right to attend college, while also believing that other (e.g., Whites) students have earned that right.

Institutional racism describes the policies in a society which create legal or political structures that disallow or discourage equality among ethnic or racial groups (Jones, 1997). An example of institutional racism is a grocery store chain allocating its freshest produce and best products to a store located in a predominantly White and well-to-do neighborhood while allocating its less desirable products, for which it charges a higher price, to a predominantly minority and relatively impoverished community. *Cultural racism* refers to commonly accepted beliefs about non-majority members as being deficient in comparison to the majority (Jones, 1997). An example of cultural racism may be how the fashion industry has standardized certain features (e.g., hair, skin tone, body type) as beautiful. Jones' (1997) multidimensional conceptualization of racism is helpful in recognizing that there are various levels at which racism may have an impact.

In addition to the multidimensional nature of racism, another important aspect concerns how blatant or subtle the racism is. Blatant racism refers to overt or aggressive acts of racism such as calling someone a racial slur. Subtle racism refers to the more ambiguous, often indirect, unintentional, and unconscious manifestations of racism. An example of subtle racism may be an African American male college student being mistaken for a service worker and being asked to dispose of trash while walking to class. Some studies suggest that individuals respond differentially to blatant and subtle racism with regard to outcomes (e.g., Salvatore & Shelton, 2007). For example, Salvatore and Shelton (2007) found that African American participants performed more poorly on a Stroop Task following a subtle racism condition (e.g., learning of unfair hiring decisions in which race was not directly mentioned as a factor in the decision) compared to a Stroop Task completed following a blatantly racist condition (e.g., learning of unfair hiring decisions in which race was directly stated as a reason for the decision). In trying to understand the link between racism and health, researchers must be sure to pay attention to these

important dimensions and characteristics of racism. It may be that differences among these dimensions and characteristics have implications for our understanding of the link between racism and health.

The Importance of Studying the Impact of Racism on Health Outcomes

Several conceptual models inform our understanding of the association between racism and health. One such model is the integrative model for the study of the development of ethnic minority youth (García Coll et al., 1996). While García Coll and colleagues (1996) do not have an explicit focus on health outcomes, their model emphasizes the significant role that racism has on the development of minority youth. In fact, they propose that the impact of social status variables (e.g., race, ethnicity, gender) on minority youth development is mediated by racism, discrimination, segregation and oppression. In other words, racism and other experiences related to being African American would be important to consider in understanding how being African American impacts developmental outcomes such as health. The integrative model (García Coll et al., 1996) is in line with research that has found racism to be a common experience for African American youth (Fisher, Wallace, & Fenton, 2000; Swim, Hyers, Cohen, Fitzgerald, & Bylsma, 2003). Moreover, evidence shows that throughout the lifespan these individuals may encounter racism in the workplace, housing industries, the legal, educational, and health care systems, and even in daily interpersonal interactions (Banks & Kohn-Wood, 2007; Landrine & Klonoff, 1996; Peters, 2004; Swim et al., 2003).

A second conceptual model which informs the proposed research is the biopsychosocial model of racism developed by Clark et al. (1999). Clark and colleagues (1999) proposed that the relationship between racism and health outcomes (e.g., depression, anxiety, hypertension, cardiovascular disease) is moderated by constitutional factors such as skin tone;

sociodemographic factors such as gender and socioeconomic status; and psychological and behavioral factors such as personality and anger expression. Additionally, Clark and colleagues (1999) proposed that the relationship between racism and health is mediated by psychological processes such as cognitive appraisal and coping response. For example, it may be that a man who encounters racial discrimination at work on a regular basis considers the discrimination stressful, but for the sake of maintaining a low-conflict work environment, he suppresses his anger. This suppression of anger can have negative effects on his health as anger suppression has been linked with higher systolic blood pressure (Armstead et al., 1989). In line with this example, Clark et al. (1999) posited that the process of appraising negative racial events as racist can lead to psychological and physiological stress which over time may contribute to long term negative physical health outcomes such as hypertension. According to Clark and colleagues (1999), the various moderating and mediating factors that influence the relationship between racism and health are thought to account for racial inter- and intragroup differences in health outcomes. Taken together, both the integrative (García Coll et al., 1996) and biopsychosocial (Clark et al., 1999) models are helpful for understanding the dynamic role that racism plays in health outcomes for African American youth.

Racism and Health: The Findings

Several works exploring the link between racism and health support the integrative and biopsychosocial conceptual models described above (e.g., Brody et al., 2006; Bynum, Burton, & Best, 2007; Gibbons, Gerrard, Cleveland, Wills, & Brody, 2004; Guthrie, Young, Williams, Boyd, & Kinter, 2002; Harrell et al., 2003; Neblett, Terzian, & Harriott, 2010; Pieterse & Carter, 2007; Williams et al., 2003). Many have focused on mental health outcomes, fewer have focused on physical health outcomes, and a small, but growing area of research that is informed by the

biopsychosocial model is the investigation of psychophysiological outcomes. In the sections that follow, I review the literature linking racism to these various domains of health outcomes.

Racism and mental health. The vast majority of work examining the association between racism and health has focused on mental health outcomes with the utilization of self-reported measures of racism and health (see Paradies, 2006 for review; Williams & Mohammed, 2009 for review; see Williams et al., 2003 for review). Racism has been linked with symptoms of depression (e.g., Banks & Kohn-Wood, 2007; Brody et al., 2006; Gaylord-Harden & Cunningham, 2009; Seaton et al., 2010) and anxiety (Banks & Kohn-Wood, 2007; Gaylord-Harden & Cunningham, 2009), psychological stress and distress (Bynum et al., 2007), substance abuse (Bennett, Wolin, Robinson, Fowler, & Edwards, 2005; Gibbons et al., 2004; Guthrie et al., 2002; Neblett et al., 2010; Wiehe, Aalsma, Liu, & Fortenberry, 2010), and conduct problems (Brody et al., 2006). Much of this work has been cross-sectional and relied primarily on self-report data; however, there have been longitudinal studies done in this area suggesting that discrimination predicts health outcomes and not that health status predicts discrimination (e.g., Gee & Walsemann, 2009; Lewis et al., 2006; Jackson et al., 1996; Pavalko, Mossakowski, & Hamilton, 2003). For example, using ordinary least squares (OLS) analyses, Jackson and colleagues (1996) found that the cumulative effects of racism on African Americans over a 13-year period showed marginally significant negative effects on reported life satisfaction. Their smaller observed effect may have been due to sample characteristics and interviewer race perceptions. The sample that was retained over the entire duration of the 13-year period had more females, higher education levels, higher income to need ratios, and they were younger than those who dropped out of the study. Each of these factors has been linked with either lower reports of racism or fewer negative effects of racism. Additionally, they found that the

participants' perception of their interviewers' race (during phone interviews) was significantly correlated with their perceptions of racism which would further affect the frequency with which individuals reported racism. This study did not directly test the directionality of the relationship between racism and health, but more recent studies (e.g., Gee & Walsemann, 2009; Pavalko et al., 2003) have found that discrimination predicted health outcomes over time, and that health did not predict discrimination. It should be noted that Gee and Walsemann (2009) examined physical health while Pavalko et al. (2003) examined both physical and mental health outcomes. Taken together, these studies suggest a causal relationship between racism and health (i.e., they indicate that cross-sectional studies may not fully capture the lagged effects of racism on long-term health).

Scholars have proposed a number of pathways by which racism can lead to various mental health outcomes in African American youth. For example, Brody et al. (2006) proposed that chronic exposure to the innately demeaning messages of racism are harmful to ethnic identity development and threaten mental health. Another proposed pathway is through maladaptive coping responses to racism. Neblett et al. (2010) suggested that substance abuse may be a maladaptive coping response to racism. A number of pathways surely provide an etiological explanation for the relationship between racism and negative mental health outcomes, and researchers are encouraged to continue pursuing these models.

Racism and physical health. While the majority of work exploring racism and health has focused on mental health, there has been a smaller body of literature investigating the impact of racism on physical health outcomes. More specifically, researchers have noted racial disparities in health outcomes and have proposed that racism may account for some of this variance in health outcomes between Blacks and Whites (e.g., Clark et al., 1999; Mays, Cochran,

& Barnes, 2007). Recent statistics suggest that African Americans are four times as likely as European Americans to develop Chronic Kidney Disease (National Institute of Diabetes and Digestive and Kidney Disease [NIDDK], 2005)], for which the leading causes are high blood pressure and diabetes. African Americans are more likely than both European Americans and Mexican Americans to be pre-hypertensive, and diagnosed with Stage 1 and Stage 2 hypertension (Centers for Disease Control and Prevention [CDC], 2007); and African American men are more likely to die from prostate cancer than European American men (CDC, 2010). Although it is not clear, there is some suggestion that racism may account for some of these differences.

Relatively fewer studies have empirically examined the impact of racism on physical health outcomes. For example, Collins, David, Handler, Wall, and Andes (2004) found that women who reported more interpersonal accounts of racism were more likely to give birth to children with very low birth weight across sociodemographic, biomedical, and behavior risk categories. This relationship was stronger for the group of mothers between 20-29 years, suggesting that mother's age may confer additional vulnerability to racism in some cases. In another study (Roberts, Vines, Kaufman, & James, 2007), it was found that women who reported either racial or other forms of discrimination had higher odds of hypertension compared to women who reported no discrimination. This study was a quasi-experiment in which participants recruited were identified a priori as hypertensive and normotensive; thus it is not possible to establish causality or direction of effects.

