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The Physiological Correlates of Race-Related Stress and Health Among African Americans and Latinos

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THE PHYSIOLOGICAL CORRELATES OF RACE-RELATED STRESS AND HEALTH AMONG AFRICAN AMERICANS AND LATINOS

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Abstract

There is a large body of research that suggests that health disparities exist in the U.S. and that they disproportionally affect African-Americans and Latinos. A number of soicodemographic factors have been proposed to account for these health disparities including diet, physical activity levels, smoking, age, and utilization of healthcare services. However, findings from empirical research studies and from national health organizations have clearly indicated that these factors alone cannot account for the health disparities and suggest that racism and race-related stress are important contributors. The present study examined the relationships among psychological and physiological race-related stress and health among African-Americans and Latinos. The study examined the contributions of ethnic identity levels, gender, SES and skin color on race-related stress and health relationships. Participants were exposed to videotaped vignettes depicting racist acts as well as to a control condition while salivary cortisol levels were collected at baseline and 20 minutes after exposure to stimulus and control conditions. Participants were also administered the Index of Race-Related Stress – Brief, the Subjective Health Complaints Inventory, the New Immigrant Survey Skin Color Scale, and the Multigroup Ethnic Identity Measure. Findings indicated that physiological reactions as measured by salivary cortisol levels were significantly higher for the race-related videotaped vignettes compared to baseline and neutral conditions. The results also revealed that gender, ethnic identity levels, skin color and family SES contributed to race-related stress and health. These results suggest that racism negatively impacts physiological processes in African-Americans and Latinos, however, prospective studies are needed to clarify the differential effect of these variables on race-related stress and health among these populations.

CHAPTER I

Introduction

There is a documented health disparity among ethnic minorities in this country (U.S. Department of Health and Human Services, 2007). The lifespan of African Americans is 5 to 7 years shorter than that of White Americans (Anderson, 1995; Felton, Parson, Misener, & Oldaker, 1997; Sue & Sue, 2008). According the U.S. Department of Health and Human Services, Office of Minority Health (2007), health disparities for African-Americans and Hispanic Americans exist in six key areas: Cancer, cardiovascular disease and stroke, diabetes, HIV/AIDS, and immunizations. African Americans and Hispanic Americans suffer the most from cardiovascular disease. Health statistics on health disparities from the U.S. Department of Health and Human Services (2007) reported that "Around 40 percent of African American men and women have some form of heart disease, compared to 30 percent of White men and 24 percent of White women. African Americans are also 29 percent more likely to die from the disease than Whites." Similarly, the report states that Hispanic Americans, particularly for Mexican Americans, the diagnosis of cardiovascular disease and stroke is significantly higher compared to Whites (U.S. Department of Health and Human Services, 2007). Stroke related deaths are also substantially higher for African Americans compared to Whites (U.S. Department of Health and Human Services, 2007).

Regarding diabetes, the statistics and health data are equally concerning. Deaths related to overweight and obesity, major risk factors for diabetes and cardiovascular illness, are highest among African Americans and Hispanic Americans (Department of Health and Human Services, 2007). The report also stated that, "1. African-Americans

are twice as likely to have diabetes compared to Whites, that African Americans are more likely to experience health complications from diabetes including retinopathy, kidney failure is about 4 times more likely common in African Americans with diabetes than in Whites with diabetes and amputations of lower extremities are also more likely for African Americans with diabetes (Department of Health and Human Services, 2007)."Similarly, Hispanics are 1.5 times as likely to have diabetes as Whites, however, death rates from diabetes in Hispanics has been shown to be 40% higher than death rates from diabetes among Whites (Department of Health and Human Services, 2007). Research has shown that demographic characteristics are important contributors, however alone, do not sufficiently account for the health disparities among ethnic minorities and that social/contextual factors particularly, racial/ethnic racism and discrimination are crucial contributing agents (Brown et al., 2000; Carter, 2007; Polednak, 1997; Vega & Rumbaut, 1991; Williams & Collins, 1995; Williams & Williams-Morris, 2000).

There is extensive literature substantiating the relationship between psychological stress, its physiological correlates and health disorders (e.g., DeLongis, Folkman, & Lazarus, 1998; Glaser, Rabin, Chesney, Cohen, & Natelson, 1999; Levenstein et al., 2008; McEwen, & Stellar, 1993; Polednak, 1997; Vega & Rumbaut, 1991; Williams & Collins, 1995; Williams & Williams-Morris, 2000). Emerging research is beginning to highlight the growing impact of racism related stress and discrimination on physiological activity and health. The purpose of the proposed study was to assess the physiological correlates of race- related stress and health among African-Americans and Latinos. The study also aimed to assess the contributing roles of skin color, ethnic identity, gender and

SES. Currently, there is little empirical data on race-related stress and health among Latinos. Therefore, an exploration of race-related stress, physiological functioning, and perceived health was examined among this population. According to Carter (2007), African-Americans and Latinos have been historically disenfranchised groups. However, the terms African-American and Latino are terms of convenience that describe complex and heterogeneous groups of people. For example, according to Falicov (1998) the race of Latinos include "White, Black, American Indian (indigenous), Asian, Mestizo (mixture of Indo-American with European groups), or Mulatto (mix of African and Indo-American with European groups), or any racial combination of these" (p. 93). Similarly, Carter (2007) suggests that race also includes, "skin color, language, and physical features. . . [among] distinct groups" (p. 18). The proposed study will provide an examination of how skin color, ethnicity, and ethnic identity status, contribute to race-related stress among African-Americans and Latinos. The proposed study examined socioeconomic status and gender in order to further elucidate individual reactivity differences and contributing factors to health outcomes. It is intended that the results of this study would provide causal evidence of race-related stress as a contributing factor to negative health among Latinos and African-Americans, identify latent factors related to health outcomes, and address the disparity of empirically based race-related stress and health research among Latinos. The following research questions and hypotheses are based upon a review of the literature and were intended to aide in exploring these factors.

Health Disparities Among Ethnic Minorities

Ethnic minorities experience a higher prevalence of health risks compared to the general population. According to the Centers for Disease Control and Prevention (CDC,

2001) heart disease is the leading cause of death in the US while diabetes is listed as the sixth leading cause of mortality for the general population. These factors continue to represent pressing health issues for U.S. health and policy makers, costing millions annually in health care costs and affecting the quality of life of millions of people. The CDC (2006) projected that heart disease is estimated to cost over $142.5 billion in health care services, medications and in lost productivity. Based on national health statistics, African-Americans and Latinos are at particular risk for cardiovascular disease. Mortality related to cardiovascular illness is highest among African-Americans and Latinos compared to Euro-Americans (CDC, 2008).

According to the Centers for Disease Control and Prevention (CDC, 2005), Hispanics are disproportionately affected with diabetes in the US. According to Organista (2007) ". . . this is especially true for Mexican Americans and Puerto Ricans, whose rates of this disease are twice that of Whites and Cuban Americans" (p. 251). Key findings from a nationally based study conducted by the CDC suggested that Hispanic woman born in 2000 have a 52.5 percent risk for developing diabetes while Hispanic men have a 45.4 percent risk factor. Similarly, African-American woman reportedly have a 49.0 percent risk while African-American men were estimated to have a 40.2 percent risk for developing diabetes (CDC, 2005). These statistics are alarming considering that the CDC reports that for White females, the risk factor was considerably lower at 31.2 percent and at 26.7 percent for White men. These projections highlight an area of substantial concern for the quality of life and well-being of African-Americans and Latinos. Coupled with a constellation of factors such as lower SES, limited access to resources, co-occurring

medical ailments and tenuous psychological health, African-Americans and Latinos are in pressing need of preventive and restorative health initiatives.

Unfortunately, health disparities continue to exist and projections from the U.S. Healthy People 2000 survey suggests that the circumstances are progressively worsening. According to the Healthy People 2000 report conducted by the CDC, ". . . diabetes-related deaths increased and the disparity gap widened" (p.10), for members of this at-risk group [e.g., African-Americans]. This is also the case for coronary heart disease and stroke related deaths. The CDC reports that "the age-adjusted death rates for both CHD [coronary heart disease] and stroke have been higher for African Americans than for the total U.S. population" (p. 217). Considering that the health disparities among ethnic minorities is widening, gaining a better understanding of the factors that are contributing and exacerbating these circumstances is of utmost importance for psychologists and health professionals alike.

Emerging research has suggested that there are many contributing factors to the poor health outcomes seen among ethnic minorities. As described above, some of these factors include: limited access to resources, gender (with men generally showing more negative outcomes; see Krieger & Sidney, 1996; Ryan, Gee, Laflamme, 2006) lower SES, the existence of co-occurring health issues, and poor psychological health. One factor that has been implicated as underlying many of these factors has been racism and discrimination. According to a recent report by the Surgeon General on Mental Health: Culture, Race, and Ethnicity (U.S. Department of Health and Human Services [USDHHS], 2001) ethnic minorities have less access to needed care and when they receive care, it is generally of poor quality. The report also stated that "disparities also

stem from minorities' historical and present struggles with racism and discrimination, which affect their mental health and contribute to their lower economic, social, and political status" (USDHHS, 2001, p.4). In order to better understand the continued and growing problem of negative health among ethnic minorities, it is essential to scrutinize racism as a catalyst to subsequent psychological and physical detriment.

Definition of Racism

The term racism is used to describe a complex social problem. Racism has been described in a number of different ways in the context of empirical and theoretical formulations and has resulted in multiple definitions. Carter and Helms (2002) define racism as ". . . racial discrimination, hostility or racial harassment, aversive-hostility, or discriminatory harassment. . . In Carter, 2007)." Jones and Carter (2006) described racism as "the transformation of racial prejudice into individual racism through the use of power directed against racial group(s) and their members, who are defined as inferior by individuals, institutional members, and leaders, which is reflected in policy and procedures with the intentional and unintentional support and participation of the entire race and dominant culture." Bulhan (1985) emphasized that racism is an oppressive factor at a systemic level of organization that hierarchically favors Whites and minimizes African-Americans, Latinos and other groups designated as inferior. Utsey (1996) calls attention to racism as a multidimensional construct that includes individual racism, institutional racism and cultural racism. The first component, individual racism (Jones & Carter, 1996), refers to racism experienced at a personal level. The second form is institutional racism which refers to racism that occurs as a result of institutional practices, policies and procedures. The third, cultural racism (Jones, 1972), occurs in the context of

one group affirming superiority at the price of another group's inferiority. What all of these definitions have in common is that the practice of racism positively favors those in power to the detriment of others and as a result, represents an important factor that can strain the psychological and physical well-being of ethnic minorities. Furthermore, a multidimensional consideration of this phenomenon permits for a more comprehensive analysis of racism and its resultant socioeconomic pressures.

Racism and Psychological Health

Substantial evidence has converged to suggest that the experience of racism can have harmful effects on African-Americans and Latinos. Considering that emotional functioning can contribute to one's physical health, a consideration of the psychological reactions to racism is critical. This is primarily because racism has been shown to lead to increases in stress among ethnic minority groups which presents challenges to physical and psychological well-being. From an evolutionary perspective, stress is an adaptive response to environmental, social and biological factors that are identified and evaluated by the individual through approach-avoidance appraisals. Unfortunately, because of the pervasiveness of racism and its inexorable nature, ethnic minorities face undue stress and subsequently experience greater negative health symptoms. Since racism is, more often than not, experienced on a daily basis, an individual's basic survival cues are unnecessarily elicited by these chronic and aversive experiences. The stress experienced as a result of racism has been shown to have a relationship with psychological distress (Broman, Mavaddat & Hsu, 2000), lower levels of life satisfaction (Philipp, 1998), decreased job satisfaction (Holder & Vaux, 1998), depression and somatization (Klonoff,

Landrine & Ullman, 1999) anxiety (Kessler, Mickelson & Williams, 1999) and lower self-esteem (Simpson & Yinger, 1985).

An emerging and significant contribution to the understanding of the psychological reactions to racism has been Carter's (2007) contention that racism experienced chronically can result in a form of race-based traumatic stress. In his model, ethnic minorities who experience chronic and severe forms of racism demonstrate symptoms that are congruent with our understanding of trauma including avoidance, depression, inability to concentrate, isolation and withdrawal, and flashbacks (Carter, 2007). From this perspective, race-related stress then refers to the complex reactions that result from the experience of racism. Since racism and discrimination affect ethnic minorities' well-being coupled with the findings of mental health consequences, race-related stress then represents a significant catalyst by which health is negatively impacted among Latinos and African-Americans (e.g., Urizar & Sears, 2006). This study further explored the relationship between stress and health by measuring cortisol activity in response to videotaped scenes depicting racist acts.

Racism and Physical Health

Extending the CDC's findings of poor cardiovascular health among Latinos and African-Americans has been recent clinical and laboratory based research exploring race-related stress and health. Emerging empirical research has found that race-related stress can harm an individual's psychological and physical health. In the case of ethnic minorities, particularly African-American's and Latinos, preliminary evidence has been provided showing a relationship between stress changes associated with racism and negative health outcomes. For example, in a 7-year longitudinal study, Krieger and

Sidney (1996) found that African-Americans' blood pressure was significantly elevated in relation to experienced racism. Ryan, Gee and Laflamme (2006) extended these findings and found that there was a significant relationship between discrimination and increases in blood pressure. Ethnic minorities have been found to suffer from hypertension and other negative health consequences as a result of experienced racism and practices of discrimination and the findings from the CDC suggest that this is a growing problem. Cardiovascular functioning then represents a particular area of concern for African-Americans in general, and racism and discrimination have been consistent contributing factors, in particular.

Research investigating the relationship between physical health and race-related stress has also found evidence for substantial changes in other areas of physiological functioning. A study by Jones, Harrell, Morris-Panther, Thomas and Omowale (1996) found that African-American woman who were exposed to racist vignettes demonstrated significant changes in heart rate, blood flow, and in facial muscle activity. Other health outcomes that have been found among members of this population include poor self-perceived health, increased risky behavior such as cigarette smoking and low birth weight among children of adults affected by racism and discrimination (e.g., Krieger, 1990; Krieger & Sidney, 1996). This study presents a stark fact; children and adolescents are affected by racism directly and indirectly by way of family transmission processes. In another study examining this phenomenon, Gibbons, Gerrard, Cleveland, Wills, and Brody (2004) found that race-based discrimination was not only endorsed as common among parents as well as among their 10 year old children but also that race-based discrimination correlated with substance use among parents and the children. These

studies indicate that the effects of racism affect the health of ethnic minorities either directly (e.g., stress experienced as a result of exposure to overt racist acts) and/or indirectly (e.g., increased engagement in risky behavior). In combination with the evidence supporting psychological responses to racism, ethnic minorities are then susceptible to a complex combination of psychophysiological responses that contribute to detrimental health outcomes.

Factors Contributing to the Relationship Between Racism and Health

The findings from the CDC (2001), in addition to the research literature, have shown that SES and gender account for significant proportions of variability in responses to racism and discrimination. Socioeconomic status has been shown to moderate health outcomes and African-Americans in the US are generally allocated lower incomes compared to White Americans (Farley & Allen, 1987). Additionally, the CDC suggests that two of the most well-noted health risks of cardiovascular illness include gender (with men overall showing greater levels of cardiovascular illness) and SES (CDC, 2000). To further support the relationship between health, physiological reactivity, and racism, research has incorporated biological markers of stress such as cortisol to better understand stress-health relationships. For example, Kapuku, Treiber, and Davis (2002) investigated the relationship between SES, cortisol and blood pressure among African-Americans. They found significant inverse relationships among SES, cortisol, and blood pressure suggesting an important role of SES in dissociating physiological outcomes of stress and health and an important role for cortisol as an index of underlying physiological functioning. The study however did not measure cortisol reactivity in response to racism. The current study enhanced these findings by further exploring

cortisol activity in direct response to videotaped vignettes depicting racist acts in comparison to cortisol reactivity in response to neutral nature scenes. Gender differences in physiological stress responsivity have also been reported and represent an important variable to an understanding of stress-health relationships. Findings suggest that African-American and Latino men have higher systolic and diastolic blood pressure compared to woman (Krieger & Sidney, 1996; Ryan, Gee, & Laflamme, 2006). The results of these studies are consistent with previous studies investigating physiological stress and cortisol in men and woman in response to laboratory stressors (Kuhlmann, Piel, & Wolf, 2005; Wolf, Schommer, Hellhammer, McEwen, & Kirschbaum, 2001).

Recently, an emerging body of literature has illuminated factors that contribute to race-related stress and health sequelae. These variables are racial identity, acculturation status, ethnic identity, and skin color. According to Cross's revised Nigrescence model (1991) the stages of racial identity include pre-encounter, encounter, immersion-emersion, and internalization, respectively. Studies have generally found that participants who identified more with their racial group and viewed their racial group membership more positively (e.g., those in the internalization stage) experienced less race-related stress (Carter, 1991; Sellers, Caldwell, Schmeelk-Cone, & Zimmerman, 2003; Wilson & Constantine, 1999). In a preliminary study investigating the relationship between racial identity and physiological activity, a significant positive relationship was found between racial identity and heart rate during the performance of a racially salient visual imagery task (Jones et al., 1996) However, no such relationship emerged for other indices of physiological health (Jones et al., 1996). Nonetheless, these findings suggest that racial identity contributes to race-related stress and health outcomes among ethnic minorities.

Among Latinos, acculturation has become central to the understanding of racism and health. Acculturation refers to the "... changes in identity, values, behaviors, cognitions, and attitudes (Berry, 1990) and the stress experienced as a result of negotiating these factors frequently manifest as psychosomatic symptoms (Williams & Berry, 1991) that may have important implications for health and physiological well-being. Research has found that low levels of acculturation are associated with greater levels of stress (Castillo, Cano, Chen, Blucker, & Olds, 2008). However, research also suggests that acculturation level alone does not predict acculturative stress and that other factors including family relationships, linguistic familiarity, "... cultural heritage, ethnic pride and identity, and interethnic interaction... (Miranda & Mathany, 2000) are also important determinants. Furthermore, studies have suggested that SES (Berry & Kim, 1988) and generational status and age (Hovey & King, 1996) also influence acculturative stress. The research on stress reactions to racism and discrimination suggest that for Latinos, acculturation remains an important contributing factor to stress-health outcomes.

A similar phenomenon, ethnic identity, has emerged as an influential factor among African-Americans and Latinos. According to Utsey, Chae, Brown and Kelly (2002) ethnic identity refers to "... the set of ideals, values, behaviors, and attitudes one holds regarding one's identity as a member of a distinguishable social group." Ethnic group identity has been shown to serve as a protective factor against the deleterious effects of racism among ethnic minorities. For example, a greater degree of identification with one's ethnic group has been shown to positively affect self-esteem (Goodstein & Ponterotto, 1997) and career planning and decision making (Perron, Vondracek, Skorikov, Tremblay & Corbiere, 1998). Recently, Utsey et al. (2002) found significant

relationships among racism, ethnic identity and quality of life suggesting that group membership remains an important variable that affects psychological adaptation among African-Americans and Latinos.

Falicov (1998) provides a historical analysis of racism against Latinos dating back to periods in history whereby Latinos were oppressed by the colonized Spaniards. In her analysis, Falicov (1998) suggests that even in the context of history, skin color differences were associated with social hierarchies among Latinos. Light skinned Latinos were granted more privileges during these times compared to dark skinned Latinos (Falicov, 1998). Similarly, dark skinned Latinos were faced with more racism and discrimination compared to their light skinned counterparts. Boyd-Franklin (2003) identifies similar historical struggles for African-Americans. In her book, titled *Black Families in Therapy: Understanding the African American experience*, Boyd-Franklin (2003) writes:

> They [light-skinned African-Americans] were also given many privileges that other Blacks lacked within the plantation system. Unlike the African sense of beauty where a deep black skin color and African hair and skin features are prized, the White standard of beauty was imposed on African Americans throughout the period of slavery and reconstruction. The tradition of favoritism towards light-skinned African Americans resulted in a system in which it was often easier for light-skinned Blacks to get an education, a job, and so on. Thus, a class system was created in many African American communities based on skin color. (p. 40)

Emerging evidence suggests that skin-color based racism and discriminatory practices continue to exist in modern day America. Additionally, studies have also found that these practices negatively impact the health and well-being of African-Americans and Latinos. According to the results of a recent study by Sweet, McDade, Kiefe and Liu (2007), there is a significant relationship between skin color and blood pressure among African-Americans. The authors found that blood pressure was higher for dark-skinned African-Americans compared to light-skinned participants. Fuentes, Cruz, O'Connor, and Acosta (2008) also found differential effects as a function of skin color among Latinos suggesting that skin color must be assessed in studies exploring racism, stress and health. The present study expanded on the aforementioned findings by exploring the relationships among skin color, SES, ethnic identity, and health among African-Americans and Latinos.

Statement of the Problem

The CDC (2001) and the office of the Surgeon General have reported findings that highlight significant concerns over the health disparities seen among African-Americans and Latinos. In particular, findings from these national health statistics suggest that reports of cardiovascular disease are highest among ethnic minorities compared to Whites. Mortality resulting from cardiovascular illness is problematic for ethnic minorities and remains a serious and alarming health care problem. The Surgeon General's Report highlighted racism and discriminatory practices as a significant contributing factor to the quality of life among ethnic minorities. This represents a unique contributing factor that must be studied in order to develop effective prevention and treatment programs. Further studying the racism-health relationships is of utmost

importance if we are going to move forward in understanding the disparate health circumstances of African-Americans and Latinos.

Research investigating the relationship among racism, stress, and health have generally failed to systematically capture a direct relationship among these factors. For example, one study by Kapuku et al. (2002) found that cardiovascular reactivity was negatively correlated with cortisol levels. However the study did not incorporate cortisol reactions, a well established physiological marker of stress and health, in response to direct racism which represents a limitation of the current research. This study built on previous work investigating the complex relationship between race-related stress and physiological outcomes while also contributing new empirical data on stress-health relationships among African-Americans and Latinos.

Limitations of Existing Studies

The research on the physiology of racism has been slow to develop. A major strength of current research is that it has drawn attention to this important area of investigation and systematic inquiry into this complex social problem shows considerable promise. Unfortunately, current studies have been inundated with methodological limitations and this remains a major limitation to existing studies. For example, in one study conducted by Jones et al. (1996) the authors found significant physiological changes in participants as a result of race-based manipulations. However, the complex procedures and intimidating machinery (e.g., attachment of electrodes and pulse sensors) may have contributed to participants' stress levels and compromised the accuracy of the physiological measures. Second, virtually no research exists to date exploring the physiological effects of racism on Latinos as well as the role of ethnic identity.

In a recently published study by Ryan, Gee, and Laflamme (2006), a relationship between increased physical health symptoms (e.g., bodily pain etc.) and discrimination was found. The study used the physical health subscale of the short-form health survey (Ware, Kosinsky, & Keller, 1998) which is a relatively brief, 12-item survey of health symptoms. The current research study extended these findings by incorporating a more comprehensive measure of physical health; the Subjective Health Complaints Inventory (SHI; Ericksen, Ihlebaek, & Ursin, 1999). This measure offers a more inclusive assessment of physical health status across multiple domains of psychophysiological health including depression/psychosocial health, somatization as well as pain and general neurological complaints.

Definition of Terms

Race-related stress is defined as the result of both acute and chronic encounters with racism and discrimination (Clark, Anderson, Clark & Williams, 1999) that tax or exceed existing individual and collective resources or threaten well-being (Harrell, 2000). For the purposes of this study, race-related stress is operationally defined as scores on the Index of Race-Related Stress (IRRS; Utsey & Ponterotto, 1996).

Physiological stress is defined as the cascade of events that leads to excitation of the hypothalamic-pituitary-adrenal (HPA) axis resulting in hypersecretion of corticosteroids due to stress exposure (Herman, Figueiredo, Mueller, Ulrich-Lai, Ostrander, Choi, & Cullinan, 2003). The events that elicit physiological stress responsivitiy include a psychological component that results from an approach-avoidance appraisal process and responses to environmental events such as experiences of racism

and discrimination. For the purposes of this study, physiological stress will be measured by collecting salivary cortisol levels.