Mays et al. (2007) proposed a number of ways by which racism can impact the health of African Americans. They situate their discussion of mechanisms in a general stress model referred to as the allostatic load hypothesis (McEwen & Stellar, 1993). Allostatic load refers to

the chronic wear and tear that the body endures to maintain healthy functioning in response to stress (McEwen & Stellar, 1993). If the body is strained to a point of reaching the allostatic load, then it becomes more susceptible to disease and sickness (McEwen & Stellar, 1993). Mays et al. (2007) suggested three ways that racism can contribute to African Americans reaching the allostatic load. The first of these pathways is through residential segregation. In line with the integrative model (García Coll et al., 1996) which suggests that racism creates segregated communities and impacts development, Mays et al. (2007) proposed that residential segregation affects access to adequate healthcare, social services, quality of food (e.g., fresh fruits and vegetables), and increases one's exposure to environmental hazards (e.g., pollution, lead, dust). Limited access to such resources or exposure to environmental hazards reduces one's opportunity to live a healthy lifestyle and can increase the chances of reaching the allostatic load. The second proposed pathway emphasizes the intergenerational effects of racism on minorities. One study by Foster et al. (2000) showed that over a period of three generations among high socioeconomic status (SES) women, Black women were at a significantly higher risk than White women of giving birth to preterm or low birthweight babies. Though racism was not directly assessed in this study, Foster et al. (2000) encouraged future researchers to take into account that the uniquely stressful effects of racism may be salient for Black women. The third pathway proposed by Mays et al. (2007) is directly supported by the biopsychosocial model. This pathway implies that chronic exposure to race-based discrimination may contribute to developing cardiovascular disease and hypertension. This suggestion is consistent with Armstead et al.'s (1989) finding that using anger suppression as a coping response to racism may increase systolic blood pressure. Given the evolution of disease over the life course and the paucity of longitudinal work, the link between racism and physical health outcomes remains unclear.

Racism and psychophysiological outcomes. While a smaller number of studies have directly examined the link between racism and physical health, the study of psychophysiological outcomes has offered support for a causal link between racism and health. Indeed, several studies link racism with risk factors for developing hypertension and cardiovascular disease on the basis of particular patterns of physiological reactivity. Psychophysiology refers to the use of psychophysiological principles and events to understand psychological processes (Cacioppo, Tassinary, & Berntson, 2007). The majority of these studies have utilized self-report accounts of racism and focused on blood pressure (e.g., James, LaCroix, Kleinbaum, Strogatz, 1984; Krieger & Sidney, 1996). For example, as part of their larger community study, Coronary Artery Risk Development in Young Adults (CARDIA), Krieger and Sidney (1996) found that Black men and women who reported discrimination and that they tried to challenge it were more likely to have lower systolic blood pressure (BP) compared to those who failed to report discrimination or who coped passively. This finding suggests that not reporting discrimination and coping styles may also influence physiological responses to racism. However, correlational designs do not allow for directional or causal inferences to be made. Another line of research has utilized an experimental design (e.g., Guyll, Matthews, & Bromberger, 2001) which allows for better inferences to be made regarding the relationship between racism and psychophysiology. Guyll et al. (2001) found that diastolic BP during a speech stressor was higher for African American women who attributed interpersonal stress to racial discrimination compared to those who did not.

Harrell et al. (2003) described yet a third line of research characterized as moderated psychophysiology. This research takes a unique approach to assessing effects of racism by creating racism analogues in the laboratory while simultaneously recording physiological

reactivity, and examining the role of moderators that may change the relationship between racism and physiological reactivity (e.g., Armstead et al., 1989; Jones, et al., 1996; Morris-Prather et al., 1996). For example, in a study with African American college students, Armstead et al. (1989) found that the presentation of video clips depicting racism led to higher increases in BP than did anger provoking videos that did not contain racist content. In addition to exploring this bivariate relationship between racism and blood pressure, Armstead et al. (1989) also examined the role of coping style as a moderator and found that those who were high in anger suppression had higher systolic BP. This finding is in line with the correlational study by Krieger and Sidney (1996) which suggested coping style had a significant impact on physiological responses to racism. Though correlational studies do not allow for causal inferences, when taken in conjunction with experimental studies such as the one just described, they suggest that experiences with racism have the ability to impact physiology and, in turn, health outcomes for African American youth.

A seminal work by Jones et al. (1996) utilized a laboratory analogue of racism with an African American all-female college sample. The purpose of the study was to determine if Afrocentricism, a dimension of personality characterized by positive attitude toward facets of African culture, moderated the relationship between racism and physiological reactivity. The study design was particularly important because it employed two groups, one of which viewed racism depicted in videos similar to the study by Armstead et al. (1989), and another group which was presented with an audio vignette and prompted to imagine the racism condition. The authors (Jones et al., 1996) also addressed the multidimensionality of the racism by employing both a blatant and subtle condition of racism. Jones et al. (1996) also collected both physiological and self-report mood data from participants.

The findings by Jones et al. (1996) were notable in that they supplied empirical evidence that imagery is just as powerful as video presentations in producing physiological responses in African American females. In some mood reports, imagery coincided with even more exaggerated responses than the video vignette. Additionally, Jones et al. (1996) collected measures beyond blood pressure such as heart rate (HR), digital blood flow and facial electromyographic activity. The results also showed that the blatant racism condition resulted in the most significant changes in physiology which implies that the form of racism is an important consideration in the relationship between racism and psychophysiology.

One limitation of the Jones et al. (1996) study which the present study seeks to improve is the utilization of physiological indices that are not specific to the sympathetic (SNS) and parasympathetic (PNS) nervous systems. Jones et al. (1996) examined BP and HR which are influenced by both the SNS and PNS. However, Clark et al. (1999) proposed that the development of negative health outcomes is in part due to the chronic activation of the SNS related to encounters with racial stress. Furthermore, other literature suggests that the dysregulation of the PNS, which normally works in tandem with the SNS, has been associated with aggression, anxiety, depressive symptoms, and hypertension (e.g., Beauchaine, 2001; Masi, Hawkey, Rickett, & Cacioppo, 2007). For example, Masi et al. (2007) found that respiratory sinus arrhythmia (RSA), an indicator of PNS activity, was negatively related to hypertension above and beyond the effects of age in a sample of older adults. This work suggests the importance of disentangling the effects of the SNS and PNS on physiological response as each system has different implications for health. Returning to Jones et al.'s (1996) study in which they measured BP and HR, it is not clear whether the BP and HR patterns were due to the augmentation of the SNS or PNS withdrawal (which could also lead to increased BP and HR).

Other limitations of this study were that the sample did not contain any male participants and the sample size of 60 was very small. Therefore, the generalizability of these results is limited. Future research that includes males and larger sample sizes could play an instrumental role in generalizing the results in this study to Black males. Furthermore, scholars should explore other individual and contextual factors that may moderate reactivity to racism such as gender of the target and race of the perpetrator.

Gender as a Moderator of Racism and Outcomes

Although it appears that there is a link between racism and health, that relationship may be moderated by the gender of the person experiencing the racism. In fact, García Coll et al. (1996) identified gender as a primary social status variable that directly impacts an ethnic minority youth's experiences with racism. This consideration suggests that it is necessary to consider the ways in which gender might influence an individual's exposure to, appraisal of, and responses to racism. Understanding these factors could inform therapeutic, social, and medical interventions.

Several studies provide direct evidence that gender may moderate the relationship between racism and health. For example, the relationship between self-reported racism and conduct disorders was stronger in adolescent boys than girls (Brody et al., 2006), and self-reported racism was positively related to obsessive-compulsive symptoms, depression, and somatization in women, but not men (Greer, Laseter, & Asiamah, 2009). Jones et al. (1996) found that women's heart rates increased significantly during the presentation (i.e., time during which women viewed or listened to vignettes) and reflection (i.e., time during which females imagined or reflected on the vignette just presented) periods of blatantly racist vignettes. However, as mentioned earlier, one limitation of this study is that there were no male

participants and so it is not known whether this effect would have occurred in males. Morris-Prather et al. (1996) found that women had a significantly higher pulse rate than men, but that BP increased significantly more in men than in women while viewing racially noxious vignettes. Ironically, men self-reported less distress than women (Morris-Prather et al., 1996).

Several explanations exist for why the association between racism and health may differ as a function of gender. One possibility is that African American males and females have different experiences with racism. For example, some research suggests varying prevalence rates of racism experiences among males and females. These findings appear to largely suggest that males may report more experiences of racism than females (Borrell et al., 2006; Greer et al., 2009; Banks, Kohn-Wood, & Spencer, 2006; Seaton et al., 2008). However, some studies have found women to report more racism (Gibbons et al., 2004; Swim et al., 2003), while others have reported no gender differences at all (Caldwell, Kohn-Wood, Schmeelk-Cone, Chavous, & Zimmerman, 2004). Males and females may also have different experiences with racism due to differences in racial stereotypes that are associated with African American males and females. For example, Greer et al. (2009) noted that African American males are stereotyped as being dangerous and females are stereotyped as unskilled workers and “welfare queens”. These differences might lead to different forms of racism experiences, and consequently differences in the report of such experiences, as well as how racism impacts health for African American males and females.

Race of perpetrator

Another way that an individual’s responses to racism might be influenced is the race of the perpetrator. Clark et al. (1999) hypothesized that both inter and intragroup racism would have an impact on the health of African Americans. Utilizing a daily journal method to obtain

descriptive information about college students' experiences with racism and its effects on mental health, Swim et al. (2003) observed that only one perpetrator was identified as non-white. While the daily journal was a very unique method to obtaining information about racism encounters, Swim and colleagues (2003) were not able to experimentally manipulate the race of the perpetrator to test for differential effects on health outcomes.

On the other hand, Morris-Prather et al. (1996) utilized a more controlled method in the laboratory where they were able to directly manipulate the race of perpetrators to be either Black or White. In this study, 92 Black freshmen viewed a series of racially noxious vignettes in which the race of the perpetrator was counterbalanced and manipulated. Some participants first viewed a Black perpetrator followed by a White perpetrator and others viewed a White perpetrator first. The study produced a significant effect of race of perpetrator such that negative moods (e.g., fear) were more intense when the perpetrator was White, but only if a Black perpetrator had been viewed before the White perpetrator.

A third study by Bair and Steele (2010) presented 78 African American participants with either a pre-recorded racist or non-racist audio clip of a same-sex confederate discussing his or her views on certain issues. The race of the confederate was manipulated to be either Black or White. The participants were led to believe this discussion was a live recording via a webcam connected to the internet. In one condition, confederates expressed support for the use of racial profiling on campus to help solve a series of burglaries (racist condition). In the other condition, confederates expressed support for increased parking fees on campus (neutral condition). Following the analogue, participants completed a Stroop Task. Results indicated a main effect of race such that participants performed significantly worse on the Stroop Task after listening to a White confederate. Despite different methodologies, the above studies indicate that the race of

perpetrator is also an important factor to consider when examining the impact of racism on health.

Measuring Racism in the Laboratory

Self-report issues. Heretofore, much of the work assessing the impact of racism on health outcomes has utilized retrospective self-report perceptions of both racism and its outcomes. Often, the frequency of racism experiences are reported such that respondents are asked to estimate how often they have encountered racism in a given timeframe, usually within the past year (Brody et al., 2006) or over their lifetime (Clarke, 2003). At times, individuals are asked to report on the settings (e.g., health care setting, school, work) in which they have experienced racism (Krieger & Sidney, 1996), and sometimes various characteristics (e.g., authority figure, peer, race, gender) of the perpetrator are reported (e.g., Swim et al., 2003).

While self-reports provide important information to researchers, are feasible, and not very time-consuming, they can also introduce a number of methodological issues into the research process (Stone & Broderick, 2007; Williams et al., 2003). Retrospective accounts of negative emotional experiences can be problematic due to the emotion-experience gap phenomenon which refers to discrepancies in how individuals recall emotional events such that there may be over- or underreporting of negative emotions associated with events (Miron-Shatz, Stone, & Kahneman, 2009). Issues of social desirability (e.g., Hawthorne Effect) may also influence what a person reports such that individuals may overreport in an attempt to supply the researcher with information in which they believe the researcher to be interested. On the other hand, an individual may not want to appear as a hypersensitive minority, and so may underreport negative racial events. In addition to social desirability factors, some individuals may

underreport because it is difficult emotionally to discuss past experiences with racism (Krieger & Sidney, 1996).

Gender differences in self-report. Another limitation of self-report measures in the context of racism and health is that there may be gender differences in how individuals report on these negative stressful events. In their study examining mood and physiological responses to racism analogues in the laboratory, Morris-Prather et al. (1996) found that women reported more intense mood than men following blatant racial conditions suggesting that in some stressful situations, females may self-report more intense feelings than males. Ironically, males evidenced significantly higher BP across racially noxious conditions while females did not show a significant increase in BP which further speaks to possible limitations of self-reporting. This latter finding suggests that methodology is important to consider in our understanding of the relationship between racism and health outcomes. Accordingly, the use of additional methods besides self-report may provide important information about African American males' and females' experiences of racism and the impact of racism on health.

The Current Study

The link between racism and health is influenced by several situational, contextual, individual and methodological factors. In addition to examining such factors, the current study is a development over previous psychophysiological work by using specific indices of the sympathetic (SNS) and parasympathetic nervous systems (PNS). The current study seeks to advance our understanding of the relationship between racism and health in African American youth. The three aims of the current study are: 1) to examine how the type of racism (i.e., subtle versus blatant) and the race of the perpetrator influence mood and psychophysiological responses to racism; 2) to investigate how gender moderates the effects of racism; and 3) to explore

similarities and differences between psychophysiological and self-report mood responses to racism analogues while taking into account the role of gender.

Consistent with work conducted by Jones and colleagues (1996) and others (e.g., Armstead et al., 1989), I expected that participants would evidence stronger mood and physiological reactivity while imagining the blatant racism vignettes. Theory and research that have examined effects of subtle and blatant racism suggest that situational ambiguity (i.e., subtle racism) impairs cognitive functioning (e.g., Okazaki, 2009; Salvatore & Shelton, 2007). Extending this logic, affective responses may be attenuated in the short term as individuals grapple with the appraisal of the stress they encounter. It has also been proposed that the subtlety of a racism experience may affect the magnitude and duration of a psychophysiological stress response (i.e., Clark et al., 1999). Subtle racism may produce a less pronounced but more prolonged response as one's body stays vigilant while a person cognitively grapples with making a situational attribution. Salvatore and Shelton's (2007) findings that cognitive functioning is impaired in the short-term following subtle racism support such a notion. Additionally, the findings of Merritt, Bennett, Williams, Edwards, and Sollers (2006) that Black males who perceived high levels of racism in an ambiguous situation showed more pronounced cardiovascular stress response compared to those in the blatant racist condition in their last two rest periods also support such a notion. These findings should be interpreted with caution as it is not known if these findings are generalizable to Black females.

I also expect that participants will show stronger mood and physiological responses to White perpetrators as compared to Black perpetrators. Previous studies (Bair and Steele, 2010; Morris-Prather et al., 1996) have found that African Americans show more cognitive decline and more negative affect following encounters with White perpetrators. This effect may be accounted

for by African Americans' frequent reports of encountering racism with White perpetrators (e.g., Swim et al., 2003). Such a scenario may hold more personal relevance and would therefore be expected to result in a more pronounced response toward White perpetrators.

It is also predicted that gender will moderate mood and physiological responses to racism. More specifically, females will endorse greater negative affect while males will show greater physiological reactivity in response to racism. Such predictions are supported by literature suggesting that females report stronger negative mood following stressful situations as compared to males (e.g., Bagley, Weaver, & Buchanan, 2011; Morris-Prather et al., 1996). Additionally, literature also suggests that males may report more positive mood, but show a more elevated physiological response to stress (Morris-Prather et al., 1996).

Method

Participants

Data were collected as part of a larger study funded by the National Science Foundation entitled "Individual and Situational Determinants of Psychophysiological Responses to Race-Based Discrimination." Participants were 137 self-identified African Americans aged 18- to 30-years-old ($M=20.9$, $SD=2.02$) attending a medium-sized southeastern university. The sample was approximately two-thirds female (63%). Participants reported their socioeconomic status (SES) as poor (2.9%), working class (27%), middle class (51.1%), upper middle class (18.2%), and wealthy (0.7%). Participants reported their physical health as poor (0.7%), fair (15.3%), good (40.9%), very good (37.2%), and excellent (5.8%), with 62% indicating that they spent 30 minutes or more three times a week engaged in moderate to vigorous physical activity. Participants reported their mental health as poor (0%), fair (3.6%), good (27%), very good class (38%), and excellent (31.4%).

Procedure

Participants were recruited by flier advertisements placed around the campus, announcements to Black Greek organizations, Black college organizations, and listservs, and also by word of mouth. Following recruitment, data were collected in two 1-hour sessions which were scheduled approximately one week apart. Session one was primarily used to obtain sociodemographic information and to acclimate the participants to the laboratory setting and experimental procedure. Session two was dedicated to the experimental portion of the study in which racism analogues were utilized and psychophysiological and mood data were obtained.

Session one. Upon arrival to the first session, participants were greeted by a research assistant and then given a tour of the lab which consisted of a larger workspace area and a small room where data were collected. They were also given a brief introduction to the physiological equipment used (e.g. blood pressure machines, computers) with the intent to reduce any anxiety about the equipment and to help them feel more comfortable in the laboratory setting. After the tour, participants were taken to the small room where they were told that the purpose of the study was to understand how African Americans respond to challenging situations. The research assistant discussed the procedure for both session one and two, the potential risks involved and the process of having electrodes placed on the participants' bodies to increase their comfort with the experimental procedure. Participants were not told that that the challenging situations they would encounter in the study were racially-based to avoid compromising the physiological data collected. Participants were given the opportunity to read the consent form in private and ask questions. Informed consent was then obtained.