Physical health symptoms are defined as the perceived physical functioning, bodily health and well-being of an individual. For the purposes of this study, physical health symptoms are operationally defined as scores on the Subjective Health Complaints Inventory (SHI; Ericksen, Ihlebaek, & Ursin, 1999).

Ethnic identity is defined as ". . . the set of ideals, values, behaviors, and attitudes one holds regarding one's identity as a member of a distinguishable social group (Utsey, Chae, Brown & Kelly, 2002). For the purposes of this study, ethnic identity is operationally defined as scores on the Multigroup Ethnic Identity Measure (MEIM; Phinney, 1992).

Skin color is defined as a biological and polygenetically determined factor that results in skin pigmentation. For the purposes of this study, skin color will be measured by the National Immigrant Survey (NIS) Skin Color Scale (Massey & Martin, 2003).

Socioeconomic status (SES) is defined as an individuals or a family's social position that encompasses income, education and occupation. For the purposes of this study, SES will be measured by obtaining information on parental occupation and level of education consistent with Hollingshead's (1975) original four-factor social status model.

Research Questions

1. Is there a statistically significant difference in levels of salivary cortisol when participants view a race-based vignette compared to a non-racist stressor and baseline condition?

2. Is there a statistically significant relationship between race-related stress and health among African-Americans and Latinos?

3. What is the relationship among race-related stress, physical health symptoms and ethnic identity among African-Americans and Latinos?

4. How do gender and SES affect the relationship between racism and health among African-Americans and Latinos?

5. Is there a statistically significant relationship among skin color, racism and health for African-Americans and Latinos?

Statement of Hypothesis

1. It is hypothesized that both African-Americans and Latinos would show greater salivary cortisol reactivity during exposure to a racist stressor compared to a non-racist stressor and baseline conditions.

2. It is hypothesized that race-related stress will predict physical health symptoms and race-based salivary cortisol reactivity.

3. It is anticipated that there will be a positive relationship among, race-related stress, health indices and ethnic identity among African-Americans and Latinos.

4. It is hypothesized that participants with lower income will experience greater negative health outcomes compared to participants who report higher incomes. Subquestion 1. It is hypothesized that men will report higher negative health consequences compared to women.

5. There will be a negative relationship between skin color and racism and health among African-Americans and Latinos. Participants with darker skin will report higher

levels of racism and higher levels of negative health outcomes compared to lighter skinned participants.

Limitations

The present study used a quasi-experimental, repeated-measures research design. The use of a quasi-experimental design permits manipulation of variables, however, unlike a true experimental design, participants are not randomly assigned to conditions which threatens the internal validity of the study. This study will not be able to suggest that racism causes negative health consequences but instead that racism may be related to negative health and physiological reactivity among African-Americans and Latinos. The current study relied on a convenience sample of college students which presents a limitation to the generalizability of results. The terms African-American and Latino are terms of convenience. In reality, African-Americans and Latinos are diverse and heterogeneous populations. It would be difficult to truly capture the nature of individual differences in the present study. Nonetheless, the current study accounted for ethnic identity status, a factor that has been shown to account for individual reactivity differences in physiological responses to racism as well as its relationship to stress and health relationships.

Chapter II

REVIEW OF THE LITERATURE

The following chapter provides the reader with an understanding of the health status of African-Americans and Latinos in the US. Racism and discrimination are discussed in detail as a major catalyst to the health outcomes of ethnic minority populations. Physiological mechanisms of stress are discussed in relationship to stress and health. The concept of race-related stress as well as its psychological and physical consequences are then reviewed. Lastly, an overview of the existing literature on the contributing roles of SES, gender, racial identity, acculturation status, ethnic identity and skin color are provided.

Incidence and Prevalence of Racism against African-Americans and Latinos

Racism is an endemic phenomenon that continues to unjustly target ethnic minority groups. Historically, minority group membership has been associated with an unequal distribution of power, limited access to resources, and a host of other disadvantages that stem from a stratified social system. Unfortunately, modern day America continues to suffer from these social practices and racism and discrimination remain problematic. Empirical research suggests that African-Americans and Latinos in particular are often victims of discriminatory practices. As such, they represent two of the most highly stigmatized and negatively stereotyped groups. A study by Landrine and Klonoff (1996) found that a staggering 98.1% of African American participants in their sample reported experiencing racism within the past year. Furthermore, all of the participants in their sample reported that they had experienced racism at some time in their lives. The results of this study are startling and highlight the fact that these two

groups in particular are at risk for exposure. A recent study by Biasco, Goodwin and

Vitale (2001) extended these findings with a sample of college students. Their results

indicated that 66% of the Black students and 61% of the Hispanic students endorsed

experiencing race based discrimination. Participants also indicated significant racially

motivated tension on the college campus. Solorzano, Ceja, and Yosso (2000, as cited in

Carter, 2007) highlighted the experience of one African-American female math student

where she reported:

> We took a first quiz. . . and I got a 95. . .he [the professor] was like "Come into
>
> my office. We need to talk" and I was like "okay" I just really knew I was gonna
>
> be [told] "great job," but he [said] "We think you've cheated. . . we just don't
>
> know, so we think we're gonna make you [take the exam] again". . . I took it with
>
> just the [graduate student instructor] in the room. . . and I got a 98 on the exam.
>
> (p.70)

Considering the fact that African-Americans and Latinos are underrepresented in

higher education, the ongoing perception and experience of a threatening environment

full of race based bias may contribute to the high attrition rates among members of these

groups. Fox and Stallworth (2005) provided evidence of racism in the workplace. The

results of their study suggest that Latinos experienced more perceived general bullying in

the workplace compared to other ethnic minority groups. Additionally, African-

Americans and Latinos experienced more racially motivated bullying compared to their

White counterparts. The evidence converges to suggest that racism is a persistent social

problem that exists across multiple systems and supports the notion that African-

Americans and Latinos are at a particular disadvantage to these and other discriminative social practices.

Historical Perspectives on Stress

Stress is a complex adaptive response that involves a cascade of psychological and physiological changes that occur in response to the environment. From a historical perspective, the term stress was described by Hans Selye (1936) who introduced a 3-stage model of stress which he called the General Adaptation Syndrome (GAS). The syndrome described by Selye has also been described as the "fight or flight [or freeze]," response which evolved as a basic survival mechanism in man and animals. When presented with potentially threatening stimuli, organisms first undergo a cognitive appraisal process. At this level, organisms must interpret the nature of the event as threatening or non-threatening. First described by Shachter and Singer (1962) the cognitive approach-avoidance appraisal process ". . . exerts a steering function . . ." (p.380). This appraisal process is guided by past experiences and by evolutionary processes. Subsequent to this phase enters Selye's GAS syndrome. During the initial phase of this model, also known as the alarm reaction, the ". . . adrenal medulla releases epinephrine and the adrenal cortex releases glucocorticoids [e.g., cortisol]," both of which help to restore homeostasis. During the second phase of this model, resistance, defense and adaptability are optimal and constant throughout the experience of the event. In the final phase of the model, exhaustion, the body returns to a state of homeostasis and normalcy are restored.

In 1908, Yerkes and Dodson proposed an influential model of stress that further enhanced our understanding of this complex phenomenon. In particular, Yerkes and Dodson suggested that there are substantial individual reactivity differences in response

to stress that are dependent on the nature, intensity, and duration of the stimuli. The stress response is based on an inverted U shaped curve in which stress can actually facilitate cognitive processes such as learning and memory but only at optimal levels. Once stress surpasses these optimal levels, it serves to impede performance and responsivity by interfering with attention and other higher order processes. These optimal levels vary from person to person and as such, represent an important variable. While stress has been conceptualized as an adaptive process, Yerkes and Dodson's curvilinear model of stress was one of the first models to suggest that it can also have deleterious effects.

Physiological Mechanisms of Stress and Health

As noted above, stress is a process that involves numerous structures of the brain that work concurrently to organize adaptive responses to the environment. When an event is labeled as threatening, a cascade of events is elicited which involve physiological changes in the body. These changes are enacted to help the individual allocate resources necessary to increase survival potential. Initially, when an event is defined as "stressful," the amygdala is activated. The amygdala is an area of the brain that has been implicated in emotional responses such as fear and stress (LeDoux, 1996). It is part of the limbic system and anatomically is complex with 12 subnuclui containing inter-amygdalar structures and functions (Pare, Royer, Smith, & Lang, 2002) as well as functional connections with other important brain areas (Aggleton, 2000). By way of the paraventricular nucleus (PVN) the amygdala activates the Hypothalamic-Pituitary-Adrenal Axis (HPA) which causes a chain of chemical events to occur. In particular, the PVN of the hypothalamus causes the release of corticotrophin-releasing factor (CRF) which stimulates the adrenal cortex via the pituitary gland to release steroid hormones

such as cortisol into the bloodstream. This also causes the adrenal medulla to release catecholamines such as norepinephrine and epinephrine. Essentially, what is happening during this process is that the amygdala is saying "release," and the hippocampus is saying "slow down." This process is intended to help the body match the nature of the stressful event for coping mechanisms in addition to helping the body attempt to return to a state of homeostasis. The excessive release of neurotransmitters during stress has been shown to impair intracellular functioning. High levels of neurotransmitters couple with protein kinase A (PKA) and/or protein kinase C (PKC) to synergistically impair intracellular functioning. This mechanism has been shown to interrupt normal immune functioning (Kunz-Ebrcht, Mohamed-Ali, Feldman, Kirschbaum, & Steptoe, 2003) and as a result may contribute to poor health outcomes especially when stress is experienced on a chronic basis. According to Long et al. (2004) chronic stress exposure ". . . has been associated with the pathogenesis of a wide variety of diseases and disorders, including but not limited to, colitis, asthma, hypertension, affective disorders, neurodegenerative disorders, cardiovascular and gastrointestinal problems, metabolic and immune disturbances, and psychosomatic disorders." By way of the physiological mechanisms of HPA system functioning, recurrent exposure to stress can have deleterious effects on one's physical and psychological well-being.

Salivary cortisol was used in the present study to better understand the complex relationships that exist between these factors and race-related stress. Cortisol has been well established as a measure of physiological stress and health (e.g., McMorris et al., 2006; McRae et al., 2006; Simpson et al. 2008).

Race-Related Stress and Psychological Health

Among African-Americans and Latinos, racism continues to represent a realistic and oftentimes inescapable form of stress that has devastating consequences on psychological health and physiological integrity. Racism refers to "the transformation of racial prejudice into individual racism through the use of power directed against racial group(s) and their members, who are defined as inferior by individuals, institutional members, and leaders, which is reflected in policy and procedures with the intentional and unintentional support and participation of the entire race and dominant culture" (Jones & Carter, 2006). As illustrated in this example, racism can take the form of overt acts of discrimination as well as covert practices that favor the majority group and minimize ethnic minorities. Studies on racism have shown that stress is a significant reaction to practices of racism and as a result, race-related stress has become of central concern to researchers in the social sciences. According to Harrell (2000, as cited in Utsey, 2003) race-related stress is defined as "the race-related transactions between individuals or groups and their environment that emerge from the dynamics of racism, and that tax or exceed existing individual and collective resources or threaten well-being" (p. 45). This suggests that race-related stress is characterized by situations that are often experienced as overwhelming and where feelings of helplessness and hopelessness are direct consequences of these events. Along these lines, empirical research has found a wealth of evidence to suggest that race-related stress negatively effects psychological adjustment and well-being.

Klonoff, Landrine, and Ullman (1999) investigated the relationship between race-related stress and mental health symptoms among a sample of African-Americans. In

their study, participants were assessed for mental health symptoms over a period of 4

months. They were given a series of questionnaires aimed at measuring experiences with

racism as well as their appraisals of these experiences including the Schedule of Racist

Events (Landrine & Klonoff, 1996) and the Psychiatric Epidemiology Research Interview

Life Events Scale (PERI-LES; Dohrenwend, Krasnoff, Askenasy, & Dohrenwend, 1978).

The results of their study found that racial discrimination significantly predicted total

health symptoms, anxiety and somatization. Additionally, stress in general accounted for

symptoms of obsessive-compulsive behavior, interpersonal sensitivity, and depression.

The results of this study are important because they highlight the associations that exist

among racism and discrimination, stress and negative psychological health. There are

some limitations to the generalizability of the results however mainly that the sample

consisted of people who only resided in a small county in San Bernadino, California.

Additionally, the study only looked at African-Americans and failed to account for the

psychological effects of racism and discrimination among other ethnic minority groups

including Latinos who are often victimized by discriminatory social practices.

Kessler, Mickelson, and Williams (1999) investigated the psychiatric correlates of

experienced racism and discrimination using data from a national telephone mail

sampling study. First, they interviewed participants over the phone to determine

eligibility for the study. Participants had to be within the ages of 30-74 years of age in

order to qualify. Participants were then sent a self-administered questionnaire designed to

assess experiences of racism and discrimination. Approximately 34% of participants

reported experiencing events such as not being hired for a job or being forced to leave a

neighborhood because of racial discrimination. Similarly, approximately 60% of

participants indicated that they experience some form of racism on a day-to-day basis. In terms of mental health outcomes, Kessler et al. (1999) found that major life events associated with racism and discrimination significantly predicted major depression and distress but not generalized anxiety disorder. These results provide further evidence that racism negatively impacts the psychological and emotional welfare of ethnic minorities. Unfortunately, the study did not look at these psychological factors among other ethnic minority groups such as Latinos. Additionally, the survey extrapolated data from a larger study which presents some ambiguity. For example, how were the regions sampled represented in the results of the study? Did participants in certain regions report greater experiences with racism compared to other regions? Finally, the study failed to account for other stressors that could potentially have contributed to the depression and general distress symptoms. Nonetheless, the results of this study, mainly that racism is associated with depression, are consistent with previous findings (Klonoff et al., 1999).

The evidence suggests that race-related stress is associated with depression, anxiety, somatization, and overall contributes to psychological maladjustment. Its negative effects have also been found to affect occupational satisfaction and career decision making. In one study, for example, Holder and Vaux (1998) found that race-related stress negatively correlated with job satisfaction and further accounted for 42% of the variance in job satisfaction. Evans and Herr (1991) suggest that because of the perceived racism and discrimination in the workplace, ethnic minorities may avoid careers in which they perceive or anticipate racial discrimination. Research has in fact highlighted that ethnic minorities experience racial discrimination and bullying in the

workplace which may have serious consequences for career satisfaction and development.

Considering that racism is often covert, negative stereotypes about ethnic minorities can often result in race-related stress manifest as work dissatisfaction that may stem from unfair treatment and insensitive practices. Since institutional racism is of major concern for ethnic minorities, particularly for African-Americans and Latinos, the workplace then represents an important aspect of daily living whereby racism can have deleterious effects. For example, Fernandez (1981) found that out of 4300 White managers surveyed in the study, 60% of White males and 46% of White females endorsed stereotypic beliefs about ethnic minorities, in particular about African Americans. Supporting these findings, Fox and Stallworth (2005) explored racial/ethnic bullying among African-Americans and Latinos and found that Hispanic/Latinos experienced more perceived general bullying in the workplace compared to the other ethnic minority groups in the study. Interestingly however, when racially motivated bullying was assessed, African-Americans and Hispanic/Latinos experienced more racially motivated bullying compared to their White counterparts. Another interesting finding in this study was that African-Americans targeted with racial bullying at work were more likely to both react emotionally and pursue action against the bullying while Hispanic/Latinos who experienced racially motivated bullying at work were more prone to react emotionally, however, did not pursue action to counter the racist acts in this sample. In addition to these factors, Philipp (1998) found that racism and discrimination influenced the overall quality of life for African-Americans. Taken together, racism results in stress manifest across multiple domains of psychological functioning including

emotional (e.g., depression, somatization, anxiety etc.), occupational (e.g., decreased job satisfaction, work-related racial bullying, passed promotions etc.) and overall life satisfaction.

Contributing to the understanding of the psychological basis of race-related stress has been Carter's (2007) proposed model of race-based traumatic stress. More often than not, racism is a pervasive and inescapable reality of daily life for ethnic minorities. For this reason, the repeated exposure to racist events and the profound stress experienced as a direct result, often present as trauma like symptoms including intense fear, arousal, vigilance, irritability, difficulty sleeping, restlessness, hopelessness, avoidance, intrusion, numbing, and difficulty concentrating (Carter, 2007). Similarly, Bryant-Davis and Ocamo (2005) support this model arguing that race-based trauma has similar features to other traditionally more accepted precursors to trauma such as rape and domestic violence. Carter's model represents an emerging area of research and continues to receive growing support.

In summary, racism can profoundly impact the psychological adjustment of ethnic minorities. Race-related stress has been shown to result in a host of psychological outcomes including depression and anxiety. Additionally, race-related stress has been shown to negatively impact overall life satisfaction and quality of life among African-Americans and Latinos. Along these lines, career and lifestyle development can sometimes be limited by fear of being targeted by racism and discrimination. Fox and Stallworth (2005) showed that racial bullying is a reality for ethnic minorities and action must be taken to combat these discriminative practices. Finally, the cumulative effects of

race-related stress can result in a form of trauma that may further contribute to poor psychological health and concurrently to poor physical health.

Race-Related Stress and Physical Health

Research has illuminated the reality that in addition to affecting psychological health, racism negatively influences physical health. Because racism is such a salient factor in our society, ethnic minorities inevitably encounter its practices within organizations or in the larger society. The racial practices encountered by ethnic minorities include, but are in no way limited to, negative stereotypes, unequal access to resources, occupational distress, and limitations in job promotions. Another source of race-related stress stems from the "invisibility syndrome" (Franklin & Boyd-Franklin, 2000). According to Franklin and Boyd-Franklin, the invisibility syndrome refers to ". . . the intrapsychic processes and outcomes in managing the personal stress arising from racial slights and the subjective experience of invisibility . . ." (p.33), among ethnic minorities. This suggests that for ethnic minorities, the overt practices of essentially being ignored or overlooked is yet another source of race-related stress. The emphasis here however is that all of these factors can converge to contribute to poor physical health in additional to the psychological outcomes discussed above.

In a 7-year long longitudinal study of racial discrimination and physical health, Krieger and Sidney (1996) found evidence to support a relationship between race-related stress and blood pressure changes in particular. Their study was based on a multi-community sample of over 4,000 participants in Birmingham, Alabama; Chicago, Illinois; and in Minneapolis, Minnesota. At the onset of the study, several baseline measures of cardiovascular functioning were obtained including systolic and diastolic

blood pressure as well as self-report measures of racism and discrimination. They found that for working-class Black adults who accepted the unfair treatment, blood pressure was 7mm Hg higher compared to those who challenged the unfair discriminatory practices (Krieger & Sidney). Furthermore, they found that African-Americans had higher blood pressure on average, but that it was attenuated by accounting for behavioral responses to discrimination (e.g., countering the racist acts). These findings suggest that racism negatively affects cardiovascular health however, it also raises the fact that participants who countered these practices had less negative health consequences. A major limitation to this study however, is that physiological measures were obtained during substantially large time gaps (e.g., at year 2, at year 5 etc.) and it is possible that maturational changes or other physical, psychological, and/or contextual circumstances could further contribute to the cardiovascular changes. Additionally, the study failed to incorporate Latinos, who represent a growing group in the US and who often face substantial discrimination.

One study in particular has extended the stress-health relationship data among African-Americans to other groups including Latinos of immigrant status. Ryan, Gee and Laflamme (2006) recently published a study where they looked at the relationship between self-reported discrimination, physical health and blood pressure among African-Americans, Black immigrants, and Latino immigrants. Participants in their study completed self-report surveys assessing racism and discrimination. Physiological measures were also assessed including weight, blood pressure and blood glucose levels. The results of the study suggested a complex U shaped relationship between discrimination and blood pressure for all three groups. According to the authors, this

pattern of results suggests that ". . . individuals who reported some discrimination had lower blood pressures than those who reported no discrimination while those reporting a substantial amount of discrimination had higher blood pressure than both those who reported no or some discrimination" (Ryan et al. 2006). Additionally, there was a negative relationship between overall physical health and discrimination. The results of this study have been supported by previous studies. This study is one of the first to investigate health issues in Latinos that stem from perceived discrimination and racism. The study used a snowball sampling method which lacks systematic random selection of the groups which raises potential issues of selection bias. Another limitation is that while previous studies have calculated blood pressure as the average of several readings (often three), this study used a single reading. Additionally, the study failed to incorporate measures of group membership (e.g., racial/ethnic identity and acculturation) which can have important implications regarding individual reactivity differences.

The studies highlighted thus far suggest that there is a relationship between experiencing racism and discrimination and subsequent health. These studies are complex in that they often attempt to capture cardiovascular parameters such as blood pressure over extended periods of time in order to better understand the monotonic and cumulative nature of stress that results from discriminatory practices. Unfortunately, this presents some challenges to the interpretation of these studies in that they often fail to account for maturational changes, situational factors, and familial circumstances. Additionally, they often lack appropriate controls and manipulations needed to address potentially confounding or extraneous variables that can co-occur and contribute to the negative health outcomes. Current experimental research has attempted to augment this by

drawing upon laboratory paradigms of "in vivo" racism in order to better capture the physiological correlates of racism.

Jones, Harrell, Morris-Prather, Thomas and Omowale (1996) looked at affective and physiological responses to racism. In their study, they compared two race based manipulations. For participants in the emotional imagery group, they were asked to perform a guided imagery task which involved imagining scenes presented in audio format that depicted racist acts. For those in the video-taped group, they were exposed to videotaped vignettes of racist scenarios. Measures of cardiovascular functioning (e.g., heart rate and blood flow) and physiological activity (e.g. muscle tension) were obtained. The physiological data showed significant increases in heart rate, blood flow, and in muscle activity for both the videotaped as well as imagined scenes of racially charged material. The results reported here are consistent with a study by Sutherland and Harrell (1986). The findings of this study are also consistent with those of McNeilly, et al. (1995). In their study, participants were exposed to two debates involving either a racial or a nonracial stressor. They found that blood pressure and heart rate reactivity was higher for those verbally responding to the racist stressor compared to those with the nonracist stressor (McNeilly et al.). These effects persisted through the recovery periods following racial stress suggesting that exposure to race-related stress can have residual effects after exposure.

Stereotype threat has also been implicated as a form of race-related stress. Stereotype threat is experienced by ethnic minorities during ". . . situations in which other people view them stereotypically in ways likely to increased performance pressures" (Steele, 1997). Blascovich, Spencer, Quinn and Steele (2001) explored the role of

stereotype threat among African Americans. They found that African-Americans under high stereotype threat exhibited larger increased in mean arterial blood pressure (Blascovich et al.). Taken together, the research body has indicated significant concern over cardiovascular and physiological health Among African-Americans and Latinos. They suggest that daily race-related stressors are associated with poorer health and that these negative health consequences are a direct result of race-based practices. However, in order to better understand the stress-health relationships that have emerged from these findings, it is also important that we consider emerging mediators of race-related stress and health outcomes. In particular, racial identity, acculturation level, and ethnic identity are important factors that often provide important causal links regarding the degree to which ethnic minorities are affected by racism. The subsequent review is aimed at gaining a better understanding of the role that these variables play determining health outcomes.