Next, participants completed a health screener which asked them to report on physical symptoms (e.g. blackout spells, chest pain) and diseases (e.g. high blood pressure, epilepsy) that

they had experienced within the last two years; medications they were taking; their psychological/psychiatric history; their family history of diabetes; and any learning disabilities they had. Once the research assistant reviewed the screener and discussed any items of immediate concern with the participant, a questionnaire assessing demographics was administered.

Following the completion of the demographic questionnaire, participants took part in a muscle relaxation exercise that lasted approximately 15 minutes. The exercise was intended to prepare the participants for session two by helping them to feel more comfortable in the lab space. Next, participants engaged in a practice visual imagery paradigm (VIP) which helped to further prepare them for session two. They were told that this was an example of what would happen in the second session and that it was important that they followed the instructions to start and stop imagining the audibly presented scene on cue. At the conclusion of the practice VIP, participants were compensated \$20 and thanked for their participation. Finally, they scheduled their second session with the research assistant.

Session two. Session two was scheduled approximately one week after session one, and participants were matched with same-sex research assistants for this session as the electrode placement process involved shifting of clothing. Prior to arrival, participants were asked not to smoke or consume any alcoholic beverages or caffeine within the 24 hours prior to their appointment as these substances could impact physiological measures (e.g., caffeine may cause a rapid heartbeat). Upon arrival, participants were escorted to the small room again where they completed a screener which asked them to indicate whether they had smoked or consumed caffeine or alcoholic beverages within the past 24 hours. If they had consumed such substances, they were asked to indicate how much and at what time. Next, participants' baseline blood

pressure was taken using a blood pressure cuff. Participants were then reminded of the procedure and that electrodes would be placed on their bodies, and they were given the opportunity to ask any questions.

After answering any questions, the research assistant explained that the electrode placement would begin. The research assistant then turned on a soft Jazz album by John Coltrane and closed the door to the small room to give the participants more privacy. In order to connect electrodes, the research assistant first cleaned the areas of participants' skin on which electrodes would be placed (e.g., neck area, back area, bottom of rib cage, and sternum) with alcohol pads. Next, the electrodes were attached to the participant's body.

Participants were then told that the audio scenarios (i.e., racism analogue) would begin shortly and reminded that it was similar to the visual imagery paradigm that they practiced in the first session. They were reminded to begin imagining the audio scene presented when instructed to do so and to stop imagining the scene on cue as well. Finally, they were asked to remain as still as possible to avoid interfering with physiological readings. The research assistant left the room, closed the door, turned off the music and waited for a 30-second rest period before initiating the pre-recorded audio scenario. Following each scenario presentation, the participants closed their eyes and imagined the scene just described, and after approximately 60 seconds they were told to stop imagining the scene and to open their eyes. Intervals of time following the research assistant's departure from the room served as an independent variable and consisted of four periods: Initial Rest Period (IR), Presentation of Stimuli Period (P), Imagine Period (I), and Recovery Period (R). The IR period was approximately 30 seconds and the P, I, and R periods were each approximately 60 seconds. After the 60-second recovery period, the research assistant entered the room and gave a mood rating scale to the participants to complete in private. Once

the participants indicated being finished, the mood rating scale was collected and another 30-second rest period (i.e., Initial Rest) began before the research assistant initiated the next audio scenario. This process took place seven times including an initial practice scenario to ensure the participant understood the procedure. With the exception of the initial practice scenario, the six scenarios were randomized and counterbalanced according to type of racism (i.e. Subtle, Neutral, or Blatant) and race of the perpetrator (i.e. Black or White). The blatant scenes included an individual being called a racial slur and the neutral scenes were non-confrontational events such as discussing a good restaurant with a police officer. The subtle scenes were characterized as ambiguously racist events such as being followed around a department store by a security officer (see Appendix for example scenarios).

The racism analogues were adopted from Vrana and Rollock (2002). The vignettes consisted of three conditions with two scenarios each (i.e. Subtle, Blatant, Neutral) and two possible races of the perpetrator (i.e. Black or White). For example, one combination could be a subtle discriminatory event with a Black perpetrator. Scenarios were created with similar lengths (e.g. number of sentences, number of words per sentence), same number and similar intensity of physiologically charged phrases (e.g., “muscles tensing”, “your stomach tightens”).

Once the participants completed the last mood rating scale, the research assistant entered the room and took participants’ blood pressure one last time. Participants were then informed that the session was complete, and the research assistant offered to help remove the electrodes. After all electrodes had been removed, participants were asked to return to the larger room where they were debriefed and told once again that the purpose of the study was to explore how African Americans respond to challenging situations. They were given the opportunity to ask questions, compensated \$20 for the session, and thanked for their participation.

Measures

Demographics. Participants completed a questionnaire during the first session in which they provided information about their age, gender, race, ethnicity, physical and mental health status, diet, exercise habits, and their family health, educational, immigration, and socioeconomic status.

Mood Rating Scale. The self-report mood rating scale served as one of the dependent variables in the proposed study. During session two, participants completed a mood rating scale (MRS) after each audio scenario. The MRS was a brief survey consisting of eight Likert-type questions assessing the participants' self reported moods during each scenario. The range of the scale was one to nine with one being "Not at all" and nine being "Very". The eight moods included positive (e.g., self assured, happy, and pleasant) and negative (e.g., distress, fear, anger, disgust, and tense) mood.

Physiological Responses. Physiological responses served as another variable in the study. There were three physiological measures. A general index measured was *heart rate* (HR) which was measured as number of beats per minute with larger numbers indicating higher heart rates.

Additionally, respiratory sinus arrhythmia (RSA) was measured as an indicator of the parasympathetic nervous system (PNS). RSA was indexed by extracting the high frequency component (> 0.15 Hz) of the R-R time series (i.e., heart rate variability) using spectral analysis. High-frequency spectral densities are calculated in 30-s epochs and normalized through natural log transformations. The ECG signal was acquired through spot electrodes, which were arranged in a modified Lead II configuration. RSA is a well-validated measure of PNS activity (Berntson

et al., 1997). Increases in RSA reflect greater PNS activation. All variables were continuous measures.

Finally, cardiac *pre-ejection period* (PEP) was used as an index of the sympathetic nervous system (SNS). Cardiac activity was monitored continuously during the experiment via electrocardiographic (ECG) and impedance cardiography (ICG) signals acquired by a Bionex Impedance Cardiograph amplifier from Mindware Technologies [Gahanna, OH] using the spot electrode configuration described by Sherwood, Turner, Light, & Blumenthal(1990). PEP is indexed as the time between left-ventricular depolarization and the initiation of ejection of blood into the aorta. PEP is a validated measure of beta-adrenergically mediated SNS-linked cardiac activity (Sherwood et al., 1990) *Shorter* PEPs indicate increased SNS activation.

Results

Analytical Plan

To examine the mood and physiological effects of the nature of racism, perpetrator race, period of assessment, and the moderating role of gender (Questions 1 and 2), a series of repeated-measures ANOVA was conducted with participant gender as a between-subjects variable and experimental condition (i.e., blatant, neutral, subtle), perpetrator race (i.e., Black or White), period (i.e., initial rest, presentation, imagine, and recovery) and mood (e.g., angry, pleasant) as within-subjects variables. To explore the correspondence between individuals' mood reports and physiological responses to the racism analogues and the moderating role of gender (Question 3), I was initially advised by statistical consulting to run individual correlations for each of my conditions (i.e., each racism condition X race of perpetrator) for each outcome (i.e., 8 moods and 3 physiological outcomes) for males and females and to then test the correlations individually for significant gender differences. However, due to the increased chances of Type I

Error (e.g., the analysis would require ≥ 192 correlations), and upon further consultation, the decision was made to *not* conduct separate statistical analyses for this question, but to instead use the results from Questions 1 and 2 (i.e., does gender moderate mood and physiological responses to racism?) to infer and discuss correspondence between mood and physiological data and gender differences in correspondence between the two types of data.

Question 1

Do type of racism (i.e., condition: blatant versus subtle) and race of the perpetrator influence mood and psychophysiological responses to racism?

Mood Data

ANOVA yielded a significant multivariate main effect of condition (Wilks' Lambda=.186; $F(2, 104)=227.55$, $p<.001$) and mood (Wilks' Lambda=.144, $F(7,99)=83.81$, $p<.001$); however, these main effects were qualified by a significant 3-way interaction between condition, mood, and the race of the perpetrator (Wilks' Lambda=.747; $F(14, 92)=2.22$, $p=.012$; see Figure 1) suggesting that type of racism and race of the perpetrator influence mood responses to racism. Following the subtle condition, participants reported more intense fearful responses when the perpetrator was Black ($M=2.86$) than when the perpetrator was White ($M=2.30$). In the blatant condition, participants were more disgusted when the perpetrator was White ($M=7.38$) than when the perpetrator was Black ($M=6.95$). Following the neutral condition, participants were happier when the other actor(s) in the scenario were Black ($M=6.57$) than White ($M=6.10$).