Racial Identity and Health

According to Racial Identity Theory, "a primary function of an internalized racial identity for African Americans is to buffer them against the potential deleterious impact of racism on their psychological well-being" (Cross & Strauss, 1998). According to Cross's revised Nigrescence model (1991) the stages of racial identity include pre-encounter, encounter, immersion-emersion and internalization. There are three types of pre-encounter racial identities (Assimilation, Miseducation, and Self-Hatred), two types of immersion-emersion racial identity (Anti-White), and two types of internalization racial identities (Afrocentricity and Multiculturalist Inclusive). According to Cross and Vandiver (2001), pre-encounter assimilation identity refers to low race salience and high

identification with American values. The pre-encounter miseducation identity refers to

the acceptance of negative stereotypes about being Black while pre-encounter self-hatred

identity refers to an anti-Black perspective. The encounter stage involves an experience

(or experiences) with racism or discrimination that serves as a catalyst to re-examining

one's racial identity. The immersion–emersion stage consists of an anti-White identity

which views everything White (or Eurocentric) as evil. The internalization stage includes

Black nationalism, which involves the acceptance of Black values and multiculturalist

inclusive, which refers to the process of embracing a Black identity (Cokley, 2002).

Studies examining the effects of racial identity on stress-health relationships

suggest that racial identity must be accounted for in order to dissociate the nature of

health outcomes. In one study, for example, Pyant and Yanico (1991) found that racial

identity attitudes predicted mental health outcome. Participants who indicated that they

were in the pre-encounter stage of racial identity reported lower general well-being and

self-esteem as well as greater symptoms of depression. Hence, the more participants

reported pro-White/anti-Black attitudes, the more psychological and physical symptoms

they reported in addition to lower self-esteem. In a recent study, Sellers, Caldwell,

Schmeelk-Cone, and Zimmerman (2003) investigated the relationship between racial

identity and psychological distress, among a sample of academically at-risk young adults.

They conducted a series of structured, face-to-face interviews, in addition to providing

students with self-report questionnaires on racial identity, perceived racial discrimination,

and psychological distress. They found that for participants who reported that race was

more central to their identity, they were more likely to report lower levels of

psychological distress (Sellers et al., 2003). The findings from this study are also

consistent with a more recent study conducted by Sellers, Copeland-Linder, Martin and Lewis (2006), further supporting the results of this study. Additionally, Jones, Cross and DeFour (2007) found that racial identity moderated the relationship between racist stress events, racist stress appraisals, and subsequent mental health outcomes. The results of their study suggested that participants who indicated more favorable cultural identity attitudes reported less race related stress. The results provide support that multicultural identity serves a somewhat protective function against racism and the subsequent stress experienced as a result. Additionally, the results of Johnson and Arbona's (2006) study which indicated that racial identity attitudes were related to the stress associated with experiences of racism at the cultural and individual level provides further evidence of these findings.

Research systematically investigating the relationship between racial identity and physical health has been relatively slow to develop. In a preliminary study by Jones et al. (1996) described above, they found that racial identity was positively correlated with heart rate reactions to a racially salient visual imagery task. However, they failed to find evidence for a significant relationship between racial identity and physiological responses to the racially salient videotaped scenes. One possibility for these results is that the study used a relatively brief measure of racial identity. In particular, they used a subscale from the Black Nationalism and Authoritarian Coping Styles Scales (BNCSS; Harrell, Malone-Colone, & Harris, in press), which is a relatively new scale that has not yet been widely supported across the empirical literature. Additionally, the study only looked at a sample of African-American females despite the evidence suggesting important gender differences. The present study expanded on these findings by using a reliable measure of

racial identity in addition to sampling both men and woman. Nonetheless, the evidence converges to suggest that racial identity is an important factor in better understanding stress-health relationships and that racial identity stages have important implications for individual responses to race-related stress.

Acculturation and Health

Acculturation refers to ". . . the process by which individuals adopt the attitudes, values, customs, beliefs, and behaviors of another culture" (Abraído-Lanza, Armbrister, Flórez, & Aguirre, 2006). Acculturation theory suggests that many Latino immigrants suffer from acculturative stress manifest as anxiety and depression, feelings of marginality and alienation, psychosomatic symptoms, and identity confusion (Williams & Berry, 1991). According to one study by Miranda and Matheny (2000) lower levels of acculturation and limited length of residence in the US was predictive of Latinos' self-reported acculturative stress. Similarly, Romero and Roberts (2003) reported that acculturative stress was significantly correlated with depressive symptoms.

According to the acculturation hypothesis, higher levels of acculturation are associated with poorer health outcomes (Franzini & Fernandez-Esquer, 2004). The research suggests that this is due to the fact that as Latinos adapt to the U.S. "their eating, drinking and other health related behaviors change for the worse, while their experiences of perceived racism, lack of opportunity and hopelessness may increase over time" (Franzini & Fernandez-Esquer). Hubert, Snider, and Winkleby (2005) found that higher acculturation (generational status, years lived in the United States) was the strongest correlate of obesity. Additionally, Franzini and Fernandez-Esquer (2004) found that the least acculturated Mexicans reported better physical health than US-born Mexicans.

These findings have received support (e.g. Stephen, Foote, Hendershot, & Schoenborn, 1994) suggesting that more highly acculturated Latinos experience health declines while less acculturated Latinos report better health.

Ethnic Identity and Health

According to Tajfel (1981, as cited in Phinney and Ong, 2007), ethnic identity is defined as "that part of an individual's self-concept which derives from knowledge of membership of a social group (or groups) together with the value and emotional significance attached to that membership." Phinney and Ong (2007) have identified the components of ethnic identity as self-categorization and labeling, commitment and attachment, and exploration. According to Phinney and Ong, self-categorization refers to identifying with a particular social group. The construct of self-categorization may reference ethnic and racial group membership as research has shown that self-labels or categories vary by an individual's context (e.g., Portes & Rumbaut, 2001). Commitment and attachment refer to an individual's strong connection to and personal investment in their particular reference group. Finally, exploration includes actively seeking information and experiences that are congruent with one's ethnicity (Phinney & Ong).

Developmental psychology has been pivotal in contributing to our understanding of ethnic identity. In particular, ethnic identity developmental models emphasize the process of negotiating the values and beliefs of the larger mainstream society with those of one's ethnic group. One of the most influential models of ethnic identity development has been Phinney's (1993) three-stage model of ethnic identity formation. The first stage of Phinney's (1993) model, unexamined ethnic identity, refers to the absence of exploration of one's ethnicity in place of acceptance of the dominant cultures values and

beliefs (as cited in Utsey et al., 2002). At this stage of ethnic identity development,

individuals demonstrate a preference for White culture and reject identification with their

own culture. The next phase, ethnic identity search, refers to events that serve to

encourage a new understanding of one's self and his/her world view. Experiences that

may serve as catalysts for new interpretation of self-identity at this stage include ". . .

name-calling, racial slurs, or other acts of discrimination" (as cited in Utsey et al. 2002).

The third stage, achieved ethnic identity, is characterized by a greater understanding of

one's cultural norms, practices, beliefs, and a positive identification with one's own

cultural group. Ethnic identity development encompasses race, religion, and national

identity based on the premise that all of these factors contribute to the development of

ethnic identity (see Smith, 1991).

Ethnic identity has been found to impact spiritual development (Chae, Kelly,

Brown & Golden, 2001), and vocational decision making (Perron, Vondrocek, Skorkov,

Tremblay & Corbiere, 1998). Growing evidence is also emerging to support an important

role for ethnic identity in better understanding psychological health among ethnic

minorities. Walker, Wingate, Obasi, and Joiner (2008) recently investigated the

relationship between acculturative stress and ethnic identity on the psychological

adjustment of college students. Walker et al. sought to better understand how

acculturative stress and ethnic identity moderate depression and suicidal ideation among

a sample of African-American and European American college students. Participants

completed a series of self-report questionnaires including the Societal, Attitudinal,

Familial, and Environmental (SAFE) Acculturative Stress Scale (Mena, Padilla, &

Maldonado, 1987), the MEIM (Phinney, 1992) and the Beck Depression Inventory

(Beck, Steer, & Garbin, 1988). The authors anticipated that both acculturative stress and ethnic identity would moderate the relationship between depression and suicidal ideation among African-Americans but not among European Americans. To test their hypothesis, Walker et al. conducted a series of moderated multiple regression analysis. Consistent with their predictions, the authors found that both ethnic identity (poor group identity) and acculturative stress (high acculturative stress) significantly moderated the depression-suicide relationship among African-Americans. The findings of their study suggest that in order to better understand psychological adjustment among African-American college students; researchers must also consider acculturative stress and ethnic group identity.

Another study by Phinney, Cantu, and Kurtz (1997) investigated the relationship between ethnic identity and self-esteem among Latinos, African-Americans, and Whites. The study surveyed 372 Latinos, 232 African-Americans, and 65 White participants. In their study, participants completed a series of measures on self-esteem, ethnic identity, American identity, and attitude toward other groups. Based on the results of several multiple regression analysis, ethnic identity was found to be a significant predictor of self-esteem for all ethnic groups studied. The results of this study have been supported by multiple studies (see Phinney & Kohatsu, 1997 for a review) and suggest that ethnic identity affects psychological adjustment.

Preliminary research has also supported a relationship between ethnic identity and race-related stress. In one study by Utsey, Chae, Brown and Kelly (2002), the relationship between race-related stress and ethnic identity was studied among a diverse sample of African-Americans, Asian-Americans, and Latinos. In their study, participants were asked to complete measures of ethnic group identity, race-related stress and quality

of life. The authors hypothesized that there would be significant differences between ethnic groups with regard to scores on the Multigroup Ethnic Identity Measure (MEIM), the Index of Race-Related Stress (IRRS-B), and the World Health Organization Quality of Life – Brief Version (WHOQOL-Brief). Additionally, it was hypothesized that ethnic identity and race-related stress would further predict quality of life after controlling for demographic variables such as race and gender. Results from a GLM MANOVA indicated significant group differences based on group membership and race-related stress scores. Specifically, African-Americans had higher race-related stress scores compared to Latinos and Asian-Americans. A second GLM MANOVA examining MEIM and scores across the 3 ethnic groups suggested that African-American participants had higher ethnic identity scores than did Asian Americans and Latinos. A third GLM MANOVA indicated that African-Americans yielded higher quality of life scores compared to Asian-Americans and Latinos. A stepwise multiple regression analysis further revealed that ethnic identity and cultural racism subscale scores of the IRRS-B predicted quality of life and accounted for 16% of the total variance for all participants in the study. The findings of this study suggest important relationships between ethnic group identity and race-related stress and suggest that these factors affect the well-being of ethnic minority group members. This study will build on this study by exploring the relationship between ethnic identity, race-related stress, and physiological reactivity among African-Americans and Latinos.

The Role of Skin Color

According to the results of a recent study by Sweet et al. (2007), there is a significant relationship between skin color, income, and blood pressure. The authors used

data from the CARDIA study, a large epidemiological cohort study examining cardiovascular risk factors among young adults. The authors conducted an analysis of the data for African-American participants in order to explore the variables of interest which included systolic blood pressure (SBP) and diastolic blood pressure (DBP). Skin color was assessed by using a hand-held reflectance spectrophotometer which measured the percentage of light reflected from the surface of the skin. SES was measured by obtaining information on family income and educational achievement. The results of the study suggested significant relationships among skin color, SES and blood pressure. For lighter skinned African Americans, systolic blood pressure decreased as income increased. Among darker skinned African Americans, systolic blood pressure increased as income increased. The findings suggest that higher economic status does not have the "protective effects," for dark skinned African Americans as it does for lighter skinned participants. One possibility for these results discussed by the authors is that darker skinned African Americans face more racism compared to lighter skinned participants. This hypothesis is consistent with the results of a study by Klonoff and Landrine (2000). In their study, the authors found that dark-skinned African Americans were 11 times more likely to experience frequent racial discrimination compared to light skinned African Americans. Klonoff and Landrine (2000) sampled three hundred Black adults and assessed frequency of racial discrimination using the Schedule of Racist Events (Landrine & Klonoff, 1996). The authors asked participants to report their skin color on the following scale: 1=very light skinned, 2=light-skinned, 3=medium-skinned, 4=dark-skinned, 5=very dark-skinned. According to the results of the study, 67% of dark-skinned African Americans reported frequent racial discrimination compared to 8.5% of light-skinned African

Americans. These results highlight the necessity for studies to explore the role of skin color differences among African Americans and reactions to racism. The present study broadened the aforementioned findings by analyzing the relationship among race-related stress, physiological stress and health indices among dark and light skinned African Americans.

Emerging evidence has also suggested that skin color is also an influential factor among Latinos. In one study by Fuentes, Cruz, O'Connor, and Acosta (2008) the authors found support for a relationship between skin color and racism among Latinos. In their study, 65 Latino participants completed a brief demographic questionnaire, the Index of Race Related Stress and the NIS Skin Color Scale. The authors hypothesized that darker skinned Latinos will report higher levels of race-related stress, compared to lighter skinned Latinos. The authors also hypothesized significant relationships among race-related stress, income, and skin color. Significant relationships emerged between perceived racism, skin color, and income. The results of the study indicated that Latinos with darker skin reported more perceived race-related stress than Latinos with lighter skin. Moreover, they also reported higher levels of institutional, individual, and cultural racism. Consistent with the author's hypothesis, income was negatively correlated with perceived racism with low-income participants reporting higher levels of perceived racism (Fuentes et al., 2008). The aforementioned results suggest that skin color is an important variable that should be considered in studies examining race-based stress among African Americans and Latinos.

The Contributing Role of SES

Emerging evidence supports an important role for SES in dissociating the complex relationship among racism, stress, and health outcomes. Taylor and Turner (2002) found that African-Americans in their sample who reported lower SES reported higher depressive symptoms compared to Whites. Regarding health status, Karlsen and Nazroo (2002) suggest that ". . . people from ethnic minority groups have lower incomes and are concentrated in environmentally and economically poorer geographic areas, in poorer quality and more overcrowded accommodations, in less desirable occupations, and in longer periods of unemployment than their ethnic majority counterparts." Additionally, Ruggerio and Taylor (1995) highlight the fact that ethnic minorities with fewer socioeconomic resources tend to underreport illness and underutilize health services. Leybas-Amedia, Nuno, and Garcia (2005) state that "Hispanics in general experience comparatively poor access to health care services due in part to economic factors."

While the research suggests that SES affects health outcomes, little evidence is available to support a direct link between the economically disadvantaged, racism and health. One study by Kapuku, Treiber, and Davis (2002) looked at relationships among SES, stress induced changes in cortisol, and blood pressure in a sample of African-American males. The study incorporated a series of SES measures including parental education level, median household income, median monthly housing cost, mean home value, percentage poverty level, percentage unemployed, and percentage of single-woman heads of household with children. The experimental procedures included collecting plasma cortisol and blood pressure readings at baseline and after exposure to two laboratory stressors. In the first manipulation, participants played a videogame for 10 minutes under a monetary incentive challenge. Blood pressure was collected before,

throughout the videogame challenge, and after. Cortisol levels were assessed immediately after completion of the videogame stressor. The next stressor, cold pressor stress, consisted of having participants place a cold bag on their forehead for a period of 1 minute. Blood pressure and cortisol samples were taken immediately after completion of this task. The results of this study found that family SES was inversely related to initial cortisol level, neighborhood SES was inversely related to blood pressure reactivity, and that changes in cortisol levels during exposure to the stressors significantly correlated with blood pressure reactivity. The results of this study are supported by Krieger and Sidney's findings that lower SES participants who experienced racism and discrimination had higher mean blood pressure readings compared to participants of higher SES.

The Role of Gender

Research suggests that men are at greater risk for developing cardiovascular diseases compared to woman. Recently, Carroll et al. (2001) investigated blood pressure reactions to acute psychological stress and cardiovascular functioning in a diverse sample of 1003 male public service workers. During the initial medical interview, blood pressure was recorded at baseline and after exposure to a laboratory stress procedure. The laboratory stress task involved completing a computerized version of the Raven's Progressive Matrices (Raven, 1960). The results indicated that blood pressure increased from initial screening and data collection (year 1) to 10-year follow-up (Carroll et al., 2001). Blood pressure readings at baseline were predictive of blood pressure during the 10-year follow-up. Furthermore, blood pressure was also predictive of hypertension (Carroll et al., 2001). The authors results also suggested that blood pressure significantly increased as a result of the laboratory stress manipulation. These results further support

the fact that health is significantly affected by stress among men, particularly in the domain of cardiovascular functioning. This study has some limitations that must be addressed in future studies. First, the study looked at stress in response to a laboratory manipulation however it did not look at race-related stress specifically. Measuring both race-related stress and stress reactions to the cognitive task would have provided a better understanding of the complex reactions to stress in general. Also, as with the study by Krieger and Sidney (1996), this study had significant time lags during physiological data collection which can present serious confounds to the results. Additionally, this study cannot ignore the so-called white-coat effect ". . . whereby the first clinic blood pressure reading is often elevated (Pickering & Friedman, 1991)." The study could have been strengthened by formally examining ethnic/racial differences in reaction to the laboratory stressor. Nonetheless, gender differences have been found to account for significant proportions of variability in stress-health outcomes and the results of this study are consistent with published findings. For example, Matthews, Gump, and Owens (2001) explored gender differences as it relates to cardiovascular and neuroendocrine responses. Participants in their study performed a mental arithmetic task and a public-speaking task. Blood pressure and measures of catecholamine activity (e.g., epinephrine and neuroepinephrine) were collected at baseline and after completion of the stress manipulations. The results suggest that relative to woman, men had higher diastolic blood pressure to the tasks and higher systolic, diastolic, and epinephrine responses during recovery (Matthews et al.). These findings are consistent with studies exploring gender differences in physiological stress and health (e.g., Wolf, Schommer, Hellhammer, McEwen & Kirschbaum, 2001). Krieger and Sidney (1996) found evidence further

strengthening these findings. The results of their study suggest that Black men had higher blood pressure (both systolic and diastolic) compared to Black woman (Krieger & Sidney). Ryan, Gee and Laflamme (2006) found additional evidence to support gender differences. They analyzed data from the New Hampshire Racial and Ethnic Approaches to Community Health 2010 (NH REACH) Initiative which was conducted by the Centers for Disease Control. Respondents completed surveys in addition to having their weight, blood pressure and blood glucose measured. The results of the study found that men had significantly higher blood pressure compared to woman. These studies converge to support gender differences and provide the basis for further systematic inquiry into the role of gender, race-related stress and physiological reactivity.

Summary and Conclusions

Ethnic minority populations are at-risk for poor health outcomes. For African-Americans and Latinos, hypertension and diabetes represent two of the most reported factors contributing to the negative health outcomes, increased mortality rates and lengthy hospital stays. The health disparities among African-Americans and Latinos within these domains continue to worsen and as such represents an area in need of additional research, prevention and intervention initiatives.

Racism has been identified as a major contributing factor to the poor health status of African-Americans and Latinos in the US. Negative stereotypes, racial bullying, and perceived racial bias among ethnic minorities is detrimental to their general well-being and adjustment. From this perspective, the stress experienced from these practices is the mechanism by which reduced adequate health status is achieved. Hence race-related stress which stems from racially induced social practices is a major source of strain that

leads to psychological and physical health problems. Identification with one's group (e.g., racial or ethnic) has been highlighted in the literature. As such, in order to better understand the detrimental health consequences that result from racist incidence stress, researchers must also account for an individual's level of identification with his/her racial/ethnic group. Unfortunately, research systematically investigating the physiological basis of race-related stress has been severely neglected.

The preceding literature review has identified several important factors which serve as the framework for this research. First, African-Americans and Latinos experience racism and discrimination across many areas of their life from day to day. Second, the experiences of racism directly result in race-related stress. Third, race-related stress results in psychological strain, reduced quality of life and poor physical health. Fourth, cardiovascular functioning and diabetes are areas of particular concern for African-Americans and Latinos. Fifth, SES status and gender account for significant proportions of variability among stress-health outcomes. Finally, the health outcomes that stem from race-related stress are also contingent upon one's level of racial/ethnic group identification.

Chapter III

METHODOLOGY

This chapter provides a detailed description of the methodology for the study. Specifically, this chapter includes detailed descriptions of participants and study procedures. An overview of all instruments used in this study is provided along with a review of the psychometric properties for each measure. Power analyses were conducted in order to obtain meaningful outcomes. The results of several power analyses are reported along with a description of analysis plans.

Design

The proposed study used a combined quasi-experimental, repeated-measures approach to data collection. The dependent variables in the study were the health complaints total score, the three race-related stress subscales: individual racism, institutional racism and cultural racism, and salivary cortisol levels in response to videotaped race-based scenes. The independent variables in this study were skin color (dark-skinned participants and light-skinned participants), SES, gender (male and female), ethnic identity, and ethnic group membership (Latinos and African-Americans).

Participants

A sample of 62 self-identified African-American and Latino, female and male students, were recruited from a private undergraduate campus in the northeast region of the United States. The study sought to obtain a balanced sample of African-Americans and Latinos. Participants were recruited through campus-based student organizations; the Black Student Union and Adelante Latino/a Student Organization. The purpose and nature of the study were explained during membership meetings at which time potential

participants were recruited. It was also clearly emphasized that participation in this study was voluntary and that participants were free to withdraw from the study at any time. All participants provided informed consent.

Procedure

The day prior to participation in the research study, participants were contacted and told the following consistent with previous research (e.g., Bakke et al., 2004; Domes, Heinrichs, Reichwald, & Hautzinger, 2002; Wolf, Schommer, Hellhammer, McEwen, B.S. & Kirschbaum, 2001) and with recommendations of Salimetrics Laboratory (Salimetrics, 2009): (a) Avoid alcohol for 12 hours before sample collection, (b) Do not eat a major meal within 60 minutes of sample collection, (c) Avoid dairy products for 20 minutes before sample collection, and to (d) Avoid foods with high sugar or acidity, or caffeine content, immediately before sample collection, since they may compromise the assay by lowering saliva pH and increasing bacterial growth (Schwartz, Granger, Susman, Gunnar, & Laird, 1998). On the day of the participants' scheduled participation in the research study, the researcher reviewed the instructions provided to the participant the day prior to ensure that participants complied. Participants who reported that they did not comply with the instructions listed above were rescheduled. On the day of sample collection, participants were asked to: (a) Rinse his/her mouth with water to remove food residue before sample collection and (b) Wait at least 10 minutes after rinsing before collecting saliva to avoid sample dilution. In order to control for normal circadian fluctuations in cortisol levels, all sessions took place between 10 am and 12 p.m. Room temperature was monitored by way of a thermometer in order to ensure that it was within the appropriate range of 70 degrees Fahrenheit (+ - 20). Salimetrics laboratory has

validated salivary cortisol within this room temperature range. Additionally, Kirschbaum

(2009) found that salivary cortisol remains stable at room temperature for as long as 2

weeks. Furthermore, Chatterton, Vogelson, Lu, Ellman, and Hudgens (2009) found that

participants' salivary cortisol remained stable during exposure to cold and heat

manipulations.

Each participant participated in the two paradigms during a single experimental

session. Upon arrival to the data collection site, participants were greeted by an

experimenter and told that they would be viewing videotaped clips and responding to

self-report questionnaires. Participants were told that the experimenter would be

collecting saliva samples intermittently using a relatively brief, non-invasive collection

procedure (see salivary cortisol sampling procedures below for description). All

participants completed IRB-approved consent forms and the voluntary nature of this

study was reviewed. After both, the completion and review of consent forms and the 20

minute laboratory acclimation period, the researcher collected the baseline salivary

cortisol sample.

Schematic depiction of the research design and time course is outlined in Figure

1. Following a 20 minute interval, participants viewed a film containing neutral nature

scenes. Participants then completed a demographic questionnaire. Congruent with

previous research (Bakke et al., 2004; Domes, Heinrichs, Reichwald, & Hautzinger,

2002; Wolf, Schommer, Hellhammer, McEwen, B.S. & Kirschbaum, 2001), the

demographic questionnaire asked participants to report psychological and medical

histories for themselves as well as for their parents. After a 20 minute interval, I collected

the second salivary cortisol sample. Immediately after the saliva collection, participants

viewed the second videotaped clips depicting racist scenes. Participants viewed recent news clips on racism and discrimination towards African-Americans and Latinos as well as selected scenes from the movie *CRASH*. The first news clip was from a story entitled "USA: Teens Kill Man for being Hispanic." The news clip described a recent hate crime that occurred where 7 teens killed a man for being Hispanic. The second clip was entitled "A Beating on Tape Puts Philly on Edge: Tensions Run High After News Helicopter Catches Police Beating Suspects." The clip showed a brief live video of police officers physically assaulting 3 African-American men. The third selected scene was from the movie *CRASH* and depicted an African American couple being stopped by two Caucasian police officers. In this scene, the police officers stopped the African-American couple despite the fact that they did not fit the description of the individual who they were originally in pursuit of. The scene progresses to show one of the police officers inappropriately touching the African-American female and verbally harassing her and her husband. The three scenes were streamlined into a continuous 15-minute video and were shown in the order described above. After viewing the scenes from the second movie, participants completed four brief self-report assessments. The instruments were the Index of Race-Related Stress – Brief (IRRS-B; Utsey, 1999), the Multigroup Ethnic Identity Measure (MEIM; Phinney, 1992), the Subjective Health Complaints Inventory (SHI; Ericksen, Ihlebaek, & Ursin, 1999) and the NIS Skin Color Scale. After completing these questionnaires, the researcher obtained a third and the final salivary cortisol sample. The 15-20 minute time delay from stimulus presentation to saliva collection permits researchers to capture stress related changes in the salivary cortisol. Research has suggested that it generally takes 15-20 minutes for task-related changes in unbound

cortisol levels to be expressed in the saliva (Kirschbaum & Hellhammer, 2000). At the conclusion of the session, participants were debriefed and thanked for their participation in the study. The debriefing component of this study included a detailed description of the study and study hypotheses, a stress reduction exercise, stress management tips that participants were provided with and counseling services referral information. Participants were given an opportunity to ask any additional questions. Counseling resources and referral information were provided to all participants in the event that follow-up counseling was needed.

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┌─────────────────────────────────┐
│         Intro to Study          │ ┐
│       Acclimation Period        │ │
└─────────────────────────────────┘ │
                                    ├─ 20 min
┌─────────────────────────────────┐ │
│     Completion and Review of     │ │
│          Consent Forms           │ ┘
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┌─────────────────────────────────┐
│     Baseline Salivary Cortisol   │
└─────────────────────────────────┘

┌─────────────────────────────────┐
│             Video 1             │
│         Neutral Film Clips       │ ┐
└─────────────────────────────────┘ │
                                    ├─ 20 min
┌─────────────────────────────────┐ │
│     Completion of Demographic    │ │
│           Questionnaire          │ ┘
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│      Saliva Cortisol Sample      │
│          Collection 2            │
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┌─────────────────────────────────┐
│             Video 2             │
│       Race-Related Film Clips    │
└─────────────────────────────────┘
                                    ┐
┌─────────────────────────────────┐ │
│      Completion of Self-Report   │ ├─ 20 min
│            Measures              │ ┘
└─────────────────────────────────┘

┌─────────────────────────────────┐
│      Saliva Cortisol Sample      │
│          Collection 3            │
└─────────────────────────────────┘

┌─────────────────────────────────┐
│            Debriefing            │
└─────────────────────────────────┘
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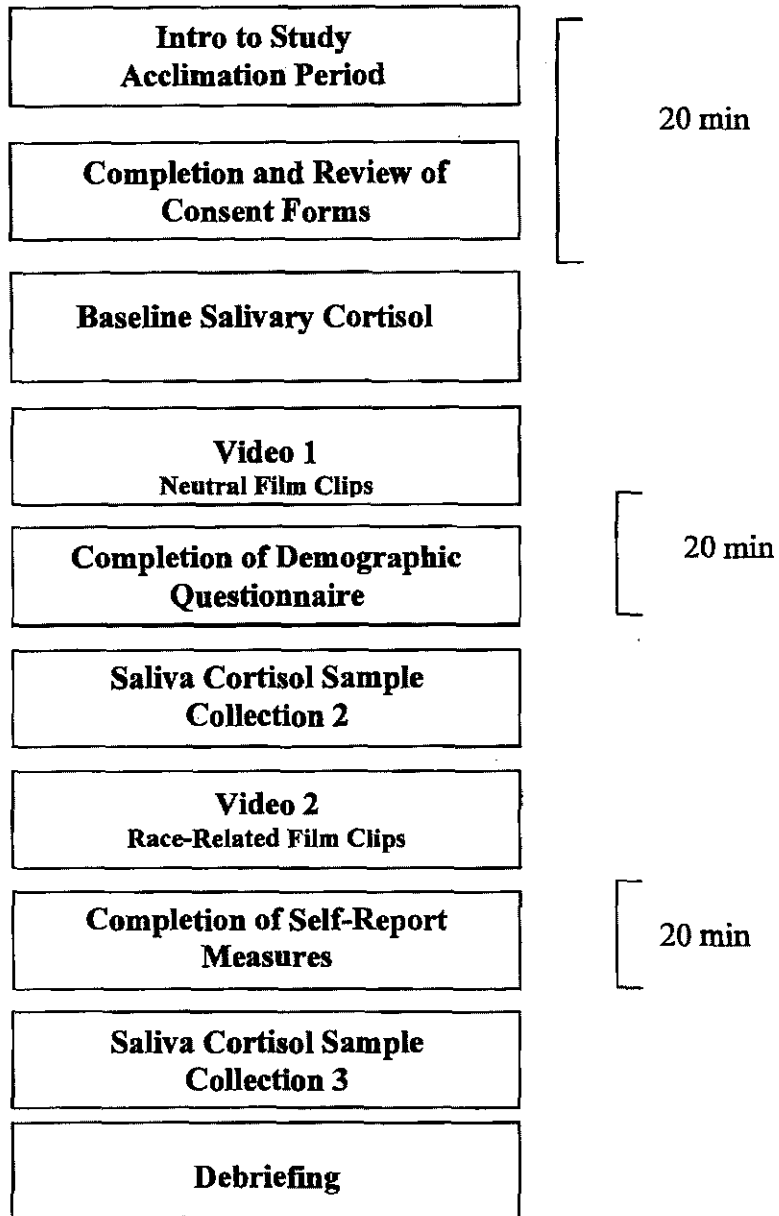
Figure 1. Representation and time course of the design.

Salivary Cortisol Sampling Procedures

Salivary cortisol levels were obtained at baseline, at time 2 (after exposure to neutral nature scenes) and at time 3 (after exposure to race-related images; see Figure 1). At the time of sample collection, participants were asked to lightly chew on cotton-like material (salivette) for approximately 2-3 minutes to permit sufficient salivary saturation. Upon completion of this procedure, the subject withdrew the salivette and the researcher immediately placed it in its individual centrifuge tube and firmly closed it with the stopper. Samples were stored at -20 Celsius (temperature of a regular household freezer). At the end of each day, samples were packaged and sent to Salimetrics Laboratory (State College, PA) for centrifugation and biochemical analysis.

Measures

Demographic questionnaire. This survey was used to obtain background information for participants in the present study. Participants were asked to report age, gender, race, SES, primary language, immigration history, general medical history, family medical history, current medication and substance use history.

The Index of Race-Related Stress – Brief Version (IRRS-B; Utsey, 1999). The IRRS-B is a 22-item, multidimensional measure of the cumulative race-related stress experienced by African-Americans. The IRRS-B asks participants to appraise the effects of racist encounters that he/she, a family member or a friend has endured. Participants indicate their responses on a 5-point likert scale ranging from 0 (this never happened to me) to 4 (event happened and I was extremely upset). The IRRS-B yields a global racism score in addition to 3 subscales: cultural (10 items measuring stress related to the disparagement of one's culture), institutional (6 items measuring stress related to the

effects of institutional policies and practices) and individual racism (6 items measuring racism experienced interpersonally); higher subscale scores indicate higher levels of race-related stress for each of the domains. The subscales are obtained by summing the relevant subscale items on the IRRS-B. A global racism measure is obtained by converting each of the subscale items into z scores and calculating a sum of those z scores. The IRRS-B was normed on a diverse sample of African-Americans ranging from universities in the northeast region to the community-at-large. Reliability coefficients for the IRRS-B based on Cronbach's alpha were reported at .79 (cultural racism), .85 (institutional racism), .84 (individual racism) and .77 (global racism) respectively. Evidence of concurrent validity is supported by positive and significant correlations among the IRRS-B cultural and individual racism subscales and the Perceived Stress Scale (Cohen, Karmarck, & Mermelstein, 1983). Convergent validity was substantiated by significant correlations between IRRS-B subscales and the Racism and Life Experiences Scale (RaLES; Harrell, 1997). The validity and reliability results reported by Utsey (1999) have been supported by a number of other studies (see Utsey, Chae, Brown & Kelly, 2002; Utsey & Hook, 2007).

The Multigroup Ethnic Identity Measure (MEIM; Phinney, 1992). The MEIM is a 14- item measure assessing three aspects of ethnic identity: pride in achievements of the ethnic group, feelings of belonging to an ethnic group, and sharing cultural customs and norms. Sample items include "I have spent time trying to find out more about my own ethnic group, such as history, traditions, and customs." In completing the MEIM, participants respond to items on a 5-point Likert-type scale ranging from 1 (*strongly agree*) to 5 (*strongly disagree*). Scores are derived by reverse

coding negatively worded items, summing across items, and deriving a mean score. Low

scores on the MEIM signify low ethnic identity, and high scores on the MEIM suggest

high ethnic identification. The MEIM was normed in a 2-part study which included 134

Asian American, 131 African American, 89 Hispanic, 12 White, and 41 mixed

background high school students (aged 14-29 yrs) and 58 Hispanic, 35 Asian, 23 White,

11 Black, 1 American Indian, and 8 mixed background college students (aged 18-34 yrs).

Validity of the MEIM suggested that items loaded highly onto a single factor, .80

(Phinney, 1992). Results of an exploratory factor analysis (Phinney, 1992) suggested that

the 14 items of the MEIM constituted a single factor of ethnic identity, distinct from the

Other-Group Orientation Scale. A number of studies have indicated a similar single-

factor structure (Ponterotto, Gretchen, Utsey, Stracuzzi, & Saya, 2003; Reese, Vera, &

Paikoff, 1998; Worrell, 2000). The validity of the measure was also supported by

significant correlations with measures of psychological well-being, such as coping,

mastery, self-esteem, optimism and happiness, loneliness, and depression. Reliability as

reported by Phinney (1992) based on calculated a high school sample ($N = 417$) and a

college sample ($N = 136$) was reported at .81 for multiethnic high school students and .90

for multiethnic college students (Phinney, 1992).

Subjective Health Complaints Inventory (SHI; Ericksen, Ihlebaek, & Ursin,

1999). The SHI is a 29 item measure designed to asses physical health symptoms. The

SHC has a two level response format: respondent's first rate their symptoms on a 3 point

likert type scale ranging from 0 (not at all) to 3(serious). Participants are then asked to

provide the number of days they have experienced each symptom across all 29 symptoms

listed. Sample symptoms include cold, flu, dizziness, anxiety, and asthma. The SHI yields

a total score as well as 5 symptom domains: musculoskeletal pain, pseudoneurology, gastrointestinal problems, allergy, and flu symptoms. The SHI has been normed on a large diverse sample of more than 1,219 participants in community and university based populations and has been found to be reliable and valid. The original study by Ericksen, Ihlebaek, and Ursin (1999) reported a Conbach's alpha of .82 for woman and .75 for men on the total score of the SHI. Subscale scores yielded the following alpha coefficients: musculoskeletal pain (0.74), pseudoneurology (0.73), gastrointestinal problems (0.62), allergy (0.58) and flu (0.67) (Ericksen, Ihlebaek, & Ursin, 1999). The results of a factor analyses showed that the 5 factor/subscales of the SHI accounted for 42% of the variance (Ericksen, Ihlebaek, & Ursin, 1999). The SHI has been used in a number of studies (e.g., Hagen, Svensen, Ericksen, Ihlebaek, & Ursin, 2006; Ihlebaek, & Eriksen, 2003; Lind et al., 2005; Watson, & Pennebaker, 1989).

New Immigrant Survey (NIS) Skin Color Scale (Massey & Martin, 2003). The NIS is a 10-point likert-type scale ranging from 0 (light skin) to 10 (dark skin). The ten shades of skin color are represented by a hand, of similar anatomical composition, with progressively darker shades of skin tone from zero to ten. Evidence for the validity of the NIS skin color scale comes from a recent study by Hersch (2008) who compared skin color obtained by reflectance spectrophotometer. The NIS Skin color scale yielded a high concordance rate with the reflectance measures as indicated by a Pearson's correlation of 0.95 (Hersch, 2008).

Salivary cortisol has been used as a valid and reliable measure of physiological stress across many studies. According to Salimetrics Laboratory, salivary cortisol is highly correlated with serum cortisol levels ($r = 0.91$, $p < .001$). Salimetrics Laboratory

has also reported the following validity data on salivary cortisol: Linearity of Dilution: Average recovery of 91.7% for dilutions from 1:2 to 1:16 Intra-assay coefficient of variation (n=18), 3.7% for low (0.097 dg/dL); (n=14), 3.4% for high (0.999 dg/dL) concentration. Average inter-assay coefficient of variation (n=12 duplicates), 6.4% variation for low (0.101 dg/dL) and 3.8% for high (1.020 dg/dL) concentration. High purity cortisol standards obtained from the National Institute of Standards and technology (NSIT). Similar results have been reported by Diagnostic Systems Laboratories and other empirical research validation Studies (e.g., Hofman, 2001; Worthman, Stallings, & Hofman, 1990). Salivary cortisol has been used in many empirically based research studies investigating physiological stress (e.g., Domes, Heinrichs, Reichwald, & Hautzinger, 2002; Elzinga, & Roelofs, 2005; Kuhlmann, Piel, & Wolf, 2005; Wolf, Schommer, Hellhammer, McEwen, & Kirschbaum, 2001).

Analysis Plans

1. It was expected that African-Americans and Latinos would evidence increased cortisol levels as a result of witnessing videotaped scenes that depict racist acts compared to a control condition. This hypothesis was tested with a within-between groups repeated-measures ANOVA. In the repeated-measures ANOVA, African-American and Latino was entered as the between groups variable and the racism-based stress and control stress salivary cortisol levels were entered as the within-groups variable.

2. It was hypothesized that race-related stress would predict physical health symptoms and race-based salivary cortisol reactivity. This hypothesis was tested using a canonical correlation analysis. In this analysis, the three race-related stress subscales

(cultural, individual and institutional racism) were tested as predictors of race-based salivary cortisol reactivity and total health concerns score.

3. It was anticipated that there would be a negative relationship between ethnic identity and race-related stress, health indices among African-Americans and Latinos. Participants who reported higher ethnic identity would report lower levels of both race-related stress and negative health. This hypothesis was tested using a MANOVA. The independent variable was ethnic group membership (Latino vs. African-American). The dependent variables were ethnic identity, race-related stress subscales, somatic symptoms index score and race-based salivary cortisol levels.

4. It was hypothesized that participants with lower income would experience greater negative health outcomes compared to participants who reported higher incomes. This hypothesis was tested using a MANOVA. A total SES score was obtained using Hollingshead's (1975) Four Factor Social Status Index. The four factors of social status are: education, occupation, gender and marital status. The first step involved calculating a composite proxy variable for social status using the following information: parents' level of education completed (scale scores assigned from 1-7; 1=less than seventh grade; 7=graduate/professional degree) and parents' occupational status (scale scores assigned from 1 to 9; 1=laborers and service workers; 9=higher executives, proprietors of large businesses and major professionals). The social status score is calculated by multiplying the assigned occupational scale value by a factor weight of 5 and the assigned scale value for educational level by a factor weight of 3 (Hollingshead, 1975). Scores are summed for single parent households. For nuclear families, scores are summed and divided by two. SES was converted into quartiles in order to compare participants with high SES with

participants with low SES. SES was entered as the independent variable. The dependent variables were race-related stress subscales, somatic symptoms index score, and racism-based salivary cortisol levels.

Subhyhpothesis 1. It was hypothesized that men would evidence greater negative health consequences compared to women. This hypothesis was tested using a MANOVA. The independent variable for the MANOVA was gender. The dependent variables were race-related stress subscales, somatic symptoms index score, and racism-based salivary cortisol levels.

5. There would be a negative relationship between skin color and racism and health among African-Americans and Latinos. Participants with darker skin would report higher levels of racism and higher levels of negative health outcomes compared to lighter skinned participants. This hypothesis was tested using a MANCOVA. The independent variable was group membership (Latino vs. African-American). The covariate was skin color. The dependent variables were race-related stress subscales, somatic symptoms index score and racism-based salivary cortisol levels.

Power Analysis

The statistical power of a hypothesis test "equals the probability of detecting a particular effect, that is, of rejecting a false H_0 (Witte & Witte, 2008)." Mathematically, power is denoted as $1 - \beta$, where β refers to the probability of a type II error (Ott & Longnecker, 2001). Power is contingent on many factors including alpha level, sample size and effect size. Power analyses are generally conducted prior to data collection in order to determine appropriate sample size for meaningful outcomes. Power analyses for this study were performed using the computer program GPower (Version 3.0 for

Windows; Buchner, Erdfelder, Faul & Lang, 1992). The power analyses were conducted

for each research hypothesis on the basis of the planned statistical analysis procedures.

The following is a description of estimated power for each hypothesis.

Hypothesis 1. A power analysis was conducted for hypothesis I in order to have

meaningful outcomes. The first hypothesis comparing salivary cortisol, between African-

Americans and Latinos, after exposure to two videotaped scenes was tested using a

within-between groups repeated-measures ANOVA. With alpha = .05 and power = .80, a

sample size of 34 is required.

Hypothesis 2. This hypothesis was tested using a canonical correlation analysis.

In this analysis, the 3 race-related stress subscales (cultural, individual and institutional

racism) will be tested as predictors of race-based salivary cortisol and somatic symptoms

index score. With an alpha level of .05 and 3 predictor variables, the required sample size

is 77 with an effect size of 0.15 and power at .80.

Hypothesis 3. This hypothesis was tested using a MANOVA. In this analysis,

ethnic group membership (Latino vs. African-American) was the independent variable.

The dependent variables were ethnic identity, race-related, somatic symptoms index score

and race-based salivary cortisol reactivity. With an alpha level of .05 and 6 dependent

variables, the required sample size was 66 with an effect size of 0.15 and power at .80.

Hypothesis 4. It was hypothesized that participants with lower income would

experience greater negative health outcomes compared to participants who reported

higher incomes. This hypothesis was tested using a MANOVA. SES was entered as the

independent variable. The dependent variables were race-related stress subscales,

physical health symptoms Index Score and racism-based salivary cortisol levels. With an

alpha level of .05, required sample size was 58, for 5 dependent variables, with an effect size of 0.25 and power at .80.

Subhhypothesis 1. It was hypothesized that men would evidence greater negative health consequences compared to women. This hypothesis was tested using a MANOVA. The independent variable for the MANOVA was gender. The dependent variables were race-related stress subscales, physical health symptoms, and racism-based salivary cortisol levels. With an alpha level of .05, required sample size was 58 with an effect size of 0.25 and power at .80.

Hypothesis 5. This hypothesis proposed a negative relationship between skin color and racism and health among African-Americans and Latinos. Specifically, participants with darker skin would report higher levels of racism and higher levels of negative health outcomes compared to darker skinned participants. This hypothesis was tested using a MANCOVA. The independent variable was group membership (Latino vs. African-American). The covariate was skin color. The dependent variables were race-related stress subscales, physical health symptoms Index Score, and racism-based salivary cortisol levels. With an alpha level of .05 and 5 dependent variables, the required sample size was 58 with an effect size of 0.15 and power at .80.

Chapter IV

RESULTS

The purpose of this study was to examine physiological correlates and perceived

health status associated with race-related stress among African-Americans and Latinos.

The study also sought to explore the contribution of ethnic identity status, gender, SES

and skin color on stress-health relationships. This chapter provides descriptive statistics

of study variables, demographic variable testing, results of hypothesis tests and a

summary of the findings of this study. The total sample size for the study was 62. The

total sample sizes for the groups were as follows: Hispanic/Latino group, N = 24 (38.7%)

and African-American group, N = 35 (56.5%). (Note: two participants did not indicate

their ethnic group membership and one participant identified his/her ethnicity as mixed

African-American and Latino/a). All analyses were performed using the Statistical

Package for Social Sciences (SPSS Version 16 for Windows).

Descriptive Statistics

Fifteen (24%) respondents were male while 47 (76%) respondents were female.

Participants' age ranged from 18 to 26 years old. The mean average age for participants

in this study was 19.6 years with a standard deviation of 1.43. The Median age for the

sample was 19 years. The mean age for male participants was 20.3 years with a standard

deviation of 1.95. The mean age for female participants was 19.36 years with a standard

deviation of 1.13. Of the total of 62 participants, 37 indicated that they were Black

(62%). Eight indicated that they were White (13%). Fifteen participants reported other as

their race (25%). Regarding ethnicity, of the total 62 participants, 24 identified

themselves as Hispanic/Latino (40%). Thirty-five participants indicated that they were

African-American (58%). One participant identified as mixed African-American and Hispanic/Latino (2%).

Respondent's primary language.

Each participant was asked to report on his/her primary language. Fifty eight participants indicated that English was their primary language (94%). Four participants reported other as their primary language (7%). For participants who identified themselves as Hispanic/Latino, 20 indicated that English was their primary spoken language (83%), while 4 reported other as their primary language (17%). Regarding participants who identified themselves as African-American, all 35 respondents indicated that English was their primary language (100%). Out of the 62 participants, 59 responded that they were fluent in the English language (95%).

Family marital status.

Regarding participants' marital status for the total sample, 27 (44%) reported that they were never married, 24 (39%) indicated that they were married, eight (13%) reported that they were divorced, and two (3%) indicated that they were widowed. For Hispanic/Latino participants, 6 (25%) reported that they were never married, 14 (58%) married, 4 (17%) divorced, and none reported that they were widowed. For African-American participants, 19 (56%) indicated that they were never married, 9 (27%) married, 4 (12%) divorced, and 2 (6%) widowed.

Family U.S born status and length of stay.

Each participant was asked to report on whether their parents were born in the US or not. For participants who indicated that their parents were either born in the US or migrated to the US, they were also asked to indicate the length of time (in years) that they

have been living in the US. Participants were asked to report this information for both their mother and their father individually. Thirty-three participants (54%) reported that their parents were born in the US. Twenty-eight participants (46%) indicated that their parents were not born in the US. Participants reported the average length of time living in the US as 25 years (SD = 10.60) for his/her mother and 24 years (SD = 10.66) for his/her father. For Hispanic/Latino participants, 5 (21%) reported that their parents were born in the US, while 19 (79%) reported that their parents were not born in the US. For African-American participants, 26 (77%) indicated that their parents were born in the US, while 8 (24%) indicated that their parents were not born in the US.

Family educational history – mother.

Each participant was asked to report on his/her mother's level of education. Out of the 62 participants, 2 (3%) reported less than 7th grade, 2 (3%) high school 9th grade, 6 (10%) partial high school 10th and 11th grades, 23 (37%) high school graduate, 14 (23%) partial college (at least 1 year), 14 (23%) college or university graduate, and 1 (2%) reported graduate professional degree. For Hispanic/Latino participants, 2 (8%) reported less than 7th grade, 1 (4%) high school 9th grade, 4 (17%) partial high school 10th and 11th grades, 9 (38%) high school graduate, 4 (17%) partial college, 4 (17%) college or university graduate and no participant reported an educational level of graduate professional degree for his/her mother. For African-American participants, 2 (6%) reported partial high school 10th and 11th grades, 13 (37%) high school graduate, 10 (29%) partial college, 9 (26%) college or university graduate and 1 (3%) reported graduate professional degree. No participant reported less than seventh grade or high school ninth grade level of education for his/her mother.