Psychophysiological Data

Heart Rate. There was a significant multivariate main effect of period (Wilks' Lambda=.806; $F(3,89)=7.15$, $p<.001$) on heart rate which was qualified by a significant multivariate interaction between condition and period (Wilks' Lambda=.707; $F(6,86)=5.94$, $p <$

.001; see Figure 2). This result suggests that the type of racism and period of assessment influenced participants' heart rate responses to racism analogues. Post-hoc analyses revealed that during the present period (i.e., presentation of the scene), heart rate was significantly *lower* in the blatant condition ($M=72.26$) than the neutral condition ($M=73.49$).

RSA. There was a significant multivariate main effect of period on RSA (Wilks' Lambda=.741; $F(3,90)=10.50$, $p<.001$); however, this effect was also qualified by an interaction between condition and period that approached significance (Wilks' Lambda=.869; $F(6,87)=2.19$, $p=.051$; see Figure 3). This result suggests that type of racism and period of assessment influence parasympathetic responses to the vignettes. Using a Bonferroni correction, post-hoc analyses revealed that in the *imagine* period, RSA (parasympathetic nervous system activity, i.e., rest/digest) was lower in the blatant condition ($M=6.34$) than either of the subtle or neutral conditions ($M_s=6.49$, 6.52 , respectively). Analyses within condition also showed that in the blatant condition, RSA was significantly lower (i.e., lower PNS activity) in the imagine period ($M=6.34$) than in the initial rest period ($M=6.57$).

PEP. There was a significant multivariate main effect of condition (Wilks' Lambda=.930; $F(2,87)=3.264$, $p=.043$) and period (Wilks' Lambda=.662; $F(3,86)=14.655$, $p<.001$) on PEP; however, these main effects were qualified by a significant three-way interaction for condition, period and perpetrator race (Wilks' Lambda=.809; $F(6,83) = 3.27$, $p=.006$; see Figures 4 and 5) suggesting that condition, perpetrator race and period interact with one another to influence sympathetic responses to the vignettes. Post-hoc analyses revealed that in the recovery period, when the perpetrator was Black, PEP was shorter (i.e., greater SNS activation) in the subtle condition ($M=133.36$) compared to the blatant condition ($M=136.98$).

Analyses within conditions showed that in the blatant condition during the recovery period, PEP was shorter (i.e., greater SNS activation) when the perpetrator was White ($M=133.55$) compared to when the perpetrator was Black ($M=136.98$). Analyses by race of perpetrator showed that when the perpetrator was Black, in the blatant condition, PEP was shorter (i.e., greater SNS activation) in the initial rest period ($M=132.85$) compared to the present, imagine, and recovery periods ($M_s=135.62, 137.38, 136.98$, respectively). When the perpetrator was White, in the blatant condition, PEP was shorter (i.e., greater SNS activation) in the initial rest period ($M=133.158$) compared to the present and imagine periods ($M_s=135.58, 135.99$, respectively), but not the recovery period.

Summary. Type of racism and race of the perpetrator influenced mood and physiological responses to racism. For the mood data, both the type of racism and perpetrator race influenced fear and disgust responses to racism. For the physiological data, the type of racism played a role for all three outcomes, while race of perpetrator was significant only for PEP (SNS activity).

Question 2

Does gender moderate mood and psychophysiological responses to racism?

Mood Data

Gender Effects. Although the multivariate main effect of gender was nonsignificant $F(1,105)=.86, p=.357$, there was a significant interaction between gender and condition (Wilks' $\Lambda=.867, F(2,104)=7.96, p=.001$; see Figure 6 suggesting that gender moderates effects of type of racism on participants' mood responses to the vignettes. Following the subtle condition, females reported greater intensity of mood ($M=4.67$) than males ($M=4.27$). There was also a significant interaction between gender and mood (Wilks' $\Lambda=.835, F(7,99)=2.80, p=.011$). Males reported more pleasant ($M=4.01$) and happy ($M=3.64$) feelings than females ($M_s=3.58$,

3.21, respectively) across conditions, while females reported more anger ($M=5.36$) and disgust ($M=5.02$) than males ($M_s=4.71, 4.37$, respectively) across conditions.

Psychophysiological Data

Heart Rate. There was a significant multivariate main effect of gender on heart rate $F(1,91)=15.29, p<.001$. Females had significantly higher heart rates than males across all study factors (i.e., condition, race of perpetrator, and period).

RSA. Multivariate analyses showed that an interaction between period and gender also approached significance (Wilks' Lambda=.932; $F(3,90)=2.20, p=.094$; see Figure 7) indicating that there may be gender differences in parasympathetic responses to the vignettes across periods. Using a Bonferroni correction, post-hoc analyses indicated that for females, RSA in the recovery period ($M=6.78$) was higher than in the initial rest, present, and imagine periods ($M_s=6.54, 6.52, 6.56$, respectively). For males, RSA in the recovery period ($M=6.53$) was higher than in the present period ($M=6.35$). Within period, there were no significant gender differences.

PEP. Multivariate analyses showed that a three-way interaction between race of perpetrator, period, and gender approached significance (Wilks' Lambda=.920; $F(3,86)=2.51, p=.064$) suggesting that gender may moderate effects of perpetrator race and periods on sympathetic responses to the vignettes. For females (Figure 8), when the perpetrator was Black, PEP was shorter in the initial rest period ($M=134.74$) than the present, imagine, and recovery periods ($M_s=136.60, 138.06, 137.301$, respectively), and was shorter in the present period ($M=136.60$) compared to the imagine period ($M=138.06$). For males (Figure 9), when the perpetrator was Black, PEP was shorter in the recovery period ($M=132.03$) than it was in the imagine period ($M=133.558$). For males, when the perpetrator was White, PEP was shorter in the initial rest period ($M=131.099$) than in the present period ($M=133.63$).

Summary. Gender moderated effects of racism type on mood responses to vignettes. Trend-level findings suggest that gender may interact with time period to influence parasympathetic responses to the vignettes and with time period and race of perpetrator to influence sympathetic nervous system responses to the analogues.

Question 3

To what extent do self-report mood responses and psychophysiological responses to the racism analogues correspond to one another and does the extent of agreement differ for males and females?

I found some evidence of correspondence between mood responses and psychophysiological responses. The mood data suggest that individuals were more fearful when the perpetrator was Black in the subtle condition. Physiologically, individuals showed more sympathetic reactivity to Black perpetrators during the recovery period of the subtle condition. Additionally, participants reported more disgust to White perpetrators in the blatant condition as compared to Black perpetrators. Physiologically, participants showed more sympathetic activation to White perpetrators in the recovery period of the blatant condition.

With regard to gender differences, I found that females reported more intense mood in response to the subtle condition than males; however, I did not find any physiological data to support this finding. In fact, gender did not interact with condition or type of racism for any of the physiological outcomes. I also found that males reported more positive mood than negative mood across all conditions while females reported more negative than positive mood. Interestingly, when looking at the heart rate responses, I found that males had lower heart rates than females across all conditions but similar levels of sympathetic and parasympathetic activity following exposure to the racism vignettes.

Discussion

The overall aim of the current study was to examine individual, situational, and contextual influences on responses to racism analogues. My first objective was to examine the influence of the type of racism and the perpetrator race on mood and psychophysiological responses to racism analogues. Another aim was to understand the moderating role of gender in this relationship. The findings suggest that the type of racism one experiences and the race of the perpetrator influence both mood and physiological responses to racism. I also found evidence that gender moderates mood responses and possibly physiological responses to racism, as well.

Type of Racism, Race of Perpetrator, and Responses to Racism

My first question was whether type of racism and race of perpetrator influenced mood and physiological responses to racism vignettes. With regard to the mood data, the findings suggest that the blatantness of a racism experience, perpetrator race, and the specific mood being measured are all important in how we understand racism's effects on mood. Contradictory to my expectations, participants showed a more fearful response to *Black* perpetrators in the *subtle* condition. One possibility is that participants held prototypes of what racial discrimination looked like (i.e., White perpetrator and a Black victim; Inman & Baron, 1996), and the racism scenario with a Black perpetrator deviated from that prototype and was jarring (thus, producing a stronger reaction). Also, the situational ambiguity inherent in the subtle condition may have resulted in participants relying on internalized cultural stereotypes about Blacks and endorsing fear responses. Literature has supported the notion that individuals will rely on stereotypes to interpret ambiguous situations (e.g., Sagar & Schofield, 1980). It should be noted that the fear response to both Black and White perpetrators was still relatively low and so there was not an extremely fearful response towards Black or White perpetrators.

I also found that participants were more disgusted in the blatant condition and less happy in the neutral condition when the perpetrator/actor was White. Drawing on the same literature as above, this finding may have been the result of a blatant racism encounter with a White perpetrator being more easily identifiable and prototypic of what one considers racism (Inman & Baron, 1996); in turn, a situational attribution would have been much easier to make and respond to. Additionally, considering the sociohistorical meaning of a blatant experience with a White perpetrator (e.g., Jim Crow era), society is much less tolerant of such occurrences so it would seem plausible that participants would be disgusted when they encountered such a scenario.

With regard to the physiological data, I found that the effects of type of racism and perpetrator race on physiological responses depended on the outcome being evaluated. I was surprised to find that heart rate was *lower* in the presentation period of the blatant condition than the neutral condition. One possibility is that the neutral scene (e.g., asking a police officer for directions) may not have been as neutral as we may have thought initially. It may also be that this finding is a coping response to the racism vignette. In line with the finding that participants reported strong negative affect in the blatant condition, it may be that the experience of negative affect was cathartic resulting in a more relaxed physiological response. This notion is consistent with work suggesting that the expression of negative emotions can result in a reduction of physiological stress response (Verona & Sullivan, 2008). Indeed, racial discrimination research has found that expressing anger (as opposed to suppressing it) is negatively related to systolic and diastolic blood pressure (Armstead et al., 1989).

In contrast to HR, the findings for RSA revealed that participants exhibited lower RSA in blatant condition as compared to the neutral and subtle conditions while imagining the racism scenarios. This finding supports the prediction that individuals would respond more strongly to

blatant racism in the short-term (i.e., this difference between the blatant and subtle conditions was not present in the recovery period).

For sympathetic nervous system activity, the three-way interaction between condition, period, and perpetrator race indicates that these three contextual factors together influence sympathetic responses to racism. It is noteworthy that many effects (i.e., elevated sympathetic nervous system/flight-fight response) were observed in the recovery period after participants had finished imagining the scene and were sitting quietly waiting for the experimenter to return to the room. These effects possibly speak to the significance of longer term effects of racism on African Americans' health. It may be that the effects of subtle and blatant racism linger long after a racism-event has ended.

Gender as a Moderator

My second set of analyses concerned whether gender moderated mood and physiological responses to racism. The finding that gender moderated mood responses was consistent with the expectations of this study based on previous literature suggesting that males' and females' mood responses to negative situations are different. The result that females responded more intensely than males in the subtle condition is consistent with literature suggesting that females may ruminate in response to stress more than males (e.g., Jose & Brown, 2008). This ruminative process may have been even more exaggerated in the subtle condition because it is a situation that would require more thinking to process the situation. Alternative explanations are that: (a) males' mood may be less affected by racism experiences; (b) males underreport, or; (c) females overreport or exaggerate mood responses to racism. Under or overreporting seems to be more of a plausible explanation given that the physiological data suggests that males and females often have similar physiological responses.

The physiological data revealed a strong trend-level finding among gender, race of perpetrator, and period for PEP. The findings showed that females' parasympathetic activity decreased (i.e., the body was less at rest) during the imagine period as compared to the recovery period while males did not show significant difference between the imagine period and recovery periods. Though I proceed with caution, this trend-level finding may further fit with the assertion above that Black females may be more reactive to racial stress as evidenced by less parasympathetic activity while imagining the racism vignettes.

There was a trend of gender moderating perpetrator race and period effects on sympathetic activity. The finding regarding sympathetic activity is interesting in that it seems to show that females showed more sympathetic reactivity prior to imagining the vignettes (i.e., during the actual presentation of the stimuli) while males showed more reactivity after imagining the racism vignettes (during the recovery period). This may indicate that females showed a more anticipatory (i.e., prior to instructions)—or vigilant (i.e., during the reading of the vignette)—response to the vignettes while males showed a more delayed, ruminative response. Females' anticipatory response may be consistent with literature suggesting that females endorse higher rates of anxiety symptoms than males; however, the ruminative response in males is not consistent with previous literature showing the rumination is more prevalent in females (Tamres, Janicki, & Helgeson, 2002). These findings possibly suggest that Black males may engage in more ruminative (or even suppressive) processes following exposure to racial stress. For example, it may be that males do not acknowledge the emotions associated with the racism event while it is occurring, which, in turn, leads to an elevated physiological responses shortly after imagining the scene (and not while listening to it).

Exploratory Aim: Correspondence of Mood and Physiological Data and Gender

Differences

The third aim was to explore correspondence between mood and physiological data for males and females and in the overall sample. Results revealed correspondence between sympathetic findings and mood findings, suggesting some degree of accurate and honest reporting of mood by study participants. Another possibility is that individuals were using physiological cues on which to base their mood reports, or said another way, that participants used physiological cues to make inferences about their mood states. Males' lower heart rates were also consistent with reports of more pleasant, positive moods, while females' elevated heart rates across conditions might be consistent with elevated reports of negative (e.g., angry) mood. Beyond heart rate and mood findings, it is difficult to map mood findings (which do not take into account period) onto the physiological data as many of the gender differences on physiological outcomes were related to differences in specific periods.

Clinical Implications

The present findings have significant clinical implications for African Americans and other individuals who may be at risk for experiencing racism during their lifetimes. Several works have implicated racism as a risk factor for developing depressive and anxiety symptoms, conduct disorder, substance abuse issues, and self-esteem issues. One way by which racism may contribute to poor mental health is through its influence on mood. At clinical levels, depressive and anxiety symptoms are mood disorders. For example, some have proposed that racism experiences can lead to symptoms similar to posttraumatic stress disorder such as hypervigilance and hypersensitivity to racism cues in one's environment. The mood data from the present study suggest that the type of racism and race of the perpetrator both affect mood responses to racism.

These findings indicate that clinicians must be aware of the various social forces that continuously influence the mental well-being of their clients. This may mean that a client's issue is not just an intraindividual issue, but rather a result of a transaction between the individual and the environment. For example, a client presenting with anxiety about his work performance may not benefit as much from cognitive restructuring if the real issue is that he faces subtle acts of racism on a daily basis from his White supervisor which make him feel anxious about making a mistake.

The physiological data also has clinical implications. African Americans and other ethnic minorities often report experiencing somatization symptoms more than White individuals. It is possible that African American clients who have physiological responses to racism may seek out medical attention as opposed to psychological attention. This could result in them not receiving psychological services for their apparent physiological concerns and their symptoms may worsen. On the other hand, initial contact with a medical doctor may eventually lead to a referral to seek out therapeutic services.

Finally, the finding that gender moderated mood responses and only some physiological responses suggests that for the most part, males and females are physiologically responding similarly to racism analogues, but that they are reporting differently on their mood. This has implications for who will seek out psychological services. Because females seem to report more psychological distress, it is more likely they will be the ones to seek out clinical help. Some authors have speculated that racism is a threat to Black males' masculinity. Thus, males who are higher on aspects (i.e., restrictive emotionality) of masculinity tend to show a stronger correlation between racism experiences and depressive symptoms than males lower on those masculinity aspects (Hammond, 2011). Clinically, a psychologist will need to be sensitive to this

when working with Black males who may be affected by racism. Some aspects of masculinity appear to be helpful in reducing the effects of racism on depressive symptoms; therefore, clinicians may draw out those aspects in therapy.

Limitations and Future Directions

While the current study extends current discourse and scholarship surrounding the study of psychophysiological effects of racism on African Americans, there are some areas that future research should look to improve upon. Namely, the sample consisted largely of college and college-aged students. College students are young enough that they may not have encountered certain racial experiences that older Blacks may have encountered (e.g., being steered towards certain neighborhoods by real estate agents) which will shape their understanding of and responses to racism. In a similar vein, age is also associated with health status; therefore, if the field is to disentangle age effects from racism effects on health disparities, longitudinal work is imperative. Additionally, college students are more educated than the general population and have more social capital so they may show different responses to racism than someone from the general population. For example, a college student may have more access to and knowledge of resources to fight institutional forms of racism (e.g., unjust policies). Future work may look to obtain a larger portion of their sample from the community and conduct longitudinal work.

Another area for improvement is the gender distribution of the sample. The current study was approximately two-thirds female which makes it difficult to not only generalize findings, but to understand how gender may moderate responses to racism. Additionally, in considering the external validity of the study, racism is a gendered experience and it is possible that the vignettes were more representative of Black male experiences which could further influence observed findings. To improve upon both of these areas, scholars may need to oversample for males.

Secondly, scholars may consider developing focus groups to ascertain similarities and differences in Black males' and females' racism experiences and to develop a more representative, ecologically valid sample of experimental vignettes.

Speaking more to the issue of external validity, another important factor to consider is how to examine inter and intra group racism among Blacks. The manipulations of perpetrator race within otherwise identical vignettes makes it difficult to capture the unique experiences of inter and intra group racism; however this work is very significant and should be done as these differing experiences have varying implications for individuals. For example, after being called a racial epithet by a White individual, a Black female adolescent may make the attribution that the slur came from an outgroup member who does not know her; however, if that same Black female is teased by her Black female peers for having a coarser hair texture, then it may be more likely that she will internalize what her peers have said to her and her self-esteem may suffer as a result. Future work may also look to utilize a focus group approach to understanding inter and intra group experiences so that scholars can better measure them.

Finally, the current study examined various indices of the cardiovascular system, but future scholarship should also include the examination of other systems that may be affected by racial stress. Within the rising field of social neuroscience, scholars can even begin to examine neural correlates of how racism experiences affect cognitive activity.

Conclusion

The current study examined the effects of the form of racism, perpetrator race, period, and gender on psychophysiological responses to racism analogues. I observed a number of findings all indicating that these factors are important to consider, and that they may affect psychophysiological responses differentially depending on the outcome measure. The current

work attempted to combine what the field knows about both physical and mental health effects of racism in hopes to further our understanding of poorer health prognoses for African Americans in the United States. It is my hope that this work will take us one step closer to that goal.