Family educational history – father.

Each participant was asked to report on his/her father's level of education. Out of the 56 participants who responded to this question, 4 (7%) reported less than 7th grade, 2 (4%) high school 9th grade, 6 (11%) partial high school 10th and 11th grades, 28 (51%) high school graduate, 5 (9%) partial college (at least one year), 1 (2%) college or university graduate, and 9 (16%) reported graduate professional degree. Regarding educational history –father for Hispanic/Latino participants, 3 (15%) reported less than 7th grade, 1 (5%) high school 9th grade, 1 (5%) partial high school 10th and 11th grades, 12 (60%) high school graduate) and 3 (15%) graduate professional degree. No participant reported partial college or college or university graduate. For African-American participants and the educational level for his/her father, 1 (3%) reported high school 9th grade level of education, 5 (16%) partial high school 10th and 11th grades, 14 (44%) high school graduate, 5 (16%) partial college, 1 (3%) college or university graduate, and 6 (19%) indicated that his/her father obtained a graduate professional degree.

Family occupational status.

Regarding participants' occupational status and the occupational status of their parents, 34 (55%) indicated that they were employed while 28 (45%) reported that they are not currently working. For participants' mother, 47 (76%) reported that his/her mother was employed while 15 (24%) indicated that his/her mother was not employed. Forty (60%) of the participants indicated that his/her father was employed. Fourteen (23%) reported that his/her father was not currently working. Regarding occupational status for self, mother and father for Hispanic/Latino participants, 10 (42%) reported currently being employed and 14 (58%) unemployed. For participants' mother, 20 (83%)

reported that his/her mother was employed while 4 (17%) were unemployed. 20 (87%) reported that their fathers were currently employed and 3 (13%) reported unemployed status for their father. Regarding occupational status for African-American participants (self), 22 (63%) indicated that they were employed and 13 (37%) reported currently not working. Twenty seven (77%) indicated that his/her mother was currently actively working while 8 (23%) indicated that his/her mother was unemployed. Eighteen (64%) indicated that their fathers were employed while 10 (36%) indicated that their fathers' were unemployed.

Family Estimated Annual Income

Of the total 60 participants who responded to this question, 44 (73%) reported an estimated annual income of less than $24,000 a year, 1 (2%) reported an estimated annual income in the range of $25,000 to $49,000 and 15 (25%) indicated that they were not currently working. Regarding estimated annual income for participants' mother (total of 59 participants responded to this question), 17 (29%) reported less than $24,999 a year, 26 (44%) $25,000 to $49,999 a year, 9 (15%) $50,000 to $74,999 a year, 2 (3%) $75,000 or more a year and 5 (9%) indicated that his/her mother was not currently working. Fathers estimated annual income was as follows (total of 46 participants responded to this question): 16 (35%) less than $24,999 a year, 13 (28%) $25,000 to $49,999 a year, 7 (15%) $50,000 to $74,999 a year, 4 (9%) $75,000 or more a year, and 6 (13%) indicated that his/her father was not currently working.

For Hispanic/Latino participants, estimated annual income for self was as follows: 12 (50%) less than $24,999 a year, 1 (4%) $25,000 to $49,999 a year, and 11 (46%) reported not currently working. Estimated annual income for participants' mother was: 8

(33%) less than $24,999 a year, 9 (38%) $25,000 to $49,999 a year, 3 (13%) $50,000 to

$74,999 a year, 2 (8%) $75,000 or more a year, and 2 (8%) reported that their mother was

not currently working. Estimated annual income for Hispanic/Latino participants' father

was: 5 (25%) Less than $24,999 a year, 5 (25%) $25,000 to $49,999 a year, 5 (25%)

$50,000 to $74,999 a year, 3 (15%) $75,000 or more a year, and 2 (10%) reported that

their father was not currently working.

For African-American participants, 29 (88%) reported an estimated annual

income of less than $24,999 a year, and 4 (12%) reported not currently working. For

estimated annual income – mother, African-American participants reported the following:

8 (25%) less than $24,999 a year, 16 (50%) $25,000 to $49,999 a year, 6 (19%) $50,000

to $74,999 a year, and 2 (6%) reported that their mother was not currently working. For

father's estimated annual income, participants reported the following: 10 (42%) less than

$24,999 a year, 7 (29%) $25,000 to $49,999 a year, 2 (8%) $50,000 to $74,999 a year, 1

(4%) $75,000 or more a year, and 4 (17%) reported that their father was not currently

working.

Medical history – self, mother and father.

Each participant was asked to report on his/her medical history and current

medical problems. Three (5%) reported high blood pressure, 3 (6%) diabetes, 3 (5%)

depression, 2 (3%) anxiety, 1 (2%) ADHD, and 1 (2%) OCD. Regarding medical

problems for participants' mother, 18 (30%) reported that their mother had high blood

pressure, 1 (2%) stroke, 12 (20%) diabetes, 2 (3%) hypertension, 6 (10%) depression, 4

(7%) anxiety disorder, 2 (3%) schizophrenia, 3 (5%) seizures/epilepsy, and 1 (2%)

participant reported that his/her mother was diagnosed with cancer. Reports of fathers'

medical problems were as follows: Fourteen (23%) reported that their father had high blood pressure, 3 (5%) stroke, 6 (10%) diabetes, 2 (3%) hypertension, 3 (5%) depression, 1 (2%) anxiety disorder, 2 (3%) stroke/TIA, 1 (2%) cancer, and 1 (2%) rheumatoid arthritis.

Medical history was also analyzed separately for Hispanic/Latino and African-American participants. For Hispanic/Latino's, 2 (11%) reported having diabetes and 1 (4%) depression. Six (25%) reported that their mothers medical history was significant for high blood pressure, 1 (4%) stroke, 3 (13%) diabetes, 1 (4%) hypertension, 6 (25%) depression, 4 (17%) anxiety, 1 (4%) schizophrenia, and 2 (8%) seizures/epilepsy. Regarding fathers medical history, Hispanic/Latino participants reported the following: 7 (29%) high blood pressure, 3 (13%) stroke, 4 (17%) diabetes, 2 (8%) hypertension, 2 (8%) depression, 1 (4%) anxiety disorder, 2 (8%) stroke/TIA, and 1 (4%) rheumatoid arthritis.

For African-American participants and medical history, 3 (9%) reported high blood pressure, 1 (3%) diabetes, 2 (6%) depression, 1 (3%) anxiety disorder, and 1 (3%) seizures/epilepsy. Ten (29%) reported that their mothers medical history was significant for high blood pressure, 8 (24%) diabetes, 1 (3%) schizophrenia, 1 (3%) seizures/epilepsy, and 1 (3%) cancer. Seven (20%) reported that their father had high blood pressure, 1 (3%) diabetes, 1 (3%) depression, and 1 (3%) cancer.

Caffeine consumption.

Nineteen (31%) of the participants stated that they never consume caffeine, 15 (24%) reported that they consume caffeine daily, 20 (32%) weekly, 2 (3%) monthly, and 6 (10%) more than monthly. For Hispanics/Latinos, frequency of caffeine consumption

was reported as follows: 5 (21%) never, 11 (46%) daily, 7 (29%) weekly, and 1 (4%) less

than monthly. African-American participants reported the following: 13 (37%) never, 3

(9%) daily, 12 (34%) weekly, 2 (6%) monthly and 5 (14%) less than monthly.

Alcohol consumption.

Nineteen (31%) of the participants reported that they never consume alcohol, 21

(34%) consumed caffeine weekly, 14(23%) monthly, and 8 (13%) less than monthly. For

Hispanic/Latino participants, frequency of alcohol consumption was reported as follows:

8 (33%) never, 7 (29%) weekly, 5 (21%) monthly, 4 (17%) less than monthly. African

American participants reported the following frequencies for alcohol consumption: 10

(29%) never, 13 (37%) weekly, 9 (26%) monthly, 3 (9%) less than monthly.

Cigarette smoking.

Fifty-nine (95%) of the participants reported that they never smoke cigarettes, 1

(2%) daily, and 2 (3%) monthly. For Hispanic/Latino participants, 22 (92%) reported

never smoking while 2 (8%) indicated smoking monthly. For African-American

participants, 34 (97%) reported never smoking while 1 (3%) reported smoking daily.

Height and weight.

Participants' average height was 66 inches (SD = 3.15) for the total sample. The

average height was 66 inches (SD = 3.53) for Hispanic/Latino participants and 65 inches

(SD = 2.9) for African-American participants. Average weight for participants in the

sample was 158 lbs (SD = 37). An independent samples t-test indicated that the mean

differences in weight for Hispanic/Latinos (M = 156.26, SD = 24.96) were not

statistically significant when compared to the weight of African-Americans (M=158.5,

SD = 45.41), $t(55)$ =-.22, p > .05.

Average hours of sleep.

Average hours of sleep was 6.32 (*SD* = 1.25) per night and 46.21 (*SD* = 16.62) per week. An independent samples *t*-test indicated that average hours of sleep per night for Hispanics/Latinos (*M*=6.23, *SD* = 1.5) was not significantly different compared to average hours of sleep per night for African-Americans (*M* = 6.46, *SD* = 1.01), *t*(57) = -.70, *p* > .05. Average hours of sleep per week was 51.08 (*SD* = 21.96) for Hispanic/Latinos and 43.16 (*SD* = 10.28) for African-Americans. Results of an independent samples *t*-test indicated a statistically significant difference whereby African-Americans reported less hours of sleep per week on average (*M* =43.16, *SD* = 10.28) compared to Hispanic/Latinos (*M* = 51.08, *SD* = 21.96), *t*(53) = 1.78, *p* <.10.

Means and standard deviations for the Multigroup Ethnic Identity Scale.

Participants' ethnic identity levels were measured by the MEIM scale. Higher scores on the MEIM (1=strongly disagree; 5=strongly agree) indicate higher levels of ethnic identity. The MEIM also provides two subscales: Ethnic identity search and Affirmation, belonging and commitment. For the entire sample, the mean average ethnic identity scores were as follows: 4.41 (*SD* = 0.51; total score), 4.24 (*SD* = 0.6; Ethnic Identity Search), and 4.51 (*SD* =0.54) for Affirmation, Belonging, and Commitment. Average ethnic identity status score was 4.48 (*SD* = 0.45) for Hispanic/Latinos and 4.37 (*SD* = 0.56) for African-Americans. Regarding Ethnic Identity Search, Hispanic/Latinos had an average score of 4.40 (*SD* = 0.63), while African-Americans had a mean average score of 4.15 (*SD* = 0.57). For the Affirmation, Belonging, and Commitment scale, Hispanic/Latinos had a mean average score of 4.53 (*SD* = 0.47) while African-Americans had a mean average score of 4.49 (*SD* = 0.6). A series of independent samples *t*-tests

comparing male and female participants and African-Americans and Hispanics/Latinos on MEIM scale and subscale scores did not yield statistically significant differences.

Table 1

Means and Standard Deviations for the Multigroup Ethnic Identity Scale and Subscales

	Total Sample (N =59)		Hispanic/Latino (N=23)		African-American (N=34)	
Multigroup Ethnic Identity Measure	*M*	*SD*	*M*	*SD*	*M*	*SD*
Ethnic Identity Search Subscale	4.24	0.6	4.4	0.63	4.15	0.57
Affirmation, Belonging and Commitment Subscale	4.51	0.54	4.53	0.47	4.49	0.6
Total Scale Score	4.41	0.51	4.48	0.45	4.37	0.56

Note: Total number of participants out of 62 who reported their ethnic identity levels was 59. Out of the 59 participants, 23 self-identified as Hispanic/Latino, 34 as African-American and 2 participants who reported on their ethnic identity levels did not identify their ethnic group membership.

Means and standard deviations for the Index of Race-Related Stress (IRRS-B).

Participants' race-related stress levels were measured by the Index of Race-Related Stress – Brief (IRRS-B) scale. Higher scores on the IRRS – B (0=this never happened to me; 4=this event happened and I was extremely upset) indicate higher levels of discrimination and race-related stress. The IRRS-B also provides three subscales: Individual racism, Institutional racism and Cultural racism. For the entire sample, the mean average ethnic identity scores were as follows: 4.41 (*SD* = 0.51; total score) 4.24 (*SD* = 0.6; Ethnic Identity Search) and 4.51 (*SD* =0.54) for Affirmation, Belonging, and Commitment. Means and standard deviations for IRRS – B scales and subscales are provided in Table 2. An independent samples *t*-test revealed that male participants scored significantly higher on Institutional racism (*M*=13.08, *SD*=6.50) compared to females (*M*=9.33, *SD*=5.40), $t(57) = 2.11$, $p < .05$. No significant gender differences were found on global, cultural and individual race-related stress. Results of a series of independent

samples *t*-tests indicated significant differences between African-Americans and

Hispanics/Latinos for global racism, cultural racism and institutional racism. On global

racism, African-Americans scored significantly higher (M = 48.67, SD = 17.18)

compared to Hispanics/Latinos (M=38.05, SD = 18.78), $t(52)$ = -2.14, $p<.05$. African-

Americans scored significantly higher on cultural racism (M=25.67, SD = 7.32)

compared to Hispanics/Latinos (M=19.38, SD = 8.3), $t(52)$ = -2.92, $p<.05$. A significant

difference also emerged for institutional racism whereby African-Americans scored

higher (M=10.83, SD=5.55) than Hispanics/Latinos (M=8.05, SD = 5.03), $t(55)$ = -1.91, p

< .10.

Table 2

Means and Standard Deviations for the Index of Race-Related Stress-Brief Scale and

Subscales

	Total Sample (N =56)		Hispanic/Latino (N=21)		African-American (N=33)	
	M	SD	M	SD	M	SD
Global Racism	45.91	19.47	38.05	18.78	48.67**	17.18
Cultural Racism	23.79	8.62	19.38	8.3	25.67**	7.32
Institutional Racism	10.15	5.82	8.05	5.03	10.83*	5.55
Individual Racism	12.05	6.46	10.82	7.37	12.23	5.48

Note: Total number of participants out of 62 who reported their race-related stress levels was 56. Out of the 56 participants, 21 self-identified as Hispanic/Latino, 33 as African-American and 2 participants who reported on their race-related stress levels did not identify their ethnic group membership.
*p<.10
**p<.05

Means and standard deviations for the Subjective Health Complaints Inventory scale and subscales.

Participants' health concerns were measured by the Subjective Health Complaints Inventory (SHI). Higher scores on the SHI (0=not at all; 3=serious) indicate more health complaints. The SHI also provides five subscales: Muskuloskeletal Pain, Pseudoneurological, Gastrointestinal Problems, Allergy and Flu symptoms. The variable SHI Total score was significantly skewed. This pattern of results was observed by Eriksen, Ihlebaek, and Ursin (1999). In order to correct for skewness, the SHI total score underwent a square root function transformation. The results of descriptive statistics for skewness and kurtosis indicated that the square root transformation normalized the distribution of the variable. Means and standard deviations for SHI total score and subscales are summarized in table 3. Regarding gender, woman reported significantly more musculoskeletal pain (M=4.81, SD=4.39) compared to men (M=1.53, SD=1.60), $t(55) = -2.81, p < .05$. Woman also reported more overall health complaints (M=3.60, SD=1.26) relative to men (M=2.85, SD=1.22), $t(50) = -1.92, p < .10$. Results of a series of independent samples t-tests indicated that African-Americans reported significantly more allergy symptoms (M=1.68, SD = 2.57) compared to Hispanics/Latinos (M=0.41, SD = 1.05), $t(54) = -2.19, p < .05$. Statistical significance also emerged for musculoskeletal pain and gastrointestinal problems. African-American participants scored significantly higher on Musculoskeletal Pain subscale (M=4.59, SD =4.2) compared to Hispanics/Latinos (M=2.68, SD=2.99), $t(52) = -1.83, p < .10$. African-Americans scored higher on gastrointestinal problems (M=2.76, SD = 2.91) compared to Hispanics/Latinos (M=1.45, SD =2.3), $t(54) = -1.78, p < .10$.

Table 3

Means and Standard Deviations for SHI Scale and Subscale Scores

	Total Sample (N =53)		Hispanic/Latino (N=24)		African-American (N=29)	
Subjective Health Complaints Inventory	*M*	*SD*	*M*	*SD*	*M*	*SD*
Musculoskeletal Pain	3.95	4.1	2.68	2.99	4.59*	4.2
Pseudoneurological	2.82	2.72	3.05	2.95	2.51	2.44
Gastrointestinal Problems	2.34	2.78	1.45	2.3	2.76*	2.91
Allergy	1.14	2.14	0.41	1.05	1.68**	2.57
Flu	1.25	1.5	1.08	1.21	1.25	1.63
Total Health Complaints	3.4	1.28	3	1.19	3.59	1.28

Note: Total number of participants out of 62 who reported on health complaints was 53.
*p<.10
**p<.05

Skin color scale.

Participants' skin color was measured by the New Immigrant Survey (NIS) Skin

color scale. Higher scores on the NIS Skin color scale (1=albinism; 10= darkest possible

skin color) indicated darker skin. Means and standard deviations on the NIS skin color

scale are reported in Table 4. An independent samples *t*-test indicated that African-

American participants had darker skin on average (M=5.27, SD=1.33) compared to

Hispanic/Latino participants (M =3.75, SD=1.42), $t(55)$ = -4.15, p <.01.

Table 4

Means and standard deviations for NIS Skin Color Scale

	Total Sample (N =60)		Hispanic/Latino (N=24)		African-American (N=29)	
NIS Skin Color Scale	*M*	*SD*	*M*	*SD*	*M*	*SD*
	4.7	1.54	3.75	1.42	5.27***	1.33

Note: Total number of participants out of 62 who reported on their skin color darkness was 53. Out of the 53 participants, 24 self-identified as Hispanic/Latino, 29 as African-American and 7participants who reported on their skin color darkness did not identify their ethnic group membership.
*p<.10
**p<.05
*** < .01

Demographic variables testing – Multigroup Ethnic Identity Measure (MEIM).

A series of Multivariate Analysis of Variance (MANOVA) were performed on the

two Multigroup Ethnic Identity Measure (MEIM) subscales (Ethnic Identity Search and

Affirmation, Belonging, and Commitment). Scores on the MEIM range from 1 to 4 with

higher scores reflecting greater ethnic identity levels. Independent variables examined

were gender, race, ethnicity, educational level-mother, educational level-father, income

level – self, income level – mother, and income level – father. There were no violations

of assumptions of normality, homogeneity of variance, linearity and multicollinearity.

The results of the MANOVA's are summarized in Table 5. The MANOVA model for the

linear combination of the MEIM subscales on the independent variable of income level–

self was statistically significant, Wilk's Λ = .68, $F(4, 98)$ = 5.26, $p < .01$, partial η = .17.

A follow-up Analyses of Variance (ANOVA) was performed in order to explore the

specific differences indicated by the MANOVA. The ANOVA results are summarized in

Table 5 and means and standard deviations are also reported in Table 5. The ANOVA on

MEIM ethnic identity search was statistically significant, $F(2, 50)$ = 7.41, $p <.01$, partial

$\eta 2 = .23$. Participants who reported an income in the range of \$25,000 to \$49,999 a year

scored lower on ethnic identity status ($M = 2.2$, $SD = .56$) compared to participants who

reported either a yearly income less than \$25,000 a year ($M = 4.37$, $SD = .09$) or those

who indicated that they are not currently working ($M = 4.45$, $SD = .14$).

Table 5

Multivariate Analysis of Variance Results for Demographic Variables and MEIM Scores

Multivariate Effect	Wilks Lambda	F	p	Effect	N
Gender	0.99	0.19	0.83	0.01	55
Race	0.95	0.83	0.64	0.03	53
Ethnicity	0.97	0.85	0.43	0.03	53
Educational Level - Mother	0.73	1.34	0.21	0.15	55
Educational Level – Father	0.78	1.14	0.35	0.35	50
Income - Self	0.68	5.26	0.01***	0.18	53
Income - Mother	0.79	1.51	0.17	0.11	54
Income - Father	0.76	1.42	0.20	0.13	45

Note: Total number of participants out of 62 who reported their ethnic identity levels and gender was 55. Total number of participants out of 62 who reported their ethnic identity levels and race was 53. Total number of participants out of 62 who reported their ethnic identity levels and ethnicity was 53. Total number of participants out of 62 who reported their ethnic identity levels and educational level – mother was 55. Total number of participants out of 62 who reported their ethnic identity levels and educational level – father was 50. Total number of participants out of 62 who reported their ethnic identity levels and income – self was 53. Total number of participants out of 62 who reported their ethnic identity levels and income – mother was 54. Total number of participants out of 62 who reported their ethnic identity levels and income – father was 45.
*$p<.10$
**$p<.05$
*** $< .01$

Univariate ANOVA's for Significant Demographic Variables and Multigroup Ethnic

Identity Measure (MEIM) subscales

Variable	F	p	Effect	N
MEIM Search Subscale	7.41	0.01***	0.23	53
MEIM Affirmation Subscale	0.19	0.83	0.01	53

Total number of participants out of 62 who responded to the Search subscale and to income – self was 53. Total number of participants out of 62 who responded to the Affirmation subscale and to income – self was 53.
*p<.10
**p<.05
*** <.01

Means and standard deviations for demographic variables and Multigroup Ethnic

Identity Measure (MEIM) subscales

	MEIM Search Subscale		
Income Level - Self	*M*	*SD*	*N*
Less than $24,999 a year	4.38	0.55	37
$25,000 to $49,999 a year	2.2***	-	1
$50,000 to $74,999 a year	-	-	
$75,000 or more a year	-	-	
Not Currently Working	4.25	0.59	15
Total	4.3	0.62	

Note: Note: (-) – value could not be computed because cell contained values less than two
*p<.10
**p<.05
*** <.01

Demographic variables testing – Index of Race-Related Stress (IRRS-B).

A series of Multivariate Analysis of Variance (MANOVA) were performed on the

Index of Race-Related Stress (IRRS-B) subscales (Cultural, Institutional and Individual).

Independent variables examined were gender, race, ethnicity, educational level-mother,

educational level-father, income level – self, income level – mother, and income level –

father. There were no violations of assumptions of normality, homogeneity of variance,

linearity and multicollinearity. The results of the MANOVAs are summarized in Table 8.

The MANOVA model for the linear combination of the IRRS-B subscales were

statistically significant for gender, Wilk's Λ = .89, $F(3, 52)$ = 2.23, $p < .10$, partial $\eta 2$ =

.11, race, Wilk's Λ = .76, $F(6, 98)$ = 2.46, $p < .05$, partial $\eta 2$ = .13, ethnicity, Wilk's Λ =

.80, $F(3, 50)$ = 4.31, $p < .05$, partial $\eta 2$ = .21, and income level – mother, Wilk's Λ = .66,

$F(12, 121)$ = 1.72, $p < .05$, partial $\eta 2$ = .13. Follow-up Analyses of Variance (ANOVA)

were conducted for significant MANOVA's. The ANOVA results are summarized in

Table 9 and means and standard deviations are reported in Table 10 for IRRS-B

subscales. Regarding the variable gender, the ANOVA on IRRS-B Institutional racism

was statistically significant, $F(3, 52)$ = 4.83, $p < .05$, partial $\eta 2$ = .08. Men reported

significantly higher levels of institutional racism (M=13.33, SD =6.72) compared to

woman (M = 9.2, SD = 5.5). For the variable race, the ANOVAs on IRRS-B subscales

was statistically significant for cultural racism, $F(2, 54)$ = 5.37, $p < .05$, partial $\eta 2$ = .17,

institutional racism $F(2, 54)$ = 2.89, $p < .10$, partial $\eta 2$ = .10, and individual racism $F(2,$

54) = 3.57, $p < .05$, partial $\eta 2$ = .12. For the statistically significant ANOVA on Race and

Institutional racism, Black participants scored significantly higher on Institutional racism-

related stress (M = 11.35, SD = 6.22) compared to White (M = 5.67, SD = 4.84)

participants or participants who identified their race as other (M = 9.14, SD = 4.2). The

ANOVA for Ethnicity was statistically significant for cultural racism $F(1, 54)$ = 8.52, p

<.05, partial $\eta 2$ = .14 and institutional racism $F(1, 54)$ = 3.34, $p < .10$, partial $\eta 2$ =.06.

The ANOVA for income level – mother was significant for cultural racism $F(4, 53)$ =

2.47, $p < .10$, partial = .17., institutional racism $F(4, 53)$ = 3.04, $p < .05$, partial $\eta 2$ = .20.

and individual racism $F(4, 53)$ = 3.77, $p < .05$, partial $\eta 2$ = .24.. For institutional racism,

participants who reported income levels for their mother at $25,000 to $49,999 a year

scored significantly higher on Institutional racism ($M = 10.88$, $SD = 5.52$) compared to

participants who their mothers income at $50,000 to $74,999 a year ($M$=3.33, $SD = 2.66$).

Regarding individual racism, participants reported higher levels of individual racism

when they reported that their mother was either not currently working (M=15.6, $SD =$

8.02) or with an estimated annual salary of $25,000 to $49,999 a year ($M$=13.54, $SD =$

5.9) compared to participants who reported that their mothers estimated annual income

was between $50,000 to $74,999 a year ($M = 5.5$, $SD = 4.97$).

Table 6

Multivariate Analysis of Variance Results Demographic Variables and Index of Race-

Related Stress (IRRS-B) subscales

Multivariate Effect	Wilks Lambda	F	p	Effect	N
Gender	0.88	2.23	0.09*	0.11	56
Race	0.76	2.46	0.03**	0.13	54
Ethnicity	0.8	4.31	0.09*	0.21	54
Educational Level - Mother	0.64	1.27	0.22	0.14	56
Educational Level - Father	0.61	1.21	0.26	0.15	49
Income - Self	0.84	1.51	0.18	0.08	54
Income - Mother	0.66	1.72	0.07*	0.13	53
Income - Father	0.84	0.51	0.91	0.06	40

Note: Total number of participants out of 62 who reported on their race-related stress levels and gender was 56. Total number of participants out of 62 who reported on their race-related stress levels and race was 54. Total number of participants out of 62 who reported their race-related stress levels and ethnicity was 54. Total number of participants out of 62 who reported on their race-related stress levels and educational level – mother was 56. Total number of participants out of 62 who reported on their race-related stress levels and educational level – father was 49. Total number of participants out of 62 who reported on their race-related stress levels and income – self was 54. Total number of participants out of 62 who reported on their race-related stress levels and income – mother was 53. Total number of participants out of 62 who reported on their race-related stress levels and income – father was 40.
*p<.10
**p<.05
*** < .01

Univariate ANOVAs for significant demographic variables and Index of Race-Related

Stress (IRRS-B) subscales

Variable	F	p	Effect	N
Gender				
IRRS-B Cultural	2.41	0.13	0.04	56
IRRS-B Institutional	4.83	0.03**	0.08	56
IRRS-B Individual	0.27	0.61	0.01	56
Race				
IRRS-B Cultural	5.37	0.01***	0.17	54
IRRS-B Institutional	2.89	0.07**	0.1	54
IRRS-B Individual	3.57	0.04*	0.12	54
Ethnicity				
IRRS-B Cultural	8.52	0.01***	0.14	54
IRRS-B Institutional	3.34	0.07*	0.06	54
IRRS-B Individual	0.72	0.4	0.01	54
Income Level - Mother				
IRRS-B Cultural	2.47	0.06*	0.17	53
IRRS-B Institutional	3.04	0.03**	0.2	53
IRRS-B Individual	3.77	0.01***	0.24	53

Note: Total number of participants out of 62 who reported on their race-related stress levels for Cultural, Institutional and Individual race-related stress and gender was 56. Total number of participants out of 62 who reported on their race-related stress levels for Cultural, Institutional and Individual race-related stress and race was 54. Total number of participants out of 62 who reported their race-related stress levels for Cultural, Institutional and Individual race-related stress and ethnicity was 54. Total number of participants out of 62 who reported on their race-related stress levels Cultural, Institutional and Individual race-related stress and income – mother was 53.
*p<.10
**p<.05
*** < .01

Means and standard deviations for demographic variables and Index of Race-Related

Stress (IRRS-B) subscales

	N	IRRS-B Cultural		IRRS-B Institutional		IRRS-B Individual	
Gender		*M*	*SD*	*M*	*SD*	*M*	*SD*
Male	12	27.17	8.01	13.33*	6.72	12.92	6.43
Female	44	22.86	8.63	9.2	5.5	11.8	6.74
Race							
Black	34	26.32*	7.86	11.35*	6.22	12.85*	6.09
White	6	15.67	9.75	5.67	4.84	5.83*	9.11
Other	14	23.29	5.11	9.14	4.2	13.43*	5.2
Ethnicity							
Hispanic/Latino	21	19.38	8.3	7.95	5.13	10.71	7.54
African-American	33	25.67*	7.32	10.76*	5.72	12.24	5.65
Income Level - Mother							
Less than $24,999 a year	16	20.13	9.31	8.88	4.84	9.13	5.29
$25,000 to $49,999 a year	24	25.29	6.95	10.88*	5.52	13.54*	5.9
$50,000 to $74,999 a year	6	17	7.67	3.33*	2.66	5.5*	4.97
$75,000 or more a year	2	27	0	14	0	14	0
Not Currently Working	5	27.6	8.14	11.2	7.6	15.6*	8.02

*p<.10
**p<.05
*** < .01

Demographic variables testing – Subjective Health Complaints.

A series of Multivariate Analysis of Variance (MANOVA) were performed on the

Subjective Health Complaints Inventory (SHI; Eriksen, Ihlebaek, & Ursin, 1999)

subscales. The 5 subscales (dependent variables) were: Musculoskeletal Pain,

Pseudoneurological, Gastrointestinal Problems, Allergy, and Flu. Independent variables examined were gender, race, ethnicity, educational level-mother, educational level-father, income level – self, income level – mother, and income level – father. There were no violations of assumptions of normality, homogeneity of variance, linearity, and multicollinearity. The results of the MANOVA's are summarized in Table 7. The MANOVA model for the linear combination of the SHI subscales were statistically significant for gender, Wilk's $\Lambda = .81$, $F(5, 46) = 2.05$, $p < .10$, partial $\eta2 = .18$, race, Wilk's $\Lambda = .61$, $F(10, 86) = 2.42$, $p < .05$, partial $\eta2 = .22$, ethnicity, Wilk's $\Lambda = .71$, $F(5, 43) = 3.53$, $p < .05$, partial $\eta2 = .29$, and educational level – father, Wilk's $\Lambda = .25$, $F(30, 138) = 1.90$, $p < .05$, partial $\eta2 = .24$. Follow-up ANOVA's and means and standard deviations are summarized in tables 7. The ANOVA for gender and muskuloeskeletal pain was statistically significant, $F(1, 52) = 8.92$, p $<.05$, partial $= .15$. Woman reported significantly higher levels of musculoskeletal pain (M=5.21, SD = 4.42) compared to men (M=1.57, SD = 1.65). The ANOVA for race and pseudoneurological symptoms was statistically significant, $F(1, 52) = 2.97$, p $< .10$, partial $= .11$. White participants reported significantly higher pseudoneurological symptoms ($M = 5.5$, $SD = 3.51$) compared to either Black participants (M=2.94, SD = 2.67) or participants who identified their race as other (M=2.31, SD = 2.39). The ANOVA's for ethnicity were significant for musculoskeletal pain, $F(1, 49) = 3.62$, $p < .10$, partial $= .07$., gastrointestinal problems, $F(1, 49) = 3.16$, $p <.10$, partial $= .06$, and allergy $F(1, 49) = 3.18$, $p <.10$, partial $= .06$.. The ANOVA's for educational level – father were significant for pseudoneurological pain $F(6, 45) = 2.97$, $p <.05$, partial $= .32$, and gastrointestinal problems $F(6, 45) = 1.94$, p $<.10$, partial $= .24$.. Regarding educational level – father, participants'

pseudoneurological symptoms were highest when they reported that their fathers educational level was less than seventh grade (M=6.25, SD =2.87) compared to either high school graduate and partial college (M=3.91, SD = 2.62) or graduate professional degree (M=1.43, SD =1.4).

Table 7

Multivariate Analysis of Variance Results for Demographic Variables and Subjective Health Complaints.

Multivariate Effect	Wilks Lambda	F	p	Effect	N
Gender	0.82	2.05	0.09*	0.18	52
Race	0.61	2.42	0.01*	0.22	50
Ethnicity	0.71	3.53	0.01*	0.29	49
Educational Level - Father	0.25	1.9	0.01*	0.24	45

Note: Total number of participants out of 62 who reported on their health complaints and gender was 52. Total number of participants out of 62 who reported on their health complaints and race was 50. Total number of participants out of 62 who reported on their health complaints and ethnicity was 49. Total number of participants out of 62 who reported on their health complaints and educational level – father was 45.
*p<.10
**p<.05
*** < .01

Univariate ANOVA's for significant demographic variables and Subjective Health Complaints

Variable	F	p	Effect	N
Gender				
Musculoskeletal Pain	8.92	0.01*	0.15	52
Pseudoneurological	0.47	0.5	0.01	52
Gastrointestinal				
Problems	0.14	0.71	0.01	52
Allergy	2.14	0.15	0.04	52
Flu	0.07	0.79	0.01	52

Race

Musculoskeletal Pain	1.36	0.27	0.06	50
Pseudoneurological	2.97	0.06*	0.11	50
Gastrointestinal Problems	1.22	0.31	0.05	50
Allergy	0.96	0.39	0.04	50
Flu	1.52	0.23	0.06	50

Ethnicity

Musculoskeletal Pain	3.62	0.06*	0.07	49
Pseudoneurological	0.34	0.56	0.01	49
Gastrointestinal Problems	3.16	0.08*	0.06	49
Allergy	3.18	0.08*	0.06	49
Flu	0.06	0.81	0.01	49

Educational Level - Father

Musculoskeletal Pain	0.74	0.63	0.1	45
Pseudoneurological	2.97	0.02*	0.32	45
Gastrointestinal Problems	1.94	0.09*	0.24	45
Allergy	0.96	0.46	0.13	45
Flu	0.64	0.7	0.09	45

Note: Total number of participants out of 62 who reported on their health complaints for Musculoskeletal Pain, Pseudoneurological symptoms, Gastrointestinal Problems, Allergy and Flu and gender was 52. Total number of participants out of 62 who reported on their health complaints for Musculoskeletal Pain, Pseudoneurological symptoms, Gastrointestinal Problems, Allergy and Flu and race was 50. Total number of participants out of 62 who reported on their health complaints for Musculoskeletal Pain, Pseudoneurological symptoms, Gastrointestinal Problems, Allergy and Flu and ethnicity was 49. Total number of participants out of 62 who reported on their health complaints for Musculoskeletal Pain, Pseudoneurological symptoms, Gastrointestinal Problems, Allergy and Flu and educational level – father was 45.
$*p<.10$
$**p<.05$
$*** <.01$

Means and standard deviations for demographic variables and Subjective health

complaints

	Musculo-skeletal Pain		Pseudo-neurological		Gastro-intestinal problems		Allergy		Flu	
Gender	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Male	1.57	1.65	2.64	3.2	2.79	3.21	0.36	1.08	1.14	1.51
Female	5.21*	4.42	3.24	2.61	2.45	2.76	1.32	2.35	1.26	1.43
Race										
Black	5	4.63	2.94	2.67	3.1	3.06	1.42	2.54	1.26	1.57
White	3	2.9	5.5*	3.51	1.83	2.56	0.83	1.6	2	1.67
Other	3	3.32	2.31	2.39	1.77	2.52	0.46	0.97	0.77	0.93
Ethnicity										
Hispanic/Latino	2.85	3.1	3.25	3.02	1.6	2.37	0.45	1.1	1.2	1.28
African-American	4.95*	4.25	2.79	2.47	3.03*	3.02	1.55*	2.6	1.1	1.45
Educational Level – Father										
Less than 7th Grade	4.75	7.54	6.25*	2.87	1	1.15	0.75	0.5	1.75	0.5
High School 9th Grade	5.5	7.78	3	1.41	1	1.41	2	1.41	1.5	2.12
Partial High School 10th and 11th Grades	4.75	4.11	3	2.58	2.5	4.36	0.5	1	0.5	1
High School Graduate	5.14	3.4	3.91*	2.62	4	2.79	0.64	1.79	1.45	1.3
Partial College (at least one year)	4.6	6.02	1.2	1.79	1.2	1.79	3	4.8	1.6	2.19
College or University Graduate	7	-	-	-	-	-	-	-	-	-
Graduate Professional Degree	1.43	2.94	1.43*	1.4	1.43	2.44	1.14	1.57	0.71	1.89

Note: Note: (-) – value could not be computed because cell contained values less than two
*p<.10
**p<.05
*** < .01

Scale and subscale reliability analyses.

Reliability analyses were performed for all scales and subscales in this study.

Specifically, reliability as measured by Cronbach's alphas, were calculated for MEIM

scale and subscales (Ethnic identity search ; Affirmation, belonging and committment),

IRRS-B (Global, Individual, Institutional, and Cultural racism), SHI scale and subscales

(Muskuloskeletal Pain, Pseudoneurological, Gastrointestinal, Allergy and Flu), NIS Skin

color scale. Cronbach's alphas for MEIM scale and subscales were as follows : .88

(MEIM total scale score), .72 (Ethnic identity search), .88 (Affirmation, belonging, and

committment). For the IRRS-B scale and subscales, alpha coefficients were as follows:

.91 (Global racism), .82 (Cultural racism), .74 (Institutional racism), .75 (individual

racism). SHI scale and subscale Reliabilities are as follows: .84 (total score), .80

(Muskoloskeletal Pain), .59 (Psuedoneurological), .68 (Gastrointestinal), .65 (Allergy),

.67 (Cold/Flu).

Table 8

Scale and Subscale Reliabilities for Study Variables and Normative Sample

Scale/Subscale	Cronbach's Alpha Current Sample	Cronbach's Alpha Normative Sample
Multigroup Ethnic Identity Measure	0.88	0.90
Ethnic Identity Search	0.72	0.69
Affirmation, belonging, and commitment	0.88	.75
Index of Race-Related Stress - Brief	0.91	0.77
Cultural racism	0.82	0.78

Institutional Racism	0.74	0.69
Individual Racism	0.75	0.78
Subjective Health		.82 (woman); .75
Complaints	0.84	(men)
Muskuloskeletal Pain	0.8	0.74
Pseudoneurological	0.59	0.73
gastrointestinal	0.68	0.62
allergy	0.65	0.58
cold/flu	0.67	0.67

Bivariate correlations.

Correlation coefficients were computed to determine bivariate relationships

among variables of interest. The variables entered for analyses were as follows: age, time

spent in the US. for participant's mother and father, income level for self, mother and

father, health problems reported on the demographic variable for participants as well as

for their mother and father, baseline salivary cortisol, neutral stress salivary cortisol

(exposure to nature scenes) and physiological race-related stress (salivary cortisol after

exposure to race-related videotaped vignettes), subjective health complaints, ethnic

identity level, and perceived race-related stress (scores on Index of Race-Related Stress –

Brief). The results of the correlational analyses are presented in Table 9. There was a

positive correlation between income level – mother and the amount of time (in years)

spent in the US for participants' father, $r = .63$, $p < .01$. There was also a positive

relationship between fathers income level and participants' income level, $r = .56$, $p < .01$.

Fathers income level was also associated with health concerns (as reported on the

demographic questionnaire) for participants, $r = .46$, $p < .01$, as well as for participants'

mother, $r = -.31$, $p < .05$, and father, $r = .35$, $p < .05$. Participants health concerns, as

reported on the demographic questionnaire, was significantly correlated with health

complaints on the Subjective Health Complaints Inventory, $r = .50, p < .01$ and negatively

correlated with MEIM total score, $r=-.36, p < .01$, and the MEIM Affirmation subscale, r

$= -.36, p < .01$. Baseline salivary cortisol levels were negatively correlated with MEIM

Search subscale, $r = .28, p < .05$. A negative correlation emerged between ethnic identity

status and physiological race-related stress, $r = -.36, p < .05$. A negative correlation also

emerged between physiological race-related stress and ethnic identity affirmation, $r = -$

$.36, p < .05$. Participants who reported lower ethnic identity levels had higher

physiological race-related stress in response to videotaped vignettes that depicted racism.

Table 9

Pearson's Correlations for Study Variables

Variable	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1. Age	.24	.08	-.10	.19	.06	.09	.12	-.01	-.02	.17	.14	.09	.02	.10	-.01	.03	.04	.13	-.08
2. Mother Years in U.S.		.64***	.01	.30	.30	-.36	-.05	-.03	-.20	-.17	.13	.08	.32	.23	.30	-.21	-.14	-.17	-.23
3. Father Years in U.S.			-.15	.63***	.24	.02	-.05	.19	.15	.12	-.02	-.09	.13	.12	.07	-.26	-.21	-.29	-.20
4. Income - Self				-.04	.56***	.17	.11	.31**	.01	-.03	.12	-.03	-.09	-.04	-.08	.01	-.04	-.06	.12
5. Income - Mother					.26	-.14	-.18	-.03	.14	.20	.09	-.25	.19	.17	.15	.16	.18	.06	.19
6. Income - Father						.46***	-.31**	.35**	-.03	-.02	.16	.01	-.05	-.08	-.03	.12	.11	.14	.13
7. MH Self Total Score							.12	.34***	-.03	-.06	.08	.50***	-.36***	-.24	-.36***	.14	.13	.17	.08
8. MH Mother Total Score								.09	.02	-.07	.20	.05	-.21	-.21	-.13	-.14	-.18	-.20	.01
9. MH Father Total Score									-.06	-.13	-.12	.05	-.20	-.06	-.23	-.04	-.05	-.08	.02
10. Baseline Salivary Cortisol										.52***	.03	.04	.21	.28**	.13	.01	.02	-.07	.06
11. Neutral Stress Salivary Cortisol											.19	.03	.03	.05	-.03	.20	.20	.19	.15
12. Race-Related Stress Salivary Cortisol												.12	-.36**	-.24	-.36**	.10	.04	.08	.18
13. Subjective Health Complaints													-.22	-.16	-.18	.08	.07	.10	.04
14. MEIM Total Score														.87***	.91**	-.09	-.08	-.10	-.08
15. MEIM Search Subscale															.58***	-.03	-.01	-.09	-.01
16. MEIM Affirmation Subscale																-.20	-.20	-.14	-.18
17. IRRS- Global																	.95***	.89***	.89***
18. IRRS- Cultural																		.81***	.78***
19. IRRS- Institutional																			.68***
20. IRRS- Individual																			

Note: MH – Medical History. Neutral Stress – Salivary cortisol levels in reaction to neutral videotaped nature scenes. Race-Related stress salivary cortisol – salivary cortisol levels in reaction to videotaped racism scenes. MEIM – Multigroup Ethnic Identity Measure. IRRS – Index of Race-Related Stress – Brief.
**p<.05
*** < .01

Primary Analyses

Hypothesis 1.

The first hypothesis sought to determine whether there was a statistically significant difference in levels of salivary cortisol when participants viewed a race-based vignette compared to a neutral condition and baseline salivary cortisol levels. It was predicted that African-Americans and Latinos would evidence increased cortisol levels as a result of witnessing videotaped sciences that depict racism compared to a neutral condition and baseline salivary cortisol levels. A mixed between-within-groups ANOVA was conducted with African-American and Latino as the between-groups variable and baseline, neutral and racism-related salivary cortisol levels as the within-groups variable. The results of the mixed between-within-groups ANOVA revealed a result close to significance for cortisol, Wilk's $\Lambda = .88$, $F(2, 45) = 3.06$, $p = .06$, partial $\eta = .12$ but not for the interaction between cortisol and group membership (African-American and Latino), Wilk's $\Lambda = .00$, $F(2, 45) = .02$, $p > .10$, partial $\eta = .01$. Means and standard deviations are provided in Table 10. Results show that salivary cortisol levels were highest in response to the videotaped race-based vignettes compared to baseline and neutral stress conditions.

Table 10

Means and Standard Deviations for Salivary Cortisol Levels During Baseline, Neutral Stress and Race-Related Stress Conditions.

Baseline Cortisol Condition			
	Mean	*SD*	*N*
Hispanic/Latino	0.067	0.065	20
African-American	0.087	0.11	28
Total	0.078	0.099	48

Neutral Condition			
	Mean	*SD*	*N*
Hispanic/Latino	0.055	0.05	20
African-American	0.078	0.078	28
Total	0.069	0.069	48

Racism-Related Stress Condition			
	Mean	*SD*	*N*
Hispanic/Latino	0.13	0.21	20
African-American	0.15	0.21	28
Total	0.14	0.21	48

Note: Total number of participants out of 62 who reliably provided salivary cortisol samples across the 3 conditions and who identified their ethnic group membership were 48.

Hypothesis 2.

Canonical correlation analysis was performed between a set of health variables

and a set of racism-related stress and health variables using SPSS (Version 16 for

Winsows) MANOVA procedure syntax command (Tabachnick & Fidell, 2007). The

syntax command used to evoke SPSS MANOVA CANCORR was as follows:

```
MANOVA SHITotalSqrtTransform_1 Cortisol3_1 WITH IRRSCulturalRacism_1
IRRSInstRacism_1 IRRSIndRacism_1
/DISCRIM ALL ALPHA(1)
/PRINT SIGNIF(MULTIV UNIV EIGEN DIMENR).
```

This command and procedure results in a canonical correlation analysis and creates

weighted linear combinations of two or more sets of variables, such that the correlation

between these sets of variables is maximized. The health variables set included perceived

health status (as measured by the Subjective Health Complaints Inventory) and

physiological reactivity (as measured by racism-related stress cortisol levels). The

racism-related stress set included the Index of Race-Related Stress subscales: Cultural

racism, Individual racism, and Institutional racism. Variables were assessed for skewness

and kurtosis. Assumptions of normality and within-set multicolinearity were met.

Missing values were substituted for the mean value of the variable respectively. The first

step in interpreting the analysis is to determine which, if any, of the correlations between

the canonical variates are significant. In the MANOVA approach to canonical correlation

analysis, the statistical significance of canonical correlations are evaluated using the F

distribution rather than through the chi-square test of independence (Tabachnick & Fidell,

2001, p. 185). The first test of significance evaluates whether any of the correlations are

significant. The second statistical significance test assesses whether any remaining

correlations are significant, accounting for the first one. The results of the first canonical

correlation analysis was not statistically significant, Wilk's Λ = .95, $F(6, 114)$ = .48, p =.82. The second canonical correlation analysis was also not statistically significant , Wilk's Λ = .99, $F(2, 58)$ = .26, p =.77. These findings are consistent with the results of the bivariate correlation analysis in which no significant bivariate correlations emerged among self-reported race-related stress and health indices.

Hypothesis 3.