Appendix

SESSION II VISUALIZATION SCRIPTS

ADOPTED FROM VRANA & ROLLOCK (2002)

Practice script:

“You are sitting in a lawn chair on your porch on a summer afternoon, leaning back relaxed. You feel a soft warm breeze blowing across the porch. A green lawn stretches out before you and scattered trees sway gently with the wind. Comfortable and content you are so relaxed you hardly move while you sit in the chair enjoying the pleasant summer day.”

Experimental Scripts:

Blatant

1. “You are driving along a suburban street when a car like yours screeches past you at high speed. Then you see a police car behind you with its red lights flashing. To your surprise, the Black/White policeman pulls you over and begins to criticize you for speeding. You feel your heart pounding in your chest as you realize his mistake. Muscles tensing, you try to explain what happened, but he cuts you off saying “You Niggers are all the same”. While struggling to control your temper, you sit fuming to yourself while the policeman writes out the ticket.” (98 words; 2 rps)
2. “You are on your way through a cafeteria line, in a hurry to get your lunch before your next class. As you are about to order your food, three Black/White students cut in line in front of you and one says “Move out of my way, Nigger.” Your stomach tightens and you feel upset. You become angry as the students joke and take their time, because you are in

a hurry to get finished. You struggle not to boil over at this group, but you feel your breathing quicken as you prepare to let them know how you feel.” (98 words)

Neutral

1. “You’ve just selected a snack in a grocery store, and are waiting in line to pay for it. In front of you and behind you in line are young Black/White students about your age. You are in no rush, and the line is moving along reasonably. You casually glance around at the store shelves, the head of the customer ahead of you, the items in your hand – but not paying too much attention to any one thing. You are not aware of thinking or feeling anything in particular, as you move along with the line toward the cashier.” (98 words)
2. “You are walking around downtown on a hot, summer afternoon, trying to find a new restaurant a friend has told you about. At one point, you see a policeman, a tall Black/White man, standing at the corner, and go over to ask him if he knows where it is. He says yes, and says he has been there several times and likes the food. You spend a few minutes discussing other good places to eat in the area. Finally, he points you in the right direction and you move on.” (90 words)

Subtle

1. “You are shopping in a bookstore with a couple of friends, looking for a good book to take on your upcoming vacation. After a few minutes of browsing, you notice that the Black/White security guard you saw at the entrance of the store is now following you around the store and he asks twice if you need help. Your armpits feel clammy with sweat even though you know you have done nothing wrong. Breathing rapidly, you

ignore the angry look from the guard and prepare to ask that you no longer be followed around the store.” (96 words, 2 rps)

2. “You are standing in line at a department store waiting to make a purchase. You are next in line. You approach the register, but to your surprise, the Black/White cashier gestures to the customer behind you and signals the other customer to approach the register. Having now waited in line for some time now, you feel your fists clench as you recognize anger welling up inside of you. Face flushed with anger, you struggle not to lose your composure as you begin to tell the cashier that you were next in line.” (92 words)

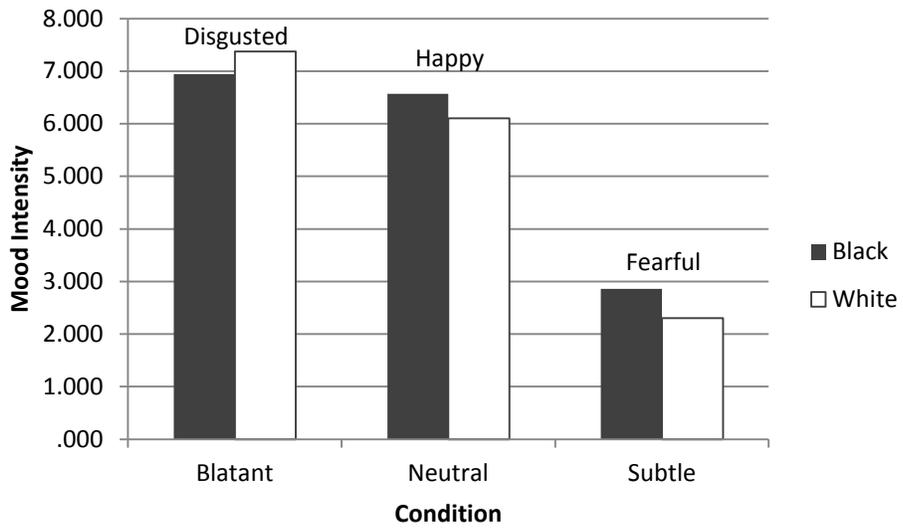


Figure 1. Condition, perpetrator race, and mood effects on mood.

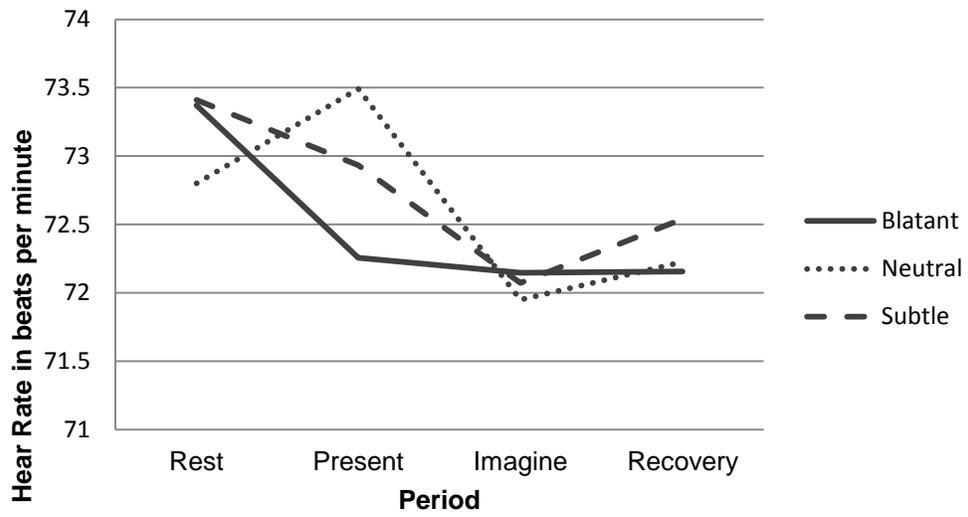


Figure 2. Condition and period effects on heart rate.

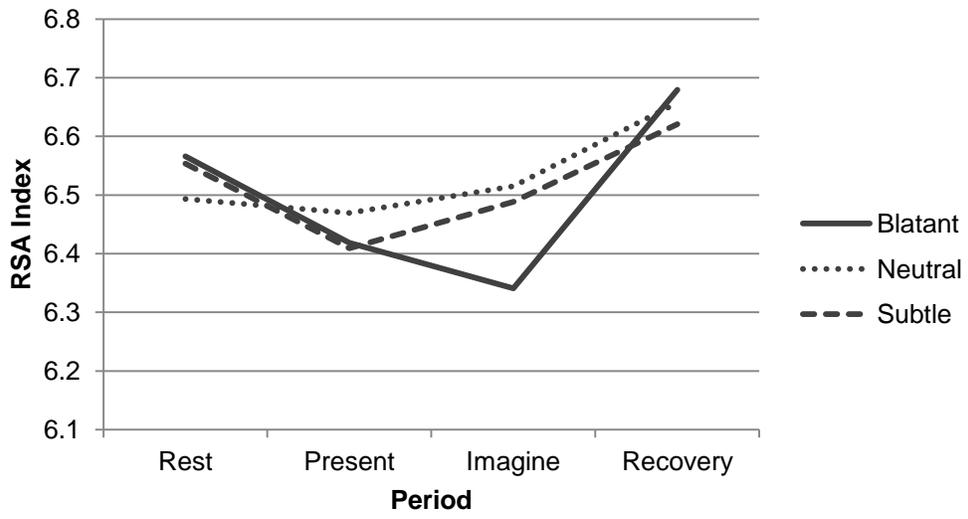


Figure 3. Period and condition effects on RSA

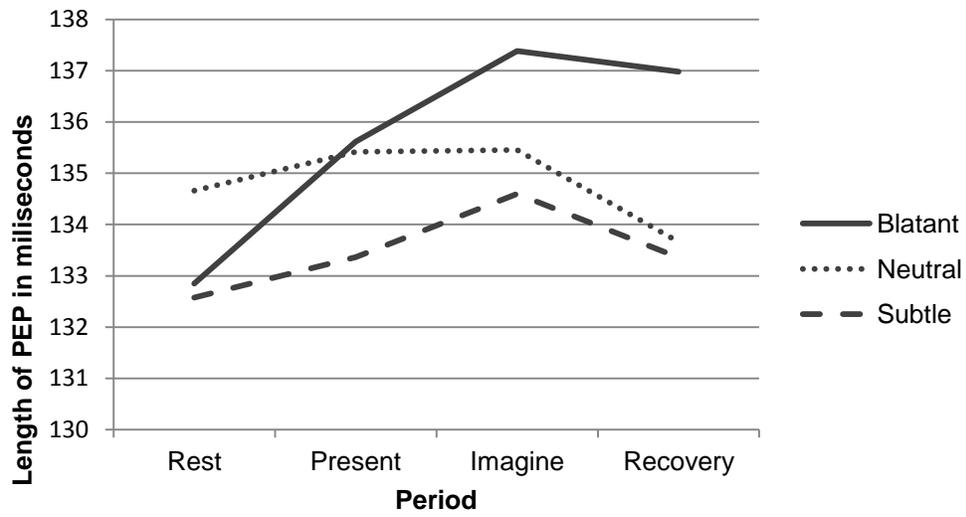


Figure 4. Condition, period and perpetrator race effects on PEP for Black perpetrators.