For hypothesis 3, it was anticipated that there would be a negative relationship between ethnic identity levels and race-related stress for health indices among African-Americans and Latinos. It was predicted that participants who reported higher ethnic identity scores would report lower levels of both race-related stress and negative health (as measured by scores on Subjective health Concerns Inventory and salivary cortisol levels). The hypothesis was tested with a Multivariate Analysis of Variance (MANOVA). The independent variable is ethnic group membership (Latino vs. African-American). The dependent variables are ethnic identity level(as measured by the Multigroup Ethnic Identity Measure), race-related stress subscales (as measured by the Index of Race-Related Stress – Brief), subjective health complaints total score (as measured by the Subjective Health Complaints Inventory) and race-based salivary cortisol levels (as measured by salivary cortisol reactivity levels to race-based videotaped vignettes). There were no violations of assumptions of normality, homogeneity of variance, linearity and multicollinearity. The linear combination of scores formed by the Multigroup Ethnic Identity (MEIM) scores, Index of Race-Related Stress (IRRS-B) subscales (individual, cultural and institutional), Subjective Health Concerns Inventory (SHI), and race-related salivary cortisol levels were significantly affected by African-American and Latino group

membership, Wilk's Λ = .61, $F(6, 26)$ = 2.75, $p<.05$, partial $\eta2$ = .39. Analyses of

variances (ANOVA) on each dependent variable were conducted as follow-up tests to the

MANOVA. Using the Bonferroni method, each ANOVA was tested at the .05 level of

significance. The ANOVA on the Subjective Health Complaints Inventory (SHI) was

close to statistical significance, $F(1, 31)$ = 3.53, p =.07, partial $\eta2$ = .10, suggesting a

possible relationship between ethnic group membership and perceived health status.

African-American participants reported more overall health concerns (M = 3.83, SD=1.4)

compared to Hispanic/Latino participants (M=2.95, SD=1.26) (see Table 11).

Table 11

Means and standard deviations for SHI Scores by Ethnic Group Membership

	African-Americans (N=19)		Latinos (N=14)	
Variable	*M*	*SD*	*M*	*SD*
Subjective Health Complaints Inventory	3.83*	1.4	2.95	1.26

*$p<.10$
**$p<.05$
*** $< .01$

Hypothesis 4.

The fourth hypothesis proposed that participants with lower SES would report

greater negative health problems compared to participants with higher SES. This

hypothesis was examined using the Four Factor Index of Social Status (Hollingshead,

1975). As described in the methods section, the first step involved calculating a

composite proxy variable for social status using the following information: parents' level

of education completed (scale scores assigned from 1-7; 1=less than seventh grade;

7=graduate/professional degree) and parents' occupational status (scale scores assigned

from 1 to 9; 1=laborers and service workers; 9=higher executives, proprietors of large businesses and major professionals). The social status score is calculated by multiplying the assigned occupational scale value by a factor weight of 5 and the assigned scale value for educational level by a factor weight of 3 (Hollingshead, 1975). Scores are summed for single parent households. For nuclear families, scores are summed and divided by two. A one-way Multivarate Analysis of Variance (MANOVA) was conducted using the total estimated social status score. The independent variable for the MANOVA was SES (estimated by Hollingshead's 1975 Four Factor Index of Social Status). The dependent variables were race-related stress subscales (cultural, institutional and individual racism), Subjective Health Concerns scale total score, and racism-based salivary cortisol levels. There were no violations of assumptions of normality, homogeneity of variance, linearity and multicollinearity. The linear combination of scores formed by the Index of Race-Related Stress (IRRS-B) subscales Subjective Health Concerns Inventory (SHI), and race-related salivary cortisol levels were not significantly affected by social status, Wilk's $\Lambda = .77$, $F(15, 77) = .52$, $p = .92$, partial $\eta 2 = .08$.

Table 12

Means and Standard Deviations for Variables in the MANOVA Model by Quartiles of the Total Calculated Score for Hollingheads Four Factor Model of SES.

Variable	Group 1			Group 2			Group 3			Group 4		
	M	*SD*	*N*	*M*	*SD*	*N*	*M*	*SD*	*N*	*M*	*SD*	*N*
Physiological Race-Related Stress	0.093	0.13	9	0.187	0.22	10	0.18	0.26	10	0.158	0.28	7
Subjective Health Complaints	2.94	0.96	9	3.43	1.78	10	3.53	1.18	10	3.48	1.75	7

IRRS – Cultural Racism	18.56	7.78	9	26	6.51	10	22.6	9.62	10	21.57	6.02	7
IRRS – Institutional Racism	6.33	3.84	9	10.6	6.04	10	9.2	5.47	10	10.43	5.13	7
IRRS – Individual Racism	10.67	6.58	9	14.1	5.4	10	11.3	6.36	10	11.14	6.2	7

Note: IRRS – Index of Race-Related Stress – Brief

The results of demographic variable testing revealed that income levels (income levels for self, mother and father) differentially impacted race-related stress and health. This finding is also consistent with the body of research which suggests that income impacts race-related stress and health among African-Americans and Latinos. Based on these findings, three separate MANOVA's were conducted examining each participant's income level as well as the income level for his/her mother and father. The linear combination of scores formed by the independent variable Income – self was not affected by the dependent variables, Wilk's $\Lambda = .89$, $F(5, 28) = .69$, $p > .10$, partial $\eta2 = .11$. Income – Mother was also not statistically significant, Wilk's $\Lambda = .41$, $F(20, 90) = 1.4$, $p > .10$, partial $\eta2 = .20$. For the variable, income – father, the MANOVA was close to statistical significance, Wilk's $\Lambda = .22$, $F(20, 57) = 1.69$, $p = .06$, partial $\eta2 = .32$. Participants reported significantly more health complaints when they reported that their father was currently unemployed ($M = 5.77$, $SD = 1.84$) or an estimated annual salary of less than $24,999 a year ($M = 3.71$, $SD = .54$) compared to participants who reported that their father had an estimated annual salary of $75,000 or more a year.

Table 13

Means and Standard Deviations for Fathers Estimated Annual Income and SHI Scores

Estimated Annual Income – Father	Mean	SD	N
Less than $24,999 a year	3.71*	.54	9
$25,000 to $49,999 a year	3.48	1.76	6
$50,000 to $74,999 a year	3.61	.87	6
$75,000 or more a year	1.33*	.58	3
Not Currently Working	5.77*	1.84	2

*p<.10
**p<.05
*** < .01

Subhypothesis 1.

The fourth hypothesis predicted that men would evidence greater negative health

consequences compared to women. The hypothesis was tested using a one-way

Multivarate Analysis of Variance (MANOVA). The independent variable for the

MANOVA was gender (male and female). The dependent variables were race-related

stress subscales (cultural, institutional and individual racism), Subjective Health

Concerns scale total score, and racism-based salivary cortisol levels. There were no

violations of assumptions of normality, homogeneity of variance, linearity and

multicollinearity. The linear combination of scores formed by the Index of Race-Related

Stress (IRRS-B) subscales Subjective Health Concerns Inventory (SHI), and race-related

salivary cortisol levels were significantly affected by gender, Wilk's Λ = .65, $F(5, 30)$ =

3.28, p <.05, partial $\eta2$ = .35. Analyses of variances (ANOVA) on each dependent

variable were conducted as follow-up tests to the MANOVA. Using the Bonferroni

method, each ANOVA was tested at the .05 level of significance. The ANOVA on the

Subjective Health Complaints Inventory (SHI) was statistically significant, $F(1, 36)$ =

10.03, $p < .05$, partial $\eta2 = .23$. Means, standard deviations and cell sample sizes are provided in Table 19. It should be noted that cell sizes are below estimated power for men as it is recommended that there be a minimum of 20 participants per cell in a MANOVA (Tabachnick & Fidell, 2007). Contrary to the proposed hypothesis, women reported significantly more subjective health concerns compared to men.

Table 14

Means and Standard Deviations for SHI Scores by Gender

	Male (N=6)		Female (N=30)	
Variable	*M*	*SD*	*M*	*SD*
Subjective Health Concerns Inventory	1.87	1.11	3.64*	1.27

*p<.10
**p<.05
*** < .01

Hypothesis 5.

The fifth hypothesis proposed that there would be a negative relationship between skin color and racism and health among African-Americans and Latinos. It was anticipated that participants with darker skin would report higher levels of racism and higher levels of negative health outcomes compared to lighter skinned participants. The hypothesis was tested using a one-way Multiviariate Analysis of Covariance (MANCOVA). The independent variable for the MANCOVA was Latino and African-American. The covariate was skin color. The dependent variables were race-related stress subscales, subjective health complaints total score and racism-based salivary cortisol levels. There were no violations of assumptions of normality, homogeneity of variance, linearity and multicollinearity. A preliminary analysis was conducted in order to evaluate

the homogeneity-of-slopes assumption. A custom model was specified and developed to test for the ethnicity and skin color interaction term. The results indicated that there was as a significant interaction for ethnicity and skin color, Wilk's $\Lambda = .35$, $F(10, 54) = 3.71$, $p < .05$, partial $\eta 2 = .41$. This indicated that the homogeneity-of-slopes assumption was violated. Therefore, hypothesis testing could not proceed with a MANCOVA.

In order to examine the relationship between skin color and racism and health indices, a Multivariate Analysis of Variance (MANOVA) was conducted. The independent variable skin color was transformed into a categorical variable using a quartile ranking procedure. The data were ranked and divided into the four ranges defined by the first (lowest 25%), second (50th percentile; median) and third quartiles (highest 25%). The dependent variables for the analysis were race-related stress subscales, subjective health complaints total score and racism-based salivary cortisol levels. There were no violations of assumptions of normality, homogeneity of variance, linearity and multicollinearity. The linear combination of scores formed by the Index of Race-Related Stress (IRRS-B) subscales, Subjective Health Concerns Inventory (SHI), and race-related salivary cortisol levels were significantly affected by skin color, Wilk's $\Lambda = .32$, $F(15, 74) = 2.56$, $p < .05$, partial $\eta 2 = .32$. Analyses of variances (ANOVA) on each dependent variable were conducted as follow-up tests to the MANOVA. Using the Bonferroni method, each ANOVA was tested at the .05 level of significance. The ANOVA on individual racism $F(3, 35) = 3.16$, $p < .05$, partial $= .23$ and subjective health complaints, $F(3, 35) = 4.28$, $p < .05$, partial $= .29$, were statistically significant. Means and standard deviations are provided in Table 14. Regarding skin color and individual racism, participants who ranked lightest on skin tone (lowest 25%) scored higher ($M = 16.88$, SD

=6.66) than participants who ranked second on skin tone (below the median; 26-50%)

(*M*=7.5, *SD*=5.26). For subjective health complaints, participants who ranked third on

skin tone (above the median; 51-75%) reported significantly more health complaints

(*M*=4.36, *SD*=1.28) compared to participants who ranked fourth on skin tone (76-100%)

(*M*=2.52, *SD*=1.31).

Table 15

Means and Standard Deviations for Individual Racism and Subjective Health by Skin

Color

	Percentile Group of NIS Skin Color Scale							
	Group 1 (*N*=8)		Group 2 (*N*=4)		Group 3 (*N*=11)		Group 4 (*N*=12)	
Variables	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Individual Racism	16.88*	6.66	7.5*	5.26	10.91	4.97	11.5	5.2
Subjective Health Complaints	3.24	1.07	3.56	1.2	4.36*	1.28	2.52*	1.31

*p<.10
**p<.05
*** < .01

Conclusions

The results suggest partial support for the major hypothesis in this study. The

race-related videotaped vignettes produced higher physiological reactivity as measured

by salivary cortisol levels compared to baseline and control conditions. The second

hypothesis predicted significant relationships between health, racism-related stress, and

health variables. This hypothesis was tested using a canonical correlation analysis. This

hypothesis was not supported in the present study. No multivariate relationships emerged among these variables. The third hypothesis predicted that there would be a negative relationship between ethnic identity and race-related stress for health indices among African-Americans and Latinos. Analysis of bivariate correlations revealed that lower levels of ethnic identity levels resulted in higher levels of physiological race-related stress. No significant relationships between ethnic identity status and race-related stress and health indices emerged when tested with a multivariate model. The results revealed a pattern whereby ethnic group membership (African-American and Hispanic/Latino) impacted overall health concerns. African-American participants reported more overall health concerns compared to Hispanics/Latinos. The fourth hypothesized proposed that participants with lower incomes would report greater negative health problems compared to participants with higher incomes. Partial support was found for this hypothesis. Participants who reported that their father was either not currently working or had a lower estimated annual income, had significantly more overall health complaints compared to participants who reported that their father was gainfully employed and had a higher estimated annual income. Hypothesis 4 also proposed gender differences whereby men would evidence greater negative health compared to woman. Contrary to the study hypothesis, woman in the study reported significantly more perceived health problems compared to men. The fifth and final hypothesis proposed negative relationships between skin color and racism and health among African-Americans and Hispanics/Latinos. The results revealed significant differences between darker skinned participants whereby participants with dark skin (participants who's scores on the NIS Skin color scale fell in the 3rd quartile and above the median on skin color darkness; higher scores indicated

darker skin tones) reported more health concerns compared to participants with the

darkest skin tones (4th quartile). Possible explanations for and interpretations of the study

results are explored in Chapter V.

Chapter V

DISCUSSION

This study sought to investigate the relationships among race-related stress, health, ethnic identity status, SES, skin color, and gender among African-Americans and Latinos. A multidimensional assessment approach to psychological and physiological health status was undertaken in order to clarify the impact of racism on health and well-being. This chapter discusses the statistical findings associated with each research hypothesis, provides a comparison of the current findings with previously conducted empirical research studies and discusses implications and future directions for research.

Empirically validated research and findings from the U.S. Department of Health and Human Services and Centers for Disease Control and Prevention (CDC) have provided strong evidence of health disparities in the US that unequivocally affect ethnic minority groups. Health statistics related to these health disparities have identified African-Americans and Latinos as two groups disproportionately affected. The U.S. Department of Health and Human Services (USDHHS; 2007) provided data from several large scale studies which found that African-Americans and Hispanics/Latinos are particularly affected in the following areas: Cancer, cardiovascular disease and stroke, diabetes, HIV/AIDS, and immunizations. They also found that African-Americans and Latinos are not only affected by these illnesses at higher rates than non-Hispanic Whites but that they are more likely to die from these illnesses compared to their non-Hispanic White counterparts (USDHHS, 2007). Several factors have been proposed to account for the racial/ethnic differences in health status including demographic characteristics. However, while research has shown that demographic characteristics are important

contributors, studies have found that they do not sufficiently account for the health

disparities among ethnic minorities and that social/contextual factors particularly,

racial/ethnic racism and discrimination are crucial contributing agents (Brown et al.,

2000; Carter, 2007; Polednak, 1997; Vega & Rumbaut, 1991; Williams & Collins, 1995;

Williams & Williams-Morris, 2000). These findings served as the impetus for the current

study's examination of the relationships among racism and race-related stress and its

health correlates.

Discussion of the Results of the Hypotheses

The first research question examined whether there were statistically significant

differences in levels of salivary cortisol when participants viewed a race-based vignette

compared to baseline and to exposure to a non-racist stressor. Hypothesis 1 predicted that

both African-Americans and Latinos would show greater salivary cortisol reactivity

during exposure to a racist stressor compared to baseline and control conditions. This

hypothesis was supported in the present study. African-Americans and Latinos evidenced

a significant increase in salivary cortisol reactivity when exposed to the videotaped

racism-related vignettes compared to baseline and control conditions. These findings are

consistent with previous research conducted by Jones, Harrell, Morris-Prather, Thomas

and Omowale (1996) who investigated affective and physiological responses to racism.

In their study, they found that participants exposed to racism-related stressors evidenced

significant increases in physiological reactivity in heart rate, blood flow and in muscle

activity (Jones, Harrell, Morris-Prather, Thomas, & Omowale, 1996) for both the

videotaped as well as imagined scenes of racially charged material. The results reported

in the current study are also consistent with the findings from McNeilly et al. (1995). In

their study, participants were exposed to two debates involving either a racial or a nonracial stressor. They found that blood pressure and heart rate reactivity was higher for those verbally responding to the racist stressor compared to those with the nonracist stressor (McNeilly et al.). These effects persisted through the recovery periods following racial stress suggesting that exposure to race-related stress can have residual effects after exposure. The results are in line with Utsey's theoretical model of race-related stress (Utsey & Ponterotto, 1996) which suggests that acute and chronic encounters with racism and discrimination result in frequent stress exposure that threaten well-being and psychological adjustment. Long et al. (2004) postulated that chronic exposure to stress ". . . has been associated with the pathogenesis of a wide variety of diseases and disorders, including but not limited to, colitis, asthma, hypertension, affective disorders, neurodegenerative disorders, cardiovascular and gastrointestinal problems, metabolic and immune disturbances, and psychosomatic disorders." Along these lines, there is evidence that implicates reactions to acute psychological stress as a predictor of future health status (Carroll et al., 2001). Given that African-Americans and Latinos experience race-related stress on a daily basis, the finding in the present study is vital to prevention, education and intervention initiatives.

The second research question asked whether there was a statistically significant relationship between race-related stress and health among African-Americans and Latinos. It was hypothesized that there would be significant multivariate relationships among race-related stress, physiological reactivity and perceived health status. This hypothesis was not supported in the present study. Cultural racism, institutional racism, and individual racism did not produce significant relationships with perceived health

status and physiological reactivity, as measured by race-related salivary cortisol levels. One possible explanation for these findings is that racism-related stress may negatively impact target areas of health and functioning more so than others. The results of the demographic variable analyses found that African-American participants reported higher levels of cultural and institutional racism as well as higher levels of musculoskeletal pain, gastrointestinal problems, and allergy symptoms. This suggests that the dimensions of race-related stress and health present ethnic minorities with unique health consequences that are closely tied to the particular domains of racism and appraisals of those experiences. Future research should examine the multivariate relationships among specific domains of health and race-related stress to elucidate patterns that may contribute to knowledge of health outcomes associated with racism. A second possible explanation for the current findings are related to the distribution of scores inherent in the psychometric instrument used to measure perceived health status and its subdomains. An examination of the Subjective Health Complaints total score revealed significant skewness and kurtosis that required a linear transformation procedure to bring the total score within normal range. The presence of a skewed distribution for the total score found in the current study was also observed in the normative study (Eriksen, Ihlebaek, & Ursin, 1999). The authors suggested a trend whereby participants appeared to underreport health problems. The authors also noted that "for many of the single items, most people do not report any complaints, and high levels of negative scores may yield data that are too skewed for many analyses" (Eriksen, Ihlebaek, & Ursin, 1999, p. 70). Future research studies may want to explore alternative data analytic strategies that account for the skewness and kurtosis observed. Future research examining perceived health status

should explore alternative data analytic strategies that account for skewness and kurtosis which was observed in the present study and in the normative sample. Possible statistical approaches include dichotomizing health variables for discriminant function analyses (Eriksen, Ihlebaek, & Ursin, 1999), frequency analyses and nonparametric statistical procedures. Given that the mean can be influenced by skewness and kurtosis, the median should be used as the measure of central tendency as it is not influenced by the shape of the distribution (Witte & Witte, 2008).

While health complaints did not produce significant correlations with experiences of discrimination and racism-related stress, participants' physiological responses suggested that they were affected by in vivo exposure (videotaped scenes) to racism. This is an important contribution of the current study because it provides evidence for a discrepancy between perceived health status and physiological reactivity which may present challenges to health and increase vulnerability to the development of health problems. This is particularly concerning given that ethnic minorities are exposed to racism either directly or indirectly on a frequent basis. This is in line with the findings from studies conducted by Krieger and Sidney (1996) and Peters (2004) which found that individuals who did not report discrimination had higher blood pressure compared to participants who reported discrimination. An examination of internal consistency, measured by Cronbach's alpha, for reliability of SHI scale and subscales indicated that some of the subscales produced low average correlations among items. The results indicated that the following subscales had low Cronbach alphas: pseudoneurological (alpha = .59), gastrointestinal (alpha = .68), allergy (alpha = .65) and cold/flu (alpha = .67). However, the reliability coefficients reported in the current study were generally

consistent with those reported in the SHI normative sample: Pseudoneurological (alpha = .73), gastrointestinal (alpha = .62), allergy (alpha = .58), and cold/flu (alpha = .67).

The third research question explored the relationship among race-related stress, physical health symptoms and ethnic identity among African-Americans and Latinos. It was anticipated that there would be significant relationships among race-related stress, health and ethnic identity for African-Americans and Latinos. Results indicated that while there were no significant multivariate relationships among ethnic identity status, racism and health, the findings revealed a significant relationship for ethnic group membership (African American and Latino) and subjective health status. African-Americans reported significantly more health complaints compared to Latino participants. One possible interpretation for these findings is that participants' tendency to underreport health problems impacted the overall model. This is supported by the fact that bivariate correlation analyses indicated significant negative relationships between ethnic identity status and physiological reactivity. This was also observed for ethnic identity affirmation subscale and physiological responses to the videotaped race-related vignettes. This finding is consistent with the results of Utsey, Chae, Brown and Kelly (2002), which found that ethnic identity status impacted race-related stress. As discussed in Chapter I, this study sought to extend the findings from the Utsey et al. study by exploring the relationship between ethnic identity, race-related stress and physiological reactivity among African-Americans and Latinos. The findings support the fact that ethnic identity status and ethnic identity affirmation impacted participants' physiological reactions to race-related vignettes.

The third research questions determined if there was a significant relationship between the sociodemographic variables of SES and gender. Two separate hypotheses were proposed in order to examine the impact of SES and gender on racism and health relationships. In hypothesis 4, it was predicted that participants with lower incomes would report greater negative health outcomes compared to participants who reported higher incomes. This hypothesis was partially supported. Estimation of SES was achieved through use of the proxy variable social status using Hollinghead's four factor model. Social status did not produce statistically significant differences suggesting that social position did not affect participants' health. Possible interpretations for these findings appear to be partially attributable to methodological limitations inherent in Hollinghead's Four Factor Index of Social Status (Hollingshead, 1975). First, the normative sample that contributed to the development of Hollingshead index were residents in New Haven, CT, which presents challenges to its generalizability. Second, the occupational factor is based on a scale that depends on occupational titles used by the United States Census in 1970. The occupational titles used in the study and their assigned weights may be unreliable given our changing economy and sociopolitical environment. It appears that in the present study, parents' educational and income levels differentially impacted participants' race-related stress and health. While the multivariate model examining social status, health, and race-related stress did not reach statistical significance, separate multivariate models for income and educational levels for participants and their families did reveal statistical significance. The MANOVA model examining income and race-related stress revealed that cultural, institutional and individual race-related stress was affected by the income levels of participants' mother.

Statistical analyses examining father's educational and income levels and participants' perceived health status suggested that participant's overall health complaints were impacted by their fathers' level of educational attainment and estimated annual income. Participants whose father had lower levels of educational attainment and income reported significantly more health complaints. The contribution of SES to racism-related stress appraisals, self-reported health and physical health outcomes is complex. This is because SES is a construct that is operationally defined and measured differently across studies which may contribute to variability in outcomes. Theoretical models of family systems in African-American and Latino communities point to the reality that SES is further complicated by the fact that in African-American and Latino families, extended family play a vital role. Boyd-Franklin (2003) proposes that, "Many African-American families function as extended families in which relatives with a variety of blood ties have been absorbed into a coherent network of mutual emotional and economic support" (p. 53). This implies that the contribution of family SES is not necessarily linear given that the definition of family in African-American and Latino communities is comprised of complex social networks. This line of reasoning is supported by the findings of Wilson, Kliewer, Plybon and Sica's (2000) study which found that African-Americans from lower SES neighborhoods, who had parents with higher education, evidenced a significantly less exaggerated cardiovascular reactivity (CVR) pattern than those from lower SES neighborhood with lower parent education levels or those from high SES neighborhoods. Another study conducted by Kapuku, Treiber and Davis (2002) found that family SES and neighborhood SES was not correlated with resting BP and that family SES did not contribute to blood pressure responses to laboratory stress tasks in their study. They did

find however, that neighborhood SES was inversely correlated with diastolic blood pressure. Taken together with the findings of the present study, it appears that the discrepancy among SES and health are partially accounted for by cultural forces and by the use of different indexes of SES across studies.