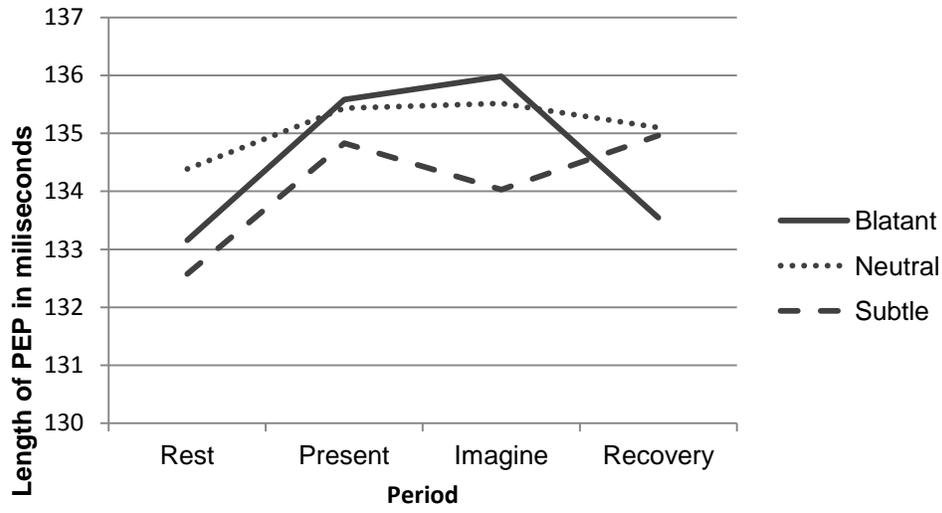


Figure 5. Condition, period and perpetrator race effects on PEP for White perpetrators.

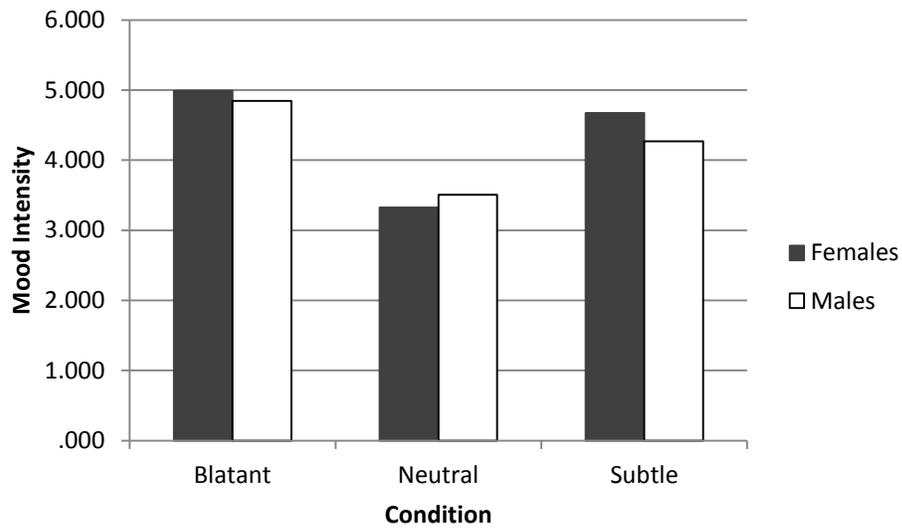


Figure 6. Gender and condition effects on mood.

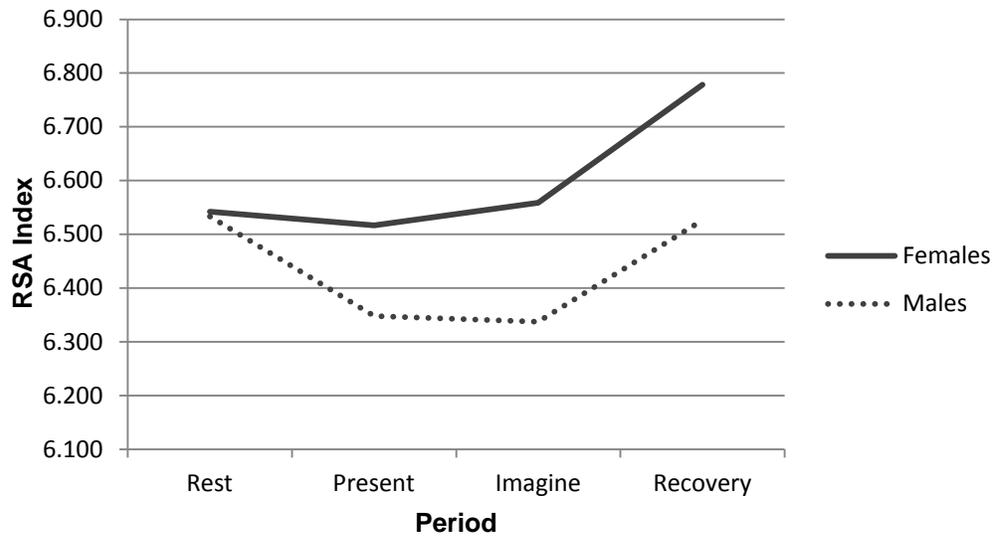


Figure 7. Period and gender effects on RSA.

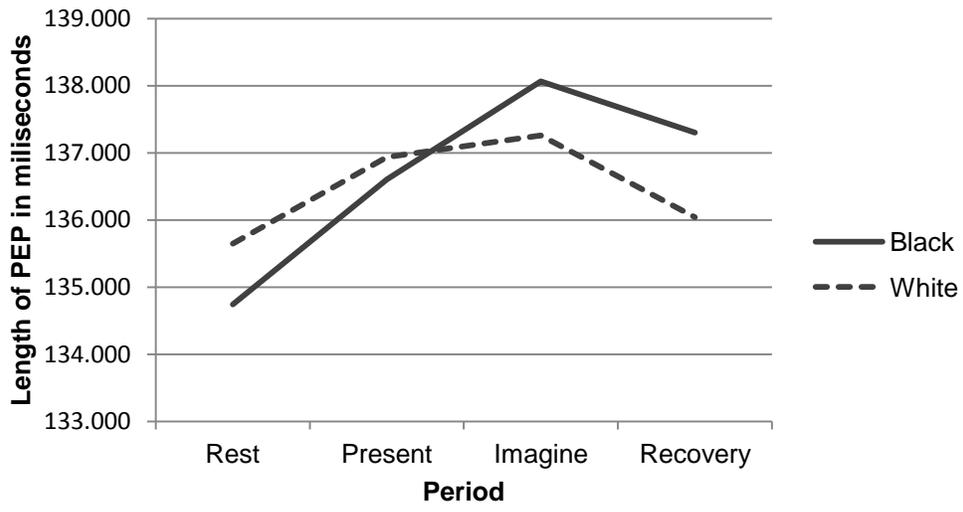


Figure 8. Period, perpetrator race, and gender effects on PEP for females.

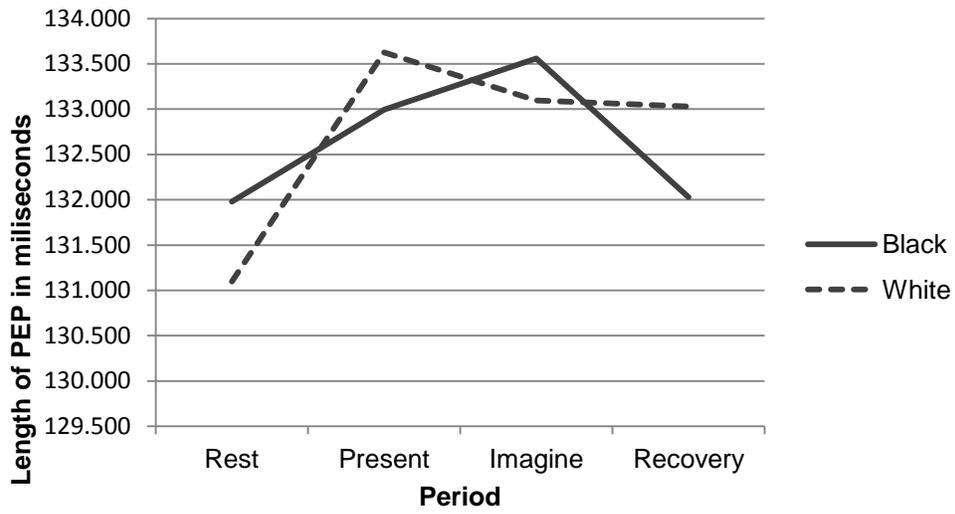


Figure 9. Period, perpetrator race, and gender effects on PEP for males.

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