Subhypothesis 1 of hypothesis 4 stated that men would report higher negative health complaints compared to women. This hypothesis was not supported in the present study. The results indicated that woman reported more health complaints compared to men. These findings can be understood by examining the body of research on gender differences in racism, stress and health and the differential impact of gender on health outcomes. For example, Ryan, Gee and Laflamme (2006) found that being male was positively correlated with systolic and diastolic blood pressure but was not associated with self-reported health status. While it was anticipated that men would report more health concerns compared to woman, the findings do provide evidence that gender moderates perceived health status. One possible interpretation for these findings is that men in the sample may have underestimated health concerns because of the pressures to minimize any signs of "weakness," and "vulnerability." Falicov (1999) postulated that Latino men are faced with significant pressures to live up to gender role expectations and ideals of masculinity. Falicov states that some men in the Latino community believe that, "A man should be very strong physically [and] indomitable in character" (p. 195). This can be problematic to the health and well-being of Latinos as Falicov illustrates that, "Negative correlates of male gender role stress are restrictive emotionality, propensity to engage in high-risk behaviors like substance abuse [and] somatic illnesses such as cardiac problems and irritable bowel syndrome" (p. 197). A similar process for African-

American men is described by Boyd-Franklin (2003). Boyd-Franklin suggests that, "Above all, many Black males learn that they must be 'cool' – that they must don a mask of utmost composure, no matter what is happening in their inner emotional words (p. 93)." Following this line of reasoning, it is plausible that the selective pressures and gender role expectations for African-American and Latino men, place them significant risk for the development of health problems and diseases. This is consistent with the findings from a study by Matthews, Gump, and Owens (2001) which explored gender differences as it relates to cardiovascular and neuroendocrine responses. The study found that relative to woman, men had higher diastolic blood pressure to the tasks and higher systolic, diastolic and epinephrine responses during recovery. These findings are consistent with studies exploring gender differences in physiological stress and health (Wolf, Schommer, Hellhammer, McEwen & Kirschbaum, 2001) and with the findings that suggest that Black men have higher blood pressure (both systolic and diastolic) compared to Black woman (Krieger & Sidney, 1996). Given that perceived gender role status and masculinity levels were not directly measured in the present study, future research should explore the impact of these factors on race-related stress, perceived health status and physiological reactivity.

The finding that woman reported more health complaints than men received support from the SHI normative sample study (Erikson, Ihlebaek, & Ursin, 1999). The study found that woman reported more overall health problems and obtained higher scores on musculoskeletal pain, gastrointestinal problems and pseudoneurological symptoms compared to men. Women in the present study also scored significantly higher on musculoskeletal pain compared to men which corroborates the current study's results.

This pattern of results was also observed in the SHI normative study. According to Erikson, Ihlebaek, & Ursin (1999), "Women seem more likely than men to experience a variety of recurrent pains. They report higher levels and longer duration of pain, are more vulnerable to unwarranted psychogenic attributions by healthcare providers and respond more aggressively to pain through health-related activities" (p. 70). Future research should further explore the relationship between gender and chronic and recurrent pain and isolate factors that contribute to this phenomenon among African-Americans and Latinos.

The fifth and final research question tested for statistical significance among skin color, racism and health relationships for African-Americans and Latinos. It was predicted that there would be a negative relationship between skin color and racism and health indices. Specifically, it was proposed that participants with darker skin would report higher levels of racism and higher levels of negative health outcomes compared to lighter skinned participants. Surprisingly, a more complex pattern emerged whereby differences in health complaints were most notable among participants with darker skin tones. In the present study, participants with the darkest skin (4th quartile) reported the lowest health complaints while participants who ranked second highest on skin color darkness (3rd quartile) reported more health problems. These findings appear to reflect within-group differences and suggest the possibility that there are other factors that may moderate the contribution of skin color to health outcomes. Support for this line of reasoning comes from a series of studies that have identified SES as a moderator to skin color, racism and health relationships. Sweet et al. (2007) found that among lighter skinned African Americans, systolic blood pressure decreased as income increased and

that for darker skinned African Americans, systolic blood pressure increased as income increased. These findings are in line with a series of studies examining SES and skin color contributions to health outcomes in African-Americans (i.e., Keil et al.,1977; Klag et al., 1991). This interaction effect has also been observed among Latinos. In a series of studies by Gravlee, Dressler and Bernard (2005) and Gravlee and Dressler (2005) blood pressure for Latino participants of Puerto Rican descent was found to be moderated by SES and skin color. In their study, they found that higher SES was associated with lower blood pressure for participants with lighter skin tones. Future research should explore these factors in a model testing for multivariate relationships among skin color, SES, race and ethnicity and health outcomes.

Another possible explanation for the findings presented in the current study on skin color and perceived health is related to the contribution of family and community systems in African-American and Latino communities. Boyd-Franklin states that, "Skin color has presented complex, multigenerational issues" (p. 39) and that as a result of this complex interaction, the skin color, racial and ethnic identity levels and experiences of racism and discrimination of family members could contribute to participant's reactions and appraisals to stress and health in general and race-related stress and health more specifically. Boyd-Franklin elaborates on this concept by describing Bowen's (1976, 1978) family projection process, "whereby a family ascribes or projects roles, expectations and acceptance onto an individual, as well as the multigenerational transmission process whereby these roles and expectations are passed to the next generation" (p. 42). It is plausible that the findings in the present study of differential effects of skin color on perceived health status could be partially accounted for by these

complex family processes. Future studies should include qualitative and quantitative measures of familial factors in attempts to assess their contribution to skin color, racism and health outcomes among ethnic minorities. Based on the current finding of skin color, future studies should examine skin color using nonlinear statistical models to more accurately assess variability. Additionally, the complexity of the interaction of skin color, ethnic identity and race within the Latino group is a rich factor that needs to be explored further.

In conclusion, the results of this study indicate that both African-Americans and Latinos are negatively affected by in vivo racism which is often experience on a frequent basis. A discrepancy was found between physiological race-related stress and perceived health status which is an important contribution of the present study. While participants were affected by the videotaped vignettes of racism, psychological appraisals of race-related stress appeared to minimally contribute to health outcomes in the current study. This appears to be at least partially attributed to a pattern of minimizing health concerns that was particularly evident among male participants. While male participants reported higher levels of institutional race-related stress, this finding did not directly contribute to perceived health status or to physiological reactivity. Future research should examine psychological constructs of gender including masculinity and dimensions of adherence to gender roles on physiological and perceived health status. In the present study, woman reported more overall health complaints and reported having more concerns in the area of musculoskeletal pain. A better understanding of pain symptoms and underlying causal factors among African-American woman and Latinas is needed. The present study found that ethnic identity levels impacted physiological reactions to videotaped vignettes of racism. Future research should explore the roles of racial identity status and acculturation

on physiological functioning and health. The findings in the current study related to SES

and skin were complex and warrant future research to clarify the contribution of socio-

psychological-familial factors on adults' health and well-being.

Clinical and Practical Implications

The results of this study have implications for understanding African-Americans

and Latinos and how (a) racism impacts underlying physiological functioning and

increases risk and vulnerability for disease development, (b) ethnic identity affects stress

and health, (c) gender and SES relate to race-related stress and health, and (d) skin color

differences account for health outcomes. Given the findings of the current study,

psychologists, physicians, and health advocates will play a vital role in disseminating to

the larger community the impact that social inequalities and racism have on ethnic

minorities. Psychologists have an ethical responsibility to promote multiculturalism and

diversity and to develop evidence-based interventions and programs for diverse

populations. Psychologists must continue to work on promoting education and prevention

programming for ethnic minorities in general and for African-Americans and Latinos

specifically. This is of particular importance given the findings in the present study and

trends in the literature that African-Americans and Latinos tend to underreport health

concerns. The findings in the present study of increased physiological reactivity to in

vivo racism and the literature that chronic physiological race-related stress exposure

increases vulnerability to disease is a central finding that must inform future program

development. The discrepancy between perceived health and physiological health among

men suggests that education programs should target male African-Americans and Latinos

in particular. Community based education initiatives must be well thought out and

barriers addressed given the findings that African-Americans and Latinos tend to underutilize health care services. Organista (2007) suggests that prevention initiatives can be achieved through, "top-down governmental and bottom-up community collaborations that combine governmental financial resources and technical assistance with community-based agency and resident knowledge of local problems and high –risk groups and how to access them" (p. 273). Organista also suggests that a second way to promote prevention education programs is through, "university-community collaborations that combine research expertise with community-level service expertise" (p. 272). Both strategies are collaborative and emphasize psychologists working alongside teams of health professionals and community advocates to target at-risk populations. Health psychologists are in a particularly favorable position to advance these initiatives and to collaborate with physicians and healthcare professionals to promote prevention programs.

The results of this study revealed that familial factors affected race-related stress levels and perceived health status. This finding has implications for mental health professionals that service African-Americans and Latinos. First, mental health providers are encouraged to assess psychological factors including racial/ethnic identity and experiences and appraisals of racism in order to better understand their clients' unique presentations. Second, clinicians are strongly encouraged to include family members during their assessment and data gathering to inform treatment planning and interventions. The fact that immediate and extended family and community members play a vital role in African-American and Latino families, suggests that education and treatment initiatives would be best served if family members were actively considered. Psychologists are encouraged to promote active discussions among family members and

their experiences with racism, coping strategies, coping resources, and religion and spirituality. Psychologists are also encouraged to query qualitatively or quantitatively about racial/ethnic identity and migration among their patients family members. This can be achieved through family interviews, family therapy sessions, and through therapeutic tools such as family genograms.

Given that gender differences account for variance in racism reactions and health outcomes, psychologists and mental health professionals are encouraged to promote active discussions about gender, gender roles, masculinity-femininity and internalized role expectations that may contribute to psychological distress and poor health. Men in the present study reported significantly more institutional race-related stress compared to woman. This suggests that African-American men and Latinos are vulnerable to the racist structures that stem from macro- and micro- level institutional practices. This finding is consistent with previous research conducted by Utsey, Payne, Jackson and Jones (2002) who reason that men have traditionally had discordant experiences with societal racism, discrimination and oppression.

Given that racism and discrimination are often experienced on a chronic and recurrent basis, emerging models are proposing new concepts and classifications that may capture the unique experiences of ethnic/racial minorities. Carter (2007) has proposed the concept of race-based traumatic stress to account for the trauma-like symptoms that may develop as a result of the emotional impact of racism and that account for the psychological, emotional, social, behavioral and cognitive changes that stem from direct exposure to discriminatory practices. Future research is needed to validate this theoretical

construct among African-Americans and Latinos and to assess it's impact on

psychological and physiological functioning and health outcomes.

The proposal that race-related stress may contribute to the development of trauma

has received growing support (see Carter, 2007 for a review). In one study, Loo et al.

(2001) found that race-related stress was a significant predictor of PTSD. There have

been well documented psychological, physiological and cognitive changes associated

with stress and traumatic stress (i.e., Palmer, 1995; Palmer, et al., 1999; van der Kolk,

Roth, Pelcovitz, Sunday, & Spinazzola, 2005). A recent study by Palmer et al. (n.d.a)

found significant relationships among perceived stress, physiological stress (as measured

by salivary cortisol and alpha-amylase), fatigue, and trauma symptoms. Additionally,

Palmer et al. (n.d.b) found that perceived stress, physiological stress, and fatigue all

negatively impacted neurocognitive functioning and learning. These findings are

important because they suggest that race-related stress and trauma interferes with

emotional and cognitive functioning which can challenge academic, social, and

psychological adjustment. The relationship between race-related stress more specifically

and cognitive functioning was recently examined by Utsey, Lanier, Williams, Bolden,

and Lee (2006). In their study, they found that cognitive ability was a significant

moderating variable to race-related stress reactions. Specifically, they found that

participants with higher cognitive ability were better able to benefit from social support

which served as a buffer against the negative impact of race-related stress (Utsey, Lanier,

Williams, Bolden, & Lee, 2006). Given that recurrent chronic and acute stress can

negatively impact neuropsychological (Palmer et al., 1999) and physiological (van der

Kolk et al., 2005) functioning, further inquiry into the relationship between cognitive functioning and race-related stress is warranted.

A critical aspect of the current study is the important role that systems play in perpetuating racist practices. Systems – that it to say, employers, educators, and institutions – have to be responsible for evaluating the culture/environment and manage to the degree possible racism and discrimination, as they represent known psychological and physical health risks. It is essential that initiatives against racism and discrimination continue to take place. But it is equally important that they be clearly monitored, outcomes measured, and programs enhanced. Racism and discrimination can occur in even the most subtle ways. One example of this is microaggressions, relatively subtle racist acts (i.e., ignoring) against ethnic/racial minorities. Nonetheless, the consequences that it carries on the health and well-being of ethnic minorities is immense. Systems need to work to continuously assess the climate in their institutions and ensure that anti-racism and discrimination initiatives are at the forefront of their agenda.

Limitations

Several limitations are noteworthy when interpreting the findings of the present study. The current study used a quasi-experimental design in order to examine the effects of racism on changes in cortisol levels. Quasi-experimental designs lack one aspect of a true experimental study which is random assignment to conditions. This may result in uncontrolled factors that threaten the internal validity of the study. Future research should incorporate a mixed-methods design approach to data collection to address both internal and external validity. This is because internal and external validity are inversely related and controlling for one form of validity often comes at the expense of compromising the

other. In the present study, a within-groups repeated-measures approach to data collection was included in order to compare participants' cortisol levels at baseline and in response to two stress conditions. However, the present study did not use counterbalancing procedures to control for order effects. According to Cozby (2009) counterbalancing permits the research to determine the extent to which order is influencing the results. Future research should counterbalance the presentation of stimulus and control videotaped vignettes in order to assess the impact of order and time effects.

Sampling college students is a form of convenience sampling which may present bias and limit the generalizability of the study's findings. One way that future studies could address this is to obtain multiple samples including college students and community-based in order to compare and contrast participant characteristics. A limitation of the findings may also be due to the restricted age range of participants in the current study. The cumulative damage of race-related stress and health may not manifest for 5-10 more years. Future studies should incorporate more longitudinal measures to follow-up on future disease development and its early predictors.

A common limitation of research studies which was evident in the present study is limited sample size. In general, the sample sizes testing hypotheses in the present study were consistent with preliminary power analyses which indicated that the findings in the present study had sufficient power for meaningful outcomes. It should be noted that data collection stopped at 62 participants, a sample size below expected power levels. This was done given that hypothesis 2, which required a sample size of 77 had a probability value of 82., an alpha of significant distance from .05. Future replication studies may want to increase sample size in order to make accurate comparisons within-subjects and

between-subjects. Additionally, in the present study there was significantly more woman compared to men. This pattern has been observed in other studies (i.e., Utsey, Payne, Jackson & Jones, 2002). Utsey et al., (2002) propose oversampling men in future studies for more accurate representation in research studies on race-related stress and for meaningful gender comparisons. Increasing sample size in general however, is not an arbitrary process and should be informed by preliminary power analyses and/or by previous research.

Future Directions

The findings in the present study indicated that physiological reactivity to in vivo racism produced increased as measured by salivary cortisol levels among African-Americans and Latinos. Physiologically based research has elucidated the complex mechanisms by which stress affects health. The stress response system is complex and salivary cortisol is only one component of this system. Future research should explore other aspects of the stress response system including the catecholaminergic system of stress to better understand it's impact on health. During periods of acute and chronic stress exposure, the paraventricular nucleus (PVN) of the amygdala activates the Hypotholamic-pituitary-adrenal (HPA) axis to release both cortisol and neurotransmitters of the catecholamine family including norepinephrine, dopamine and epinephrine. It has been observed through empirically based studies that excessive release of neurotransmitters during stress can result in disruptions to intracellular functioning and impair normal immune functioning, increasing vulnerability to disease development.

Noninvasive measures of stress and health are emerging in the literature as assessment tools that may more readily capture complex underlying physiological

processes and should be explored in future health-related studies among ethnic minorities. Salivary alpha-amylase has received considerable support as a reliable measure of underlying plasma norepinephrine levels particularly under conditions of stress (Chatterton et al., 1996) indicating that this is an important marker of physiological stress and reactivity. Interestingly, emerging research has found that stress related cortisol changes appear to be unrelated to alpha-amylase and norepinephrine stress related changes (Chatterton et al., 1996). This suggests the presence of divergent pathways of physiological stress that should be examined in future studies.

C-reactive protein (CRP) has received growing support as a measure of underlying cardiovascular functioning. CRP is a member of a group of proteins, known as acute-phase proteins whose plasma concentrations increase or decrease in response to inflammation. CRP is produced in the liver and its production is the result of proinflammatory cytokines such as interleukin-6. Changes in CRP levels further take place by way of complex intracellular signaling mechanisms (Volanakis, 2001). Research has linked CRP levels with the incidence of heart attacks and strokes as well as to general cardiovascular health (Ridker, 2003), hypertension (Blake, Rifai, Buring, & Ridker, 2003; Sesso, Buring, Rifai, Blake, Gaziano, & Ridker, 2003) and diabetes (Pradhan, Manson, Rifai, Buring, & Ridker, 2001). Additionally, CRP has been found to predict future corohonary events (Danesh, Wheeler, Hirschfield, Eda, Eiriksdottir, Rumley, Lowe, Pepys & Gudnason, 2004). Given that cardiovascular disease, hypertension and diabetes are three of the most prominent health disparities among African-Americans and Latinos, research examining CRP in these populations is critical.

The present study exposed participants to videotaped vignettes of blatant acts of racism and discrimination. The results revealed that participants were significantly affected by these images as evidenced by increases in cortisol levels. African-Americans and Latinos are not only exposed to racism and discrimination directly on a frequent basis, but they are also exposed to images of racism and discrimination that may produce similar physiological reactions. For example, the media often reports on news stories related to racism and discrimination and negative images of racism are often depicted. The current research study and the experimental race-related stimulus exposure (videotaped vignettes of racism) represent ecologically valid images that may account for the "real-world," experiences and reactions of racial/ethnic minorities. Future research would also want to explore less blatant images of racism which include microaggressions in order to assess physiological reactions. Future research on racism and race-related stress would also be benefited by using combined qualitative and quantitative research designs given that race-related stress and the experiences of ethnic minorities are complex and multidimensional.

Particularly salient in collectivist cultures are family systems which include immediate and extended family and community members that assume family roles. Falicov (1999) and Boyd-Franklin (2003) theorize that in Latino and African-American communities, family systems are central to the psychological and social development of children, adolescents and adults and are relevant to understanding individual differences in race-related stress and health. This was supported in the present study given the findings of relationships among family SES and race-related stress and health. Given that factors such as racial and ethnic identity and acculturation status have been traditionally

studied among individual participants, future research is needed to investigate the contribution of familial factors (i.e., family racial identity status, skin color, acculturation levels, migration experiences) on participants' appraisals of racism, physiological reactivity, and somatic complaints. Combining quantitative and qualitative research paradigms to investigate these complex processes would be ideal and would greatly advance the scientific knowledge of these constructs.

The present study attempted to contribute to the growing research on race-related stress among African-Americans and Latinos. The research to date has made clear the fact that race-related stress is multidimensional and that many factors in the African-American and Latino communities contribute to racism appraisals and stress reactions. Factors that have been identified thus far that moderate race-related stress and psychological and physiological reactions include heart rate variability (Utsey & Hook, 2007), racial identity (Sellers & Shelton, 2003), acceptance of unfair treatment versus challenging unfair treatment and experiences of racism and discrimination (Krieger & Sidney, 1996), and quality of life indicators (i.e., social functioning, emotional well-being; Utsey, Payne, Jackson and Jones, 2002). Additionally, protective factors that may lower racism related stress have also been described. Thus far the following buffering factors have been examined: Cultural consonance in lifestyle and social support (Dressler & Bindon, 2000), positive affect (Ong & Edwards, 2008), spirituality, culturally congruent coping and religious problem-solving (Lewis-Coles & Constantine, 2006), and cultural resources (i.e., racial pride, religiosity), psychological resources (i.e., optimism, ego resilience), and social resources (i.e., family adaptability and cohesion) (Utsey,

Giesbrecht, Hook & Stanard, 2008). Further investigation of these protective factors that

promote resilience in African-American and Latino communities is strongly warranted.

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Appendix A

Background Information

Participant ID#:_____ Examiner:_____ Date:_____

DOB:_____ **Age :**_____   **Gender:**   M   F

Marital Status: Single   Married   Divorced   Widowed

Race (circle all that apply):

   1.Black   2. White   3. Asian   4. Pacific Islander   5. Other (please specify):_____

Ethnicity

   1. Hispanic/Latino   2. African-American   3.Other (please specify):_____

Primary Language: English   **Fluent in English:** Yes   No
                Other:_____

Were you born in the U.S.? Yes   No

If no, where were you born?_____

At what age did you come to the U.S.?_____

Family History

My parents: Never Married   Married   Divorced   Widowed

Were your parents born in the U.S.?   Yes   No

If not, where were they born? Mother_____ Father_____

Approximately what year did they come to the U.S.? Mother_____ Father_____

Family Educational History:
Circle the appropriate number for your **Mother's** and your **Father's** level of school completed. If you grew up in a single parent home, circle only the score for your one parent.

Level of School Completed	Mother	Father
Less than 7th grade	1	1
High School 9th grade	2	2
Partial High School 10th and 11th grades	3	3
High School Graduate	4	4
Partial College (at least one year)	5	5
College or University Graduate	6	6
Graduate Professional Degree (Masters, etc.)	7	7

Occupational History

Are <u>You</u> currently working?   Yes No

If Yes: Occupation: _____

Is your <u>Mother</u> currently working?   Yes No

If Yes: Occupation: _____

Is your <u>Father</u> currently working?   Yes No

If Yes: Occupation: _____

Please circle the appropriate number corresponding to the annual income for You, your Mother and your Father below:

Estimated Annual Income	You	Mother	Father
Less than $ 24,999 a year	1	1	1
$25,000 to $49,999 a year	2	2	2
$50,000 to $74,999 a year	3	3	3
$75,000 or more a year	4	4	4
Not Currently Working	5	5	5

Medical History

Have you, your Mother or Father been diagnosed with, or received treatment for, any of the following conditions within the last 6 months:

If Yes, please circle the appropriate number below:

			You	Mother	Father
High Blood Pressure	Yes	No	1	1	1
Stroke	Yes	No	2	2	2
Diabetes	Yes	No	3	3	3
Hypertension	Yes	No	4	4	4
Depression	Yes	No	5	5	5
Anxiety Disorder	Yes	No	6	6	6
Schizophrenia	Yes	No	7	7	7
ADHD	Yes	No	8	8	8
Seizures/Epilepsy	Yes	No	9	9	9
Obsessive-Compulsive Disorder	Yes	No	10	10	10
Stroke/TIA	Yes	No	11	11	11
Cancer	Yes	No	12	12	12
Cushing's Syndrome	Yes	No	13	13	13
Fibromyalgia	Yes	No	14	14	15
Rheumatoid Arthritis	Yes	No	15	15	15

Please List Current Medications:

_____

_____

Are you currently taking a steroid hormone such as prednisone?   Yes   No

Height:_____   **Weight:**_____

How often do you have a drink containing caffeine? Never   Daily   Weekly   Monthly   >Monthly

On average, how many hours do you sleep per night?_____   Per week?_____

On average, how well rested do you feel (1= well rested; 5= not well rested):_____

How often do you smoke cigarettes?

        Never   Daily   Weekly   Monthly   >Monthly

        If so, when was the last time you smoked?_____

How often do you have a drink containing alcohol?

        Never   Daily   Weekly   Monthly   >Monthly

      If so, when was the last time you consumed a drink containing alcohol?_____

How often do you use marijuana?

    Never   Daily   Weekly   Monthly   >Monthly

    If so, when was the last time you used marijuana?_____

How often do you use cocaine?

    Never   Daily   Weekly   Monthly   >Monthly

    If so, when was the last time you used cocaine?_____

Other:_____

    If so, last time used:_____

FOR WOMEN ONLY

When was the first day of your last menstruation?_____

One average, how long is your menstrual cycle?_____

Are you currently taking oral contraceptives?   Yes   No

Confidentiality Notice: The information that you provide will remain confidential. To ensure confidentiality, all information will be coded by a number and individual participants will never be identified.